AROAMS QUARRY (PTY) LTD

PROPOSED MINING OF AGGREGATE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE ON A PORTION OF PORTION 2 (REMAINING EXTENT) OF THE FARM AROAMS 57, REGISTRATION DIVISION OF NAMAQUALAND, NORTHERN CAPE.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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ENVIRONMENTAL MANAGEMENT REPORT

JANUARY 2020

REFERENCE NUMBER: **NC 30/5/1/2/2/10156 MR**

PREPARED FOR:

Aroams Quarry (Pty) Ltd
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Highveld

PREPARED BY:

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EXECUTIVE SUMMARY

Aroams Quarry (Pty) Ltd intends to apply for a mining right to mine 13.6ha of on a portion of portion 2 (remaining extent) of the farm Aroams 57, which falls in the Khâi-Ma Municipality Local Municipality in the Registration Division of Namaqualand RD, Northern Cape Province.

The area earmarked for the proposed mining falls on a section of the farm that was previously used as an existing quarry and the intention of this application is to increase the existing quarry. The mining methods will make use of blasting means of explosives in order to loosen the hard rock, in pit crushing is also taking place, the material is then loaded and hauled out of the excavation to the mobile crushing and screening plants. The granite will be stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the site. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as permit holders are informed of each blasting event.

The granite to be mined at the site is found at surface level, and very little to no topsoil exist in the proposed mining area. Topsoil stripping is therefore not viable at the proposed quarry area. The overburden (product that could not be sold) will be removed and stockpiled separately for later use when the quarry is rehabilitated. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as permit holders are informed of each blasting event.

Due to the remote locality of the proposed operation no infrastructure will be affected. Existing roads and tracks will be used and in the case of new tracks being developed it will be addressed at final closure and rehabilitation.

The impact of the proposed mining area on the infrastructural features of the surrounding area is deemed to be of very low significance. The impact of the mining activities will be concentrated within the 13.6ha footprint area of the mine.

Generators and solar power panels will be used to power the infrastructure on site. Future endeavours will dictate if or when an Eskom connection will be secured. All diesel storage will be below the threshold as mentioned in the EIA regulations of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended 2017. See the requested map attached as Appendix 6.

Site Establishment / Construction phase:

There will be no site establishment / construction phase as Aroams Quarry will continue working from the SPH mining permit area into the Aroams Quarry mining permit area. Aroams Quarry will be using the same processing area that was used by SPH Kundalila during the mining permit timeframe. Potential expansion (less than 1ha) of this proposed processing area will take place.

During the site establishment phase the applicant have to fence the footprint area and clear the topsoil from the applied area, it should be noted that there is very little topsoil on site.

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 Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite 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 should 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 proposed mining area was previously used for Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite mining and therefore no construction phase is applicable. The area need to be cleared of topsoil and an access road already exist. The expansion of the quarry pit will be handled as part of the operational phase of the quarry. As the infrastructure are temporary the use of infrastructure and machinery that is either track-based or can be removed without difficulty. Temporary infrastructure to be used in the mining method will entail a temporary weighbridge and chemical toilet, with servicing of vehicles and equipment being done on-site at the workshop and wash bay of the applicant. An on-site office will also be used for all administration purposes relating to the project.

During the site establishment phase the applicant, have to demarcate the boundaries of the site and fence the entire mining area.

EXISTING INFRASTRUCTURE:

As stated above, the proposed mining area will be established adjacent to an existing quarry

The following structures are present within a 3 km radius from the proposed mining area:

- ±150m from site: Borehole with pump
- ±890 m from site: Cement dam with water pipe line
- ±2.5 km from site: N14 national road

The impact of the proposed mining area on the infrastructural features of the surrounding area is deemed to be of very low significance. The impact of the mining activities will be concentrated within the 13.6ha footprint area of the mine.

Generators and solar power panels will be used to power the infrastructure on site. Future endeavours will dictate if or when an Eskom connection will be secured. All diesel storage will be below the threshold as mentioned in the EIA regulations of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended 2017. Potable water will be transported to site daily. See the requested map attached as Appendix B.

Operational phase:

The proposed mining site will be an extension of the existing quarry pit previously distributed by stone Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite mining activities. The mining methods will make use of blasting means of explosives in order to loosen the hard rock, the material is then loaded and hauled out of the excavation, where primary crushing is conducted in the pit, to the mobile crushing and screening plants. The granite will be stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the site. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as permit holders are informed of each blasting event.

Mine area:

- Demarcating the mining area:
- The mining area will be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- Permanent beacons will be firmly erected and maintained in their correct position throughout the life of the operation.
- The blasted material is loaded with earth moving equipment onto tipper trucks, which carts it to the crushing plant. Here it is fed into the crushers by means of a system of conveyor belts. After crushing and screening has taken place in the plant the crushed material is transported to the stockpile area. This activity will be continuous throughout the operation phase.

Mineral Processing:

- The mining methods will make use of blasting by means of explosives in order to loosen the hard rock and the material will then be loaded and hauled out of the excavation and loaded onto a mobile crusher plant in the mining area. The Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite will then be stockpiled and transported to clients via transporting trucks and trailers. Aggregate will be recovered mechanically with drilling equipment, excavating equipment, earth-moving equipment, mobile crushing & screening plants. The Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite that is recovered will be loaded on tipper trucks from where it will be transport to an area where it will be screened and stockpiled. Blasting noise will be instantaneous and of short duration. This will only occur once every two to three weeks. The blasted material is primarily crushed in the quarry by the blast. It is then loaded with earth moving equipment into trucks, which carts it to the crushing plant. Here it is fed into the crushers by means of a system of conveyor belts. After the crushing and screening has taken place in the plant the crushed material is transported into stockpile.
- Deliveries are made from the Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite stockpiles. Delivery is by truck or alternatively it is collected by the client's transport.
- Approximately fourty five (45) will be employed at the site.

The stockpiling process includes mechanical loading and transportation of the sought granite. As mentioned previously the granite will be loaded with a front end loader onto trucks upon which it will be weighed and transported to the client. The product stockpiling activities will consist of the following:

- Loading of granite;
- Weighing of granite; and
- Transportation of granite.

Working hours:

- All proceedings will be undertaken in 24 hours' day shifts to meet schedule demands.
- Two Shifts will be worked:
  - Sunrise to Sunset
  - Sunset to Sunrise

Plant Residue Disposal:

- No plant residue is generated that need to be disposed. Unsuited material will be put back into the excavations.

Roads and Transport:

- The site is located off the N14. Turn right on the unnamed road leading to Aroams Quarry. Haul trucks will travel along the existing farm road up to the N14. Turning right they will travel along the existing road, as illustrated below.

A chemical toilet (flushable) 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 granite from the mining site to the client. Haul trucks will travel along the existing farm road up to the provincial/public road. Turning onto the N14, they will travel along the existing N14 road, as illustrated below.

- In the event that new roads need to be constructed, these roads will be selected as far as possible to avoid watercourses and steep gradients. Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.
- Any new roads to be established to the site will be below the threshold of the EIA regulations of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended June 2014
- The existing farm road will be used as access road to the site. Should a portion of the access road need to be newly constructed in future the following will be adhered to:
    - The route will be selected that a minimum number of bushes or trees are felled and existing fence lines will be followed as far as possible.
    - Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.

Water:

- Process water will be obtained from the municipal line that runs across the property. Water will be bought from the municipality. The water will mainly be used for dust suppression purposes on the crusher plant, roads and mining area. T Potable water will be transported to site daily. The solid waste produced during the operational phase of the project will be transported from site to the nearest landfill site.

Decommissioning phase:

- The closure objectives for the mining area is to be made safe, and the remainder of the site to be returned to agricultural use. The perimeter of the site will be subject to top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil.
- Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding (if applicable) has been done in an area.
- Site management will implement an alien invasive plant management plan during the 12 months' aftercare period to address germination of problem plants in the area.

The decommissioning activities will consist of the following:

- Landscaping during rehabilitation;
- Replacing of topsoil; and
- Implementation of an alien invader plant management plan.

The closure objectives for the mining area is to be made safe, and the remainder of the site to be returned to agricultural use (grazing). The perimeter of the site will be subject to top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil.

Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding (if applicable) has been done in an area.

Site management will implement an alien invasive plant management plan during the 12 months' aftercare period to address germination of problem plants in the area.

The decommissioning activities will consist of the following:

- Reshaping during rehabilitation;
- Replacing of topsoil; and
- Implementation of an alien invader plant management plan.

Site Alternatives

The applicant identified two alternative sites for the proposed mining activity namely:

Site Alternative 1 (S1) (Preferred Alternative): The Applicant, Aroams Quarry (Pty) Ltd intends to apply for a mining right, 13.6ha, on a portion of portion 2 (remaining extent) of the farm Aroams 57, which falls in the Khâi-Ma Municipality Local Municipality in the Registration Division of Namaqualand RD, Northern Cape Province.,

Site Alternative 2 (S2): Site Alternative 2 entails the mining of a 30.5 ha area within a Greenfield area. The applicant investigated the possibility of establishing the proposed mining area in a new greenfields area.

As mentioned earlier, the quarry pit on the property of the applicant has previously been used for mining purposes. In this light the applicant identified the proposed area as preferred and only viable site alternative. The establishment of a quarry pit in a greenfield area while the existing quarry pit has not yet been mined out or rehabilitated were not found to be the best option with regard to sustainable development. In the light of the above the impacts associated with establishing another quarry pit in a greenfield site on the property is believed to have a higher significance without the need or motivation to justify it.

Project Alternatives

Various project alternatives were considered during the planning phase of the project. These included the following:

1. Opencast mining (Preferred Alternative) **vs.** Underground Mining:
2. Temporary Infrastructure (Preferred Alternative) **vs.** Permanent Infrastructure:

No-go Alternative:

The no-go alternative entails no change to the status quo and is therefore a real alternative that needs to be considered. The Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite to be stockpiled at the site will be used for road and construction industries, if however, the no-go alternative is implemented the applicant will not be able to utilize the mineral present in the area.

This could have major impacts on aspects such as transporting of material to construction sites from far off mining areas, cost effectiveness of material, impact on roads and road users due to long distance hauling of Aggregate, Gravel, Granite and Dolomite and loss of income to the Aggeneys/Pofadder business area due to the multiplier effect.

Public participation process

The applicant will submit a mining right application for environmental authorisation in terms of NEMA, 1998 and the EIA Regulations, 2014 (amended 2017) to the DMR on a date to be decided. Initial public participation was done in terms of this application and the below mentioned stakeholders, the landowner and I&AP's were notified of the proposed project.

The stakeholders and I&AP's were informed of the project by means of I&AP comment / notification letters that were either delivered by hand or sent directly to the contact persons. A 30 days commenting period were allowed which extended from the 3rd of July 2019 to 3rd of August 2019 during the initial Mining Right Application.

The property is owned by Mr. GA Gerber. No land claim has been lodged against the property, and Mr Gerber is the only lawful occupier of the land concerned.

On-site notices were placed at the site entrance on the N14 and in town at the local OK Grocer. The project was also advertised in the Gemsbok on the 5th of July 2019.

The Draft Scoping Report (DSR) was submitted to the Department of Mineral Resources (DMR) –Springbok and Kimberley for review purposes. This report was made available to the public for a 30 days' review period (6 August – 8 September 2019. An electronic copy of the report was published on the Greenmined Environmental website (www.greenmined.com). All registered I&AP's and stakeholders was notified of the commenting period in advance as above.

The DSR was then updated to reflect the comments received during the public commenting period. Thereafter, the Final Scoping Report (FSR) was submitted to the DMR for its consideration as part of the authorization process in terms of the NEMA 2014 regulations (as amended by GNR 326 effective 7 April 2017). A copy of the final report was made available on the Greenmined Environmental website. Once the Final Scoping Report has been accepted by the DMR (4 December 2019), the Draft Environmental Impact Assessment Report (DEIAR) was prepared and also made available to the public for a 30-day commenting period (22 November 2019 – 14 January 2020). An electronic copy of the DEIAR report was published on the Greenmined Environmental website. All registered I&AP's and stakeholders was notified of the commenting period in advance.

The acceptance letter (in terms of MPRDA) for the application was received 22 October 2010. The FSR was accepted by the DMR on the 4 December 2019.

Upon expiry of the commenting period the DEIAR was updated to reflect the comments received during the public commenting period. Thereafter, the Final EIAR was submitted to the DMR for its consideration as part of the authorization process in terms of the NEMA 2014 regulations (as amended by GNR 326 effective 7 April 2017). A copy of the final report was made available on the Greenmined Environmental website. All registered I&AP's and stakeholders was notified in writing within 14 days of the date of the decision of the outcome of the application, including the reasons for the decision and the right of appeal.

Scoping Report

The scoping report identifies the potential positive and negative impacts that the proposed activity and alternatives 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.

Plan of Study for the Environmental Impact Assessment Process

The aspects to be assessed as part of the environmental impact assessment process will include, but not be limited to, the following:

1. Various alternatives (project, technology, design etc.) that will in turn dictate the design and layout of the proposed project as well as hone the proposed mining method.
2. Upon deciding on the preferred alternatives, the applicability of the listed activities identified in terms of the NEMA EIA Regulations, 2017 was confirmed and aligned with the most recent proposal.
3. The need and desirability of the proposed activity was discussed in detail and weighed against the no-go option of upholding the *status quo* at the study area.
4. The inputs received during the public participation process (first- and second phase) was assessed and considered by the project team during the EIA process.
5. The findings, recommendations and management measure proposed in the specialist reports was assessed during the EIA process and incorporated into the DEIAR.
6. The impact of the proposed project on the physical-, biological-, and human environments was assessed.
7. Mitigation measures was proposed to control, modify, remedy or stop the impacts associated with the proposed activity on the surrounding environment.
8. Any additional requirements submitted by the DMR was incorporated into the DEIAR and treated accordingly.

Registered I&AP's and stakeholders was provided with a copy of the Draft Scoping Report for their perusal, while the rest of the stakeholders and I&AP's (unregistered) was notified of the availability of the DSR should they be interested. An electronic copy of the document was made available on the Greenmined website. Additional comments were added to the Final Scoping Report to be submitted to the DMR for approval. Upon

approval of the Final Scoping Report, the Draft EIA report was compiled. The Draft EIA & EMPR report was circulated to the registered I&AP's and stakeholders for their perusal over a 30-days period.

The Environmental Impact Assessment Report and Environmental Management Programme Report templates prescribed by the DMR in terms of the National Environmental Management Act, 1998 in respect of listed activities that have been trigger by this application was used to assess the information with regard to the proposed mining project.

ABBREVIATIONS

BID	Background Information Document
CARA	Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983)
CBA	Critical Biodiversity Areas
CRR	Comments and Response Report
DSR	Draft Scoping Report
DEAT	Department of Environment, Agriculture and Tourism
DMR	Department of Mineral and Resources
DWS	Department of Water and Sanitation
DEIAR	Draft Environmental Impact Assessment Report
DoA	Department of Agriculture
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPR	Environmental Management Programme
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EA	Environmental Authorisation
EIS	Ecological Importance and Sensitivity
ESA	Ecological Support Areas
FEIAR	Final Environmental Impact Assessment Report
FSR	Final Scoping Report
GN	Government Notice
GNR	Government Notice Regulation
HAS	Hazardous Substances Act, 1973 (Act No 15 of 1973)
HIA	Heritage Impact Assessment
HSA	Mine Health and Safety Act, 1996 (Act No 29 of 1996)
I&AP's	Interested and Affected Parties
IDP	Integrated Development Plan
IWULA/IWMMP	Integrated Water Use Licence Application / Integrated Waste Water Management Plan
LED	Local Economic Development
LUPA	Land Use Planning Act, 2014 (Act No 13 of 2014)
NEMA	National Environmental Management Act, 1998
NEM: AQA	National Environmental Management: Air Quality Control 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, 2003 (Act No 57 of 2003)
NEM: WA	National Environmental Management: Waste Act, 2008 (Act No 59 of 2008)

NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NRTA	National Road Traffic Act, 1996 (Act No 25 of 1999)
NWA	National Water Act, 1998 (Act No 36 of 1998)
MHSA	Mine Health and Safety Act
MPRDA	Minerals and Petroleum Resources Development Act, 2002
MR	Mining Right
OHSA	Occupational Health and Safety Act, 1993 (Act No 85 of 1993)
PPP	Public Participation Process
PPE	Personal Protective Equipment
Ptn	Portion
PCO	Pest Control Officer
PE	Protected Environment
PES	Present Ecological State
PPE	Personal Protection Equipment
ROM	Run of Mine
SAMRAD	South African Mining Mineral Resources Administration System
SANS	South African National Standards
SLP	Social and Labour Plan
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SHE	Safety, Health and Environmental
SLP	Social and Labour Plan
WMA	Water Management Area

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: *INZALO CRUSHING AND AGGREGATES (PTY) LTD*
TEL NO: *011 966 4313*
FAX NO: *086 513 7220*
POSTAL ADDRESS: *PO. BOX 26730, East Rand, 1462*
PHYSICAL ADDRESS: *93&94 Maple Street, Pomona, Kempton Park*
FILE REFERENCE NUMBER SAMRAD: *FS 30/5/1/3/2/1/10045 MR*

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LIST OF ABBREVIATIONS

BID	Background Information Document
DEDET	Department of Environment, Development and Tourism
DEIAR	Draft Environmental Impact Assessment Report
DMR	Department of Mineral and Resources
DMEC	Desired Ecological Management Class
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Awareness Plan
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EIS	Ecological Importance and Sensitivity
EMC	Ecological Management Class
FEIAR	Final Environmental Impact Assessment Report
FEPA	Fresh Water Priority Areas
FS	Northern Cape Province
FSR	Final Scoping Report
GIS	Geographic Information System
GPS	Global Positioning System
GN	Government Notice
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
Ha	Hectares
HGM	Hydro-geomorphic
I&AP's	Interested and Affected Parties
IWULA/IWMMP	Integrated Water Use Licence Application / Integrated Waste Water Management Plan
LED	Local Economic Development
MPRDA	Minerals and Petroleum Resources Development Act, 2002
MHSA	Mine Health and Safety Act
m	Metres
mm	Millimetres
NEMA	National Environmental Management Act, Act 107 of 1998
NEMBA	National Environmental Management: Biodiversity Act, 2004
NHRA	National Heritage Resources Act
PPE	Personal Protective equipment

PPP	Public Participation Process
Ptn	Portion
PEMC	Present Ecological Management Class
PES	Present Ecological State
SANBI	South African National Biodiversity Institute
SASS	South African Scoring System
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SHE	Safety, Health and Environment
SLP	Social and Labour Plan
SPLUMA	Spatial Planning and Land Use Management Act
REC	Recommended Ecological Category
RHP	River Health Program
WMA	Water Management Area

1. IMPORTANT NOTICE

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

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

In terms of section 16(3)(b) of the EIA 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 authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

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

2. 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

3. 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. Aroams Quarry (Pty) Ltd (hereinafter the "Applicant") appointed Greenmined Environmental (Pty) Ltd (hereinafter "Greenmined") to undertake the study needed. Greenmined has no vested interest in Aroams Quarry (Pty) Ltd or the proposed project and hereby declares its independence as required by the EIA Regulations, 2014 (as amended 2017).

i) Details of the EAP

Name of The Practitioner:	Yolandie Coetzee
	Greenmined Environmental
Tel No:	011 966 4390/ 082 734 5113
Fax No:	086 546 0579
e-mail address:	Yolandie.c@greenmined.co.za

ii) Expertise of the EAP.

(1) The qualifications of the EAP

(with evidence).

Mrs. Yolandie Coetzee has a B.Sc. Degree in Microbiology and Biochemistry and an Honours Degree in Envivornmental Sciencies. Please find full CV attached in Appendix 1.

(2) Summary of the EAP's past experience

(In carrying out the Environmental Impact Assessment Procedure)

Yolandie Coetzee is an Environmental Consultant with 9 years' experience in the environmental sector. She specialized the last 5 years in the rehabilitation of mines where she conducted the conceptual rehabilitation and management designs and the closure plans and programs. She has also been involved in a number of other environmental projects including railway sidings, filling stations, abattoir's, logistics hub and mining sites where she compiled environmental management plans, environmental impact assessments, environmental audits, due diligences, IWULA's / IWWMP's and alien invasive encroachment programs.

She studied at the University of Potchefstroom where she has successfully completed her undergraduate degree in microbiology and biochemistry and her Honours degree in environmental sciences. See a list of past project attached as Appendix 1.

b) Description of the property

Farm Name:	On a portion of Portion 2 (Remaining Extent) of the farm Aroams 57, Registration Division of Namaqualand RD, Northern Cape
Application area (Ha)	13.6ha
Magisterial district:	Registration Division of Namaqualand RD
Distance and direction from the nearest town	Approximately 8.84 km East Aggeneys, Northern Cape Province
21 digit Surveyor General Code for each farm portion	C05300000000057000002

c) Locality map

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

The requested map is attached as Appendix 4. The project site falls within the quarter degree square 2918 BB.

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

Aroams Quarry (Pty) Ltd intends to apply for a mining right to mine 13.6ha of on a portion of portion 2 (remaining extent) of the farm Aroams 57, which falls in the Khâi-Ma Municipality Local Municipality in the Registration Division of Namaqualand RD, Northern Cape Province.

The area earmarked for the proposed mining falls on a section of the farm that was previously used as an existing quarry and the intention of this application is to increase the existing quarry. The mining methods will make use of blasting means of explosives in order to loosen the hard rock, in pit crushing is also taking place, the material is then loaded and hauled out of the excavation to the mobile crushing and screening plants. The granite will be stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the site. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as permit holders are informed of each blasting event.

The granite to be mined at the site is found at surface level, and very little to no topsoil exist in the proposed mining area. Topsoil stripping is therefore not viable at the proposed quarry area. The overburden (product that could not be sold) will be removed and stockpiled separately for later use when the quarry is rehabilitated.

Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as permit holders are informed of each blasting event.

The mining activities will consist out of the following:

- Stripping and stockpiling of topsoil;
- Blasting;
- Excavating;
- Crushing;
- Stockpiling and transporting;
- Sloping and reshaping upon closure of the site; and
- Replacing the topsoil for future vegetation growth the disturbed area.

The mining site will contain the following:

- Drilling Equipment;
- Excavating Equipment;
- Earth Moving Equipment;
- Crushing and Screening infrastructure;
- Site Office;
- Site vehicles;
- Parking area for visitors and site vehicles;
- Vehicle service area;
- Wash bay;
- Workshop;
- Salvage Yard;
- Bunded diesel and oil storage facilities;
- Generator on bunded area;
- Ablution Facilities;
- Weigh Bridge; and
- Demarcated general and hazardous waste area.

Due to the remote locality of the proposed operation no infrastructure will be affected. Existing roads and tracks will be used and in the case of new tracks being developed it will be addressed at final closure and rehabilitation.

EXISTING INFRASTRUCTURE:

As stated above, the proposed mining area will be established adjacent to an existing quarry

The following structures are present within a 3 km radius from the proposed mining area:

- ±150m from site: Borehole with pump
- ±890 m from site: Cement dam with water pipe line
- ±2.5 km from site: N14 national road

The impact of the proposed mining area on the infrastructural features of the surrounding area is deemed to be of very low significance. The impact of the mining activities will be concentrated within the 13.6ha footprint area of the mine.

Generators and solar power panels will be used to power the infrastructure on site. Future endeavours will dictate if or when an Eskom connection will be secured. All diesel storage will be below the threshold as mentioned in the EIA regulations of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended 2017. See the requested map attached as Appendix 6.

i) Listed and specified activities

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	13.6ha	X	GNR 325 Environmental Impact Assessment Regulations Listing Notice 2 of 2014 Activity 15 (Mining Right area): *The clearance of an area of 20 hectares or more of indigenous vegetation.* GNR 325 Environmental Impact Assessment Regulations Listing Notice 2 of 2014 Activity 17 (Mining Right area): *Any activity including the operation of that activity which requires a mining right in terms of section 22 of the Mineral and Petroleum Resources Development Act, 2002 (act No. 28 of 2002), including associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource or 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 Environmental Impact Assessment Regulations Listing Notice 1 of 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 meters.* GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 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*

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)**
			(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.* <u>GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 27 (Mining Area):</u> *The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.* <u>GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 28 (Mining and Stockpile area):</u> *Commercial and industrial developments where such land was used for agriculture 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.* <u>GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 35 (Mining and Stockpile area):</u> *The expansion of residential, retail, recreational, tourism, commercial or institutional developments on land previously used for mining or heavy industrial purposes, where the increased development footprint will exceed 1 000 square meters; excluding—*

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)**
			(i) where such land has been remediated in terms of part 8 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or *(ii) where an environmental authorisation has been obtained for the decommissioning of such a mine or industry in terms of this Notice or any previous NEMA notice; or* *(iii) where a closure certificate has been issued in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) for such land* <u>GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 56:</u> *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre –* *ii) Where no reserve exists, where the existing road is wider than 8 metres.*
Demarcation of site with visible beacons.	13.6 ha	N/A	Not listed
Strip and Stockpile of topsoil	13.6 ha	**X**	GNR 325 Environmental Impact Assessment Regulations Listing Notice 2 of 2017 Activity 15, 17 GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 28
Drilling and Blasting	±7.8 ha	**X**	GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 21, 28
Excavation And Loading Of Aggregates To Be Processed	±3.87 ha	**X**	GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 21, 28
Crushing and screening of aggregates	±3.87 ha	**X**	GNR 325 Environmental Impact Assessment Regulations Listing Notice 2 of 2014 Activity 17 (Mining Right area); and GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 14
Stockpiling and transportation of material from stockpile area to clients	± 3.87 ha	**X**	GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 24;

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)**
Sloping, Landscaping and replacement of topsoil over disturbed area (Final Rehabilitation)	13.6 ha	**X**	GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 22
Replacing the topsoil and vegetating the disturbed area.	13.6 ha	**X**	GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 22

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)

The area earmarked for the proposed development is situated on a portion of portion 2 (remaining extent) of the farm Aroams 57 is situated Approximately 8.84 km East Aggeneys, Northern Cape Province. The area earmarked for the proposed mining falls on a section of the farm that was previously used as an existing quarry and the intention of this application is to increase the existing quarry. The mining methods will make use of blasting means of explosives in order to loosen the hard rock, primary crushing is conducted in the pit, and the material is then loaded and hauled out of the excavation to the mobile crushing and screening plants. The Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite will be stockpiles and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the site.

The GPS coordinates of the proposed mining area are as follow:

Preferred Alternative	
Decimal Degrees	**Degrees; Minutes: Seconds**
A – 29.169143°°S; 18.994345°E B – 29.169018°S; 18.993913°E C – 29.169520 °S; 18.992853 °E D – 29.169720 °S; 18.991502 °E E - 29.171831 °S; 18.992998 °E F - 29.171142 °S; 18.995963 °E G - 29.171029 °S; 18.996257 °E H - 29.171404 °S; 18.996342 °E I - 29.174965 °S; 18.998309 °E J – 29.175303°S; 18.997709°E K – 29.171763 °S; 18.995391 °E L – 29.172402 °S; 18.992814 °E M – 29.172146 °S; 18.992078 °E N – 29.171908 °S; 18.990222 °E O – 29.169597 °S; 18.989575 °E A – 29.169143°°S; 18.994345°E	A 29°10'8.91"S; 18°59'39.64"E B 29°10'8.46"S; 18°59'38.09"E C 29°10'10.27"S; 18°59'34.27"E D 29°10'10.99"S; 18°59'29.41"E E 29°10'18.59" S; 18°59'34.79"E E F 29°10'16.11"S; 18°59'45.47"E G 29°10'15.70"S;18°59'46.53"E H 29°10'17.05"S; 18°59'46.83"E I 29°10'29.87"S; 18°59'53.91"E J 29°10'31.09"S; 18°59'51.75"E K 29°10'18.35"S; 18°59'43.41"E L 29°10'20.65"S S; 18°59'34.13"E E M 29°10'19.73"S; 18°59'31.48"E N 29°10'18.87"S; 18°59'24.80"E O 29°10'10.55" S; 18°59'22.47"E A 29°10'8.91"S; 18°59'39.64"E

An application for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [MPRDA] was submitted to the Department of Mineral Resources (DMR).

The proposed project triggers the following listed activities in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) [NEMA] and the Environmental Impact Assessment (EIA) Regulations (as amended by GNR 326 effective 7 April 2017), and therefore requires an environmental impact assessment and environmental management program to obtain environmental authorisation:

- <u>GNR 325 Environmental Impact Assessment Regulations Listing Notice 2 of 2014 Activity 15 (Mining Right area):</u>

  The clearance of an area of 20 hectares or more of indigenous vegetation.

- GNR 325 Environmental Impact Assessment Regulations Listing Notice 2 of 2014 Activity 17 (Mining Right area):

  Any activity including the operation of that activity which requires a mining right in terms of section 22 of the Mineral and Petroleum Resources Development Act, 2002 (act No. 28 of 2002), including associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource or 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 Environmental Impact Assessment Regulations Listing Notice 1 of 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 meters.

- GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2014 Activity 22 (Mining Area):

  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 Environmental Impact Assessment Regulations Listing Notice 1 of 2014 Activity 27 (Mining and Stockpile Area):

  The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.

- GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2014 Activity 28 (Mining and Stockpile area):

  Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or before 01 April 1998 and where

such development will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.

- GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2014 Activity 35 (Mining and Stockpile area)

The expansion of residential, retail, recreational, tourism, commercial or institutional developments on land previously used for mining or heavy industrial purposes, where the increased development footprint will exceed 1 000 square meters; excluding—
(i) where such land has been remediated in terms of part 8 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or
(ii) where an environmental authorisation has been obtained for the decommissioning of such a mine or industry in terms of this Notice or any previous NEMA notice; or
(iii) where a closure certificate has been issued in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) for such land.

Other legislation triggered by the proposed project includes:

- An application for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) has been submitted to the Department of Mineral Resource.

Site Establishment / Construction phase:

There will be no site establishment / construction phase as Aroams Quarry will continue working from the SPH mining permit area into the Aroams Quarry mining permit area. Aroams Quarry will be using the same processing area that was used by SPH Kundalila during the mining permit timeframe. Potential expansion (less than 1ha) of this proposed processing area will take place.

During the site establishment phase the applicant have to fence the footprint area and clear the topsoil from the applied area, it should be noted that there is very little topsoil on site.

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 Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite 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 should 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 proposed mining area was previously used for Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite mining and therefore no construction phase is applicable. The area need to be cleared of topsoil and an access road already exist. The expansion of the quarry pit will be handled as part of the operational phase of the quarry. As the infrastructure are temporary the use of infrastructure and machinery that is either track-based or can be removed without difficulty. Temporary infrastructure to be used in the mining method will entail a temporary weighbridge and chemical toilet, with servicing of vehicles and equipment being done on-site at the workshop and wash bay of the applicant. An on-site office will also be used for all administration purposes relating to the project.
During the site establishment phase the applicant, have to demarcate the boundaries of the site and fence the entire mining area.

The applicant will introduce the processing equipment to the area during the site establishment phase. The equipment to be introduced on site will entail the following:

- Drilling Equipment;
- Excavating Equipment;
- Earth Moving Equipment;
- Crushing and Screening infrastructure;
- Site Office;
- Site vehicles;
- Parking area for visitors and site vehicles;
- Vehicle service area;
- Wash bay;
- Workshop;
- Salvage Yard;
- Bunded diesel and oil storage facilities;
- Generator on bunded area;
- Ablution Facilities;
- Weigh Bridge; and
- Demarcated general and hazardous waste area.

The mining activities will consist out of the following:

- Stripping and stockpiling of topsoil;
- Blasting;
- Excavating;
- Crushing;
- Stockpiling and transporting;
- Sloping and landscaping upon closure of the site; and
- Replacing the topsoil and vegetation the disturbed area.

EXISTING INFRASTRUCTURE:

As stated above, the proposed mining area will be established adjacent to an existing quarry

The following structures are present within a 3 km radius from the proposed mining area:

- ±150m from site: Borehole with pump
- ±890 m from site: Cement dam with water pipe line
- ±2.5 km from site: N14 national road

The impact of the proposed mining area on the infrastructural features of the surrounding area is deemed to be of very low significance. The impact of the mining activities will be concentrated within the 13.6ha footprint area of the mine.

Generators and solar power panels will be used to power the infrastructure on site. Future endeavours will dictate if or when an Eskom connection will be secured. All diesel storage will be below the threshold as mentioned in the EIA regulations of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended 2017. Potable water will be transported to site daily. See the requested map attached as Appendix B. Process water will be obtained from the municipal line that runs across the property. Water will be bought from the municipality.

Operational phase:

The proposed mining site will be an extension of the existing quarry pit previously distributed by stone Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite mining activities. The mining methods will make use of blasting means of explosives in order to loosen the hard rock, the material is then loaded and hauled out of the excavation, where primary crushing is conducted in the pit, to the mobile crushing and screening plants. The granite will be stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the site. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as permit holders are informed of each blasting event.

Mine area:

- Demarcating the mining area:
- The mining area will be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- Permanent beacons will be firmly erected and maintained in their correct position throughout the life of the operation.
- The blasted material is loaded with earth moving equipment onto tipper trucks, which carts it to the crushing plant. Here it is fed into the crushers by means of a system of conveyor belts. After crushing

and screening has taken place in the plant the crushed material is transported to the stockpile area. This activity will be continuous throughout the operation phase.

- The proposed mining area is approximately 5 ha in extent and the applicant, Aroams Quarry (Pty) Ltd intents to win material from the area for at least 2 years with a possible extension of another 3 years. The granite to be removed from the quarry will be used for road construction and various other projects in the vicinity

Mineral Processing:

- The mining methods will make use of blasting by means of explosives in order to loosen the hard rock and the material will then be loaded and hauled out of the excavation and loaded onto a mobile crusher plant in the mining area. The Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite will then be stockpiled and transported to clients via transporting trucks and trailers. Aggregate will be recovered mechanically with drilling equipment, excavating equipment, earth-moving equipment, mobile crushing & screening plants. The Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite that is recovered will be loaded on tipper trucks from where it will be transport to an area where it will be screened and stockpiled. Blasting noise will be instantaneous and of short duration. This will only occur once every two to three weeks. The blasted material is primarily crushed in the quarry by the blast. It is then loaded with earth moving equipment into trucks, which carts it to the crushing plant. Here it is fed into the crushers by means of a system of conveyor belts. After the crushing and screening has taken place in the plant the crushed material is transported into stockpile.
- Deliveries are made from the Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite stockpiles. Delivery is by truck or alternatively it is collected by the client's transport.
- Approximately fourty five (45) will be employed at the site.

The stockpiling process includes mechanical loading and transportation of the sought granite. As mentioned previously the granite will be loaded with a front end loader onto trucks upon which it will be weighed and transported to the client. The product stockpiling activities will consist of the following:

- Loading of granite;
- Weighing of granite; and
- Transportation of granite.

Working hours:

- All proceedings will be undertaken in 24 hours' day shifts to meet schedule demands.
- Two Shifts will be worked:
  - Sunrise to Sunset
  - Sunset to Sunrise

Plant Residue Disposal:

- No plant residue is generated that need to be disposed. Unsuited material will be put back into the excavations.

Roads and Transport:

- The site is located off the N14. Turn right on the unnamed road leading to Aroams Quarry. Haul trucks will travel along the existing farm road up to the N14. Turning right they will travel along the existing road, as illustrated below.

A chemical toilet (flushable) 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 granite from the mining site to the client. Haul trucks will travel along the existing farm road up to the provincial/public road. Turning onto the N14, they will travel along the existing N14 road, as illustrated below.

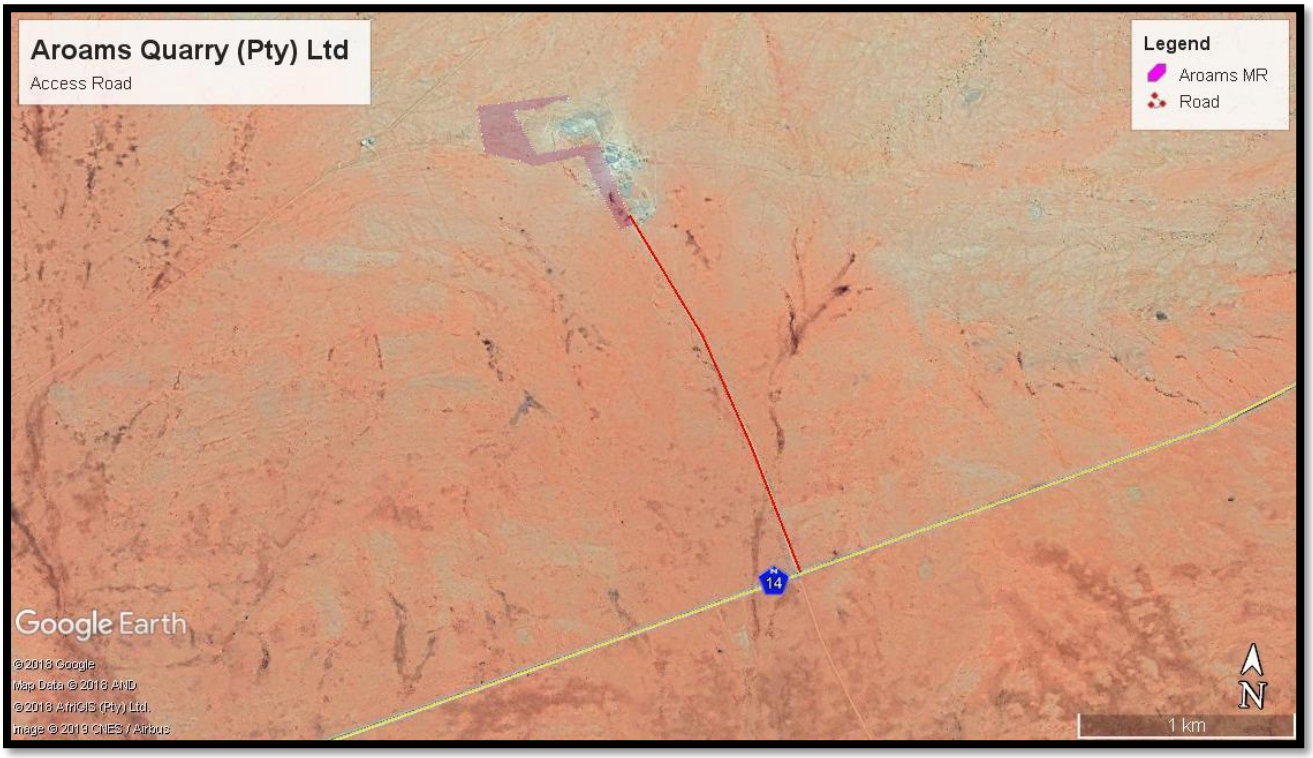


Figure 1: Satellite view indicating the proposed access road to the mining site

- In the event that new roads need to be constructed, these roads will be selected as far as possible to avoid watercourses and steep gradients. Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.
- Any new roads to be established to the site will be below the threshold of the EIA regulations of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended June 2014

- The existing farm road will be used as access road to the site. Should a portion of the access road need to be newly constructed in future the following will be adhered to:
    - The route will be selected that a minimum number of bushes or trees are felled and existing fence lines will be followed as far as possible.
    - Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.

Water:

- Process water will be obtained from the municipal line that runs across the property. Water will be bought from the municipality. The water will mainly be used for dust suppression purposes on the crusher plant, roads and mining area. Potable water will be transported to site daily. The solid waste produced during the operational phase of the project will be transported from site to the nearest landfill site.

Decommissioning phase:

- The closure objectives for the mining area is to be made safe, and the remainder of the site to be returned to agricultural use. The perimeter of the site will be subject to top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil.
- Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding (if applicable) has been done in an area.
- Site management will implement an alien invasive plant management plan during the 12 months' aftercare period to address germination of problem plants in the area.

The decommissioning activities will consist of the following:

- Landscaping during rehabilitation;
- Replacing of topsoil; and
- Implementation of an alien invader plant management plan.

The closure objectives for the mining area is to be made safe, and the remainder of the site to be returned to agricultural use (grazing). The perimeter of the site will be subject to top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil.

Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding (if applicable) has been done in an area.

Site management will implement an alien invasive plant management plan during the 12 months' aftercare period to address germination of problem plants in the area.

The decommissioning activities will consist of the following:

- Reshaping during rehabilitation;
- Replacing of topsoil; and
- Implementation of an alien invader plant management plan.

e) Policy and Legislative Context.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.** (E.g. in terms of the National Water Act a Water Use License has/has not been applied for)
Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) • Section 22	Application for a Mining Right Ref No: NC 30/5/1/2/2/10156 MR	Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) - Section 22 – Application for a mining right submitted to DMR-NC.
National Environmental Management Act 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2017 • GNR 325 LN2 of 2017 Activity 15 • GNR 325 LN2 of 2017 Activity 17 • GNR 327 LN 1 of 2017 Activity 14 • GNR 327 LN 1 of 2017 Activity 22 • GNR 327 LN 1 of 2017 Activity 27 • GNR 327 LN 1 of 2017 Activity 28 • GNR 327 LN 1 of 2017 Activity 35 • GNR 327 LN 1 of 2017 Activity 56	Application for environmental authorisation Ref No: NC 30/5/1/2/2/10156 MR	Application for environmental authorisation submitted to DMR-30/5/1/2/2/10156 MR
National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) and amendments	Assessment of the Biophysical Environment	Weed / Alien vegetation clearing. Should the proposed mitigation measures be implemented no aspects of the project could be identified that triggers the NEM:BA, 2004.
Mine Health and Safety Act, 1996 (Act No 29 of 1996)	The mitigation measures proposed for the site includes specifications of the MHSA Part A(iv)(1)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Health and Safety Aspects.*	The operational phase of the site will trigger the MHSA. The mitigation measures proposed for the site includes specifications of the MHSA, 1996

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.** (E.g. in terms of the National Water Act a Water Use License has/has not been applied for)
National Heritage Resources Act No. 25 of 1999	Assessment of the Cultural and Heritage Environment. Cultural and Heritage Environment. Part A(iv)(1)(a) Type of environment affected by the proposed activity – *Human Environment*	A Notice of Intent to Develop in terms of Section 38(8) of the NHRA, 1999 was submitted to SAHRA on 3 August 2018 to determine the action required for the proposed project. SAHRA requested that a HIA and Palaeontological Study be conducted. HCAC was appointed to conduct a Heritage Impact Assessment to determine the presence of cultural heritage sites and the impact of the Mining Right for the mining of aggregate, gravel, granite and dolerite, 13.6 ha, on a portion of Portion 2 (Remaining Extent) of the farm Aroams 57, Registration Division of Namaqualand RD, Northern Cape on non-renewable heritage resources. The study area was assessed both on desktop level and by a field survey. The field survey was conducted as a non-intrusive pedestrian survey to cover the extent of the mining right footprint. The mitigation measures proposed for the site includes specifications of the NHRA, 1999.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) Land Use Planning Ordinance (Ordinance 15 of 1985)	Assessment of biophysical environment Land use zoning requirements. Part A(iv)(1)(a) Type of environment affected by the proposed activity: *Physical Environment – Geology and Soil.* Part A(iv)(1)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of weeds- or invader plants*.	The mitigation measures proposed for the site includes specifications of the CARA, 1983.
Northern Cape Nature Conservation Ordinance 8 of 1969	Biophysical Environment	Protected trees and plants in the area have been identified. Relevant acts are complied with and the necessary permits and licences obtained.
Northern Cape Nature Conservation Ordinance 8 of 1969		
Northern Cape Nature Conservation Act No. 9 of 2009		
Cape Nature and Environmental Conservation Ordinance 9 of 1974		

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.** (E.g. in terms of the National Water Act a Water Use License has/has not been applied for)
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	Part A (iv) (1) (a) Type of environment affected by the proposed activity: *Physical Environment – Geology and Soil.* Part A (iv) (1) (viii) The possible mitigation measures that could be applied on the level of risk – *Management of weeds- or invader plants*.	
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 (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 NEM: WA.
National Water Act, 36 (Act No 36 of 1998) read together with applicable amendments and regulations thereto.	Part A (iv) (1) (a) Type of environment affected by the proposed activity – *Aquatic Features.*	Land Use Planning Ordinance (Ordinance 15 of 1985)
National Environmental Management: Waste Act, 59 (Act No 59 of 2008) read together with applicable amendments and regulations thereto. NEMWA, 2008: National norms and standards for the storage of waste (GN 926)	Part A(ii) Description of the activities to be undertaken: *Operational phase – Waste Handling*	
Land Use Planning Ordinance (Ordinance 15 of 1985)	Land use zoning requirements	Land Rezoning will be conducted once the mining permit application has been converted to a mining right application.
Khai-Ma Municipality Rural Spatial Development Framework / Land Development Plan, 2010	Description of the current land uses	
Northern Cape Planning and Development Act No 7 of 1998		
Khai-Ma Municipality, Spatial Planning and Land Use Management Act, 16 of 2013		
Northern Cape Spatial Planning and Land Use Management Bill 2012		
Khai-Ma Local Municipality Integrated Development Plan		
Spatial Planning and Land Use Management Act, Act 16		

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.** (E.g. in terms of the National Water Act a Water Use License has/has not been applied for)
Public Participation Guideline in terms of the NEMA EIA Regulations	Part A(ii) Details of the Public Participation Process Followed Application for a mining right Ref No: **NC 30/5/1/2/2/10156 MR** Application for an Environmental Authorisation Ref No: **NC 30/5/1/2/2/10156 MR**	Public Participation Guideline in terms of the NEMA EIA Regulations

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).

The increase in building, construction and road maintenance projects in the vicinity of the property triggered the need of the applicant to trade with the available granite. The proposed mining will also contribute to the diversification of activities on the property, extending it from agriculture to include small scale mining.

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.

Aroams Quarry (Pty) Ltd, identified the need for Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite in the area due to an increase in building, construction and road maintenance projects. As mentioned earlier the quarry pit on the property of the applicant has previously been used for mining purposes. In this light the applicant identified the proposed (site alternative 1) area as preferred and only viable site alternative. The facts that the existing quarry have not yet been mined out and will be extended were found to be the best option.

The technology/design proposal as discussed in this report must be treated as preliminary, and will be assessed during the EIA process.

The proposed site was identified as the preferred alternative due to the following reasons:

- The mining site offers the mineral sought after;
- The mining area can be reached by an existing farm access road that connects to N14. No new road infrastructure need to be constructed;
- Due to the small size of the activity and the remote location of the mining area the potential impacts on the surrounding environment, associated with mining is deemed to be of low significance; and
- No residual waste as a result of the mining activity will be produced that needs to be treated on site. Any general waste that may be produced on-site will be contained in sealed refuse bins to be transported to the local municipal landfill site (Pofadder Municipal Landfill). The amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental leakage. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site.

i) Details of the development footprint alternatives considered.

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

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

Site Alternatives

Site Alternative 1 was identified during the planning phase by the Applicant and project team, as the preferred site alternative based on the evaluation of previous quarry operations in the area and the corresponding position of the Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite deposit. Should additional viable site alternatives be identified during the EIA process, the project team will heed the suggestions and investigate the possibility of implementation thereof. Additional site alternatives (if identified) will be discussed in detail in the draft EIAR to be distributed for public comments.

The applicant identified two alternative sites for the proposed mining activity namely:

1. **Site Alternative 1 (S1) (Preferred Alternative):** The Applicant, Aroams Quarry (Pty) Ltd intends to apply for a mining right, 13.6ha, on a portion of portion 2 (remaining extent) of the farm Aroams 57, which falls in the Khâi-Ma Municipality Local Municipality in the Registration Division of Namaqualand RD, Northern Cape Province.

Site Alternative 1 was identified during the assessment phase of the environmental impact assessment, by the applicant and project team, and was therefore selected as the **preferred alternative** due to the following:

- The mining site offers the mineral sought after;
- The site is located approximately 4.5km from the closest farm house with mitigation measures in place impacts such as dust and noise will be minimal.
- The mining site is more than 8.3km away for the town of closest town Aggeneys, and will not affect the community with regards to dust and noise;
- The mineral to be mined is already in Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite form and will not need to be blasted in order to loosen the material;
- The mining area can be reached by an existing farm access road that connects to N14. No new road infrastructure need to be constructed;
- Due to the small size of the activity and the remote location of the mining area the potential impacts on the surrounding environment, associated with mining is deemed to be of low significance; and
- No residual waste as a result of the mining activity will be produced that needs to be treated on site. Any general waste that may be produced on-site will be contained in sealed refuse bins to be

transported to the local municipal landfill site. The amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental leakage. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site.

2. **Site Alternative 2 (S2):** Site Alternative 2 entails the mining of a 30.5 ha area.

The applicant investigated the possibility of establishing the proposed mining area in a new greenfields area. This alternative was however found **not** to be the **preferred** alternative due to the following reasons:

- The site is adjacent to the Aggeneys towns water supply dams;
- The area has not been disturbed before; thus the natural area needs to be cleared and is not preferred with regards to sustainable development; and
- In the light of the above the impacts associated with establishing another quarry pit in a greenfield site on the property is believed to have a higher significance without the need or motivation to justify it.

As mentioned earlier, the quarry pit on the property of the applicant has previously been used for mining purposes. In this light the applicant identified the proposed area as preferred and only viable site alternative. The establishment of a quarry pit in a greenfield area while the existing quarry pit has not yet been mined out or rehabilitated were not found to be the best option with regard to sustainable development. In the light of the above the impacts associated with establishing another quarry pit in a greenfield site on the property is believed to have a higher significance without the need or motivation to justify it.

Technology/Design Alternatives

As with the project alternatives, technology and design alternatives will be considered during the EIA process and discussed in the FEIAR. The following technology/design principles will be considered by the Applicant and project team:

- Alternative box cut (secure and safe portals/accesses to the open-cast pit) positions and direction of mining for opencast operations;
- Alternative locations of topsoil and overburden stockpile areas;
- Alternative conveyor technology to solve environmental problems (e.g. noise, river crossings);
- Alternative slime dam locations and designs;
- Alternative alignments of access road and haul roads;
- Alternative locations for mine infrastructure, including the locations of offices, workshops; refuelling bays, stores, magazines, and processing plants; and
- The implementation of renewable energy sources will be considered;

3. No-go Alternative:

The no-go alternative entails no change to the status quo and is therefore a real alternative that needs to be considered.

The Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite to be stockpiled at the site will be used for road and construction industries, if however, the no-go alternative is implemented the applicant will not be able to utilize the mineral present in the area.

This could have major impacts on aspects such as transporting of material to construction sites from far off mining areas, cost effectiveness of material, impact on roads and road users due to long distance hauling of Aggregate, Gravel, Granite and Dolomite and loss of income to the Aggeneys/Pofadder business area due to the multiplier effect.

The no-go alternative was not deemed to be the preferred alternative as:

- The applicant will not be able to supply in the demand of road or construction contractors,
- The application, if approved, would allow the applicant to utilize the available Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite as well as provide employment opportunities to local employees. Should the no-go alternative be followed these opportunities will be lost to the applicant, potential employees and clients,
- The applicant will not be able to diversify the income of the property.

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).

The applicant will submit a mining right application for environmental authorisation in terms of NEMA, 1998 and the EIA Regulations, 2014 (amended 2017) to the DMR on a date to be decided. Initial public participation was done in terms of this application and the below mentioned stakeholders, the landowner and I&AP's were notified of the proposed project.

The stakeholders and I&AP’s were informed of the project by means of I&AP comment / notification letters that were either delivered by hand or sent directly to the contact persons. A 30 days commenting period were allowed which extended from the 3rd of July 2019 to 3rd of August 2019 during the initial Mining Right Application.

A register of interested and affected parties (I&AP’s) was opened and maintained containing the names, contact details and addresses of all persons who have submitted written comments, attended meetings or have in writing requested to be registered and all organs of state which have jurisdiction in respect of the activity. Please note that only registered I&AP’s and stakeholders was entitled to comment on reports and plans to be submitted to the Department provided that the party provides its name, contact details and address and discloses any direct business, financial, personal or other interest which he/she may have in the approval or refusal of the applications. The following table provides a list of the I&AP’s and stakeholders that were informed of the project:

Table 1: List of contacted I&AP's and Stakeholders

INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
• Mr. Piet Carstens • Mr. Pieter Jan van den Heever • Mr. Deon Pieterse • Mr. Abrie van Niekerk • Horomela Mining Investment & Resources (Pty) Ltd	• Mr. Quincy (Khâi-Ma Local Municipality Ward 4) • Mr. Obegang (Khâi-Ma Local Municipality) • Mr Christiaan Fortuin (Namakwa District Municipality) • MR W.V.D Mothibi (Department of Agriculture, Land Reform and Rural Development) • Mr Darren Engelbrecht (Department of Agriculture, Land Reform and Rural Development-Springbok) • Mr S Mabilo (Department of Economic Development, Environment and Tourism) • Mr Johan van Schalkwyk (Department of Economic Development, Environment and Tourism- Springbok) • Mr Denver van Heerden (Department of Environment and Nature Conservation) • Mr Johan Jonk (Department of Environment and Nature Conservation-Springbok) • Mr. Kholekile Nogwili (Department of Public Works, Roads and Transport) • Me Van Hinsbergen (Department of Public Works, Roads and Transport - Springbok) • Zolile Albanie (Department of Labour) • Mr A Abrahams (Department of Water and Sanitation) • Mr. P. Msimango (Department of Water and Sanitation) • Mr. Shaun Cloete (Department of Water and Sanitation - Upington) • Katie Smuts (South African Heritage Resource Agency)

The property is owned by Mr. GA Gerber. No land claim has been lodged against the property, and Mr Gerber is the only lawful occupier of the land concerned.

The Draft Scoping Report (DSR) was submitted to the Department of Mineral Resources (DMR) –Springbok and Kimberley for review purposes. This report was made available to the public for a 30 days' review period (6 August – 8 September 2019. An electronic copy of the report was published on the Greenmined Environmental website (www.greenmined.com). All registered I&AP's and stakeholders was notified of the commenting period in advance as above.

The DSR was then updated to reflect the comments received during the public commenting period. Thereafter, the Final Scoping Report (FSR) was submitted to the DMR for its consideration as part of the authorization process in terms of the NEMA 2014 regulations (as amended by GNR 326 effective 7 April 2017). A copy of the final report was made available on the Greenmined Environmental website. Once the Final Scoping Report has been accepted by the DMR (4 December 2019), the Draft Environmental Impact Assessment Report (DEIAR) was prepared and also made available to the public for a 30-day commenting period (22 November 2019 – 14 January 2020). An electronic copy of the DEIAR report was published on the Greenmined Environmental website. All registered I&AP's and stakeholders was notified of the commenting period in advance.

The acceptance letter (in terms of MPRDA) for the application was received 22 October 2010. The FSR was accepted by the DMR on the 4 December 2019.

Upon expiry of the commenting period the DEIAR was updated to reflect the comments received during the public commenting period. Thereafter, the Final EIAR was submitted to the DMR for its consideration as part of the authorization process in terms of the NEMA 2014 regulations (as amended by GNR 326 effective 7 April 2017). A copy of the final report was made available on the Greenmined Environmental website. All registered I&AP's and stakeholders was notified in writing within 14 days of the date of the decision of the outcome of the application, including the reasons for the decision and the right of appeal.

See attached Appendix 9 for proof of the public participation process conducted for the said mining right application.

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

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

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
AFFECTED PARTIES				
Landowner/s				
Mr. D.A Gerber	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	No objections	N/A
Lawful occupier/s of the land				
N/A	N/A	N/A	N/A	N/A
Landowners or lawful occupiers on adjacent properties				
Mr. Piet Carstens	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A
Mr. Pieter Jan van Heerden	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A
Mr. Deon Pieterse	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A
Mr. Abrie van Niekerk	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A

Mr. Rheon Muller	22 October 2018	(Comment submitted during Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite Application, due to validity and applicability of comment this has been left in the report. Additional comments will be worked into the FBAR). I WR Muller owner of the farm Aroams 57 agree in principle that this area could be used for repair of road ways, I however have the following stipulations: 1. There has to be a rental or use agreement in place prior to commencing any activities on the premises. 2. I insist on a fence to fence the area off from the rest of the farm. 3. I insist on a full waste management system as per DMR requirements. 4. The additive sprayed on the road will be specified. It has to be environmentally friendly and hydrophobic when dry. 5. The crushing process produces a -6mm material, usually referred to as Crusher Dust. The storage and cover of this material will have to be done as agreed, it is a potential source of dust long after the area has been rehabilitated.	Noted. 1. The land owner agreement is in place with Mr. D.A Gerber who currently owns a portion of portion 2 (Remaining Extent) of the Farm Aroams 57. Please find this land owner agreement attached as Appendix F1. 2. There is currently a fence around the mining permit area. 3. Please refer to the DBAR that is provided on our Greenmined Environmental website for the waste management that is currently in place at the Aroams quarry. 4. The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. If dust allaying agents are to be used, these agents will be environmental friendly and hydrophobic when dry. However, in the past since Aroams Quarry was established in 2012 water spraying was deemed sufficient for this area. 5. Noted. Water sprayers are located on the crushing plants where the sprayers are switched on when the crushing plant is running. Stockpiles are wetted various times during the day to minimise dust in the area. All roads on the mining permit area are sprayed with the water trucks to minimise the dust in the area.	Please refer to Part A, h) iv) and the Management and mitigation measures of dust as stated in Part B, e)
Municipal councillor				
Mr. Quincy (Khâi-Ma Local Municipality Ward 4)	X	No comments received. Please refer to Appendix F for the	N/A	N/A

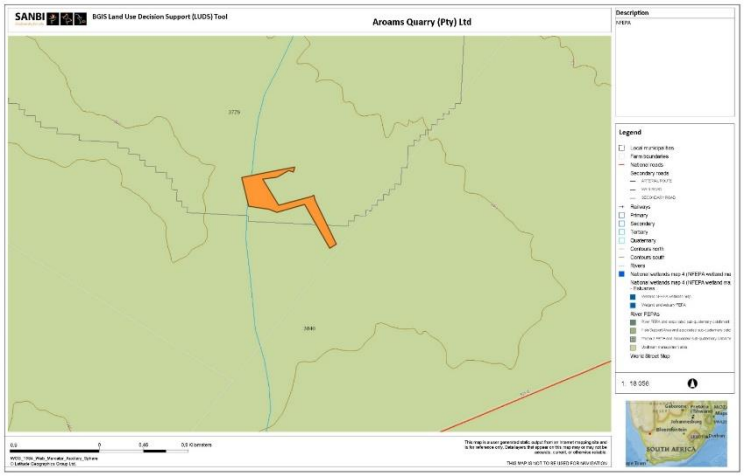
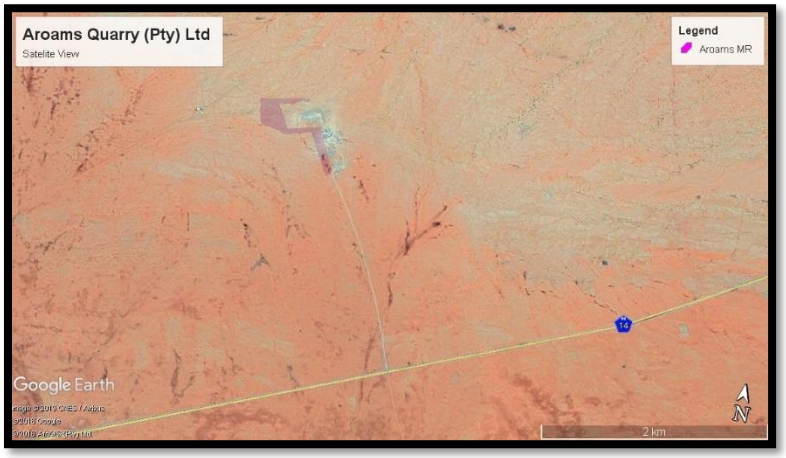
Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
		landowner agreement and comments letter.		
Municipality				
Mr. Obegang (Khâi-Ma Local Municipality)	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A
Mr Christiaan Fortuin Jannie Loubser Senior Manager: Economic Development & Planning Namakwa District Municipality (Namakwa District Municipality)	9 September 2019	Requested the Appendix 10 – Public Participation Report to be send.	The PPP report was send on the 9th of September 2019.	No comments needed any further.
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS				
Mr. Kholekile Nogwili (Department of Public Works, Roads and Transport)	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A
Me Van Hinsbergen (Department of Public Works, Roads and Transport - Springbok)				

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
Mr A Abrahams (Department of Water and Sanitation)	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A

Mr. P. Msimango (Department of Water and Sanitation)	29/07/2019	Reference is made to the letter received from the DWS on the 18th of September 2019, dated 29 July 2019, relating to the BID that was submitted to the DWS. The following comments were made in the letter received and are responded to accordingly: **1. Background** The department assumes that the proposed activity at the above mentioned locations will include: 1) Bulk sampling and prospecting activities; 2) Establishment of prospecting/mining related infrastructure which includes construction of buildings amenities, road infrastructure, accumulation of materials and waste erosion of topsoil, stockpiles, discard dumps, etc. The area falls within the D82C quaternary catchment in the Lower Orange Unit of the Orange River Proto Catchment Management Agency. Future correspondence on this project should be directed to the Upington Office of the Department (HlenganiA@dws.goc.za). There was no impact assessment report submitted for this project. No application for water use licence has been submitted as part of this project. There also has never been a pre-application	• *In the DBAR the catchment area was classified as the D82G catchment in the Lower Orange Water Management Area (WMA), specifically in the Orange Sub Water Management Area (Boegoeberg Sub Catchment). This classification was done in accordance with the SANBI, BGIS system, as well as the DAFF AGIS system.* • *Please inform us of the correct catchment area. It should also be noted that no bulk sampling will be conducted but only mining.* • *Aroams Quarry (Pty) Ltd has made the decision to obtain the necessary permissions from the Aggeneys Municipality, the the municipal dams supplying water to Aggeneys is located on the farm Aroams 57, Portion 2 – the same property that the proposed quarry will be located on. Please herewith find the proof of municipal water supply to the quarry.*	Please refer to Part A, h) iv) and the Management and mitigation measures of water aspects as stated in Part B, e)

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
		engagement with the Department. **2. Distance from the water course** Please note that our department rates all perennial a non-perennial rivers all together with all dry river bed as and natural drainage and associated riparian areas extremely sensitive tot development. An option of developing furthest away from all water course would be the preferred option. Please note that no development or prospecting/mining should be done within 100m or 1:100 year flood line of any water courses should be delineated in order to provide appropriate buffer to maintain such a water course. The delineation should be done according to the appropriate DWS's delineation document. The construction camp shall not be located within the 1:100 year flood line or within 100 meters whatever is the greater from any watercourse. Operation and	• *Please refer to the DEIAR, as attached for information on water uses in order to provide the Department with a more accurate, efficient comments during this application* • *No water will be abstracted or used during mining from any Riverbed. Water will be obtained from the municipality. Potable water will daily be transported to site.* • *No prospecting will be conducted within 100m from a watercourse or in close proximity (within the 500m buffer zone) of any perennial/non-perennial or dry river beds as indicated in Figure of the DEIAR.*	

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
		storage of equipment within n the riparian zone must be limited as far as possible. Vehicles and other machinery must be services well above the 1:100 year flood line or within a horizontal distance of 100 meters from any watercourse or estuary. Oils and other potential pollutants must be disposed of at any appropriate licensed site, with the necessary agreement from the owner of such site.	 ***Figure 2: Map showing surface water features (Figure 37 in the* DEIAR*) As indicated in the figure above, there is 1 stream flowing towards the west of the site. This stream (which is a** dry bed***) is indicated in Figure 2 as well.***	

			The environmental impact assessment will identify water resources within the proposed footprint area, and prescribe no-go buffer areas to be managed throughout the invasive phase of the proposed mining permit activity. There are no significant river that runs through the farm with the exception of dry drainage channels that flow during rainy periods.  ***Figure 3: NFEPA status***  ***Figure 4*: *Satellite view showing the position of Site Alternative 1 indicated in purple.***	

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			From Figure 4 *it can be seen the mining right area is not in close proximity to the streams.* • *No staff or employees will be accommodated on site.* • *No residual waste as a result of the prospecting activity will be produced that needs to be treated on site. Any general waste that may be produced on-site will be contained in sealed refuse bins to be transported to the local municipal landfill site (Pofadder). The amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental leakage. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site.*	
		3. Storm water management Any storm water must be diverted from the construction works and roads and must be managed in such a manner as to disperse runoff and to present the concentration of storm water flow. Where necessary, works must be constructed to attenuate the velocity of the storm water discharge and to protect the banks of the watercourse. Storm water control works must be constructed, operated and maintained in a sustainable manner throughout the project.	• *Please refer to the DEIAR, as attached for information on water uses in order to provide the Department with a more accurate, efficient comments during this application* ***Storm water Handling:*** *The risk of contamination through dirty storm water escaping from work areas, or erosion or loss of stockpiled topsoil caused due to uncontrolled storm water flowing through the prospecting area can be reduced to being low through the implementation of the mitigation measures listed below:* *a) Storm water must be diverted around the topsoil heaps, and access roads to prevent erosion and loss of material.* *b) Prospecting 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:*	

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		Increased runoff due to vegetation clearance and/or soil compaction must be managed, and steps must be taken to ensure that storm water does not lead to bank instability and excessive levels of silt entering the watercourse. Storm water leaving the construction its must in no way be contaminated by an substance, whether such substance is a solid, liquid, vapor or gas or a combination thereof which is produced, used, stored dumped or spilled on the premises. **4. Invasive alien vegetation** Vegetation must be monitored a managed on an on-going bases during construction and operation. Alien vegetation must bot be allowed to further colonizes the area, and all new alien vegetation recruitment must be eradicated or controlled, using standard methods approved by the Department.	*c) Runoff water should be diverted around the site areas with trenches and contour structures to prevent erosion of the work areas.* *d) 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.* *e) Dirty water must be collected and contained in a system separate from the clean water system.* *f) Dirty water must be prevented from spilling or seeping into clean water systems.* *g) The storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns).* *h) The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the management plan.* - *Please refer to the DEIAR as attached for information on water uses in order to provide the Department with a more accurate, efficient comments during this application* - *Weed / Alien clearing will be done in a sporadic manner during the life of the prospecting activities. Species regarded as the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure. Final rehabilitation shall be completed within a period specified by the Regional Manager.*	

			• *An alien invasive management plan will be compiled during the EIAR/EMPR phases.*	
		5. Design and layout of prospecting/mining A detailed layout plan needs to be submitted to our Department showing all the facilities in the proposed development, distance from the any watercourses a bathroom facilities. Details of the final design must also be supplied as soon as a decision has been made, as the details of this factor may influence the environmental impact both during the construction and operation phases of the project.	• *Please refer to all maps indicating all prospecting activities in the DEIAR as Appendix 1 to 7.* • *Details of design changes or final design will be supplied as soon as the Mining Right have been granted.*	
		6. Construction Material with polluting generation potential must be limited in any construction activities. Any hazardous substances must be handled according to the relevant legislation relating to transport, storage and us of the substance. Any spillage of any hazardous materials inclusion diesel that may occur during construction and operation must be reported immediately to our Department.	• *Noted. Please refer to the DEIAR, as attached for more information on the rehabilitation on site. More information will be provided during the EIAR/EMPR phases.* • *No residual waste as a result of the prospecting activity will be produced that needs to be treated on site. Any general waste that may be produced on-site will be contained in sealed refuse bins to be transported to the local municipal landfill site (Pofadder). The amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental leakage. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site.* ***Handling of Hazardous Materials and Substances:*** • *All hazardous materials or substances should be stored in a closed storage facility with an impermeable floor.* • *The storage area should meet the following conditions:*	

			○ *The storage area should be constructed on a level area to prevent offsite migration of any spilled product.* ○ *The floor of the storage area should be impermeable to prevent seepage of spilled products into the ground or ground water.* ○ *The storage area should be out of the 1:100-year flood line or further than 100m from the edge of a watercourse, whichever is greatest.* ○ *The facility should be such that access to the materials/substances can only take place with the prior notification of an appropriate staff member.* • *All fuel storage tanks should have secondary containment in the form of an impermeable bund wall and base within which the tanks sits, raised above the floor, on plinths. This bund capacity should be sufficient to contain 110% of the tank's maximum capacity.* • *The distance and height of the bund wall relative to that of the tank should also be taken into consideration to ensure that any spillage does not result in oil spouting beyond the confines of the bund.* • *The site manager should establish a formal inspection routine to check all equipment in the bund area, as well as the bund area itself for malfunctions or leakages. The bund area should be inspected at least weekly and any accumulated rainwater removed. All valves and outlets should be checked to ensure that they are intact and closed securely.* • *The bund base must slope towards a rainwater sump of sufficient size.* • *Contaminated water may not be allowed to mix with clean water, and contained until it can be collected by a registered hazardous waste handling contractor or be disposed of at a registered hazardous waste handling facility.* • *Drip trays should be available to be place underneath all stationary equipment or vehicles.* • *The layer of material at the vehicle service area should be removed and if contaminated with hazardous substances such as hydrocarbons should be disposed of as hazardous waste by an appropriately qualified waste handling contractor. The compacted areas should be ripped and the topsoil returned over the area.* • *The site should be cleared of all hazardous substances once decommissioning has been completed and should be disposed of by an appropriately qualified waste handling contractor.*	
		7. Waste Management Rubbish bins and Enviro loose/mobile toilets must be there and enough for people on site	• *Noted. Please refer to the DEIAR, as attached for more information on the waste management on site. More information will be provided during the EIAR/EMPR phases.*	

		during construction. A letter of consent from a registered waste facility to allow the contractor to empty the toilet facility at their sewer system should be submitted to our department. All sewerage, grey and wash water , as well as any waste generated during the construction phase of the facilities will be collected, contained and disposed of a the permitted and/or licensed facilities of the local authority and this must please be confirmed in writing by the local authority.	***Waste Management:*** *The risk of waste generation having a negative impact on the surrounding environment can be reduced to being low through the implementation of the mitigation measures listed below:* • *No waste stockpile area may be established outside the boundaries of the mining area.* • *Vehicle maintenance may only take place within the service bay area of the off-site workshop.* • *The diesel bowser needs to be equipped with a drip tray at all times. Drip trays have to be used during each and every refueling event.* • *The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refueling.* • *Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site.* • *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 recognised facility.* • *Spills must be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing it at a recognised facility. Proof should be filed.* • *Suitable covered receptacles should be available at all times and conveniently placed for the disposal of waste.* • *Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc, should be stored in a container with a closable lid at a collecting point and collected on a regular basis and disposed of at a recognised landfill site. Specific precautions should be taken to prevent refuse from being dumped on or in the vicinity of the mine area.* • *Biodegradable refuse generated should be handled as indicated above.* • *Water from the wash bay should drain into the oil sump from where it should be removed by an approved contractor.* • *Drip trays should be available to be place underneath all stationary equipment or vehicles.* • *Waste material of any description, including receptacles, scrap, rubble and tyres, should be removed entirely from the mining area and disposed of at a recognized landfill facility once decommissioning has been completed. It will not be permitted to be buried or burned on the site.*	

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		8. Rehabilitation Soils that have become compacted through the activities of the development must be loosed to an appropriate depth to allow seed germination. The necessary erosion prevention mechanism must be employed to ensure the sustainability of all structure and activities and to prevent in-stream sedimentation. Rehabilitation remains the sole responsibility of the applicant and the Department.	*Noted. Please refer to the DEIAR, as attached for more information on the rehabilitation on site. More information will be provided during the EIAR/EMPR phases.* ***Rehabilitation of the excavated area:*** • *Rocks and coarse material removed during the operational phase must be dumped into the excavation;* • *No waste may be permitted to be deposited into the excavations;* • *Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, 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 must 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 6 months from closure of the site;* • *If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager 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.* • *The mitigation measures associated with these impacts must be expanded upon as part of the closure plan and EIA process.* ***Rehabilitation of the mining related infrastructure:*** • *Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required) and maintenance, and weed / alien clearing;*	

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		9. Water use entitlement The department notes that the applicant has not submitted a request for a water use authorization from our Department. Please be informed that engaging in water us activities is unlawful without necessary authorization form our Department. Please note that an application can be lodged electronically vie the EWULAA system.	• *All infrastructure, temporary equipment and other items used during the mining period shall be removed from the site (section 44 of the MPRDA);* • *Waste material of any description, including receptacles, scrap, rubble and tyres, shall 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;* • *Weed / Alien clearing will 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) must be managed and controlled on site on an ongoing basis;* • *Final rehabilitation shall be completed within a period specified by the Regional Manager;* • *The mitigation measures associated with these impacts must be expanded upon as part of the closure plan and EIA process.*	

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		10. Issues to take into consideration. The applicant is to submit an EMPR/EIA and it should take the following issues into consideration: a) Should the project continue, a site visit and pre consultation meeting must be conducted by DWS official with the applicant, which will be followed by an application for Water Use Authorization (proof of consultation of an application). This must be submitted to DWS in terms of the NA, before any prospecting/mining activities will take place. A list was provided of items to be included into the application. b) The EMP must clearly show all water courses as defined in the National Water Act, 1998 (Act 36 of 1998) as well as the delineated 1:100year flood lines. No activity may occur within the 1:100 year flood line of a river/draining lines without authorization. No activity may occur within the 500m radium of a pan/wetland (Perennial/non perennial) without authorization.	• *Noted. Application has been made to the Department, however it was decided by mine management to use water that will be obtained from the municipal water supply. Please refer to letter attached in Appendix* • *Noted. Application has been made to the Department, however it was decided by mine management to use water that will be obtained from the municipal water supply.* • *Noted. Please refer to comments under Number 1 of this response letter.*	

		c) The EMP must clearly show the methods for collecting, storing, transporting and finally disposing of all waste products as well as the responsible and accountable persons. This include written consent from the relevant accredited waste disposal site. Sewage disposal /oil disposal in handling the waste. All applicable sections of the National Environmental Management Waste Act 59 of 2008 should be strictly adhered to.	*Noted. Please refer to the DEIAR.*	
		d) The EMP must clearly identify all risk that are associated with the project that can affect the water resources in and around the project area and state all implementable measures to prevent and respond to accidents and abnormal events that may occur.	*Noted. Please refer to the DEIAR.*	
		e) The EMP must clearly identify all risk that are associated with the project that can affect the water resources in and around the project area and state all corresponding measures to prevent and response to accidents and abnormal event that may occur.	*Noted. Please refer to the DEIAR.*	
		f) The EMP must clearly show through a responsibility matrix and organogram the responsible persons for implementing the mitigation measures and reporting line, the the event of an accident.	*Noted. Please refer to the DEIAR.*	
		g) The EMP must show in written form that the developer	*Noted. Please refer to the DEIAR.*	

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		has made a legally binding commitment to implement the proposed mitigation measures and that these measures are not only suggestion and recommendations. h) The EMP must clearly show the process followed in the developer does not comply with the legal requirements of the EMP and the National Water Act, 1998 (Act No 36 of 1998). The regulations on the use of water for prospecting/mining and related activities aimed at the protection of the Water Resources as published by GN704 of 4 June 2018 must be complied with. Every person in control of a mine activity must take reasonable measures to comply with the following requirements: a) Prevent water containing waste or any substance which is likely to cause pollution n of a water resource from entering any water resource, either by natural flow or by seepage, and must retain and collect such substance or water	*Noted. Please refer to the DEIAR.* *Noted.*	

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		containing waste for the use, re-use, evaporation or for purification and disposal in terms of the Act; b) Design, modify, construct, maintain all water systems, including residue deposits, in any area so as to prevent the pollution of any water resource through the operation or use therefore and to restrict the possibility of damage to the riparian or in stream habitat through erosion n or sedimentation, or the disturbance of vegetation , or the alternation of flow characteristics; c) Cause effective measures to be taken to minimized the flow of any surface water or floodwater into mine working, opencast working, other working or subterranean caverns, through cracked o fissured formations, subsided ground, sinkholes, outcrop excavations, audits, entrances or any other openings; d) Design, modify, construct, maintain and use any dam or any residue deposit or stockpile used for the disposal or		

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		storage of mineral tailing, slimes, ash or other hydraulic transported substance, so that the water or waste therein, or falling therein, will not result in the failure thereof or impair the stability thereof; e) Prevent the erosions or leaching of materials from a residue deposit or stockpile from any area and contained material or substances so eroded or leaching such area by providing suitable barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting any water resources; f) Ensure that water used I any processes at a mine or activity is recycled as far as practicable, and any facility, sump. Pumping installation, catchments dams or impoundment used for the recycling of water is adequate design and capacity to prevent the spillage, seepage, or release of water containing waste at any time g) At all times keep any water system free from any		

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		matter or obstruction which may affect the efficiently thereof; and h) Cause all domestic waste, including wash-water, which cannot be disposed of in a municipal sewerage system, to be disposed of in terms of an authorization under the act. **11. Conclusion** The department therefore has no objections to this activity provided proof of adherence to the above mentioned recommendations has been obtained.	*A pre-application meeting has been held with Mr. Shaun Cloete from the DWS-Upington on the 12th of June 2019 regarding the water uses on site. Application has been made on 22 May 2019.* *Aroams Quarry (Pty) Ltd management has made the decision to obtain the necessary permissions from the Aggeneys Municipality, the municipal dams supplying water to Aggeneys is located on the farm Aroams 57, Portion 2 – the same property that the proposed quarry will be located on. Please herewith find the proof of municipal water supply to the quarry. The proof of municipal water supply to the quarry is in Afrikaans, we await the agreements in English and will send it to the Department as soon as received.*	

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Mr. Shaun Cloete (Department of Water and Sanitation - Upington)				

Natasha Higgitt (South African Heritage Resource Agency)	31 July 2019 22 November 2019	(Comment submitted during Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite Application, due to validity and applicability of comment this has been left in the report. Additional comments will be worked into the FBAR). As the proposed development is undergoing an EA Application process in terms of the National Environmental Management Act, 107 of 1998 (NEMA), NEMA Environmental Impact Assessment (EIA) Regulations for activities that trigger the Mineral and Petroleum Resources Development Act, No 28 of 2002 (MPRDA) (As amended), it is incumbent on the developer to ensure that a **Heritage Impact Assessment** (HIA) is done as per section 38(3) and 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA). This must include an archaeological component, paleontological component and any other applicable heritage components. The HIA must be conducted **as part of the** EA Application in terms of NEMA and the NEMA EIA Regulations. The quickest process to follow for the archaeological component would be to contract a specialist (see www.asapa.org.za or www.aphp.org.za to provide an Archaeological Impact Assessment (AIA). The AIA must	*A desktop Heritage Impact Assessment and recommendation for exemption from further Paleontological studies was submitted to SAHRA for their perusal. SAHRA subsequently responded that the development is unlikely to impact significant heritage resources and that the SAHRA Archaeology, Palaeontology and Meteorites Unit has no objection to the development on condition that, if any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources are found during development, constructing or mining, SAHRA and an archaeologist and/or palaeontologist, depending on the nature of the finds, must be alerted immediately"* A heritage specialist study was commissioned for Aroams Quarry as per the SAHRA recommendations. Please refer to the Heritage assessment that was conducted as included in Appendix K.	Please refer to Part A, h) iv) and the Management and mitigation measures of archaeological and cultural aspects as stated in Part B, e)

		comply with the SAHRA 2007 Minimum Standards: Archaeological and Paleontological Component of Impact Assessments. The proposed prospecting area is located within an area of insignificant sensitivity in terms of paleontological resources. No further assessment of the impact to paleontological resources is required. Any other heritage resources as defined in section 3 of the NHRA that may be impacted, such as maritime archaeology, built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewscapes must also be assessed. The draft Basic Assessment Report (BAR) and appendices must be submitted so that an informed comment can be issued. **Aroams Quarry (Pty) Ltd intends to apply for a Mining Right for the mining of aggregate, gravel, granite and dolerite, 13.6 ha, on a portion of Portion 2 (Remaining Extent) of the farm Aroams 57,**		

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		Registration Division of Namaqualand RD, Northern Cape. Greenmined Environmental has been appointed by Aroams Quarry (Pty) Ltd to conduct an Environmental Authorisation (EA) Application and Mining Right (MR) Application for proposed mining activities on a portion of portion 2 (remaining extent) of the farm Aroams 57, near Aggeneys, Northern Cape (NC 30/5/1/2/2/10156 MR). A draft Environmental Impact Assessment (EIA) Report has been submitted in terms of the National Environmental Management Act, No 107 of 1998 (NEMA), NEMA EIA Regulations for activities that trigger the Mineral and Petroleum Resources Development Act, No 28 of 2002 (MPRDA)(As amended). The proposed mining activities will include extending the existing rock quarry within 13.6 ha.		

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		Heritage Contracts and Archaeological Consulting (HCAC) were appointed to provide the heritage specialist component as part of the EA in terms of section 24(4)b(iii) of the NEMA and section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA). *Van der Walt, J. 2019. Heritage Impact Assessment for the Aroams Mining Right Application, Northern Cape Province.* A total of seven heritage resources that comprise of find spots i.e. isolated Stone Age artefacts and a scatter of modern glass and metal fragments were identified. These resources were assessed as having no heritage significance and no other heritage resources were identified. The development footprint is located in an area of low and insignificant sensitivity in terms of palaeontological resources as per the SAHRIS PalaeoSensitivity		

		map. Recommendations provided in the report include the need for a Chance Finds Procedure. **Final Comment** The following comments are made as a requirement in terms of section 3(4) of the NEMA Regulations and section 38(8) of the NHRA in the format provided in section 38(4) of the NHRA and must be included in the Final EIA and EMPr: 38(4)a – The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit has no objections to the proposed development; 38(4)b – The recommendations provided by the heritage specialist are supported and must be adhered to and must be included in the Final EIA/EMPr. No additional specific conditions are provided for the development; 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per		

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		section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; 38(4)d – See section 51(1) of the NHRA; 38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as		

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		possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; The Final EIA and EMPr must be submitted to SAHRA for record purposes; The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application. Should you have any further queries, please contact the designated official using the case number quoted above in the case header.		

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Communities				
N/A	N/A	N/A	N/A	N/A
Dept. Land Affairs				
MR W.V.D MOTHIBI (Department of Agriculture, Land Reform and Rural Development)	X	N/A	N/A	N/A
Mr Darren Engelbrecht (Department of Agriculture, Land Reform and Rural Development-Springbok)				
Traditional Leaders				
N/A	N/A	N/A	N/A	N/A
Dept. Environmental Affairs				
Mr S Mabilo (Department of Economic Development, Environment and Tourism)	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A

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Mr Johan van Schalkwyk (Department of Economic Development, Environment and Tourism-Springbok)				
Mr Denver van Heerden (Department of Environment and Nature Conservation)	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A
Mr. Brian Fisher (Department of Environment and Nature Conservation)	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A
Mr Johan Jonk (Department of Environment and Nature Conservation - Springbok)				
Other Competent Authorities affected				
Zolile Albanie (Department of Labour)	X	No comments received. Please refer to Appendix F for the landowner agreement and comments letter.	N/A	N/A
OTHER AFFECTED PARTIES				

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
INTERESTED PARTIES				
Horomela Mining Investment & Resources (Pty) Ltd	8 July 2019	We hereby confirm the receipt of your letter dated 3 July 2019 and note its contents. We confirm that we have no objection to this application and to the proposed prospecting activities of Aroams Quarry (Pty) Ltd for the following listed minerals; aggregates, gravel, granite and dolerite. We will hold Aroams Quarry (Pty) ltd fully accountable to the commitments stipulated in their letter especially with regards to the size of the proposed project area (13.6ha).	N/A	N/A

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.

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

The key findings of the environmental impact assessment entail the following:

i. Climate

According to SA Explorer, Aggeneys normally receives about 34 mm of rain per year, with most of the rainfall occurring mainly during autumn. Figure 4 shows the average rainfall values for Aggeneys per month. It receives the lowest rainfall (0 mm) in December and the highest (9 mm) in March. The monthly distribution of average daily maximum temperatures in Figure 5 shows the average midday temperatures for Aggeneys range from 17.7 ºC in July to 31.6 ºC in January. The region is coldest during July when temperatures drops to 3 ºC on an average during the night. Refer to Figure 6 below for an indication of the monthly variation of average minimum daily temperatures (Explorer, SA Explorer, 2018).

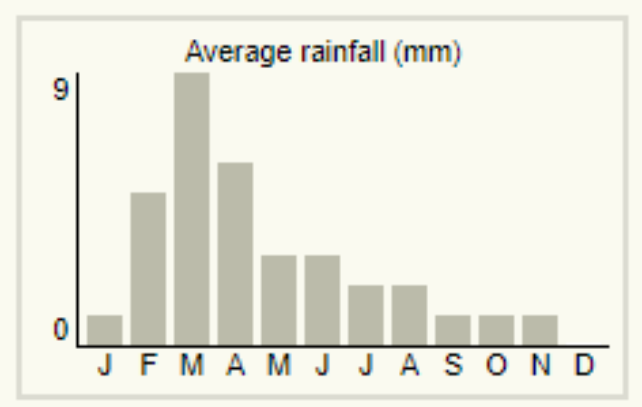

Figure 5:Average rainfall for Aggeneys

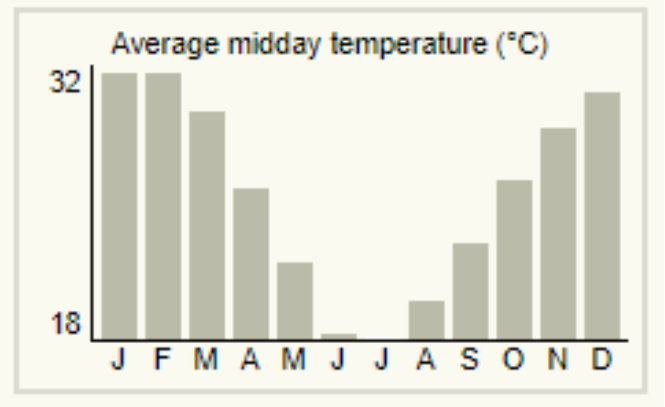

Figure 6:Average midday temperature

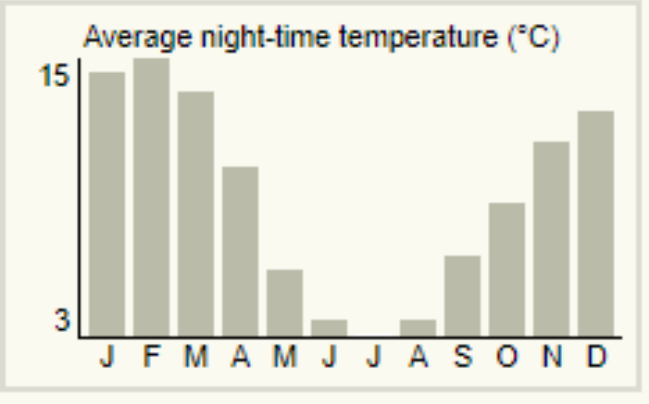

Figure 7: Average night-time temperature

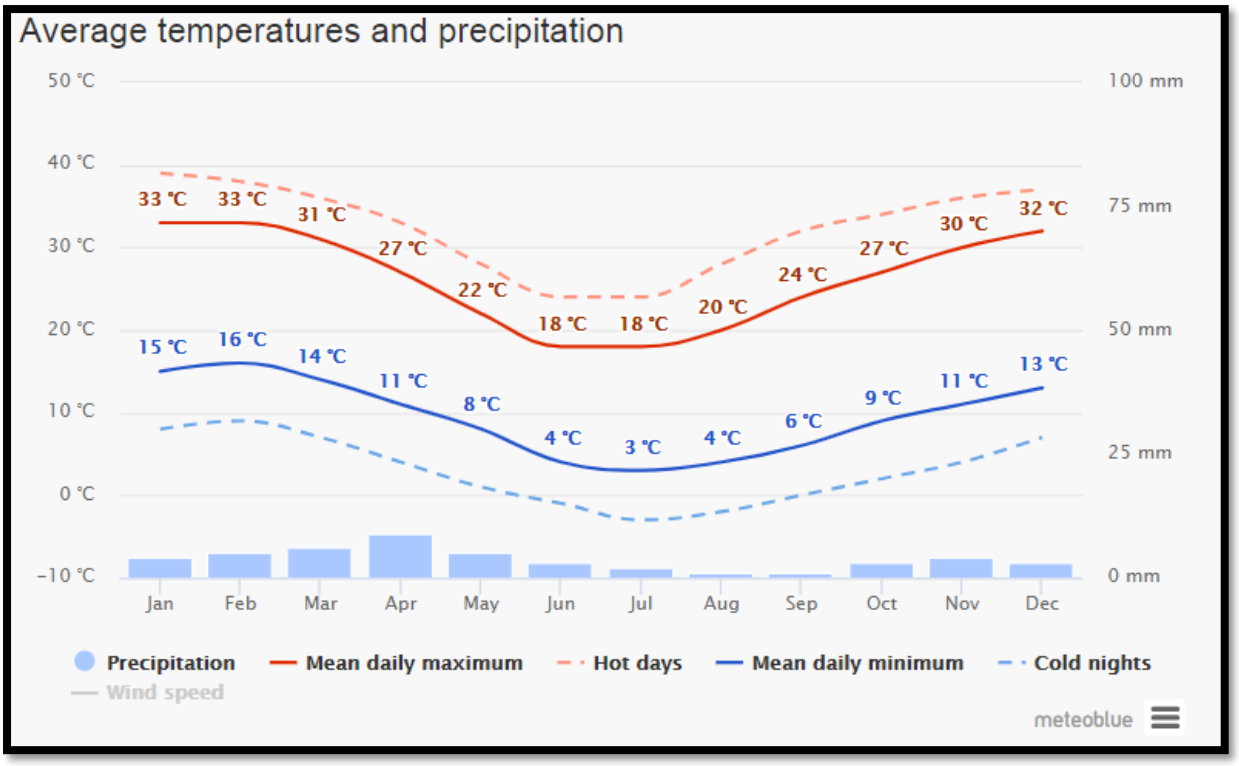

Figure 8: Average rainfall and Temperature for Aggeneys

Figure 9 shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast. As indicated in the figure below, sunny days are in June-July during winter, with overcast and precipitation days occurring in the summer season in March (Meteoblue, 2018).

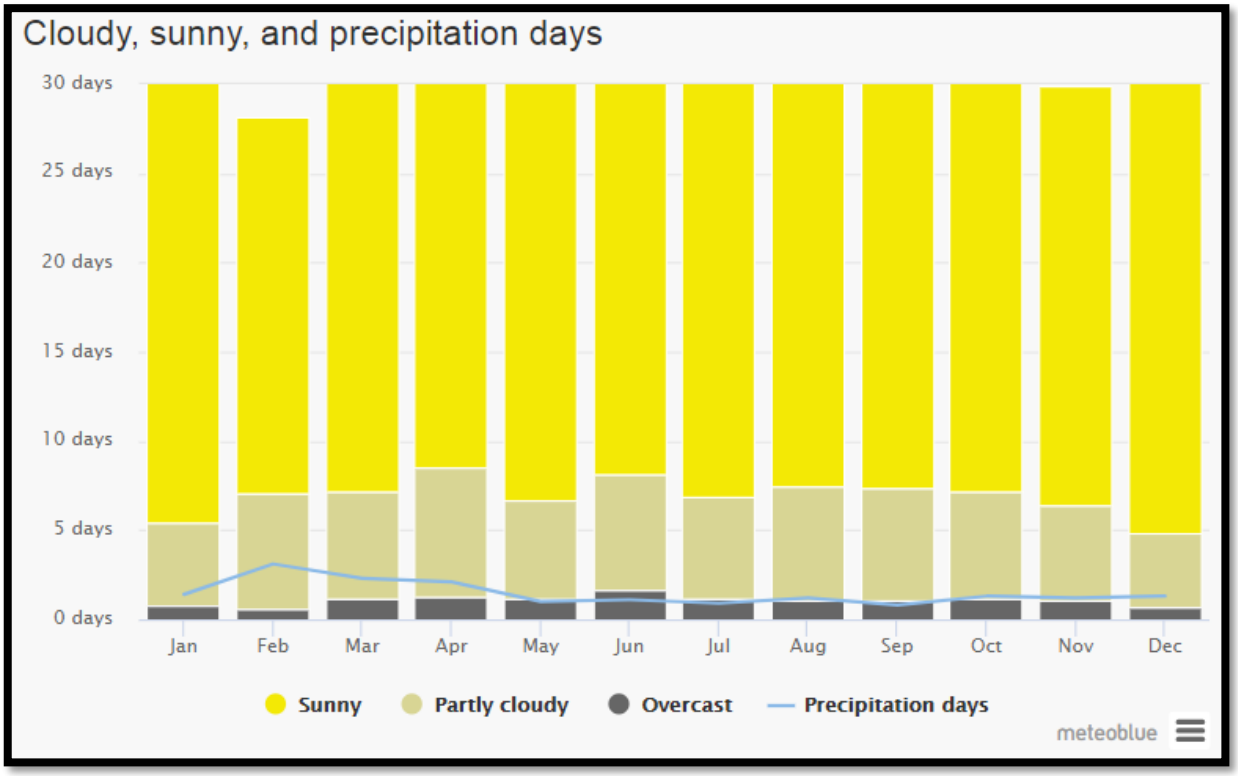

Figure 9: Cloudy, sunny and precipitation days of Aggeneys.

The maximum temperature diagram for Aggeneys displays how many days per month reach certain temperatures. As indicated in the figure below, the hottest temperatures occur during the summer season with temperatures reaching from 17.9 °C in June to 32.7 °C in January and the coldest during July when the mercury drops to 1.3 °C on average during the night when frost can occur. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Aggeneys range from 19.1 °C in June to 33.2 °C in January. The region is the coldest during July when the mercury drops to 1 °C on average during the night. Consult the figure below for an indication of the monthly variation of average minimum daily temperatures (Explorer, SA Explorer, 2018) (Meteoblue, 2018).

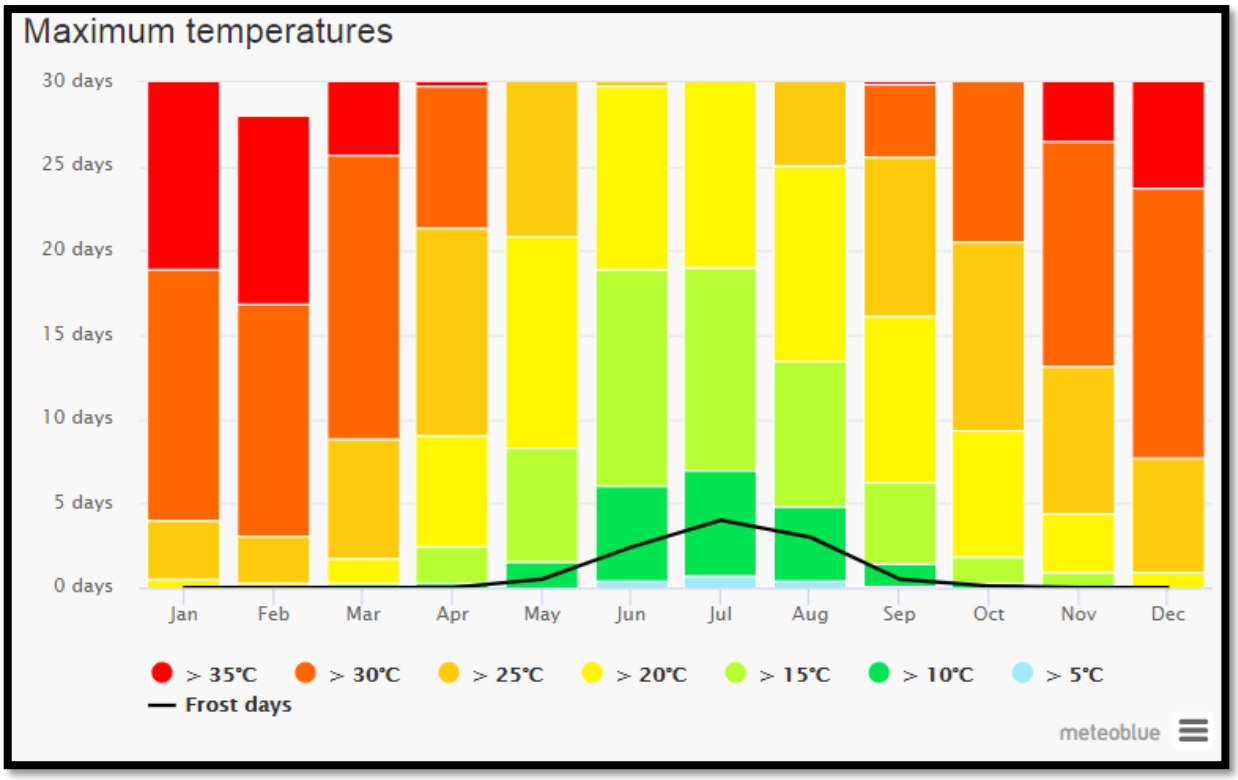

Figure 10: Maximum temperatures of Aggeneys.

The precipitation diagram for Aggeneys shows on how many days per month, certain precipitation amounts are reached. In tropical and monsoon climates, the amounts may be underestimated. Aggeneys normally receives about 132 mm of rain per year, with most rainfall occurring mainly during autumn. It receives the lowest rainfall in July and the highest in (38 mm) in March (Meteoblue, 2018) (Explorer, SA Explorer, 2018).

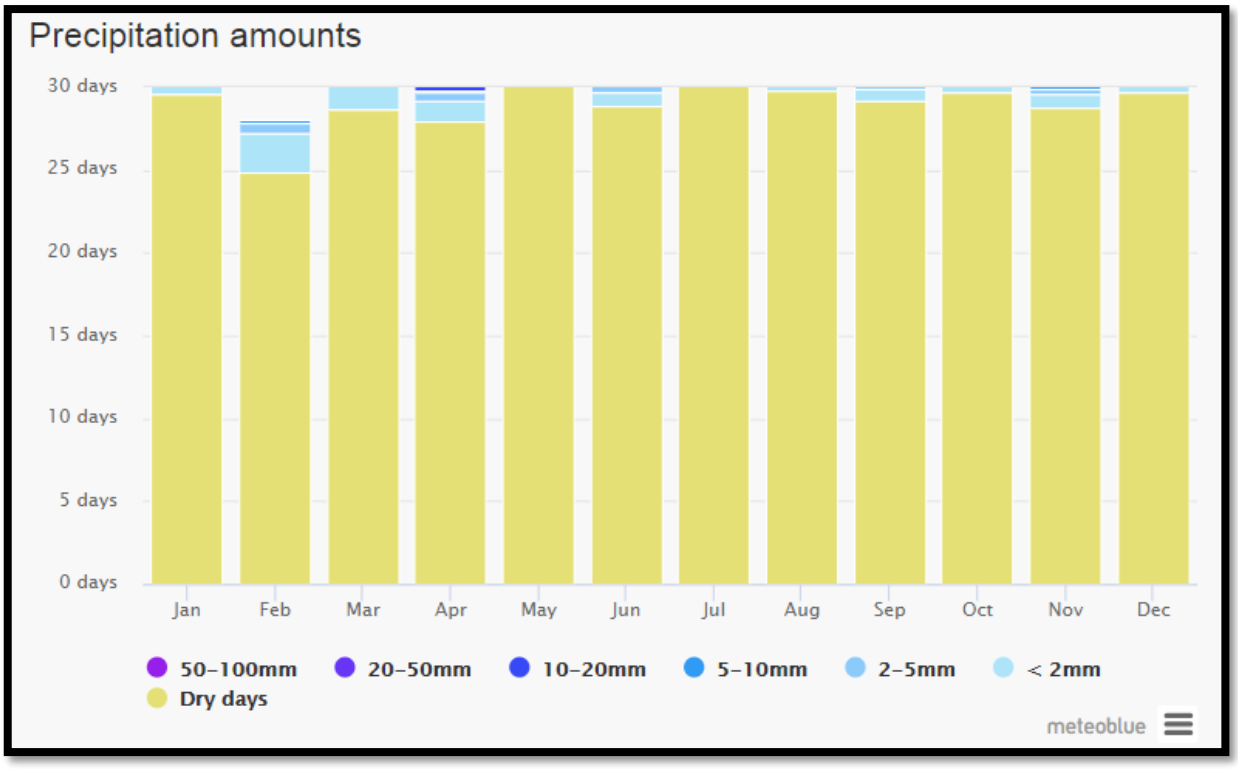

Figure 11: Precipitation amounts for Aggeneys.

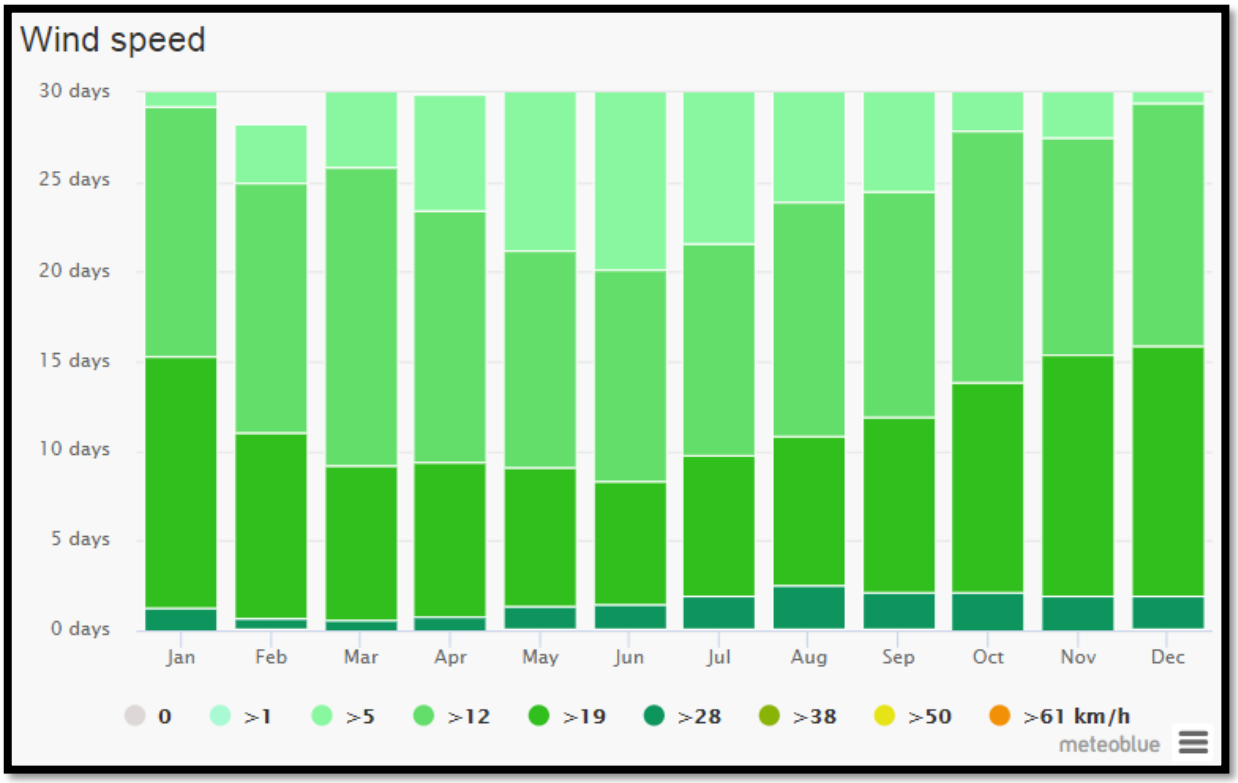

Figure 12: Average wind speeds in Aggeneys.

The diagram for Aggeneys shows the days per month, during which the wind reaches a certain speed. As seen from the figure above, the average wind speeds over the summer season is calculated to be about 19 km/h whereas in the winter season in drops to 5km/h.

The wind rose for Aggeneys shows how many hours per year the wind blows from the indicated direction. As seen from the figure below, the average wind rose in Aggeneys is a Southerly and South-South Easterly wind, this can be during winter and summer times.

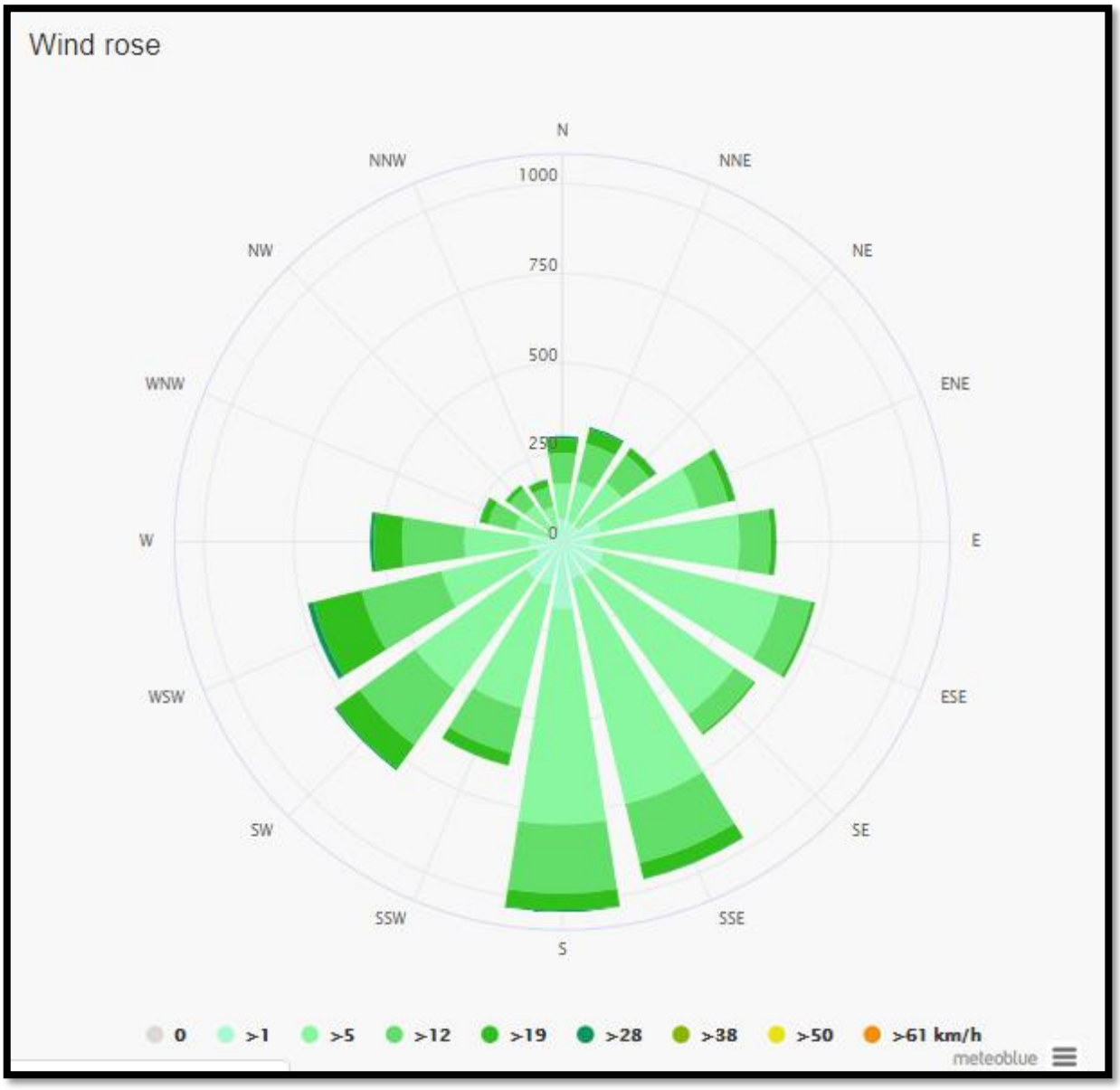

Figure 13: Wind rose for Aggeneys.

ii. Geology

According to Mucina and Rutherford, 2006 a third of the geology of the area is covered by recent (Quaternary) alluvium and calcrete. Superficial deposits of the Kalahari group are present in the east. The extensive Palaeozoic Diamictite of the Dwyka group outcrops in the area as do gneisses and metasediments of Mokolain age.

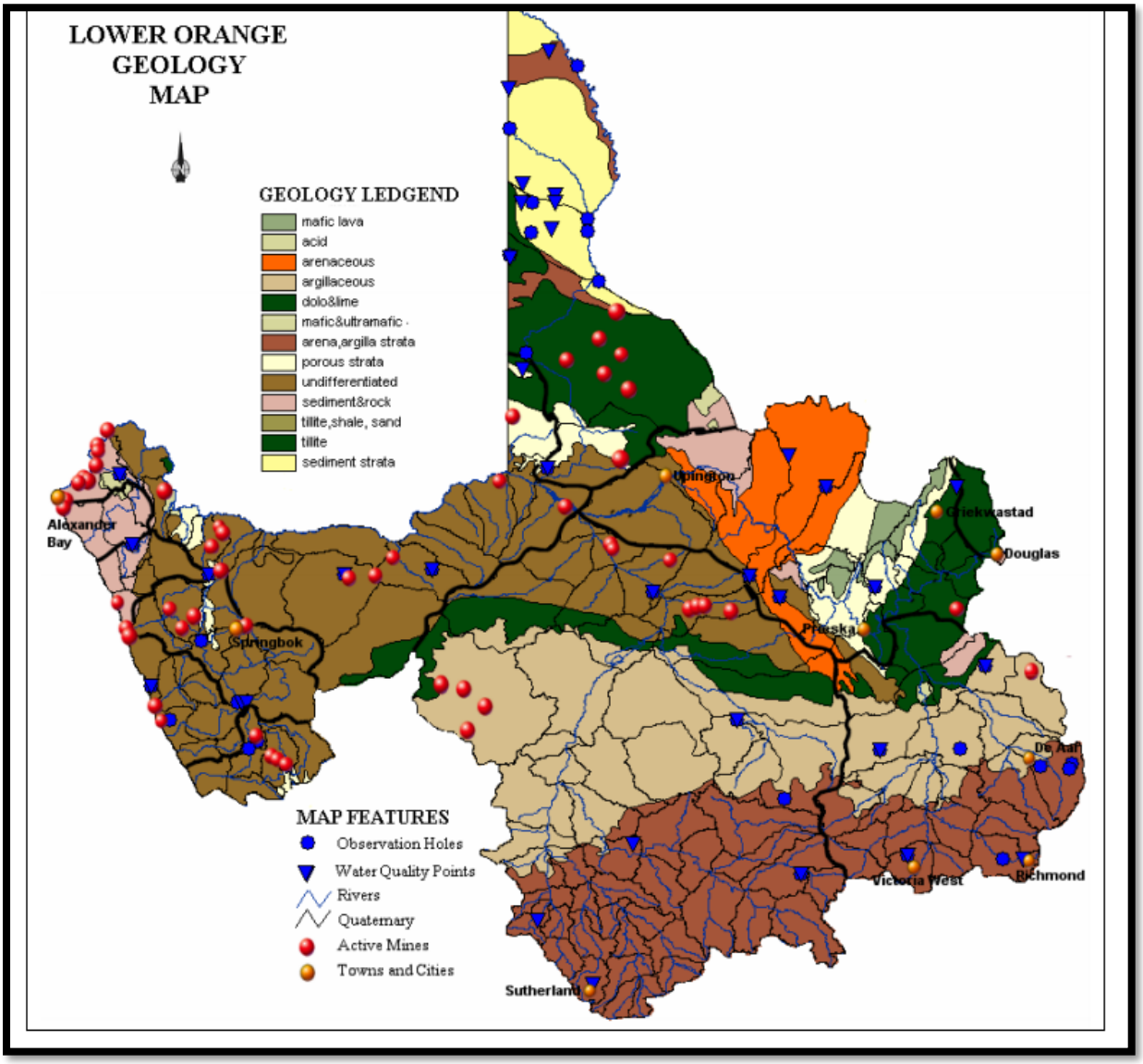

Figure 14: Simplified Geology of the WMA

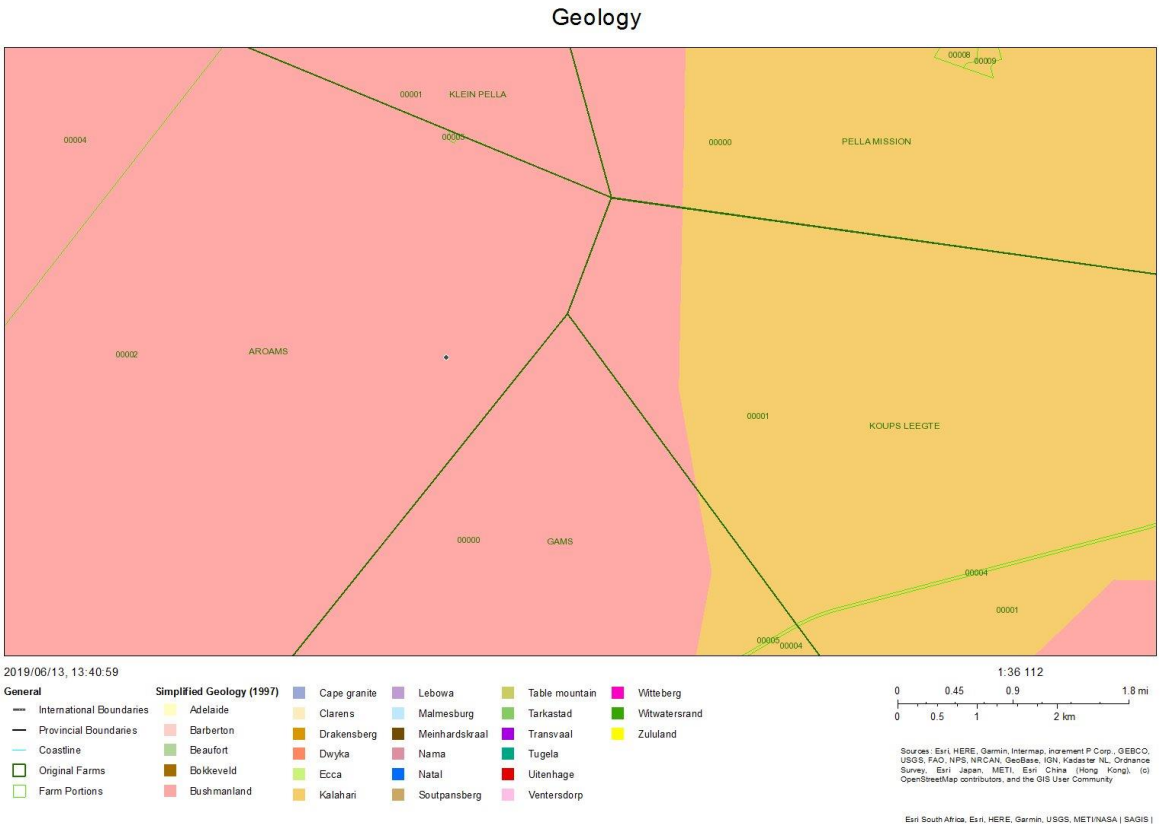

Figure 15: Geology

From the figure above, the simplified geology of the area is classified as Bushmanland.

i. Topography

The area is characterized by an expansive or extensive to irregular plains in a slightly sloping plateaus sparsely vegetated by, dry grasslands with scattered ancient rocky outcrops, named Inselbergs. The altitude varies mostly from 600-1200m above sea level.

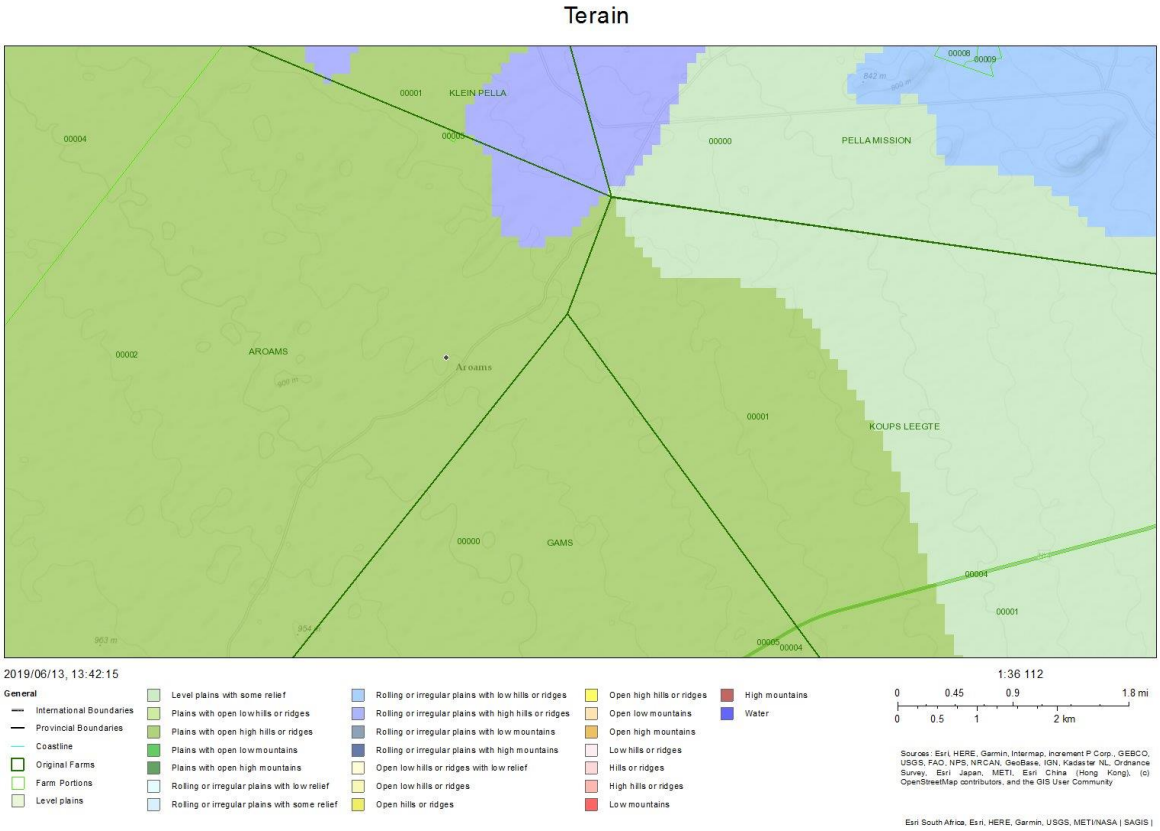

Figure 16: Terrain

The terrain of the area can be described as plains with open low hills or ridges. To the east of the properties the area can be described as level areas.

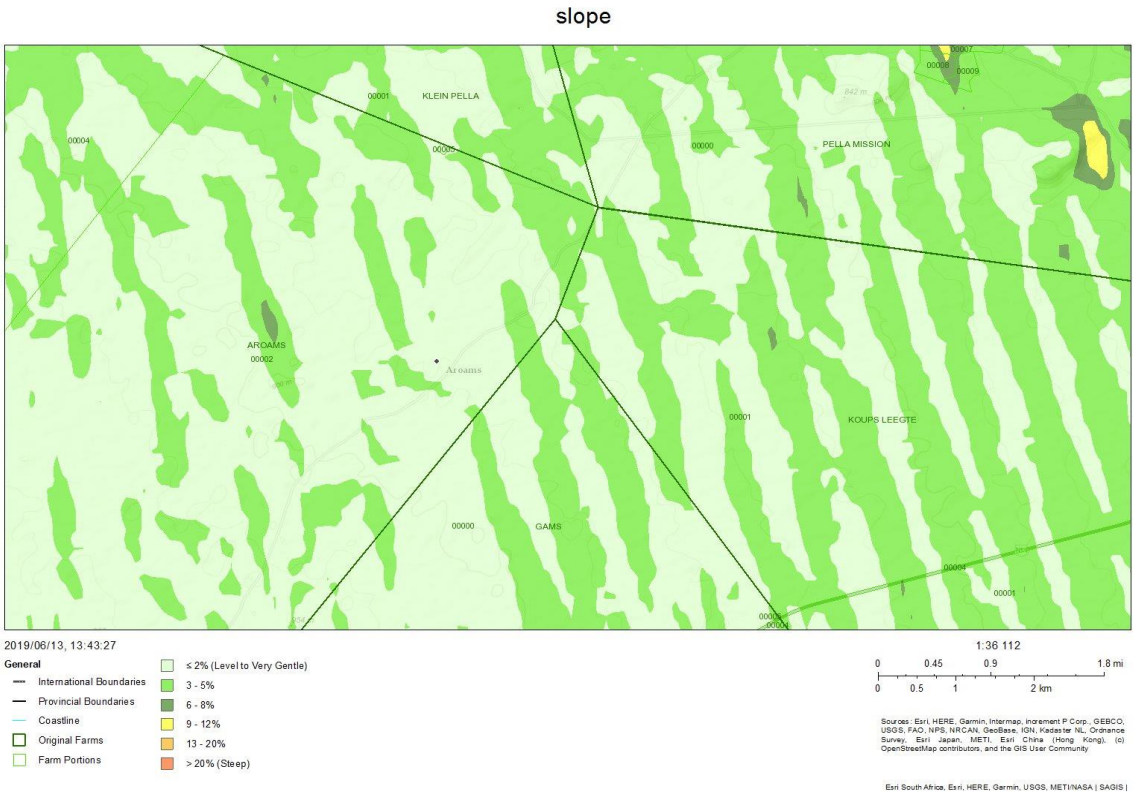

Figure 17: Slope

The slope of the area has a slope of ≤2% which is level to very gentle slopes to areas with a slope of 6-8%.

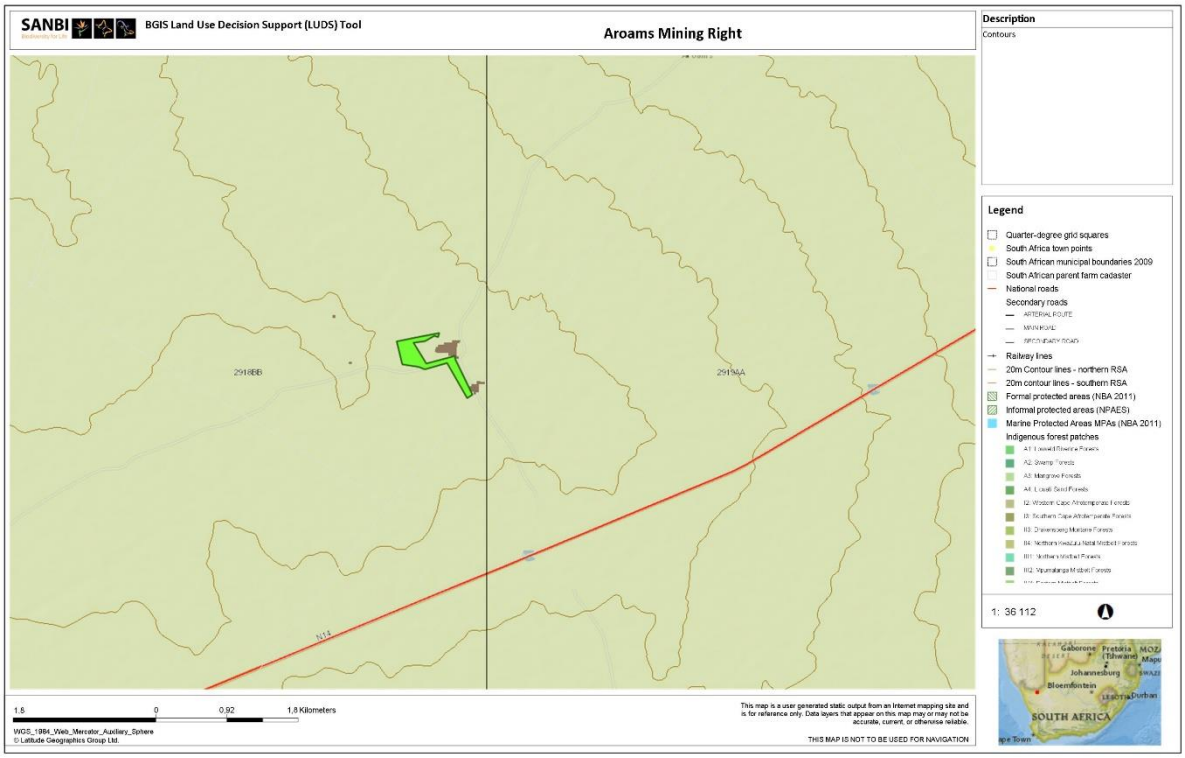

Figure 18: Contours

i. Soil, Land Use and Land Capability

Soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime generally present in part or most of the landscape. Freely drained, structureless soils

The soils of most of the area are red-yellow apedal soils, with a high base status and <300mm deep, typical of Ag and Ae land types. The soils are typically weakly structured with low organic content. These soils drain freely which results in a soil surface susceptible to erosion, especially wind erosion when the vegetation cover is sparse and gulley erosion in areas where storm-water is allowed to concentrate. The soils in the area are generally not suitable for dry land crop production therefore the pre-mining land capacity is categorized as Class III grazing land. The productivity of the area is very low at 8 – 10 Ha/SSU.

Portion 2 of the farm Aroams 57 is situated in an agricultural setting, with the land mainly used for small stock grazing purposes. Approximately 90% of the region is used for livestock grazing and production, with the remainder comprising of agriculture and mining.

The Gamsberg zinc mine will be established to the south approximately 6 km from the site, and the N14 passes the proposed mining site approximately 2.5 km to the south.

The proposed project will entail the establishment of a mining area adjacent to the existing quarry being used for the winning of Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite by SPH Kundalila (Pty) Ltd. Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite (Pty) Ltd (MP 006/2012) and SPH Kundalila (Pty) Ltd (MP 003/2015) currently holds a mining permit (MP 006/2012) for the existing quarry at the farm; Aroams Quarry (Pty) Ltd intends to establish their proposed mining area adjacent to this quarry. An agreement between SPH Kundalila (Pty) Ltd and Aroams Quarry (Pty) Ltd with regard to technical arrangements made for the co-existence of the respective operations will be included into the FEIAR. The agreement also includes a distinction between the respective environmental liabilities and management responsibilities.

Mining at the quarry will only be temporary where after land use will revert back to grazing. As the productivity of the land with regard to land use is very low, mining will have no negative impact on the production of the area.

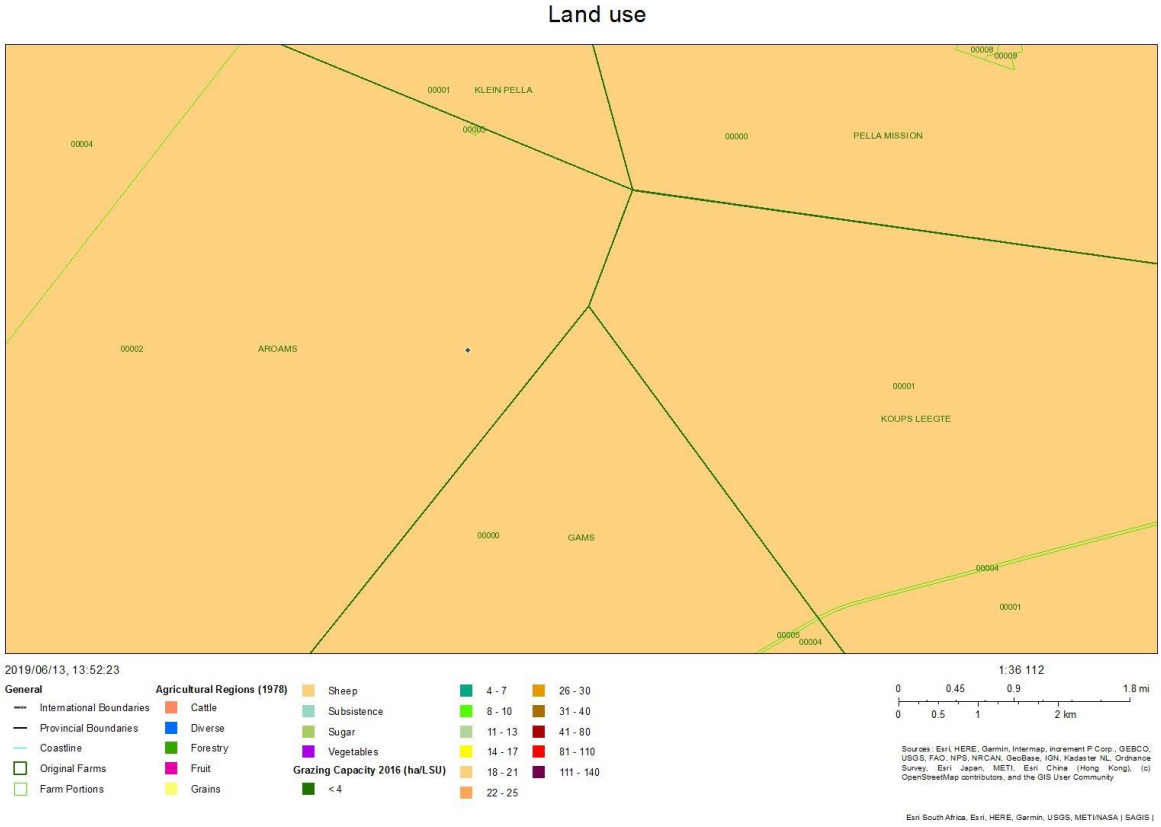

Figure 19: Land use

The general land use of the area is described as sheep agricultural regions with a grazing capacity of 18-21ha/LSu.

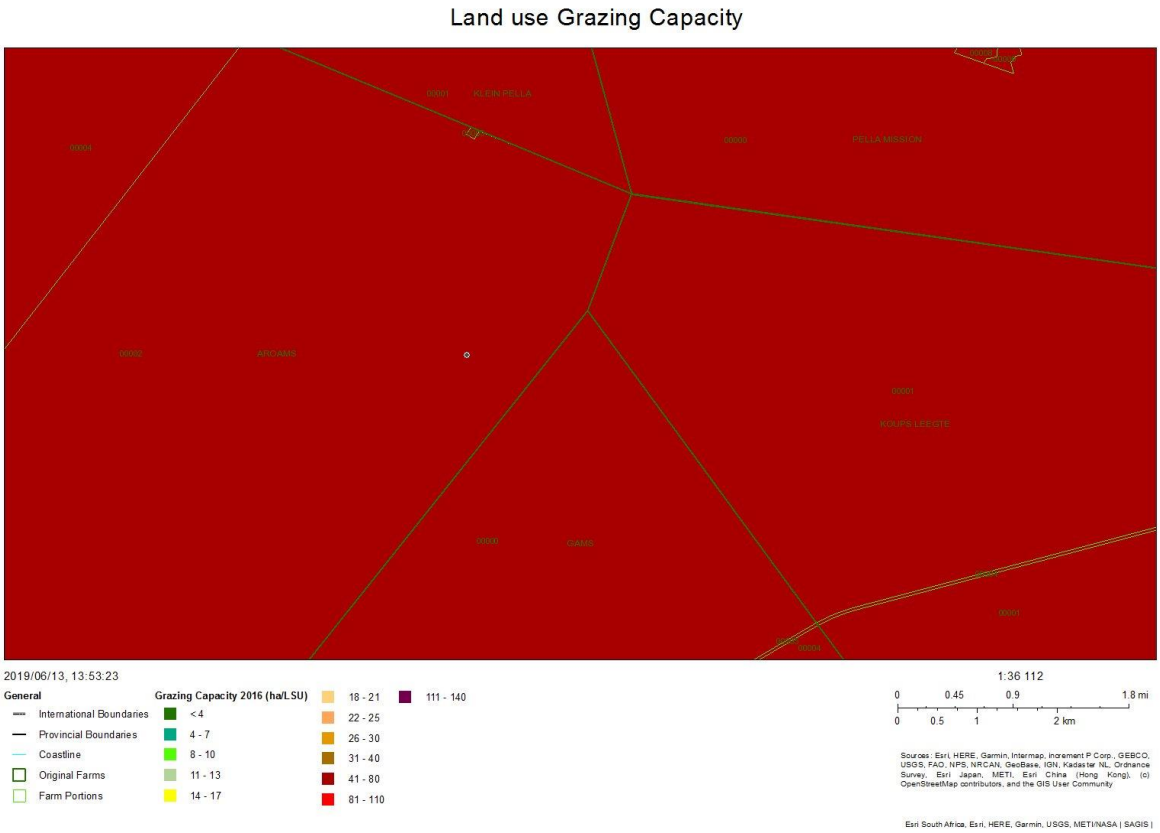

Figure 20: Grazing

The grazing capacity of the area per Life Stock Unit is 41-80ha/LSu.

i. Natural Vegetation

The mining area is situated within the Nama-Karoo Biome. The vegetation consists of Bushmanland Arid Grassland vegetation type (NKb 3 according to Mucina and Rutherford, 2006) covering an area of 45478.96ha that is rated as least threatened with little of the area transformed. Erosion in this vegetation type is deemed to range from very low (60%) to low (33%).

A large amount of pioneer species occurs within the proposed mining area due to previous disturbance dominated by *Galenia fruticosa* and *Tetragonia arbuscula*.

The dominant species outside the disturbed area is covered by sparse open grassland, with prominent *Stipagrostis* grass species, along with scattered drought resistant dwarf shrubs. Various protected plants (*Crassula corallina*, *Avonia papyracea Ebracteola* spp. *Mesembryanthemum guerichianum* and *Hoodia gordonii*) are found within the Bushmanland Arid Grassland Vegetation type. A Protected plant removal permit has been applied for in January 2019 for the removal of these plants by the DENC (Department of Environmental and Nature Conservation) for the SPH Kundalila mining permit area.

Prominent species are as follow:

Dwarf shrubs

Aridaria noctiflora	*Eriocephalus microphyllus*	*Galenia fruticosa*
Lycium bosciifolium	*Pentzia spinescens*	*Plinthus karroicus*
Pteronia mucronata	*Rhigozum trichotomum*	*Rosenia humilis*
Sarcostemma viminale	*Tetragonia arbuscula*	

Grasses

Aristida adscensionis	*Aristida congesta*	*Centropodia glauca*
Enneapogon desvauxii	*Schmidtia kalahariensis*	*Stipagrostis brevifolia*
Stipagrostis ciliate	*Stipagrostis obtusa*	

Forbs

Barleria rigida	*Berkheya spinosissima*	*Crassula muscosa*
Dicoma capensis	*Gazania lichtensteinii*	*Grielum humifusum*
Hermannia spinosa	*Hirpicium echinus*	*Manulea nervosa*
Monechma incanum	*Peliostomum leucorrhizum*	*Requienia sphaerosperma*
Ruschia robusta	*Salsola tuberculata*	*Senecio cotyledonis*
Sesamum capense	*Tribulus zeyheri*	*Zygophyllum flexuosum*
Zygophyllum microphyllum		

The mining area is situated within the Nama-Karoo Biome. The vegetation consists of Bushmanland Arid Grassland vegetation type (NKb 3 according to Mucina and Rutherford, 2006) covering an area of 45478.96 ha that is rated as least threatened with little of the area transformed. Erosion in this vegetation type is deemed to range from very low (60%) to low (33%).

A large amount of pioneer species occurs within the proposed mining area due to previous disturbance dominated by *Galenia fruticosa* and *Tetragonia arbuscula*.

The dominant species outside the disturbed area is covered by sparse open grassland, with prominent *Stipagrostis* grass species, along with scattered drought resistant dwarf shrubs. No protected plant species could be identified at the time of the site inspection.

The area is the least threatened with a target of 21%. Only small patches statutory conserved in Augrabies Falls National Park and in the Goegap Nature Reserve. The alien shrub *Prosopis sp* can be seen as a threat. Very little area has been transformed. Erosion is very low 82%.

Biodiversity priority areas	Description	Information sources
Ecological support areas	These are areas identified in spatial biodiversity plans areas that play an important role in supporting the ecological functioning Critical Biodiversity Areas or protected areas and/or in ecosystem services. The management objective for a functional state	Data: No data available for Free state
Vulnerable ecosystems	Threatened ecosystems are identified in the NBA and may be listed in terms of the Biodiversity Act 55. Vulnerable ecosystem types have experienced significant loss of natural area but are not yet critically endangered or endangered. In areas where biodiversity planning has occurred, the best areas to meet targets for vulnerable ecosystem types are generally included in will also be viewable on CBAs. However, where this planning has not yet occurred (e.g. Free State, and part of the Northern Cape), remaining intact areas of vulnerable habitat types should be avoided where possible.	Data: Terrestrial vulnerable ecosystems and currently viewable on the SANBI website. Associated legislation: Section 52 of Biodiversity Act, 2004
Focus areas for land based protected area expansion and focus areas for offshore protection	Focus areas for land-based protected area expansion are large, relatively intact (in terms of natural vegetation cover) and fragmented areas of high biodiversity importance, suitable expansion for the creation or expansion of large protected areas, were identified by the Offshore Marine identified in the National Protected Area project (OMPA; for offshore Protected Area Expansion Strategy 2008. They were identified through a systematic biodiversity planning process, taking into account the need to represent both terrestrial and freshwater biodiversity in the protected area network as well as to contribute to climate change resilience. They represent the best remaining large areas of natural habitat that still have low levels of fragmentation and form a key part of our ecological infrastructure network. Focus areas for offshore protection were identified through a systematic biodiversity planning process to direct MPA expansion and other types of spatial management to ensure sustainable resource use and a representative protected area network. They identify spatial priorities for representing offshore biodiversity, protecting sensitive ecosystems, contributing to fisheries sustainability and reducing by-catch. These areas will be refined in the future.	Data: focus areas for land based protected area expansion available on SANBI website. Associated legislation: these areas support further implementation of the protected areas act.

The primary threats to Biodiversity, ecosystem goods and services are habitat transformation and degradation, and invasive alien species. The concern regarding threats to biodiversity is borne out of the recognition that our natural resources base provides a variety of goods and services on which life depends. In Khâi-Ma this natural resource base is directly threatened by mining developments. The management of these is critical in ensuring effective conservation and sustainable use of the biodiversity. Again making the need for Environmental Conservation and Management Plans as well as Plans to eradicate and monitor Alien Invasive Species very important for Khâi-Ma.

i. Fauna:

Various small mammals and reptiles occur on the property. Larger herbivore species are very scares or absent due to the conflicting land use.

ii. Surface Water

The proposed site falls within the Lower Orange Water Management Area (WMA), specifically in the Orange Sub Water Management Area (Boegoeberg Sub Catchment), in the D81G quaternary catchment area.

The Lower Orange WMA is the lowest WMA in the Orange River Basin and as such is affected by upstream activities. The area is arid with rainfall varying from 400 mm in the east to 50 mm on the west coast. The topography of the area is flat with large pans or (endoreic areas that do not contribute runoff to the Orange River system.

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

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

Less than 1% of the Gross Domestic Product (GDP) of South Africa originates from the Lower Orange WMA. The largest economic sectors (in 1997) in the water management, in terms of GGP, were:

- Government 19,4%
- Mining 17,4%
- Agriculture 15,9%
- Trade 15,1%

Economic activity is largely concentrated along the Orange River, with several towns located on the banks of the river, and at mining developments. The two major storage dams Gariep and Vanderkloof, which are both used to supply all the irrigation, urban, mining and environmental requirements along the Lower Orange River are located in the Upper Orange WMA, but are of vital importance to the Lower Orange. There are no large storage dams in the WMA, with only a few smaller dams on some of the main tributaries.

These include:

- Smartt Syndicate Dam on the Ongers River.
- Van Wyksvlei on the Carnarvonleegte.

There are also several diversion weirs of which Boegoeberg is the largest.

The Lower Orange WMA is the lowest WMA in the Orange/Vaal River Basin and as such is affected by upstream activities, both in terms of the Upper Orange and the Vaal System. The area is arid with rainfall varying from 400 mm in the east to 50 mm on the west coast. The topography of the area is flat with large pans or endoreic areas that do not contribute runoff to the Orange River system. The Orange River, which forms a green strip in an otherwise arid landscape, also forms the border between South Africa and Namibia over about 550 km to the west of 20 degrees' longitude. The Vaal River, the main tributary to the Orange River, has its confluence with the Orange River about 13 km west of Douglas. Other tributaries are the Ongers and Hartebeest Rivers from the south, and the Molopo River and Fish River (Namibia) from the north. There are a number of highly intermittent water courses along the coast which drain directly to the ocean.

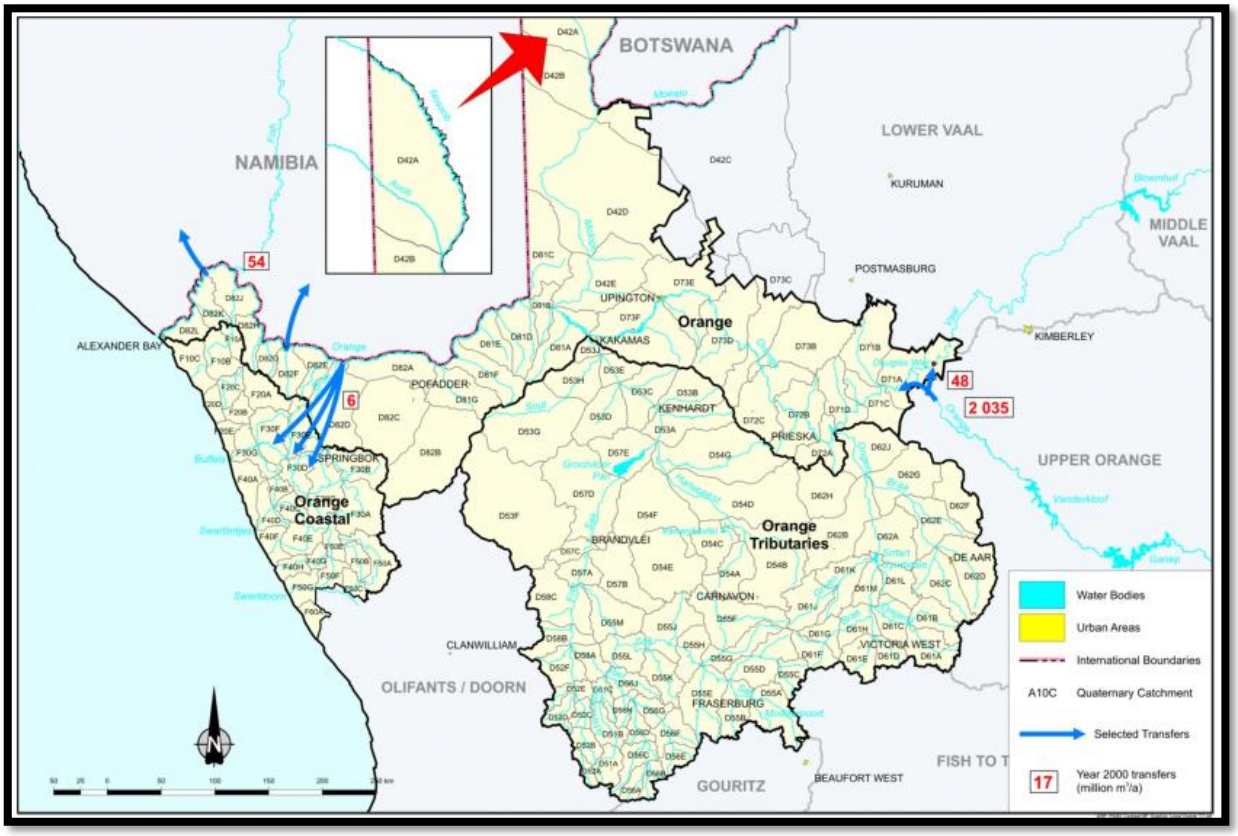

Figure 21: Lower Orange transfers

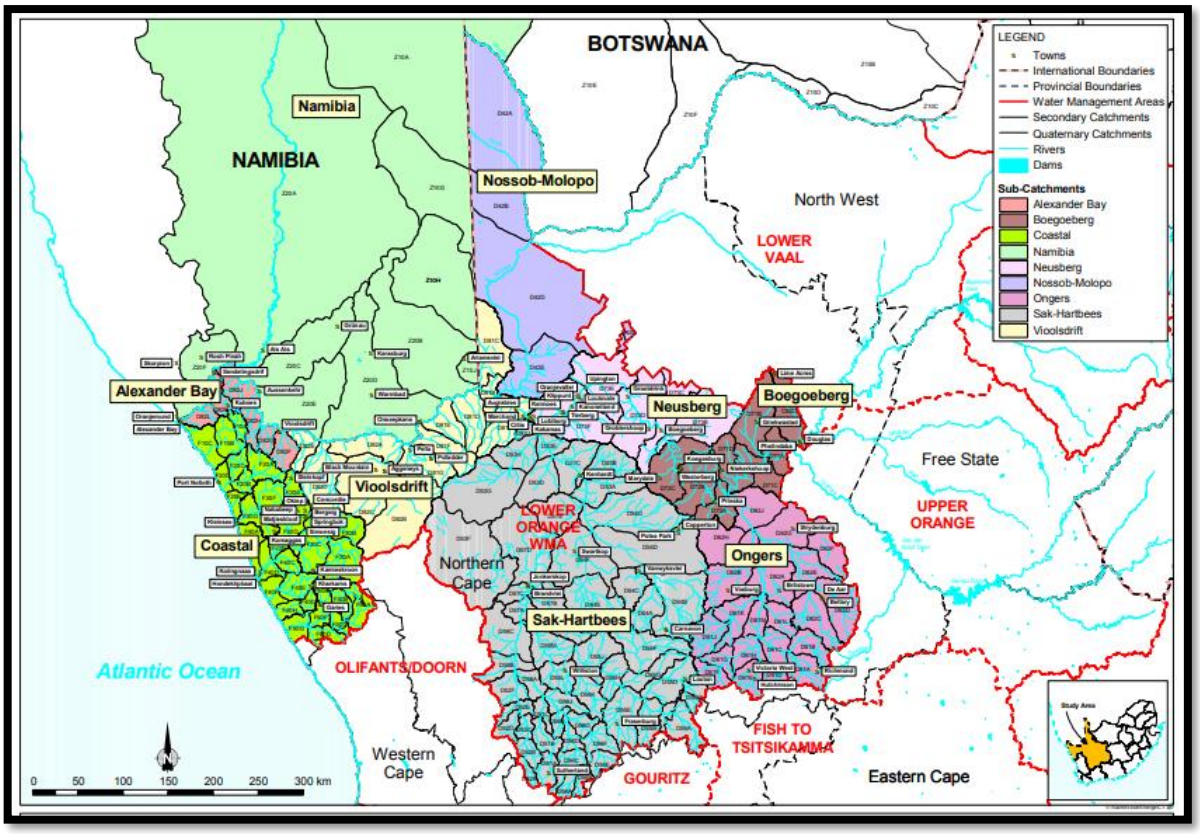

Figure 22: Sub Catchments in the WMA

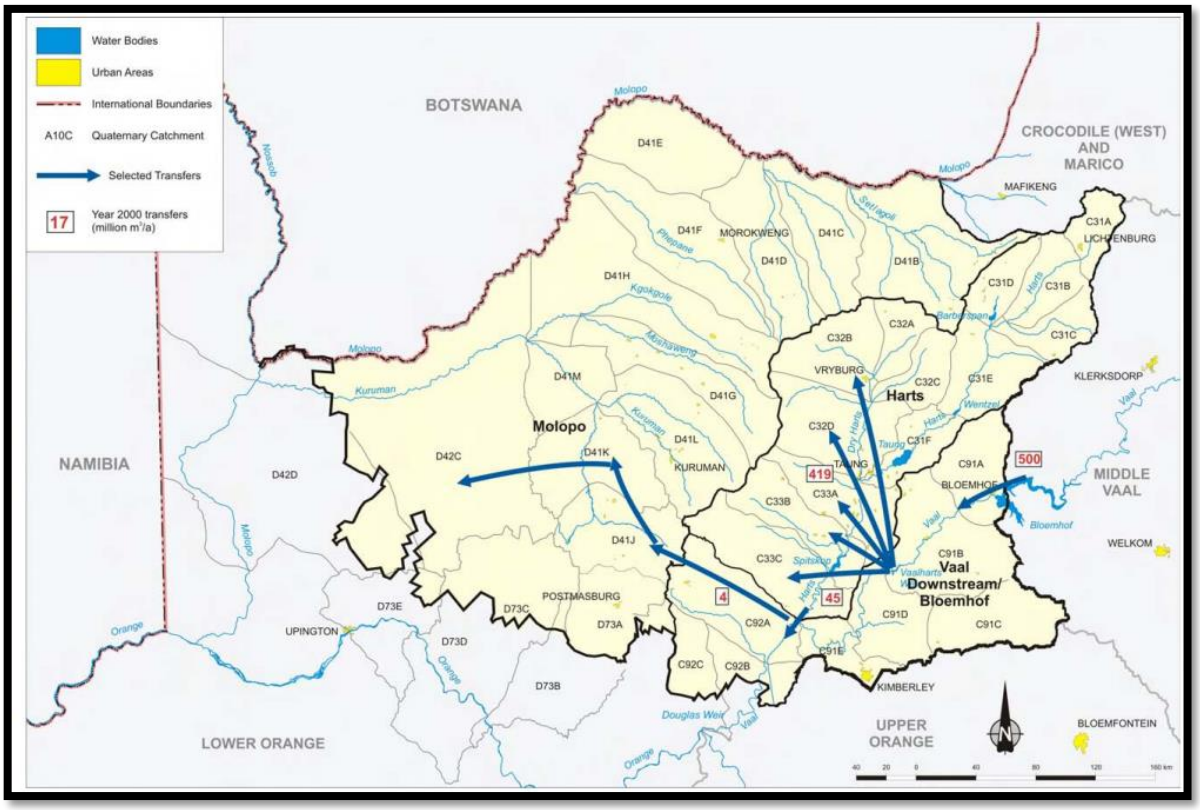

Figure 23: Layout and location of the Lower Vaal WMA

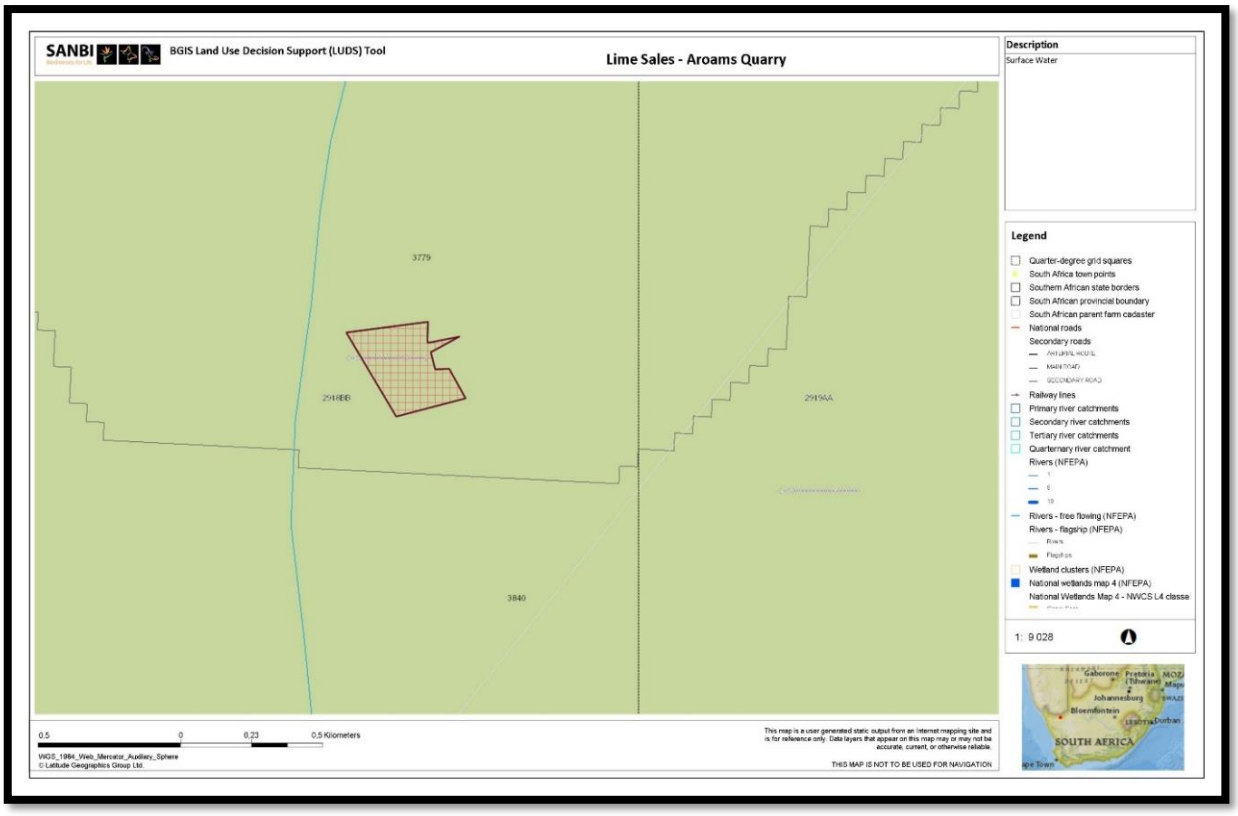

Figure 24: Map showing surface water features.

In its historical natural state, the quality of water in the Orange River was good, although of high turbidity during flood flows. Water from the tributary streams tends to be of high salinity. Both the flow regime and water quality in the Orange River has, however, been severely impacted upon by extensive upstream developments. Salinity in the Orange River has increased due to the transfer of high quality water out of the Orange River (in Lesotho and the Upper Orange WMA) and as a result of high salinity irrigation return flows along the Orange River. Poor quality water from the Vaal River, which contains a high proportion of irrigation return flows as well as treated urban effluent, also enters the Orange River. Salinity is at present still moderate and acceptable along the main stem of the Orange River. Deterioration can be expected with increased upstream irrigation and the situation must be closely monitored. There are algal blooms experienced in the main stem due largely to irrigation return flows, diffuse sources and poor quality water from the upstream Vaal WMAs. The algal blooms are of particular concern as they are potentially toxic. An algal monitoring programme along the Orange River as well as management and communication protocols have been developed by DWAF if the algal blooms are identified as toxic. Studies and monitoring programmes are underway to understand the current algae behaviour. (DWAF, 2004)

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

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

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

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

The total water available for use in the Lower Orange water management area at the year 2000 development levels summarised in Table 2.

Table 2: Available water in year 2000 (million m³/a)

Sub-area	Natural resource		Usable return flow			Total local yield (1)	Transfers in	Grand Total
	Surface water	Ground-water	Irrigation	Urban	Mining and bulk			
Orange	(1 092)	9	96	1	0	(986)	2 083	1 097
Orange Tributaries	9	13	0	0	0	22	0	22
Orange Coastal	0	3	0	0	0	3	6	9
Total	**(1 083)**	**25**	**96**	**1**	**0**	**(961)**	**2 083**	**1 122**

The negative yield for the Orange River within the Lower Orange water management area, as shown in Table 2, is as a result of evaporation losses and evapotranspiration by riparian vegetation along this reach of the river, which by far exceed the run-of-river yield contributed by local inflows. It also includes a component for losses associated with insufficient management of releases from Vanderkloof Dam.

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

No meaningful potential for surface water regulation exists in the Orange Coastal sub-area. Factors that could have a significant impact on the available surface water resources include:

- Saving in operational losses with regards to releases from Vanderkloof Dam (See Orange River Overarching ISP; DWAF, 2004a).
- Implementation of the Reserve on the Orange River (See Orange River Overarching ISP; DWAF, 2004a). Indications are that the reserve can vary significantly from the current environmental flows released from Vanderkloof and will therefore significantly impact on the current surplus available in the system.
- Utilising inflows from the Vaal River.
- Irrigation Return Flows. Very little data is available but return flows commonly amount to 10% of irrigation water. Yield analysis assessments for local surface water resources beyond the Orange River main stem can, with the current available hydrology, only be undertaken on a cursory level (using WR90 data).

This should be carried out only when the need exists and will be the responsibility of the specific towns or towns in need. (DWAF, 2004)

i. Ground Water

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

Groundwater quality is one of the main factors affecting the development of available groundwater resources. Although there are numerous problems associated with water quality, some of which are easily corrected, total dissolved solids (TDS), nitrates (NO_3 as N) and flourides (F) are thought to represent the majority of serious water quality problems. The water quality was evaluated in terms of TDS and potability.

The information was obtained from DWAF Geohydrology. The potability evaluation done was based on the evaluation of chloride, fluoride, magnesium, nitrate, potassium, sodium, sulfate and calcium using the Quality of Domestic Water Supplies, Volume 1 (DWAF, 1998). The portion of the groundwater resources considered to be potable has been calculated as the portion classified as ideal, good and marginal (Class 0 -blue, 1- green and 2 - yellow). Water classified as poor and unacceptable (Class 3 - red and 4 - purple) is considered not to be potable (See Point and diffusive pollution Agricultural activities are a source of diffuse water contamination.

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

Generally, on a local scale the areas of intense cultivation are the major contributors in terms of inorganic nitrates. The primary inorganic nitrates, which may contaminate drinking water, are potassium nitrate and ammonium nitrate both of which are widely used as fertilizers. Where feedlots are operated the contribution of organic nitrates to groundwater contamination can be far more problematic. For most farming activities organic nitrate is not a severe problem in South Africa. High-density cultivation at surface water irrigation schemes along the Orange River contributes to the nitrate load of localized aquifers in the WMA. Other contaminants of concern are pesticides and herbicides. The contribution of these to groundwater contamination is very difficult to quantify on catchment scale. Site-specific data relating to likely loading/application volumes and history, soil profile and local geohydrology are required. The mineralogical groundwater quality in the Lower Orange Water Management Area is not particularly good in terms of its TDS rating.

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

See Figure 25 for average TDS values for the area under investigation as mapped by Simonic (1999). Natural occurring radioactivity is found in some of the groundwater resources associated with geological formations such as granites and gneisses. Fortunately, the values are mostly low except at Kotzerus, Kharkams, Bulletrap, Fonteintjie, Kenhardt and Riemvasmaak, which fall into Class 2 according to the potable water classification (Van Dyk, 2003).

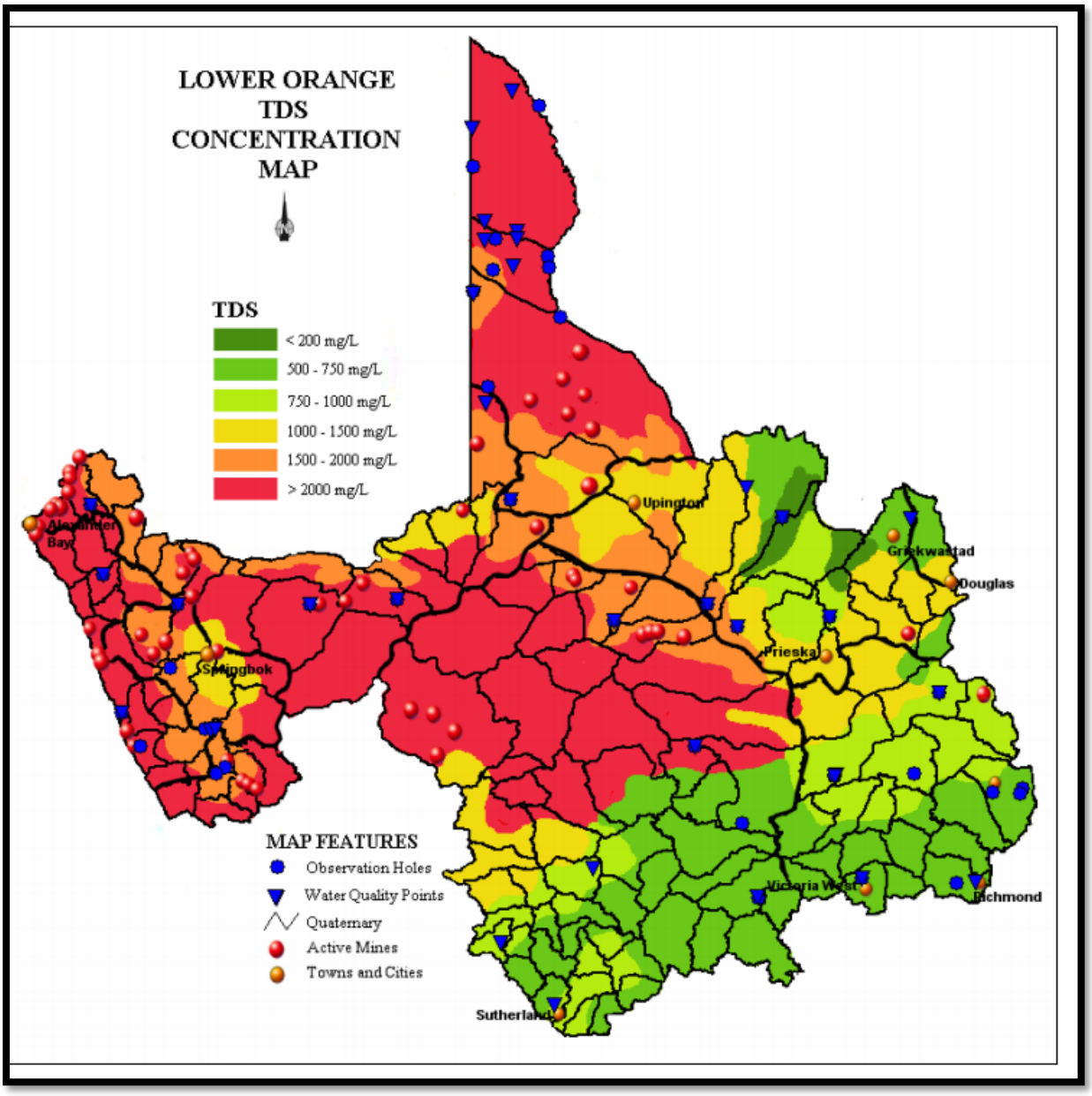

Figure 25: Total dissolved solids for the WMA with main abstraction and water quality monitoring points (DWAF, 2004).

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

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Activities related to urban areas can also result in localized or even diffuse pollution of groundwater. Poor management of sewage treatment works can contribute to the groundwater pollution as can landfill sites, on-site sanitation (especially in informal settlements) and spills resulting from accidents or leaking underground tanks. Uncontrolled dumping and accidents related to the transport industry also contribute to localized pollution in the WMA. Often goods that contain hazardous substances or perishables are confiscated by authorities and these are then dump at illegal sites. A need for incinerators has been identified. Mining activities that impact on the groundwater quality include the Okiep Copper mine and the Black Mountain lead, zinc, copper and silver mine. Mineralisation in the O'okiep area tends to occur in basic rocks intruded in the form of 'steep structures' into granitic terrain of the Namaqualand Metamorphic Complex, and may extend to depths of over 1000 m (www.metorexgroup.com/Ookiep.htm). The major copper minerals are bornite (Cu5 FeS4) with 62% copper, and chalcopyrite (CuFeS2) with 32.5% copper. Open stoping is employed at the mine, together with backfilling at times at O'okiep. Ore is concentrated by flotation and transported to the nearest available smelter. O'okiep smelts its own concentrates. The Black Mountain Mine is situated in the Northern Cape near Aggeneys. The facility produces zinc concentrate together with lead and copper concentrates, from which silver is also recovered.

Development of the nearby Gamsberg zinc deposit, is currently under consideration (http://www.dwaf.gov.za/orange). There are many impacts on the environment dealing with the water quality and waste disposal from copper mining. These adverse water quality impacts are caused primarily by land disposal practices that fail to contain wastes, by run-on and run-off controls that are inadequate to prevent surface water from flowing through impoundments, or by groundwater infiltrating surface impoundments. These open-pit mining methods also can cause disturbances that can lower the water table in an area, causing water shortages, land subsidence, and fracturing.

However due to the low rainfall in area the impacts on the groundwater quality are less than expected and very localized. Acid Mine Drainage, elevated TDS, SO4, and low pH with associated higher trace metal concentrations have been found at tailings dumps. A radioactive waste disposal site for low- and intermediate level waste generated at the Koeberg Nuclear Power Plant, is located north of Springbok on the flat plains of the Bushmanland plateau. Waste is buried in metal drums and solidified in concrete in the trenches. Up to date no significant contamination of the groundwater has occurred (Van Blerk, 2000). Sprinkbok Hard Chrome is an industry located in Springbok, an incident has occurred where Cr+6 was released into the environment but no data is available on the impact the incident had on the groundwater resource. As discussed impacts on groundwater quality from the diamond mining industry in the WMA is negligible.

The Lower Orange WMA, is underlain by very diverse lithologies. Several broad lithostratigraphic units fall within the boundaries. A simplified geological map of the WMA is presented in Figure 14.

From oldest to youngest these units comprise the following (V3, 2002):

- Namaqualand-Natal Basement Complex. Rock of this complex, ranges from homogenous granites through to migmatites and gneisses. The area underlain by the Namaqualand-Natal Complex is situated in the vicinity of the Orange River between Upington and Springbok. The area is an assembly of compact sedimentary, extrusive and intrusive rocks.
- Ventersdorp Supergroup, represented by andesitic lavas and occasional sedimentary rocks related to post extensive erosion, are encountered in very small 2-5 isolated inliers between Prieska and Douglas.
- Dolomitic and related carbonate rocks of the Postmasberg Group, Campbell and Griquatown Sequence, all forming part of the Griqualand West Sequence, occupy the north-eastern lobe of the WMA. Dolomites, limestones and related sedimentary rocks (often iron or manganiferous ore bearing) make up this broad lithostratigraphic unit.
- Abbabis and Kheis Groups are represented by relatively small inliers of diverse sedimentary successions consisting of shales, sandstones, banded iron formations and conglomerates. These rocks are encountered in the vicinity of Upington and are not widespread.
- Damara Sequence encountered in the immediate vicinity of Alexander Bay and Port Nolloth, is represented by the Fish River, Schwarzrand, Kuibis, Malmesbury, Gariep, Swakop, Otavi, Nosib, Rehoboth and Sinclair Groups. Lithologies in these various groups are very diverse, ranging from shales, sandstones, diamictites, banded iron formation through to limestones and calcareous sedimentary formations.
- Karoo Sequence represented by the Ecca Group and Dwyka Formation, and to a lesser extent the Beaufort Group, occupy the southern lobe of the WMA, and comprises thick successions of sedimentary rocks. Sedimentary rocks range from mudrocks through coarser varieties (sandstones, conglomerates) to diamictites and rhythmites (pleistocene deposits). Karoo or Jurassic dolerite is fairly common throughout the sequence and also frequently intrudes older rocks.
- Quaternary and Tertiary dune deposits, consisting of “Kalahari red sands”, occupy the extreme northern part of the WMA bordering on Namibia. These dune deposits are of considerable thickness and comprise fine aeolian sands with occasional coarser Aggregate, Gravel, Granite and Dolomite deposits.

The geohydrology is just as complex as the geology in the area but can be simplified to four main aquifers namely the Karoo sediments, the weathered granites and gneisses from the Basement complex, dolomites and associated formations and the primary aquifers such as the Kalahari sands and the alluvial deposits along streams and rivers and the coastal plains north of the Buffelsrivier. The first three of these aquifer types are typical dual porosity or secondary aquifers water associated with weathering and fracturing of the matrix. Primary aquifers are found in Kalahari sands and alluvial deposits associated with rivers and coastal plains.

At small scale a number of these aquifers are utilized mostly along dry riverbeds, Buffelsriver, Saaipoort along Carnarvon leegte, along Gamagara River, Driekop Kanhardt. In the drier west almost all abstractions from boreholes associated with a proximate riverbed. Along the Orange River some abstraction along riverbeds is also taking place (Van Dyk, 2003).

General characteristics of riverbed aquifers can be summarized as:

- Coarse gravels and sands are more typical of alluvial deposits. However, flood plains consist mainly of fine silt. Towards the end of a river's course, the river slows down dumping some of the heavier materials on these flood plains. Boreholes drilled into these types of formations normally have higher yields. It is important to note that borehole design is plays an important role in the yield of boreholes drilled into riverbed aquifers.
- Alluvial deposits grain size varies considerably, fine and coarse materials are intermixed. The hydraulic conductivities vary between 10-3 to 103 m/d and their porosities vary 12 between 25 – 70%. However, flood plain porosities usually range 35 – 50% and the hydraulic conductivities vary between 10-8 – 10-1 m/d.
- In general riverbed aquifers are high recharge areas and often recharge deeper underlying aquifers and are unconfined in nature. The surface-water groundwater interaction is often intermittent (depending on the elevation of the water level, groundwater may recharge the surface water body or the surface water may recharge groundwater). This is normally dependent on the rainfall cycle. Therefore, boreholes drilled into these aquifers are almost always successful.

<u>Groundwater-Surface Water Linkage</u>

Groundwater-surface water interaction has not been studied sufficiently in the Northern Cape due to the limited surface water. According to records documented by Van Tonder and Dennis (2003), under natural conditions there is seldom a connection between surface water and groundwater. However, observed surface water recharge in normally dry riverbeds. Current quality problems experienced in the Vaal and Orange rivers, waterlogging experienced with irrigation along these riverbanks indicate interaction. Therefore, a study is currently motivated by DWAF Geohydrology to investigate Groundwater-surface water interaction in the Vaal and Orange rivers (Van Dyk, 2003).

Groundwater quality varies from good to unacceptable in terms of potable standards. The groundwater quality is one of the main factors affecting the development of available groundwater resources. Although there are numerous problems associated with water quality, some of which are easily corrected, total dissolved solids (TDS), nitrates (NO_3 as N) and fluorides (F) represent the majority of serious water quality problems that occur (DWAF, 2004)

Summarised information on groundwater is given in this section. Groundwater utilisation is of major importance across wide areas in the Lower Orange WMA and often constitutes the only source of water. It is mainly used for rural domestic supplies, stock watering and water supplies to towns off the main stem of the Orange. These resources must be properly managed and developed.

As a result of the low rainfall, recharge of groundwater is limited and only small quantities can be abstracted on a sustainable basis. Artificial recharge of groundwater is practised in some areas where water from small dams is transferred through pipelines into boreholes located in the area of recharge of the main production boreholes. Aquifer characteristics (borehole yields and storage of groundwater) are also typically unfavourable because of the hard geological formation underlying most of the water management area. In the Orange Tributaries sub-area 60% to 70% of the available water is supplied from groundwater sources.

Groundwater also constitutes an important source of water for rural water supplies in the Orange River, although only a small proportion of the total available water. Much of the groundwater abstracted near the river (Orange sub-area), is actually recharged from the river and could also be accounted for as surface water. Groundwater availability in the coastal region is extremely limited as a result of the lack of rainfall. Close to the sea there is a strong risk of seawater intrusion into coastal aquifers.

The interaction between the mining activity and groundwater is managed through the EMPR and the water use licensing process. Some impacts do exist with regard to localized dewatering of aquifers. These impacts are however localized and very little data exist in this regard. The information from the compliance monitoring systems at the mines needs to be integrated into the DWAF monitoring systems and regularly reviewed. Mines utilise the groundwater available but are still largely dependent on surface water, which is in most cases supplied from the Orange River. Boreholes and abstraction from boreholes are seldom managed properly and therefore the failure of boreholes is experienced. Borehole siting needs to be based on proper geo-technical work to limit the drilling of unsuccessful boreholes. As result of this some towns have drilled many boreholes without much success.

From the list of towns and related water resources given it is evident that shortages in the supply from groundwater are experienced at Vanwyksvlei, Strydenburg, Carnarvon and Garies. Proper management and monitoring of groundwater sources by municipalities and other users are of vital importance. There is a need to provide groundwater information and to create an improved understanding of groundwater at a local level.

Municipalities should also investigate groundwater potential outside town boundaries as a possible source. Groundwater monitoring and data on the availability of groundwater in general is insufficient (DWAF, 2004)

No drainage channels occur within the mining area and there is no dendritic system which could be disturbed. Given the variability of semi-arid rainfall, the calculation of the mean annual runoff (MAR) would be of no use. The MAR is very low given the low rainfall (less than 250 mm/year) occurring mainly in the winter months, high evaporation rates, and shallow grade of the slope toward the drainage channels and the permeability of the soils. The surface water quality (when available after severe rainstorms) is suitable for animal consumption but not as potable water. No natural wetlands exist in the area.

- The proposed mining area will be further than 100m from any natural water source.
- The proposed activities are not expected to have a negative impact on the ground water of the area.

Less than 20 m^3 process water will be used per day. Water will be obtained from a borehole of the landowner. The taking and storing of water is covered by a General Authorisation in terms of section 39 of the National Water Act, 1998 (Act No. 36 of 1998). According to the authorisation no “groundwater taking zones” are excluded for “small industrial users”. This mining activity classifies as a “small industrial users” as it qualifies as a work creating enterprise that do not use more than 20 cubic metres per day. Mining and quarrying are also a category identified in the Standard Industrial Classification of All Economic Activities (5^{th} edition), published by the Central Statistics Service, 1993, as amended and supplemented as a small industry. Process water will be obtained from the municipal line that runs across the property. Water will be bought from the municipality.

The applicant will however in accordance with the general authorisation adhere to Record-keeping and disclosure of information.

The authorisation states that the water user must ensure the establishment of monitoring programmes to measure the quantity of water taken and/or stored, as follows -

a) the quantity of groundwater or surface water abstracted must be metered or gauged and the total recorded as at the last day of each month,

b) the quantity of water stored must be recorded as at the last day of each month.

i. Air Quality

The background air quality of the surrounding area is very good due to low industrial activity and very low population density. Given the surrounding extent of semi-desert, dust generation is high under windy conditions (dust storm) however under normal conditions no extreme dust conditions were noted on site. The mining operations at the existing quarry contribute to the dust levels of the immediate area. Dust to be generated by the proposed mining activities will imitate the dust levels generated by the current mining activities at the site, and are therefore seen as a cumulative impact. It is expected that the generation of dust will be localised within the confines of the mining area, and can be mitigated through the implementation of dust suppression measures.

i. Ambient Noise

The background noise level of the surrounding area is highly impacted on by traffic travelling along the N14 road passing the property. The background noise level of the surrounding area is the same as for other agricultural areas and at present such noise levels are below 55dBA. The surrounding areas are characterised by an agricultural setting in which vehicles and farm equipment operate. The traffic on the N14 also contributes to the ambient noise of the area. The mining activities at the existing quarry increase the natural noise levels at the proposed mining site. Due to the remote setting of the mining area noise generated by the activities at the site is not anticipated to have a negative impact on any surrounding landowner.

The limit for the air blast or "noise" generated by a blasting event is 134dB. Blasting noise is instantaneous and of short duration. If the blast is designed so that the maximum amount of energy released by the explosive goes into breaking and displacing the rock, the air blast is limited. Blasting of rock and secondary blasting could occur more than once a month. Site management has to notify the surrounding landowners in writing prior to blasting occasions. In order to minimise the noise impact, blasting has to occur between 8:00 and 15:00 Monday – Fridays.

The nuisance value of noise generated by heavy earthmoving equipment for residence in the near vicinity is deemed to be of low – medium significance, as the mine is expected to be operational 24 hours a day for 6 days a week. The distance of residents from the mining area (>2 km) will however assist in the mitigation of the noise impact. All mining vehicles will also 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).

i. Archaeological and Cultural Interest:

No sites of archaeological or cultural importance were identified during the site inspection. As the proposed mining activity will take place within an area previously utilized for mining purposes, the activity is not anticipated to have a negative impact on any archaeological or cultural aspects.

During the mining permit application of Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite (Pty) Ltd (10052 MP), SAHRA requested that a Heritage Impact Assessment and Paleontological study be done to confirm that the mining activity will not have an impact on any archaeological or cultural aspects. A desktop Heritage Impact Assessment and recommendation for exemption from further Paleontological studies was submitted to SAHRA. SAHRA subsequently responded that the development is unlikely to impact significant heritage resources and that the SAHRA Archaeology, Palaeontology and Meteorites Unit has no objection to the development on condition that, if any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources are found during development, constructing or mining, SAHRA and an archaeologist and/or palaeontologist, depending on the nature of the finds, must be alerted immediately.

As the proposed mining area applied for by Aroams Quarry (Pty) Ltd falls within the study area surveyed during the abovementioned archaeological and paleontological desktop studies, the potential impact on archaeological or cultural aspects is deemed to be insignificant. Should any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources be found during development, constructing or mining, SAHRA and an archaeologist and/or palaeontologist, depending on the nature of the finds, will be alerted immediately.

SAHRA requested in October 2018 that an Archaeological study be conducted for the new mining permit area. The following conclusion was made during this assessment.

HCAC was appointed to conduct a Heritage Impact Assessment to determine the presence of cultural heritage sites and the impact of the Mining Right for the mining of aggregate, gravel, granite and dolerite, 13.6 ha, on a portion of Portion 2 (Remaining Extent) of the farm Aroams 57, Registration Division of Namaqualand RD, Northern Cape on non-renewable heritage resources. The study area was assessed both on desktop level and by a field survey. The field survey was conducted as a non-intrusive pedestrian survey to cover the extent of the mining right footprint.

The site is used for the mining of gravel, and significance disturbance from an archaeological point of view has already occurred. Within the area earmarked for the processing and stock piling area small stone cairns occur as a result clearing of fly rock and are of no heritage significance. Within the mining area and alternative site an east west orientated outcrop of granite-gneiss occurs. To the south of this area the study area is characterised by quaternary sand cover with almost no archaeological traces. Rocky outcrops in the area are known to contain grinding hollows (Morris 2017) and a thorough inspection of the rocky outcrops revealed no such features. The granite gneiss outcrop on the northern portion of the study area is slightly elevated - isolated Stone Age lithics were recorded here as Find spots. These isolated artefacts are not considered as sites and are out of context and of no heritage significance apart from recording them in this report. At Find Spot 6 a lower grinding stone was recorded, the grinding stone is out of context as it placed on a rock.
During the survey seven find spots were recorded. Six find spots (F1 – F6) consist of isolated Stone Age artefacts. Find spot seven is marked by a low-density scatter of modern glass fragments and metal cans of no heritage significance.

The SAHRA paleontological sensitivity map indicated that the footprint as a whole is located on a paleontologically insignificant area and is not considered paleontologically vulnerable.
The survey also did not reveal any historical farm steads, colonial era stone-walling (dwellings or kraals), graves or other sites of significance. Long term impact on the cultural landscape is considered to be negligible as the immediate surrounding area consists of an area that has been subjected to previous mining developments. Visual impacts to scenic routes and sense of place are also considered to be low due to the other developments in the area. There are no battlefields or concentration camp sites in the study area.

The impact on heritage resources in the Mining Right area and the Alternative that was assessed is low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA:

- Implementation of a chance find procedure as outlined in below.

Chance Find Procedures

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- 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 SAHRA.

Reasoned Opinion

The impact on heritage resources in the study area can be mitigated to an acceptable level and it is recommended that the proposed project can commence on the condition that the recommendations in this report are implemented as part of the EMPr and based on approval from SAHRA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

Potential risk

Potential risks to the proposed project are the occurrence of unknown and unmarked graves. The possibility exists that the study area could contain graves of which surface indicators have been destroyed and subsurface material could be uncovered during earth works. These risks can be mitigated to an acceptable level with monitoring and the implementation of a chance find procedure as outlined in above.

i. Visual Exposure

The mining area was identified to constitute the lowest possible visual impact on the surrounding environment. Due to the current mining disturbance nearby the area the site has a low aesthetic value. The proposed prospecting area will visible from the surrounding farms and will therefore have a visual impact on the immediate surrounding area.

The applicant should ensure that housekeeping is managed to standard, as this will mitigate the visual impacts during the operational phase of the stockpile area. Upon closure of the prospecting area and decommissioning of the site, the area should be fully rehabilitated and all exposed areas should be seeded to enhance vegetation recovery should natural vegetation not establish within six months of completion of rehabilitation.

The proposed mining area will be operated within the vicinity of an existing quarry. All stockpiling will be done on previously disturbed areas within the processing area, which will be rehabilitated upon closure of the mining area. Although the proposed mining at the site will have a visual impact the establishment of the quarry in an already disturbed area will help to mitigate this impact.

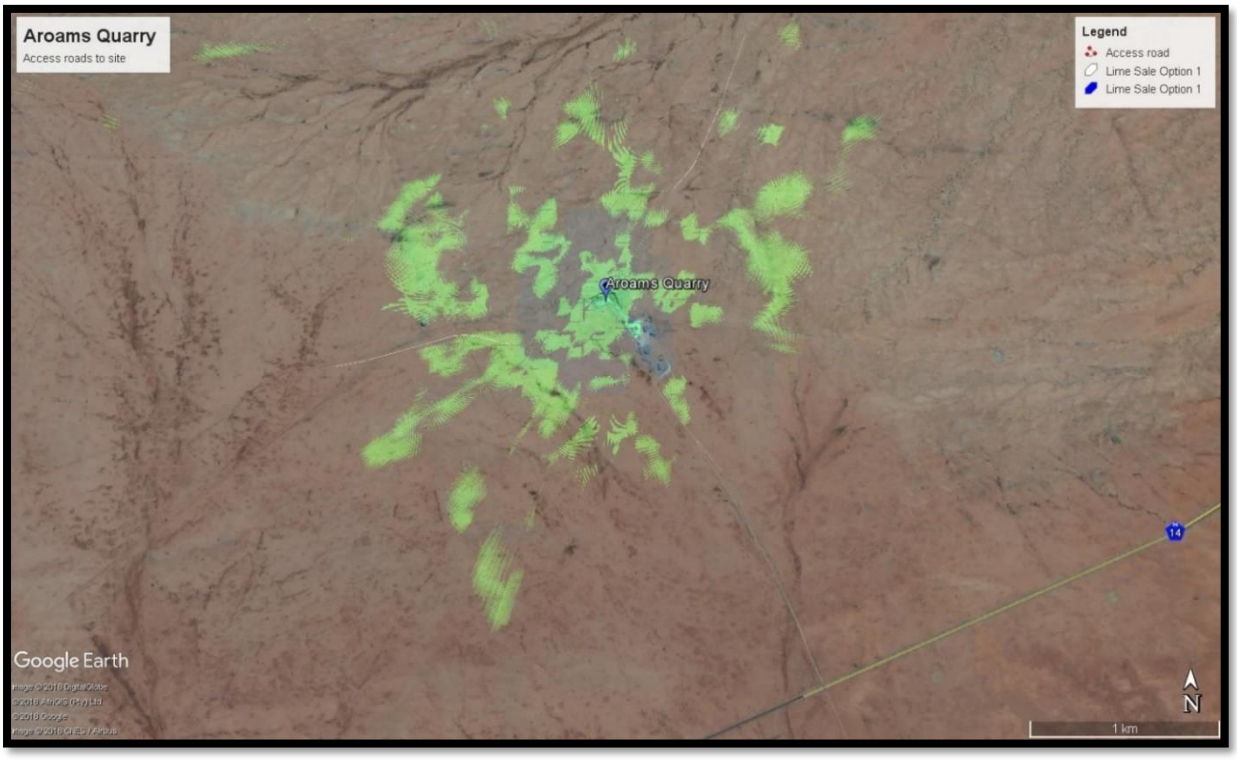

Figure 26: Visual Exposure

From the above figure, the green areas indicated the areas that will be visible from the surrounding area. From the above figure it is indicated that the mining area will be visible from the surrounding properties.

i. Regional Socio Economic Structure:

The Khâi-Ma Municipality has been classified as a Category B municipality, and was proclaimed as a local municipality with a council combined with a ward participatory system.

The Khâi-Ma Municipality is deemed to be a low capacity municipality, and shares executive and legislative authority with the Namakwa District Municipality. The municipal area is demarcated into four wards (Khai-Ma, 2017).

The situational analysis and statistics presented in this chapter indicate the developmental challenges facing Khâi-Ma Municipality, such as poverty, unemployment, and service delivery backlogs. The programmes and projects in this IDP are informed by this scenario (Khai-Ma, 2017).

Khâi-Ma Local Municipality falls within the Namakwa District of the Northern Cape Province. The Northern Cape is spatially the largest province in the country, but also has the lowest population and some of the least developed areas in terms of its economic and social development.
Khâi-Ma lies in the central north region of the Namakwa District, which is the furthest north in terms of the provincial boundaries. Khai-Ma Local Municipality is part of Namakwa District Municipality. Up to 45 workers will be employed at the site. The workers will be sourced from the local community as far as practicable and depending on skill and expertise. Workers will daily be transported to the site. The establishment of the mining area on the farm will also assist the property owner in the diversification of his income. The material to be sourced from the mining area can be used for the upgrading of the road infrastructure in the vicinity of the site, and can therefore contribute to infrastructure development and indirectly to the economy of the area.

(a) Demographic Profile

The population for Khâi-Ma is estimated at 11 340 people (2001). The municipality is sparsely populated (+/- 1 person/km2); most people are settled in its five (5) towns. The municipality is characterized by vast tracts of land, pristine natural environment, unique mountains and its limited cell phone reception, which can be regarded as a unique attraction by some urban dwellers who wish to escape the rush of the cities. This inherent potential for eco-tourism needs to be exploited and managed in a sustainable manner in order to retain this unique setting.

(b) Population Distribution

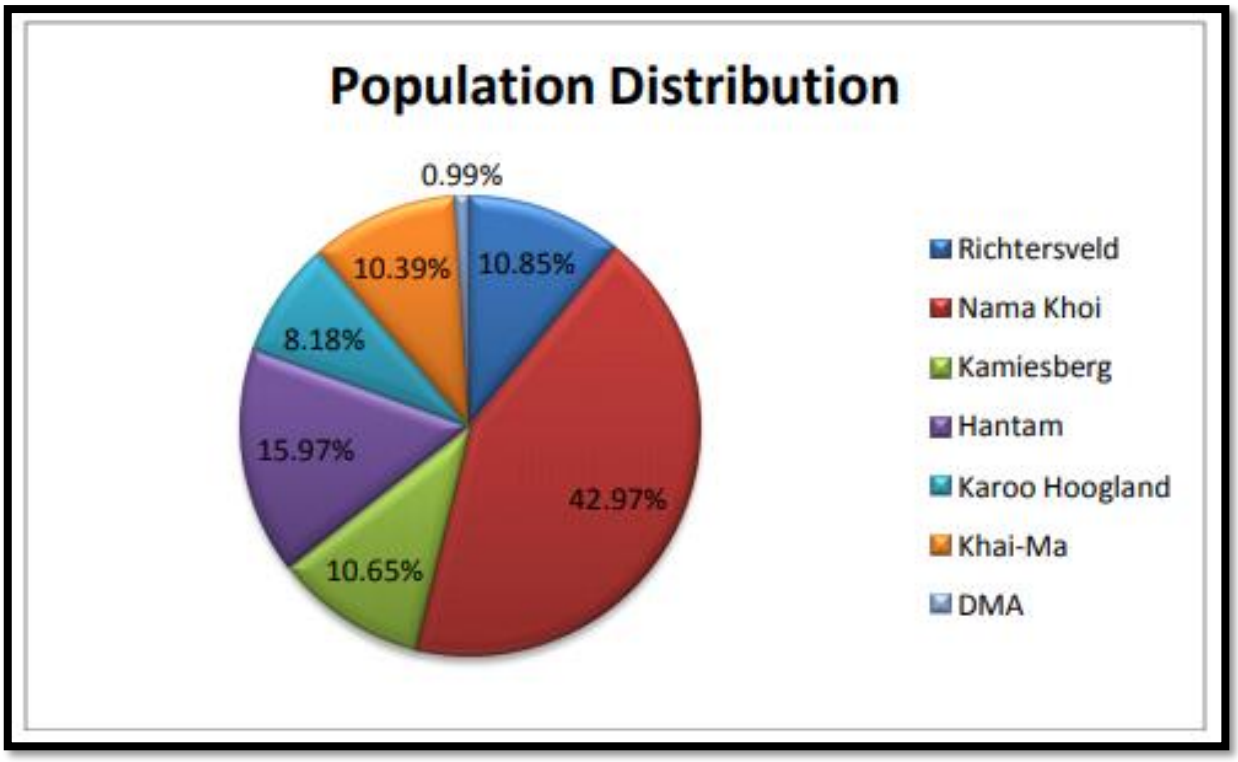

Figure 27: Population Distribution

(c) Households per town

Table 3: Household figures

Household figures per urban area.		
Towns	Population	Current households
Aggeneys	2053	666
Khâi-Ma rural	4035	1404
Onseepkans	912	204
Pella	1425	355
Pofadder	2919	733
TOTALS	**11344**	**3362**

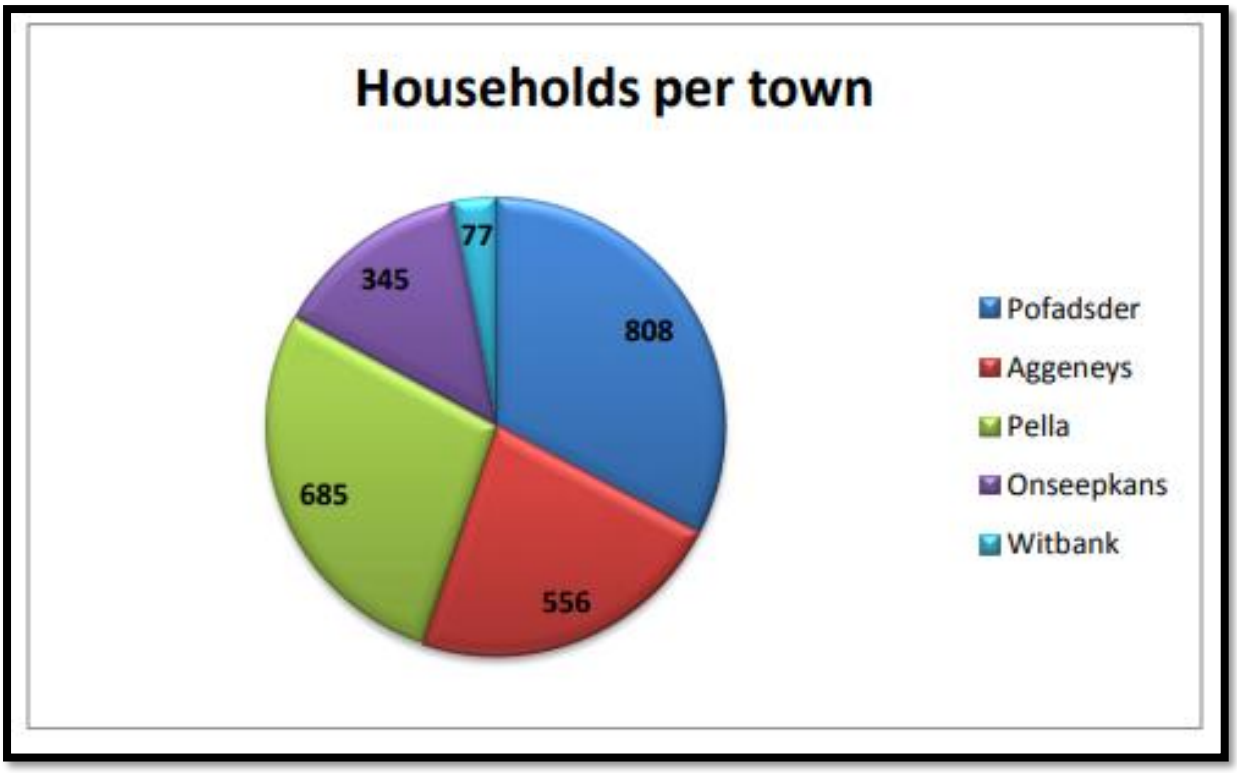

Figure 28: Households per town

Table 4: Population and Household trends.

Population and Household trends						
Khâi-Ma	Population			Households		
	1996	2001	2007	1996	2001	2007
	Statistics SA	Statistics SA	Community Survey	Statistics SA	Statistics SA	Community Survey
	9355	11344	12571	2223	3362	3787
% Increase/Decrease	n/a	21.26%	10.82%	n/a	51.24%	12.64%

CURRENT REALITY: BASIC FACTS & FIGURES

The Municipal Area is divided into 4 wards	
Ward 1	Onseepkans and it includes: Vrugbaar, Raap & Skraap, Pella Brak and Rooiklippe.
Ward 2	Blyvooruitsig and Pofadder.
Ward 3	Pella and it includes: Witbank, Klein Pella.
Ward 4	Aggeneys includes Pofadder town area and Dwaggasoutpan.

The Municipal Council of Khâi-Ma consists of 7 members. 4 represents wards and three (3) are proportional representatives of political parties. The ruling party in all the wards is the ANC.

(d) Age and Gender

Table 5: Age

Age	Male	Female
0 to 4	567	493
5 to 14	1157	1083
15 to 34	2208	1844
35 to 64	1652	1646
Over 65	254	333
Total	5838	5399

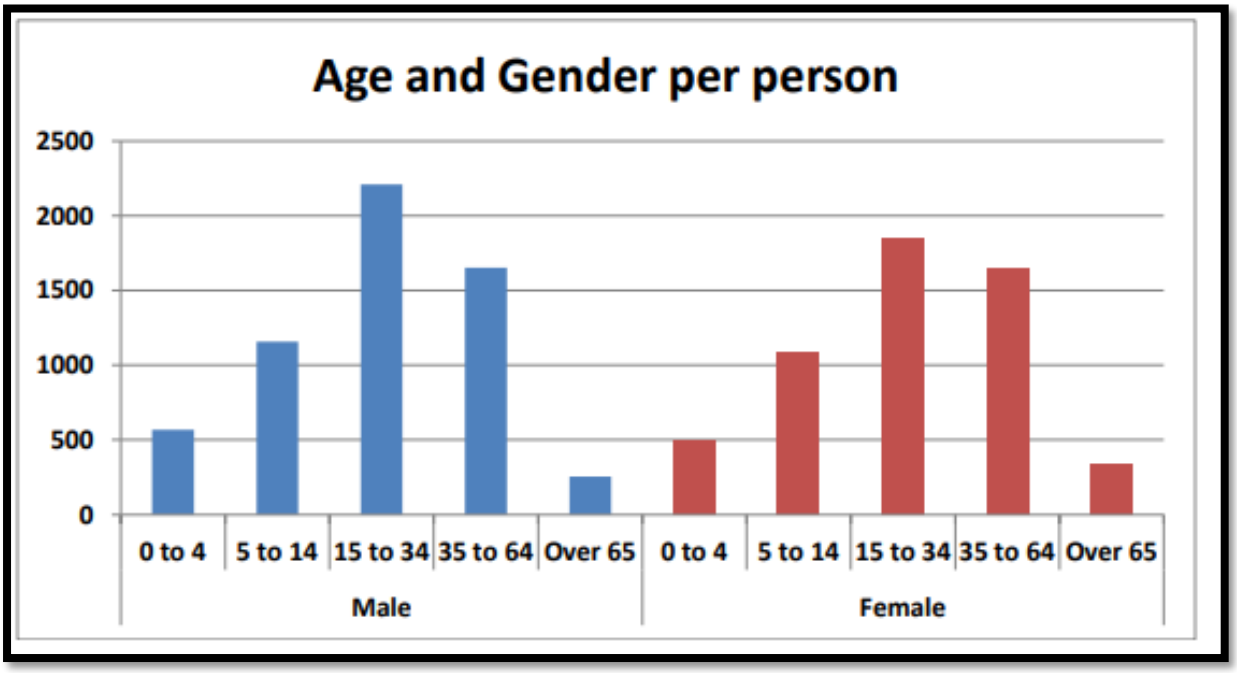

Figure 29: Age and Gender per person

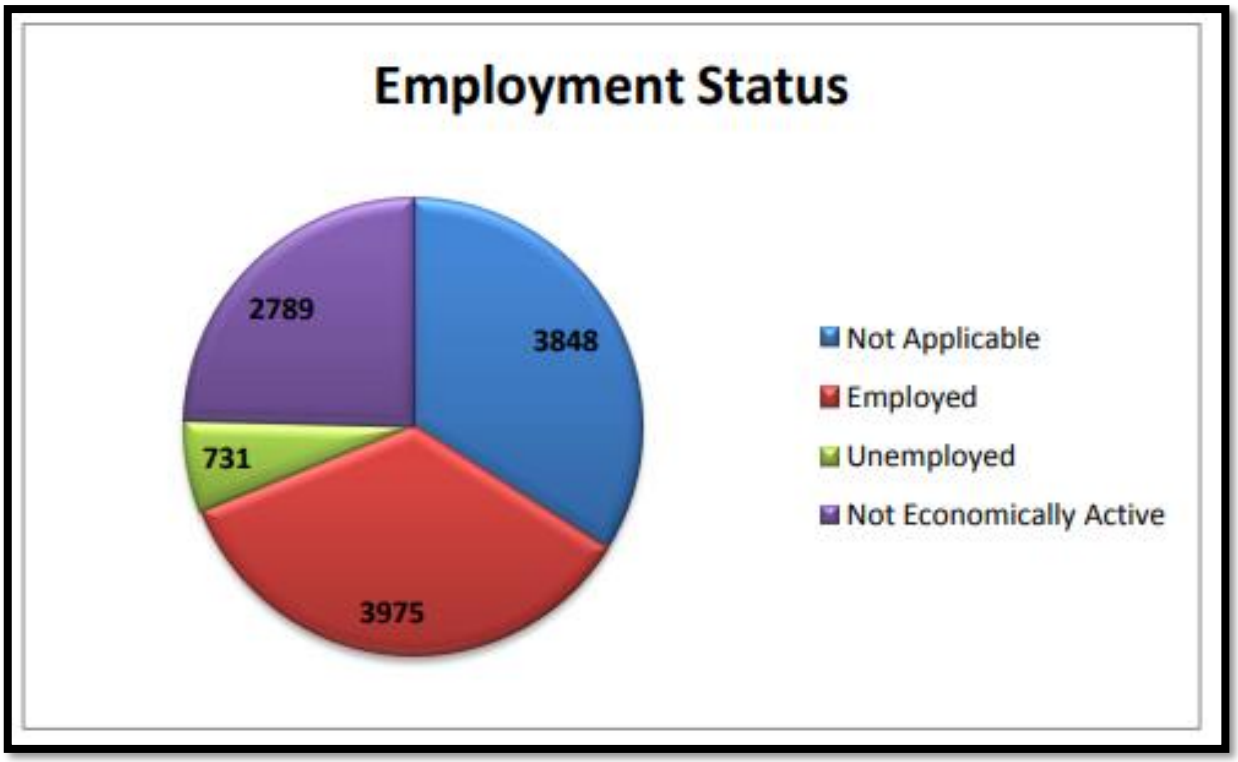

Figure 30: Employment status

(e) Employment status

Table 6: Labour force

Status	Male	Female
Employed	2589	1386
Unemployed	331	400
Not Economically Active	960	1829
Total Labour Force	3880	6315

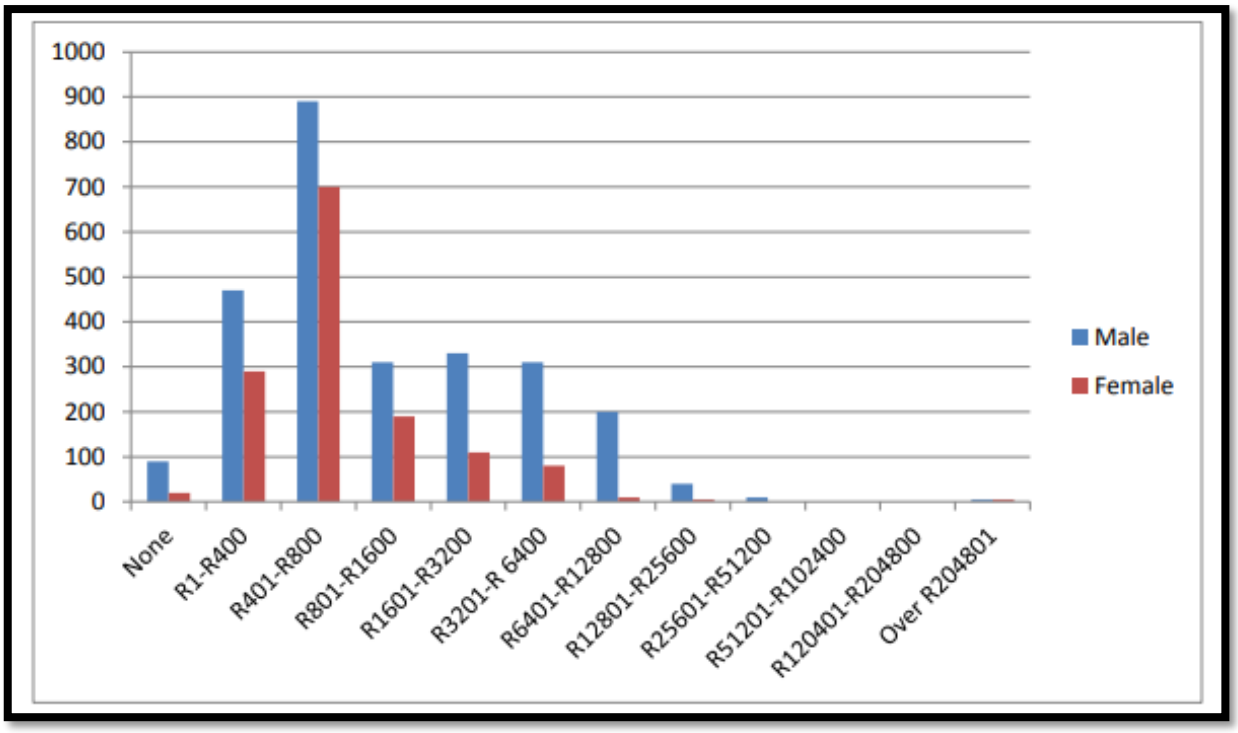

Figure 31: Salary per income.

(f) Education

Table 7: Industry monthly income

Income	Male	Female
None	76	23
R1 – 400	462	285
R401 – 800	882	688
R801 – 1600	301	179
R1601 – 3200	324	116
R3201 – 6400	313	80
R6401 – 12800	188	13
R12801 – 25600	40	3
R25601 – 51200	12	0
R51201 – 102400	0	0
R102401 – 204800	0	0
Over R204801	6	3

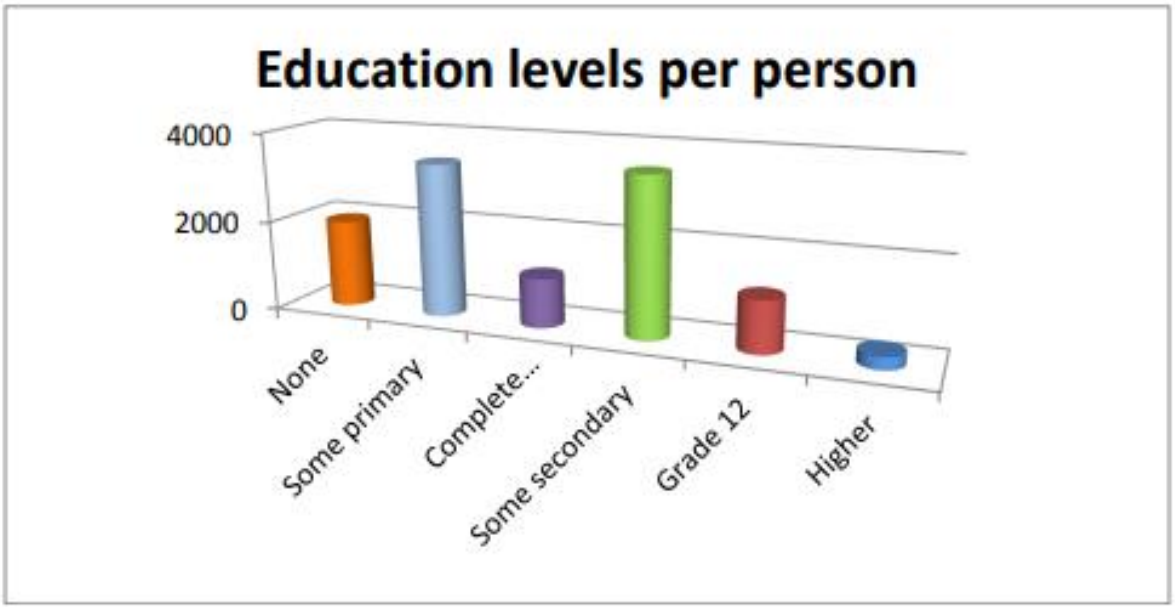

Figure 32: Education levels for person

Table 8: Education

Education Level	Persons
None	1942
Some primary	3399
Complete primary	1091
Some secondary	3497
Grade 12	1141
Higher	274

(g) Employment per industry

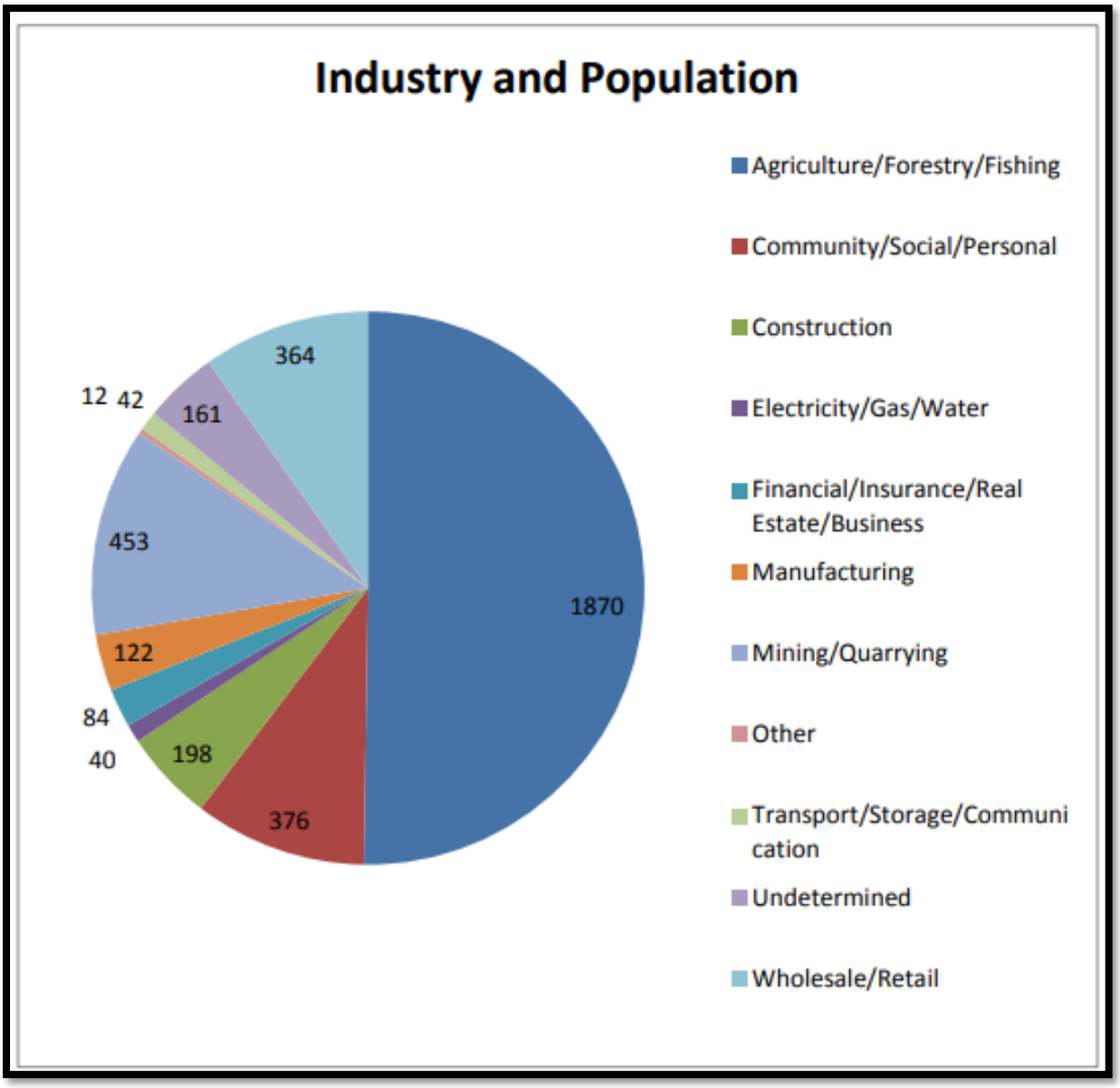

Figure 33: Industry and Population

Table 9: Employment distribution per person

Industry	Population
Agriculture/Forestry/Fishing	1870
Community/Social/Personal	376
Construction	198
Electricity/Gas/Water	40
Financial/Insurance/Real Estate/Business	84
Manufacturing	122
Mining/Quarrying	453
Other	12
Transport/Storage/Communication	42
Undetermined	161
Wholesale/Retail	364

(b) Description of the current land uses.

Portion 2 of the farm Aroams 57 is situated in an agricultural setting, with the land mainly used for small stock grazing purposes. Approximately 90% of the region is used for livestock grazing and production, with the remainder comprising of agriculture and mining.

The Gamsberg zinc mine is located to the south approximately 6 km from the site, and the N14 passes the proposed mining site approximately 2.5 km to the south.

The proposed project will entail the establishment of a mining area adjacent to the existing quarry being used for the winning of Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite by SPH Kundalila (Pty) Ltd. Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite (Pty) Ltd (MP 006/2012) and SPH Kundalila (Pty) Ltd (MP 003/2015) currently holds a mining permit (MP 006/2012) for the existing quarry at the farm; Aroams Quarry (Pty) Ltd intends to establish their proposed mining area adjacent to this quarry. An agreement between SPH Kundalila (Pty) Ltd and Aroams Quarry (Pty) Ltd with regard to technical arrangements made for the co-existence of the respective operations is attached as Appendix D. The agreement also includes a distinction between the respective environmental liabilities and management responsibilities.

Mining at the quarry will only be temporary where after land use will revert back to grazing. As the productivity of the land with regard to land use is very low, mining will have no negative impact on the production of the area.

The land use of the property comprises of the following:

- Agriculture – Mainly grazing, small stock
- Mining – Currently being mined. The Gamsberg zinc mine is located to the south approximately 6 km from the site.

The land use of the surrounding properties comprises of the following:

- Industrial – NONE
- Transport – N14 passes the proposed mining site approximately 2.5 km to the south
- Agriculture – Grazing

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

The proposed mining area is approximately 5 ha in extent and the applicant, Aroams Quarry Limited, intents to win material from the area for at least 2 years with a possible extension of another 3 years. The granite to be removed from the quarry will be used for road construction and various other projects in the vicinity.

EXISTING INFRASTRUCTURE:

As stated above, the proposed mining area will be established adjacent to an existing quarry.

The following structures are present within a 3 km radius from the proposed mining area:

- ±150m from site: Borehole with pump
- ±890 m from site: Cement dam with water pipe line
- ±2.5 km from site: N14 national road

The impact of the proposed mining area on the infrastructural features of the surrounding area is deemed to be of low significance as the impact of the mining activity will be concentrated within the 13.6ha footprint area of the mine.

In order to mitigate the potential impact on the surface or ground water. Storm water management will be implemented on-site. Storm water will be channelled around the mining area to prevent possible contamination of clean water flowing over dirty areas. If this is implemented the proposed activity is not expected to have a negative effect on the surface or ground water in the vicinity.

i. Soil, Land Use and Land Capability

The soils of most of the area are red-yellow apedal soils, with a high base status and <300mm deep, typical of Ag and Ae land types. The soils are typically weakly structured with low organic content. These soils drain freely which results in a soil surface susceptible to erosion, especially wind erosion when the vegetation cover is sparse and gulley erosion in areas where storm-water is allowed to concentrate. The soils in the area are generally not suitable for dry land crop production therefore the pre-mining land capacity is categorized as Class III grazing land. The productivity of the area is very low at 8 – 10 Ha/SSU.

Portion 2 of the farm Aroams 57 is situated in an agricultural setting, with the land mainly used for small stock grazing purposes. Approximately 90% of the region is used for livestock grazing and production, with the remainder comprising of agriculture and mining.

Mining at the quarry will only be temporary where after land use will revert back to grazing. As the productivity of the land with regard to land use is very low, mining will have no negative impact on the production of the area.

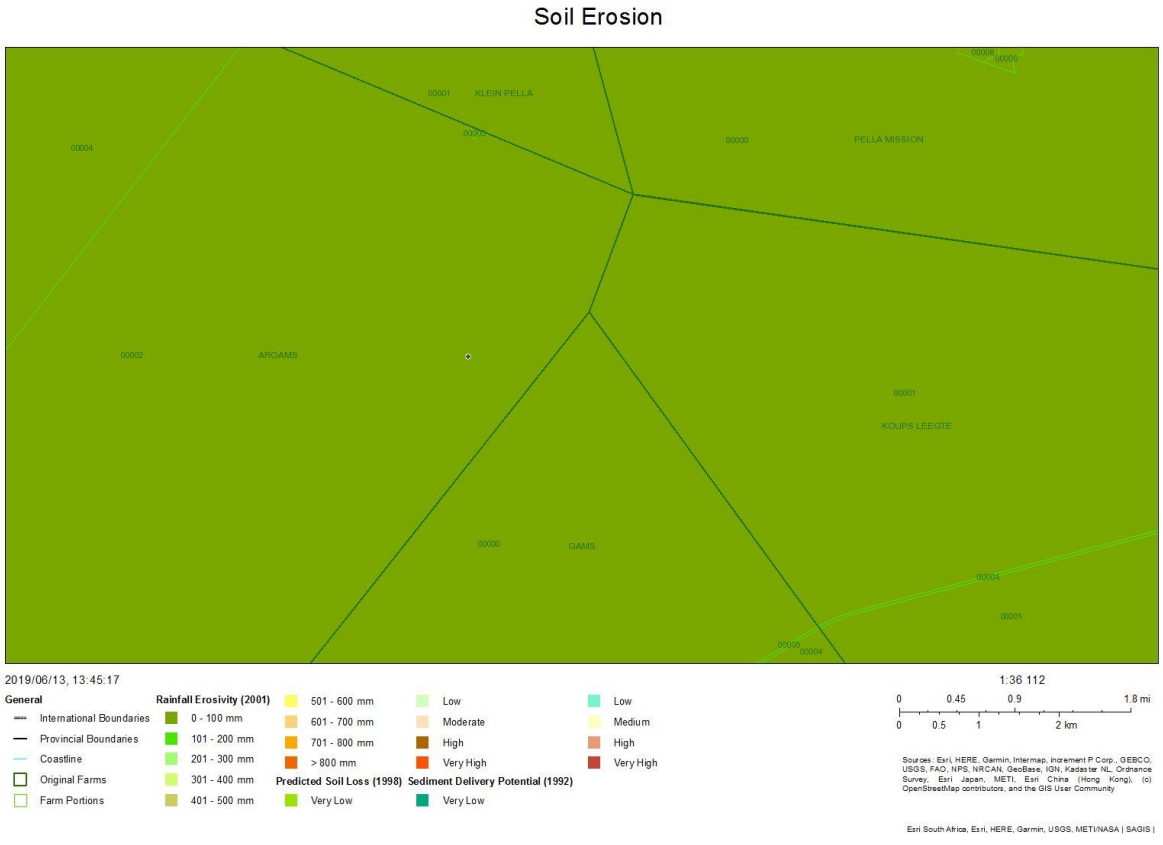

Figure 34: Soil Erosivity

The soil has an erosivity status of between 0-100 mm. this is due to limited topsoil in the area.

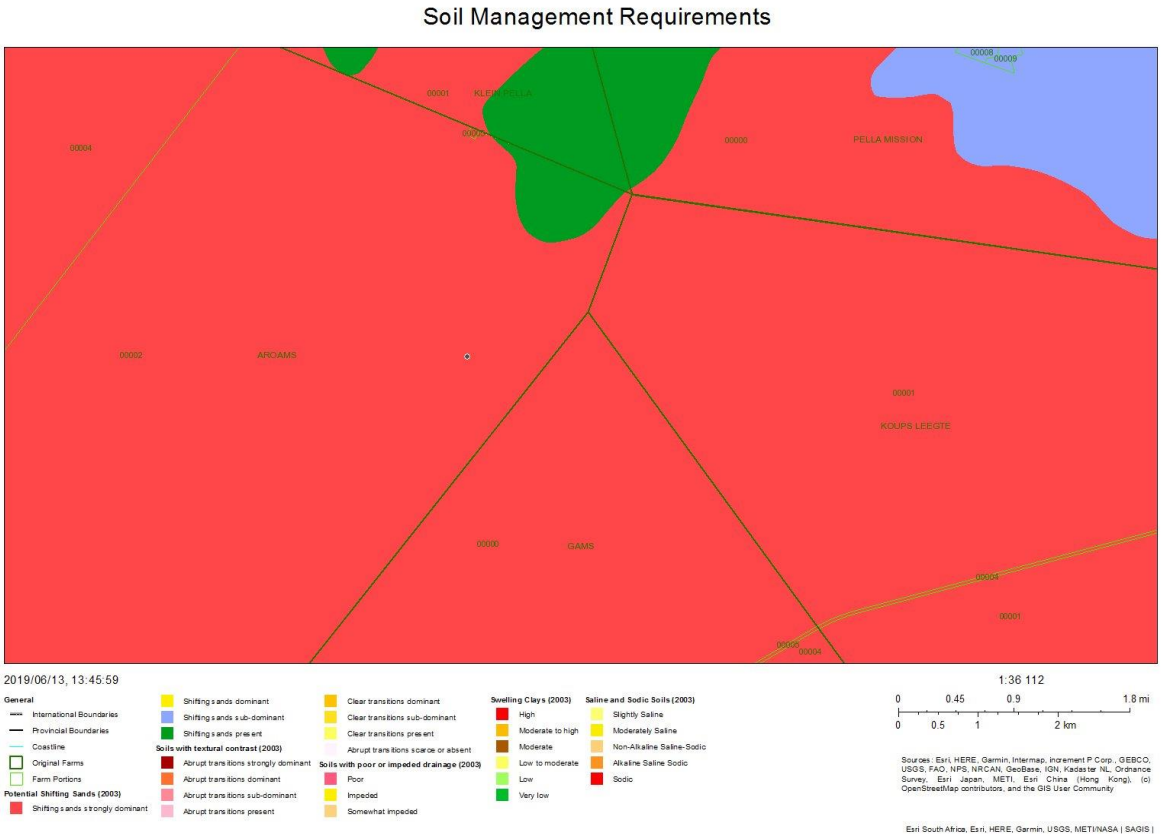

Figure 35: Soil Management Requirements

The soil in the proposed quarry area has specific management requirements which includes high swelling clays and sodic soils/ the sand is shifting sand which are strongly dominant to the area.

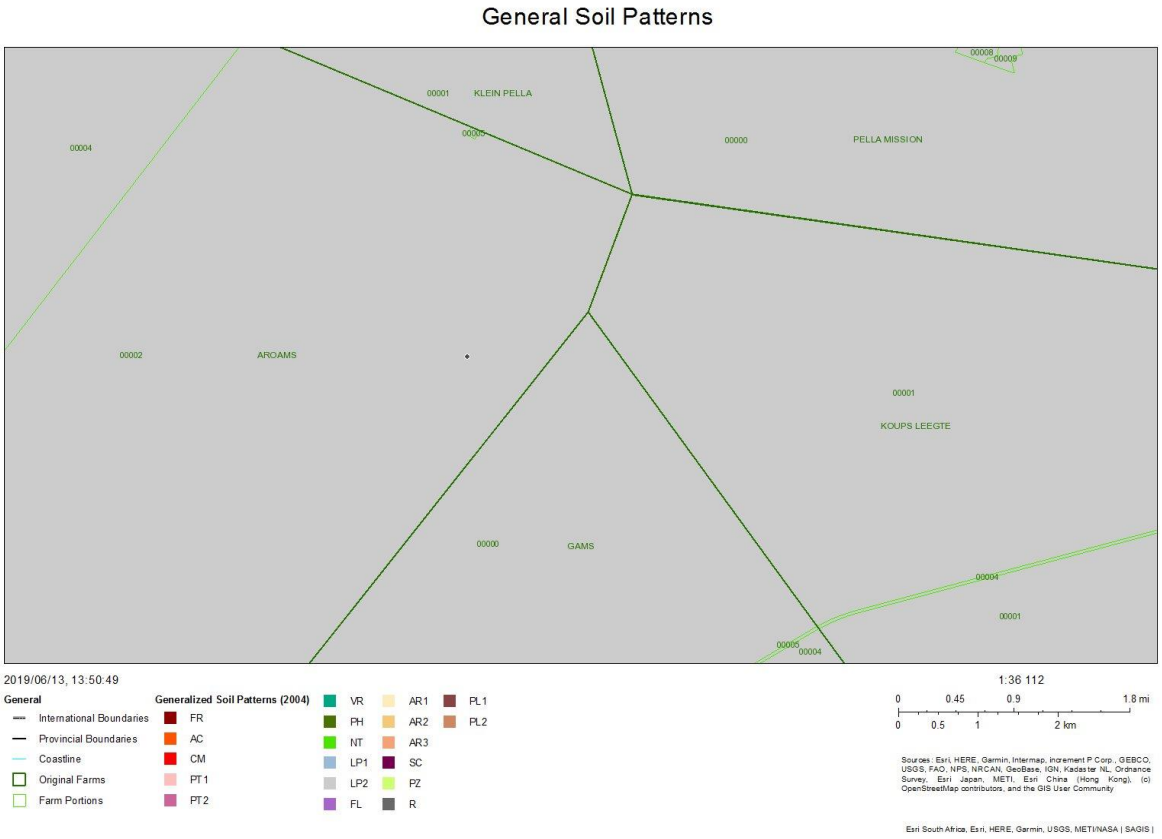

Figure 36: Soil Patterns.

The soils in the area can be classified as LP2 Soils.

ii. Natural Vegetation

The mining area is situated within the Nama-Karoo Biome. The vegetation consists of Bushmanland Arid Grassland vegetation type (NKb 3 according to Mucina and Rutherford, 2006) covering an area of 45478.96 ha that is rated as least threatened with little of the area transformed. Erosion in this vegetation type is deemed to range from very low (60%) to low (33%).

A large amount of pioneer species occurs within the proposed mining area due to previous disturbance dominated by *Galenia fruticosa* and *Tetragonia arbuscula*.

The dominant species outside the disturbed area is covered by sparse open grassland, with prominent *Stipagrostis* grass species, along with scattered drought resistant dwarf shrubs. No protected plant species could be identified at the time of the site inspection.

The area is the least threatened with a target of 21%. Only small patches statutory conserved in Augrabies Falls National Park and in the Goegap Nature Reserve. The alien shrub *Prosopis sp* can be seen as a threat. Very little area has been transformed. Erosion is very low 82%.

According to the Mining and Biodiversity guidelines (as presented in Figure 20) the mining area does not fall within the Mining and Biodiversity area. Areas that are highlighted in green falls within the Moderate biodiversity importance area which have a moderate risk for mining. These areas are not in close proximity to the propose mining area (DEA, 2013).

From the guideline, as mentioned above the area outside the mining area falls within a moderate biodiversity importance area. Please refer to the table below:

Moderate Biodiversity Importance	• Ecological support area • Vulnerable ecosystem • Focus areas for protected areas expansion	Moderate risk for mining	These areas are of moderate biodiversity value. EIAs and their associated specialist studies should focus on confirmed the presence and significance of these biodiversity features. Identifying features (e.g. threatened species) not included in the existing datasets, and on providing site-species information to guide the application of the mitigation hierarchy. Authorisations may set limits and specify biodiversity offset that would be written into licence agreements and/or authorisations.

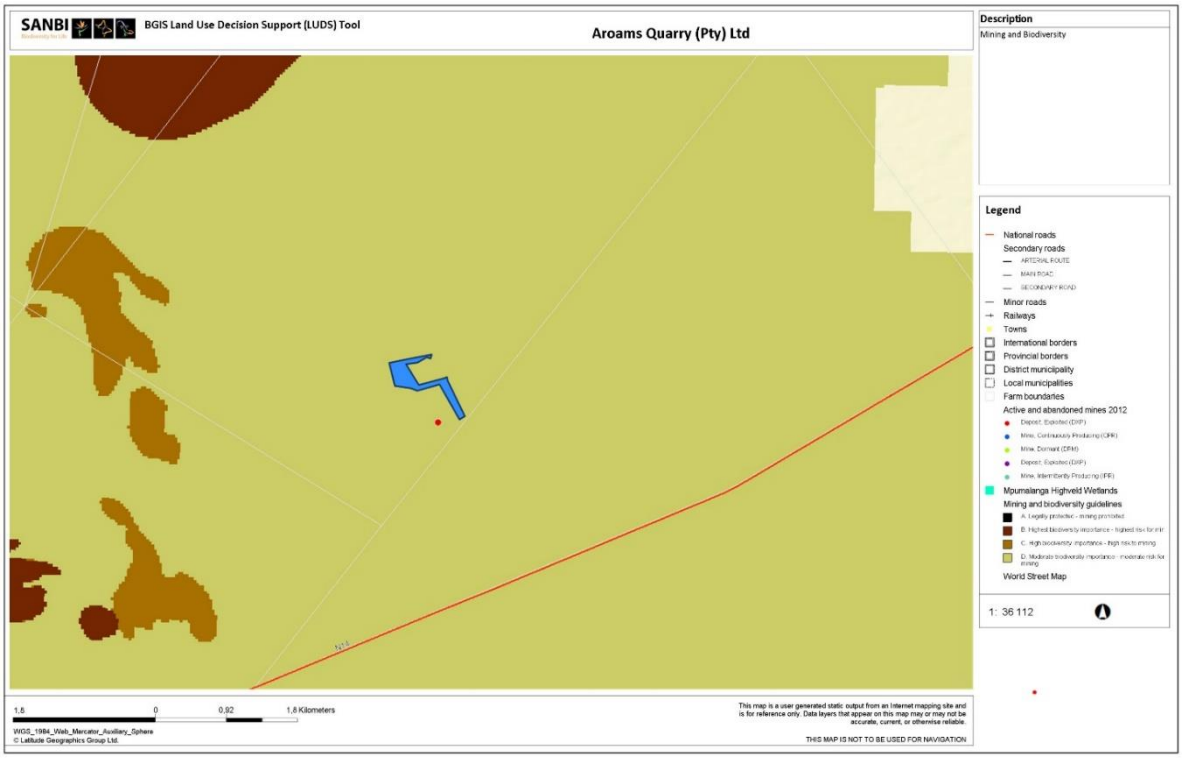

Figure 37: Mining and Biodiversity Guidelines Map (SANBI) (DEA, 2013).

Biodiversity priority areas	Description	Information sources
Ecological support areas	These are areas identified in spatial biodiversity plans areas that play an important role in supporting the ecological functioning Critical Biodiversity Areas or protected areas and/or in ecosystem services. The management objective for a functional state	Data: No data available for Free state
Vulnerable ecosystems	Threatened ecosystems are identified in the NBA and may be listed in terms of the Biodiversity Act 55. Vulnerable ecosystem types have experienced significant loss of natural area but are not yet critically endangered or endangered. In areas where biodiversity planning has occurred, the best areas to meet targets for vulnerable ecosystem types are generally included in will also be viewable on CBAs. However, where this planning has not yet occurred (e.g. Free State, and part of the Northern Cape), remaining intact areas of vulnerable habitat types should be avoided where possible.	Data: Terrestrial vulnerable ecosystems and currently viewable on the SANBI website. Associated legislation: Section 52 of Biodiversity Act, 2004
Focus areas for land based protected area expansion and focus areas for offshore protection	Focus areas for land-based protected area expansion are large, relatively intact (in terms of natural vegetation cover) and fragmented areas of high biodiversity importance, suitable expansion for the creation or expansion of large protected areas, were identified by the Offshore Marine identified in the National Protected Area project (OMPA; for offshore Protected Area Expansion Strategy 2008. They were identified through a systematic biodiversity planning process, taking into account the need to represent both terrestrial and freshwater biodiversity in the protected area network as well as to contribute to climate change resilience. They represent the best remaining large areas of natural habitat that still have low levels of fragmentation and form a key part of our ecological infrastructure network. Focus areas for offshore protection were identified through a systematic biodiversity planning process to direct MPA expansion and other types of spatial management to ensure sustainable resource use and a representative protected area network. They identify spatial priorities for representing offshore biodiversity, protecting sensitive ecosystems, contributing to fisheries sustainability and reducing by-catch. These areas will be refined in the future.	Data: focus areas for land based protected area expansion available on SANBI website. Associated legislation: these areas support further implementation of the protected areas act.

The primary threats to Biodiversity, ecosystem goods and services are habitat transformation and degradation, and invasive alien species. The concern regarding threats to biodiversity is borne out of the recognition that our natural resources base provides a variety of goods and services on which life depends. In Khâi-Ma this natural resource base is directly threatened by mining developments. The management of these is critical in ensuring effective conservation and sustainable use of the biodiversity. Again making the need for Environmental Conservation and Management Plans as well as Plans to eradicate and monitor Alien Invasive Species very important for Khâi-Ma.

iii. Fauna:

Various small mammals and reptiles occur on the property. Larger herbivore species are very scares or absent due to the conflicting land use.

iv. Surface Water

Figure 38: Map showing surface water features.

v. Air Quality

The background air quality of the surrounding area is very good due to low industrial activity and very low population density. Given the surrounding extent of semi-desert, dust generation is high under windy conditions (dust storm) however under normal conditions no extreme dust conditions were noted on site. The mining operations at the existing quarry contribute to the dust levels of the immediate area. Dust to be generated by the proposed mining activities will imitate the dust levels generated by the current mining activities at the site, and are therefore seen as a cumulative impact. It is expected that the generation of dust will be localised within the confines of the mining area, and can be mitigated through the implementation of dust suppression measures.

vi. Archaeological and Cultural Interest:

No sites of archaeological or cultural importance were identified during the site inspection. As the proposed mining activity will take place within an area previously utilized for mining purposes, the activity is not anticipated to have a negative impact on any archaeological or cultural aspects.

During the mining permit application of Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite (Pty) Ltd (10052 MP), SAHRA requested that a Heritage Impact Assessment and Paleontological study be done to confirm that the mining activity will not have an impact on any archaeological or cultural aspects. A desktop Heritage Impact Assessment and recommendation for exemption from further Paleontological studies was submitted to SAHRA. SAHRA subsequently responded that the development is unlikely to impact significant heritage resources and that the SAHRA Archaeology, Palaeontology and Meteorites Unit has no objection to the development on condition that, if any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources are found during development, constructing or mining, SAHRA and an archaeologist and/or palaeontologist, depending on the nature of the finds, must be alerted immediately.

As the proposed mining area applied for by Aroams Quarry (Pty) Ltd falls within the study area surveyed during the abovementioned archaeological and paleontological desktop studies, the potential impact on archaeological or cultural aspects is deemed to be insignificant. Should any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources be found during development, constructing or mining, SAHRA and an archaeologist and/or palaeontologist, depending on the nature of the finds, will be alerted immediately.

SAHRA requested in October 2018 that an Archaeological study be conducted for the Aroams Quarry mining permit area. The following conclusion was made during this assessment.

HCAC was appointed to conduct a Heritage Impact Assessment to determine the presence of cultural heritage sites and the impact of the Mining Right for the mining of aggregate, gravel, granite and dolerite, 13.6 ha, on a portion of Portion 2 (Remaining Extent) of the farm Aroams 57, Registration Division of Namaqualand RD, Northern Cape on non-renewable heritage resources. The study area was assessed both on desktop level and by a field survey. The field survey was conducted as a non-intrusive pedestrian survey to cover the extent of the mining right footprint.

The site is used for the mining of gravel, and significance disturbance from an archaeological point of view has already occurred. Within the area earmarked for the processing and stock piling area small stone cairns occur as a result clearing of fly rock and are of no heritage significance. Within the mining area and alternative site an east west orientated outcrop of granite-gneiss occurs. To the south of this area the study area is characterised by quaternary sand cover with almost no archaeological traces. Rocky outcrops in the area are known to contain grinding hollows (Morris 2017) and a thorough inspection of the rocky outcrops revealed no such features. The granite gneiss outcrop on the northern portion of the study area is slightly elevated - isolated Stone Age lithics were recorded here as Find spots. These isolated artefacts are not considered as sites and are out of context and of no heritage significance apart from recording them in this report. At Find Spot 6 a lower grinding stone was recorded, the grinding stone is out of context as it placed on a rock.

During the survey seven find spots were recorded. Six find spots (F1 – F6) consist of isolated Stone Age artefacts. Find spot seven is marked by a low-density scatter of modern glass fragments and metal cans of no heritage significance.

The SAHRA paleontological sensitivity map indicated that the footprint as a whole is located on a paleontologically insignificant area and is not considered paleontologically vulnerable.
The survey also did not reveal any historical farm steads, colonial era stone-walling (dwellings or kraals), graves or other sites of significance. Long term impact on the cultural landscape is considered to be negligible as the immediate surrounding area consists of an area that has been subjected to previous mining developments. Visual impacts to scenic routes and sense of place are also considered to be low due to the other developments in the area. There are no battlefields or concentration camp sites in the study area.

The impact on heritage resources in the Mining Right area and the Alternative that was assessed is low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA:

- Implementation of a chance find procedure as outlined in below.

Chance Find Procedures

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- 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 SAHRA.

Reasoned Opinion

The impact on heritage resources in the study area can be mitigated to an acceptable level and it is recommended that the proposed project can commence on the condition that the recommendations in this report are implemented as part of the EMPr and based on approval from SAHRA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

Potential risk

Potential risks to the proposed project are the occurrence of unknown and unmarked graves. The possibility exists that the study area could contain graves of which surface indicators have been destroyed and subsurface material could be uncovered during earth works. These risks can be mitigated to an acceptable level with monitoring and the implementation of a chance find procedure as outlined in above.

SAHRA requested in July 2019 that an Archaeological study be conducted for the Aroams Quarry Mining Right area. This study is included as part of the DEIAR.

vii. Visual Exposure

The mining area was identified to constitute the lowest possible visual impact on the surrounding environment. Due to the current mining disturbance nearby the area the site has a low aesthetic value. The proposed prospecting area will visible from the surrounding farms and will therefore have a visual impact on the immediate surrounding area.

The applicant should ensure that housekeeping is managed to standard, as this will mitigate the visual impacts during the operational phase of the stockpile area. Upon closure of the prospecting area and decommissioning of the site, the area should be fully rehabilitated and all exposed areas should be seeded to enhance vegetation recovery should natural vegetation not establish within six months of completion of rehabilitation.

The proposed mining area will be operated within the vicinity of an existing quarry. All stockpiling will be done on previously disturbed areas within the processing area, which will be rehabilitated upon closure of the mining area. Although the proposed mining at the site will have a visual impact the establishment of the quarry in an already disturbed area will help to mitigate this impact.

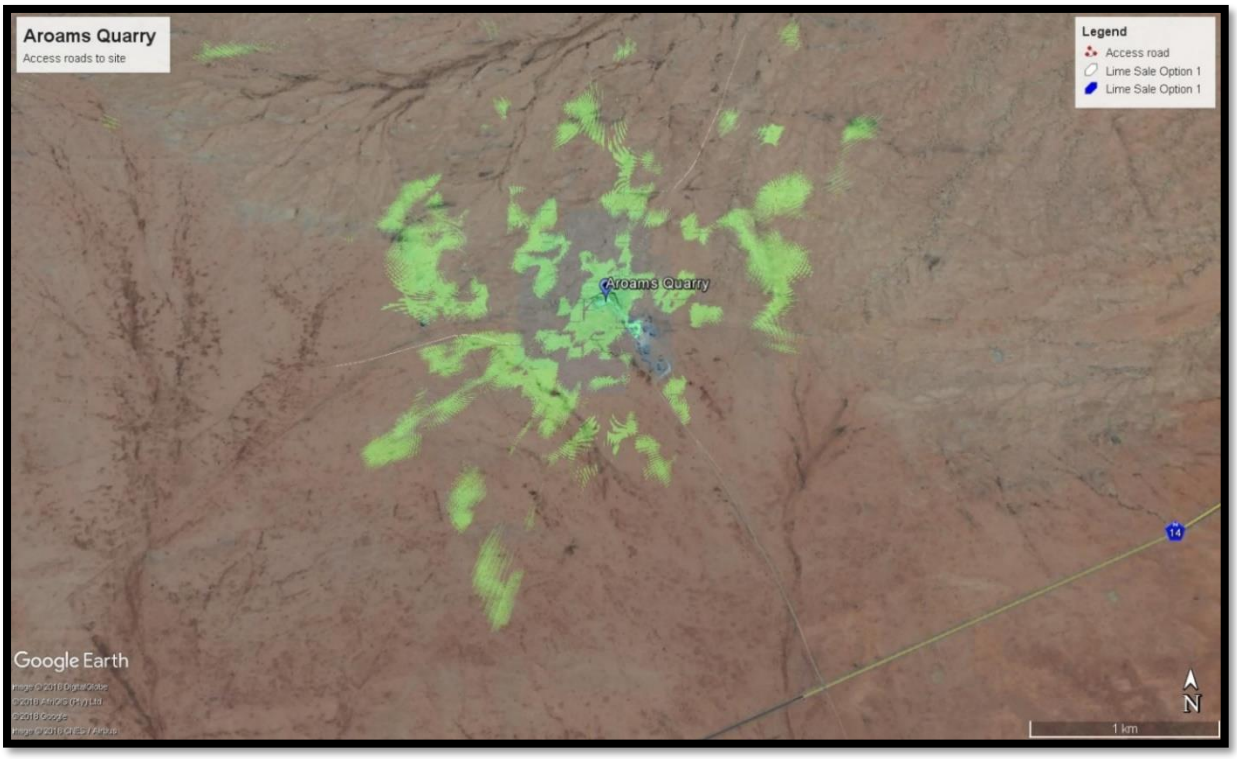

Figure 39: Visual Exposure

From the above figure, the green areas indicated the areas that will be visible from the surrounding area. From the above figure it is indicated that the mining area will be visible from the surrounding properties.

(d) Environmental and current land use map.

(Show all environmental, and current land use features)

The environmental and current land use map is attached as Appendix 3.

iv) 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 following potential impacts were identified of each main activity in each phase. The significance rating was determined using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*.

The impact rating listed below was determined for each impact **prior** to bringing the proposed mitigation measures into consideration. The degree of mitigation indicates the possibility of partial, full or no mitigation of the identified impact.

Table 10: Impact Assessment for Aroams Quarry prior to mitigation measures

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No
CONSTRUCTION / SITE ESTABLISHMENT PHASE													
ACTIVITY:	**DEMARCATION OF SITE WITH VISIBLE BEACONS.**												
	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	Neg										Low	Y
ACTIVITY:	**ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.**												
	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	Neg										Low	Y
Social & Safety	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Neg	Reversible	1	3	5	3	3	5	4	12	Med	Y
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Medium - High	N
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	2	4	2	3	5	4	9,33	Low-Med	Y
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med	N
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	4	1	5	3	11	Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Air quality	Dust nuisance caused by the disturbance of soil.	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: ABLUTION FACILITIES													
Groundwater	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	2	3	5	3	3	5	4	13,3	Med	Y
Surface water	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	2	3	5	3	3	5	4	13,3	Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Soils	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	1	3	5	3	3	5	4	12	Med	Y

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No
SUB ACTIVITY: ACCESS ROADS													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Air quality	Dust nuisance caused by the disturbance of soil.	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: SITE OFFICES													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: VEHICLE SERVICE AREA													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: WASH BAY													

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: WORKSHOP													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	2	4	2	3	5	4	9,33	Low-Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: SALVAGE YARD													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: BUNDED DIESEL AND OIL STORAGE FACILITIES													

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: GENERATOR AREA (BUNDED)													
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: WEIGH BRIDGE													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Air quality	Dust nuisance caused by the disturbance of soil.	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
SUB ACTIVITY: PARKING AREA													

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
SUB ACTIVITY: WASTE AREA													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
ACTIVITY:	**STRIPPING AND STOCKPILING OF TOPSOIL**												
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Medium - High	N
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	2	4	2	3	5	4	9,33	Low-Med	Y
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med	Y
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	4	1	5	3	11	Med	N
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y
Air quality	Dust generation	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y
OPERATIONAL PHASE													
ACTIVITY:													
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Noise	Noise nuisance generated by drilling equipment and blasting	Neg	Reversible	2	2	1	2	1	3	2	3,33	Low	Y
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	4	2	2	2	5	4	8,17	Low-Med	Y
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med	Y
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Med	Y
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	4	1	5	3	11	Med	Y
Noise	Noise nuisance generated by drilling equipment and blasting	Neg	Reversible	2	2	1	2	1	3	2	3,33	Low	Y
Air quality	Dust generation	Neg	Reversible	1	2	1	1	1	3	2	2,67	Low	Y
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Low-Med	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y
Social & Safety	Health and Safety Risk by Blasting Activities. Potential danger to surrounding communities	Neg	Reversible	1	3	1	2	1	3	2	3,33	Low	Y

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No
ACTIVITY:	**EXCAVATION**												
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med	Y
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Med	Y
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med	Y
Hazardous Waste	Dust nuisance due to loading and transportation of the material	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	2	4	3	4	5	5	12	Med	Y
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	1	2	1	1	1	2,33	Low	Y
Noise	Noise nuisance generated by excavation equipment	Neg	Reversible	1	1	3	2	2	5	4	5,83	Low-Med	Y
Air quality	Dust generation	Neg	Reversible	2	2	4	3	4	5	5	12	Med	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Med	Y
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med	Y
Social & Safety	Unsafe working conditions for employees	Neg	Reversible	1	2	4	2	3	3	3	7	Low-Med	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	2	2	2	5	4	8,17	Low-Med	Y
ACTIVITY:	**CRUSHING AND SCREENING OF AGGREGATE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE**												
Noise	Noise nuisance caused by crushing plant.	Neg	Reversible	2	2	4	3	4	5	5	12	Med	Y
Hazardous Waste	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Air quality	Dust generation	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med	Y
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med	Y

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No
	New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.												
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	2	2	2	5	4	8,17	Low-Med	Y
ACTIVITY:	**TRANSPORTATION OF AGGREGATE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE FROM STOCKPILE AREA TO CLIENTS**												
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Hazardous Waste	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Noise	Noise nuisance caused by vehicles	Neg	Reversible	2	2	4	3	3	2	3	6,67	Low-Med	Y
Air quality	Dust generation	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med	Y
Traffic and Safety	Road degradation. Increased potential for road incidences Potential distraction to road users	Neg	Reversible	2	2	4	3	3	2	3	6,67	Low-Med	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	2	2	2	5	4	8,17	Low-Med	Y
DECOMMISSIONING PHASE													
ACTIVITY:	**SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)**												
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Soils	Soils replaced and ameliorated	Pos	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	4	2	2	2	5	4	8,17	Low-Med	Y
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med	Y
Topography	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Pos	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med	Y

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med	Y
Visual aspect	Improved aesthetics through rehabilitation	Pos	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y
Noise	Noise nuisance caused by machinery	Neg	Reversible	2	2	4	3	4	3	4	9,33	Low-Med	Y
Air quality	Dust nuisance caused during landscaping activities	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med	Y
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med	Y
Fauna	Reintroduction of fauna attracted to flora to the area	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med	Y
Fauna	Reintroduction of fauna attracted to flora to the area	Pos	Reversible	2	1	3	2	1	5	3	6	Low-Med	Y
Social & Safety	Health and safety risk posed by un-sloped areas	Neg	Reversible	1	3	4	3	3	3	3	8	Low-Med	Y
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med	Y
Surface water	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. Free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Pos	Reversible	2	3	2	2	2	5	4	8,17	Low-Med	Y
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	2	2	2	5	4	8,17	Low-Med	Y
Groundwater	Improve response to issues relating to deterioration of groundwater quality or quantity	Pos	Reversible	2	1	2	2	2	5	4	5,83	Low-Med	Y
Activity: Application for Closure Certificate													

v) 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).

The impact assessment component of the EIA is subdivided into several environmental aspects to be studied as listed below (preliminary list):

- Hydrology including geohydrology;
- Air quality and noise ambiance;
- Fauna and flora component;
- Cultural and heritage environment;
- Socio-economic environment;
- Existing infrastructure including access roads to be affected; and
- Site, project and/or design/technology alternatives including the no-go option.

Greenmined will use in-house specialists to review the environmental aspects which was assessed as part of the environmental impact assessment process. The environmental aspects briefly described in the Scoping Report was updated, and site and technology specific impacts and mitigation recommendations was proposed to be reviewed by the project team, registered stakeholders and I&AP's and competent authority (DMR).

The significance of the impacts was assessed in terms of the methodology described in *Section 2 j) Methodology Used in Determining and Ranking the Significance*.

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 recognised from the various interpretations:

- Environmental significance is a value judgement
- 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 realised (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 organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation (ISO 14004, 1996).

Methodology that was **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 the purpose of 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 13 was used to obtain an overall rating for severity, taking into consideration the various criteria.

Table 11: Rating of Severity

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 was affected by the event, risk or impact, if no intervention e.g. remedial action takes place.

Table 12: 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 13: 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 14: 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 6 and 7.

Determination of Frequency

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

Table 15: 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 16: 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 summarised below, and then dividing the sum by 2.

Table 17: 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 18: Determination of Overall Environmental Significance

1.1.1.1.1.1.1 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 prioritisations and decision making process associated with this event, aspect or impact.

Table 19: Description of Environmental Significance and related action required

1.1.1.1.1.1.2 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 fairly 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.

vi) 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)

Site Alternative 1 (S1) (Preferred Alternative):

Positive Impacts:

- The mining site offers the mineral sought after;
- The proposed sites were previously used for mining activities, thus minimal environmental damage will occur;

- The mining area can be reached by an existing farm access road that connects to the N14. No new road infrastructure need to be constructed;
- Due to the small size of the activity and the remote location of the mining area the potential impacts on the surrounding environment, associated with mining is deemed to be of low significance; and
- No residual waste as a result of the mining activity will be produced that needs to be treated on site. Any general waste that may be produced on-site will be contained in sealed refuse bins to be transported to the local municipal landfill site. As maintenance and servicing of the equipment will be done at an off-site workshop the amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental leakage. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site.

Negative Impacts:

- Due to the remote location of the mining area very little negative impacts on the community could be identified that were deemed to be of significant importance. The dust and noise impacts that may emanate from the mining area during the operational phase could have a negative impact on the surrounding community if the mitigation measures proposed in this document is not implemented and managed on-site; and
- Negative impacts with regard to the environment include potential contamination of the area due to spillage of hydrocarbon products.

Site Alternative 2 (S2)

Positive Impacts:

- The site is near the mineral sought after;
- The alternative area will not have to compete with other land uses as all the activities can be contained within the boundaries of the site. Upon closure of the mining area, the land will revert back to agriculture; and
- The aggregate to be mined will be used for the upgrading of the roads in the vicinity of the activity. The alternative mining area will therefore contribute to the upgrading/maintenance of infrastructure in and around Aggeneys / Pela area and indirectly contribute to the economy of the area.

Negative Impacts:

- The site has not been previously disturbed before; thus the natural area needs to be cleared and is not preferred with regards to sustainable development;
- In the light of the above the impacts associated with establishing another quarry pit in a greenfield site on the property is believed to have a higher significance without the need or motivation to justify it;
- The dust and noise impacts that may emanate from the mining area during the operational phase could have a negative impact on the surrounding land users if the mitigation measures proposed in this document is not implemented and managed on-site; and

- Negative impacts with regard to the environment include potential contamination of the area due to spillage of hydrocarbon products.

vii) 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).

Visual Mitigation:

The risk of the proposed mining activity having a negative impact on the aesthetic quality of the surrounding environment can be reduced to a low – medium risk through the implementation of the mitigation measures listed below:

- The site must have a neat appearance and be kept in good condition at all times;
- Mining equipment must be stored neatly in dedicated areas when not in use;
- The screening of mining infrastructure must be considered;
- The right holder must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area;
- The stockpile areas must be managed to prevent excessive storage periods of overburden material;
- Upon closure, the site must be rehabilitated and top soiled to reduce the visual impact of the mining activities and return the area to its prior status.

Dust Handling:

The risk of dust, generated from the proposed mining activity, having a negative impact on the surrounding environment can be reduced to being low through the implementation of the mitigation measures listed below:

- The liberation of dust into the surrounding environment must be effectively controlled by the use of, int*er alia*, water spraying and/or other dust-allaying agents;
- The roads and stockpile areas must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits.
- The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression;
- Speed on the Aggregate, Gravel, Granite and Dolomite roads must be limited to 40 km/h to prevent the generation of excessive dust;
- The crusher plant must have operational water sprayers to alleviate dust generation from the conveyor belts;
- 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;

- Topsoil stockpiles must be covered alternatively planted with indigenous grass species to minimize exposed surface areas, and reduce windblown dust from the site. The vegetation will further assist in capturing wind born dust and minimizing the spread of dust from the site.
- Fines, blowing from the drop end of the crusher plant, must be minimized by attaching strips of used conveyor belts to the conveyor's end;
- Compacted dust must weekly be removed from the crusher plant to eliminate the dust source;
- The Applicant must implement a dust management plan and conduct fall-out dust monitoring on site to accurately determine the site specific dust levels;
- Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during windy periods will reduce airborne dust and resulting impacts;
- Dust generated from the stripping of topsoil and mining operations 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, processing and stockpiling activities in order to minimize potential dust impacts;
- The mitigation measures associated with this impact must be expanded upon as part of the atmospheric impact assessment and associated EIA process.

Noise Handling:

The risk of noise, generated from the proposed mining activity, having a negative impact on the surrounding environment can be reduced to being low-medium through the implementation of the mitigation measures listed below:

- All mining related 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);
- Noise generated by the proposed activity shall comply with the Western Cape Noise Control Regulations (PN 200/2013), June 2013;
- Best practice measures shall be implemented in order to minimize potential noise impacts;
- The Applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site;
- Employees will not be allowed to reside on site;
- No load music may be allowed on site;
- Drilling and blasting may only take place from Monday – Friday during normal work hours (8:00 to 17:00);
- A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM: AQA, 2004, SANS 10103:2008;
- The mitigation measures associated with this impact must be expanded upon as part of the noise impact assessment and associated EIA process.

Management of weed or invader plants:

The risk of weeds or invader plants invading the disturbed area can be reduced to being low through the implementation of the mitigation measures listed below:

- An invasive plant species management plan 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.
- 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 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.
- All stockpiles must to be kept free of weeds.

Storm water Handling:

The risk of contamination through dirty storm water escaping from work areas, or erosion or loss of stockpiled topsoil caused due to uncontrolled storm water flowing through the mining area can be reduced to being low through the implementation of the mitigation measures listed below:

- Storm water must be diverted around the topsoil heaps, and access roads to prevent erosion and loss of material.
- 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:
    - Runoff water should be diverted around the site areas with trenches and contour structures to prevent erosion of the work areas.
    - 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.
    - The 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 the storm water management plan.

Handling of Hazardous Materials and Substances:

- All hazardous materials or substances should be stored in a closed storage facility with an impermeable floor.
- The storage area should meet the following conditions:
    - The storage area should be constructed on a level area to prevent offsite migration of any spilled product.
    - The floor of the storage area should be impermeable to prevent seepage of spilled products into the ground or ground water.
    - The storage area should be out of the 1:100-year flood line or further than 100m from the edge of a watercourse, whichever is greatest.
    - The facility should be such that access to the materials/substances can only take place with the prior notification of an appropriate staff member.
- All fuel storage tanks should have secondary containment in the form of an impermeable bund wall and base within which the tanks sits, raised above the floor, on plinths. This bund capacity should be sufficient to contain 110% of the tank's maximum capacity.
- The distance and height of the bund wall relative to that of the tank should also be taken into consideration to ensure that any spillage does not result in oil spouting beyond the confines of the bund.
- The site manager should establish a formal inspection routine to check all equipment in the bund area, as well as the bund area itself for malfunctions or leakages. The bund area should be inspected at least weekly and any accumulated rainwater removed. All valves and outlets should be checked to ensure that they are intact and closed securely.
- The bund base must slope towards a rainwater sump of sufficient size.
- Contaminated water may not be allowed to mix with clean water, and contained until it can be collected by a registered hazardous waste handling contractor or be disposed of at a registered hazardous waste handling facility.
- Drip trays should be available to be place underneath all stationary equipment or vehicles.
- The layer of material at the vehicle service area should be removed and if contaminated with hazardous substances such as hydrocarbons should be disposed of as hazardous waste by an appropriately qualified waste handling contractor. The compacted areas should be ripped and the topsoil returned over the area.
- The site should be cleared of all hazardous substances once decommissioning has been completed and should be disposed of by an appropriately qualified waste handling contractor.

Waste Management:

The risk of waste generation having a negative impact on the surrounding environment can be reduced to being low through the implementation of the mitigation measures listed below:

- No waste stockpile area may be established outside the boundaries of the mining area.
- Vehicle maintenance may only take place within the service bay area of the workshop.

- The diesel bowser needs to be equipped with a drip tray at all times. Drip trays have to 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.
- 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 recognised facility.
- Spills must be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing it at a recognised facility. Proof should be filed.
- Suitable covered receptacles should be available at all times and conveniently placed for the disposal of waste.
- Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc, should be stored in a container with a closable lid at a collecting point and collected on a regular basis and disposed of at a recognised landfill site. Specific precautions should be taken to prevent refuse from being dumped on or in the vicinity of the mine area.
- Biodegradable refuse generated should be handled as indicated above.
- Water from the wash bay should drain into the oil sump from where it should be removed by an approved contractor.
- Drip trays should be available to be place underneath all stationary equipment or vehicles.
- Waste material of any description, including receptacles, scrap, rubble and tyres, should be removed entirely from the mining area and disposed of at a recognized landfill facility once decommissioning has been completed. It will not be permitted to be buried or burned on the site.

Management of Health and Safety Risks:

The health and safety risk, posed by the proposed mining activity can be reduced to being low through the implementation of the mitigation measures listed below:

- Workers must have access to the correct personal protection equipment (PPE) as required by law.
- All operations must comply with the Occupational Health and Safety Act.

Protection of fauna and flora:

The risk on the fauna and flora of the footprint area as well as the surrounding environment, as a result of the proposed mining activity, can be reduced to being low through the implementation of the mitigation measures listed below:

- The site manager should ensure that no fauna is caught, killed, harmed, sold or played with.
- Workers should 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.
- No plants or trees may be removed without the approval of the ECO.
- Clearing of vegetation has to be restricted to the smallest possible area.

Management of Access Roads:

The risk on the condition of the roads, as a result of the proposed mining activities, can be reduced to being low-medium through the implementation of the mitigation measures listed below:

- Storm water should be diverted around the access roads to prevent erosion.
- Erosion of access road: Vehicular movement must be restricted to existing access routes to prevent crisscrossing of tracks through undisturbed areas. Rutting and erosion of the access road caused as a result of the mining activity should be repaired by the applicant.
- On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, should be scarified to a depth of at least 300mm and graded to an even surface condition and the previously stored topsoil should be returned to its original depth over the area.

Topsoil Handling:

The risk of loss of topsoil can be reduced to being low through the implementation of the mitigation measures listed below:

- Where applicable the first 300 mm of topsoil should be removed in strips and stored along the boundary of the mining area. Stockpiling of topsoil must be done to protect it from erosion, mixing with overburden or other material. The topsoil must be used to cover the rehabilitated area and improve the establishment of natural vegetation.
- The temporary topsoil stockpiles should be kept free of weeds.
- Topsoil stockpiles should be placed on a levelled area and measures should be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water.
- Topsoil heaps should 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.
- Should natural vegetation not establish on the heaps within 6 months of stockpiling it should be planted with an indigenous grass species.
- Storm- and runoff water should be diverted around the topsoil stockpiles and access roads to prevent erosion.

Potential impact on indigenous vegetation:

- Buffer areas must be demarcated, sign posted and managed as no-go area around CBA area;
- A plant rescue must be conducted on natural (uncultivated) areas to be mined. Upon rehabilitation of the mining area, these areas must be replanted with the rescued plants as soon as the topsoil was replaced. A botanist must be consulted regarding other plant species that can be established on rehabilitated areas;
- Areas currently cultivated, to be cultivated land after mining, the replanting of crops must take place as soon as feasible once the topsoil was replaced;
- An invasive plant species management plan must be implement on site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas;

- The mitigation measures associated with this impact must be expanded upon as part of the ecological impact assessment and associated EIA process.

Potential impact on fauna within the footprint area:

- Site management must ensure no fauna is caught, killed, harmed, sold or played with at the mining area;
- 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;
- The mitigation measures associated with this impact must be expanded upon as part of the ecological impact assessment and associated EIA process.

Potential impact on areas/infrastructure of heritage or cultural concern:

- All mining activities must be contained within the boundaries of the permitted area;
- If during the pre-site establishment phase, site establishment-, 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 (within the first hour of discovery) 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 (SAHRA);
- Work may only commence once the area was cleared by SAHRA;
- The mitigation measures associated with this impact must be expanded upon as part of the heritage- and paleontological impact assessment and associated EIA process.

Management of health and safety risks:

- The type, duration and timing of the blasting procedures must be planned with due cognizance of other land users and structures in the vicinity;
- The surrounding landowners and communities must be informed in writing ahead of any blasting event;
- Measures to limit fly rock must be taken;
- Audible warning of a pending blast must be given at least 3 minutes in advance of the blast;
- All fly rock (of diameter 150mm and larger) which falls beyond the working area, together with the rock spill must be collected and removed;
- Workers 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, 1993 (Act No 85 of 1993).

Light pollution due to shift work:

- Site management must plan the positioning of exterior lighting such that lamps and reflectors are not visible from beyond the mining footprint;

- Lighting may not cause excessive reflected glare;
- Direct lighting may not illuminate the night-time sky;
- Illumination of the project and its immediate vicinity must be limited;
- light fittings must have incorporated fixture hoods/shielding with lights directed downwards or concentrated on the area to be illuminated;
- Lighting shall be minimum necessary brightness and lights in high illumination areas shall have switches, timers, or motion detectors so that the lights operate only when needed;
- The mitigation measures associated with this impact must be expanded upon as part of the engineering service report and EIA process.

Potential impact on groundwater sources:

- Groundwater quality monitoring must be implemented for the duration of the operational phase;
- The right holder must take an initial water sample from the existing borehole on the farm, of which the results will serve as baseline information.
- Thereafter an annual water sample from the same borehole must be tested for changes in water quality.
- Should the monitoring information show any significant changes, the opinion of a geohydrologist must be obtained (within a week from receipt of the results) and the findings must be submitted to DWS for further consideration.
- Upon closure of the mining activities a final water sample must be tested. The results must be submitted to DWS and filed for auditing purposes;
- The mitigation measures associated with this impact must be expanded upon as part of the geohydrological impact assessment and EIA process.

Mitigation of overloading:

- A weighing devise must be installed at the mining area to prevent overloading;
- Proof of load weights must be filed and be available for auditing by relevant officials.

Mitigation of cumulative impacts:

- The mitigation measures associated with these impacts must be expanded upon as part of the freshwater ecological assessment, socio-economic study and EIA process.

Rehabilitation of the excavated area:

- Rocks and coarse material removed during the operational phase must be dumped into the excavation;
- No waste may be permitted to be deposited into the excavations;
- Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, 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 must 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 6 months from closure of the site;

- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager 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.
- The mitigation measures associated with these impacts must be expanded upon as part of the closure plan and EIA process.

Rehabilitation of the mining related infrastructure:

- Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required) and maintenance, and weed / alien clearing;
- All infrastructure, temporary equipment and other items used during the mining period shall be removed from the site (section 44 of the MPRDA);
- Waste material of any description, including receptacles, scrap, rubble and tyres, shall 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;
- Weed / Alien clearing will 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) must be managed and controlled on site on an ongoing basis;
- Final rehabilitation shall be completed within a period specified by the Regional Manager;
- The mitigation measures associated with these impacts must be expanded upon as part of the closure plan and EIA process.

viii) Motivation where no alternative sites were considered.

Should the final Scoping Report be approved, the EIA process to follow will assess the implementation of site-, technology and/or design alternatives and in the circumstance no motivation is required in terms of this heading.

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

Aroams Quarry (Pty) Ltd, identified the need for Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite in the area due to an increase in building, construction and road maintenance projects. As mentioned earlier the quarry pit on the property of the applicant has previously been used for mining purposes. In this light the applicant identified the proposed (site alternative 1) area as preferred and only viable site alternative. The facts that the existing quarry have not yet been mined out and will be extended were found to be the best option.

The technology/design proposal as discussed in this report must be treated as preliminary, and will be assessed during the EIA process.

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).

During the impact assessment process the following potential impacts were identified of each main activity in each phase. 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 processing activity may have on the surrounding environment.

The significance rating was again determined for each impact 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.

Table 20: Aroams Quarry Impact Assessment after mitigation measures.

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
CONSTRUCTION / SITE ESTABLISHMENT PHASE													
ACTIVITY:	**DEMARCATION OF SITE WITH VISIBLE BEACONS.**												
	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	Neg		Demarcation of the site will ensure that all employees are aware of the boundaries of the processing area and that work stay within approved area.									Low
ACTIVITY:	**ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.**												
	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	Neg		None.									Low
Social & Safety	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Neg	Reversible	Ensure advertising is limited to local and regional areas, and only specifically advertise for Jobs nationally if skills are not available. Ensure that all power-related structures are adequately marked with relevant signs and warnings and fenced off.	1	2	5	3	2	5	4	9,33	Low-Med
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med
Geology	Disturbance of geological strata	Neg	Irreversible	None.	1	3	5	3	5	5	5	15	Medium-High

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Topography	Alteration of topography	Neg	Irreversible	Keep mining in footprint	1	2	5	3	2	3	3	6,67	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.	1	5	5	4	1	3	2	7,33	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Dust nuisance caused by the disturbance of soil.	Neg	Reversible	Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result	Neg	Reversible	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk	2	2	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.			of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.								
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: ABLUTION FACILITIES													
Groundwater	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	Portable toilets will be managed by reputable contractors and inspected daily for potential leaks	2	2	5	3	2	5	4	10,5	Med
Surface water	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	Portable toilets will be managed by reputable contractors and inspected daily for potential leaks	2	2	5	3	2	5	4	10,5	Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Soils	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	Portable toilets will be managed by reputable contractors and inspected daily for potential leaks	1	2	5	3	2	5	4	9,33	Low-Med
SUB ACTIVITY: ACCESS ROADS													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Dust nuisance caused by the disturbance of soil.	Neg	Reversible	Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	2	2	1	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: SITE OFFICES													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels	1	1	3	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.									
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: VEHICLE SERVICE AREA													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels	1	1	3	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.									
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: WASH BAY													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels	1	1	3	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.									
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: WORKSHOP													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.								
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: SALVAGE YARD													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.								
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: BUNDED DIESEL AND OIL STORAGE FACILITIES													
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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	1	3	4	3	2	4	3	8	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				conditions which that Department of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.								
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: GENERATOR AREA (BUNDED)													

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: WEIGH BRIDGE													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Dust nuisance caused by the disturbance of soil.	Neg	Reversible	Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: PARKING AREA													
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels	1	1	3	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.									
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
SUB ACTIVITY: WASTE AREA													
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system.	1	3	4	3	2	4	3	8	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.								
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
ACTIVITY:	**STRIPPING AND STOCKPILING OF TOPSOIL**												
Geology	Disturbance of geological strata	Neg	Irreversible	None.	1	3	5	3	5	5	5	15	Medium-High
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the	1	3	4	3	2	4	3	8	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.									
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Topography	Alteration of topography	Neg	Irreversible	Keep mining in footprint	1	2	5	3	2	3	3	6,67	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.	1	5	5	4	1	3	2	7,33	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Air quality	Dust generation	Neg	Reversible	Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low-Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
OPERATIONAL PHASE													
ACTIVITY:	**#REF!**												
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med
Noise	Noise nuisance generated by drilling equipment and blasting	Neg	Reversible	Blasting alternatives will be considered to reduce noise and associated vibrations	2	1	1	1	1	3	2	2,67	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Topography	Alteration of topography	Neg	Irreversible	Keep mining in footprint	1	2	5	3	2	3	3	6,67	Low-Med
Geology	Disturbance of geological strata	Neg	Irreversible	None.	1	3	5	3	5	1	3	9	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.	1	5	5	4	1	3	2	7,33	Low-Med
Noise	Noise nuisance generated by drilling equipment and blasting	Neg	Reversible	Blasting alternatives will be considered to reduce noise and associated vibrations	1	1	1	1	1	3	2	2	Low
Air quality	Dust generation	Neg	Reversible	Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits.	1	1	1	1	1	3	2	2	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				Roads will be sprayed with water regularly ,especially during times of high dust generation.									
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	3	3	4	3	1	1	1	3,33	Low
Social & Safety	Health and Safety Risk by Blasting Activities. Potential danger to surrounding communities	Neg	Reversible	Ensure baseline photographs are taken of all structures which may be impacted for photographic evidence prior to any blasting. Ensure procedures in place to compensate for damage. All neighbours need to be notified of each blasting activity. The N14 needs to be beacons off during the blasting event. Ensure that all power-related structures are adequately marked with relevant signs and warnings and fenced off.	1	3	1	2	1	3	2	3,33	Low
ACTIVITY:	**EXCAVATION**												

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Geology	Disturbance of geological strata	Neg	Irreversible	None.	1	3	5	3	5	1	3	9	Low-Med
Topography	Alteration of topography	Neg	Irreversible	Keep mining in footprint	1	2	5	3	2	3	3	6,67	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Hazardous Waste	Dust nuisance due to loading and transportation of the material	Neg	Reversible	Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	1	3	4	3	2	5	4	9,33	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.	1	4	1	2	1	1	1	2	Low
Noise	Noise nuisance generated by excavation equipment	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Dust generation	Neg	Reversible	Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to	2	2	1	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				reduce risk of excessive emissions.									
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low
Social & Safety	Unsafe working conditions for employees	Neg	Reversible	Ensure that all stuff are made aware of all working conditions on site	1	2	4	2	2	3	3	5,83	Low-Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
ACTIVITY:	**CRUSHING AND SCREENING OF AGGREGATES**												
Noise	Noise nuisance caused by crushing plant.	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.	2	1	4	2	3	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Hazardous Waste	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	1	3	4	3	2	5	4	9,33	Low-Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.									
Air quality	Dust generation	Neg	Reversible	Dust will be contained within the property boundaries and will therefore affect only the landowner.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low-Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
ACTIVITY:	**TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS**												
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med
Hazardous Waste	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	1	3	4	3	2	5	4	9,33	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.								
Noise	Noise nuisance caused by vehicles	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.	2	1	4	2	2	2	2	4,67	Low
Air quality	Dust generation	Neg	Reversible	Dust will be contained within the property boundaries and will therefore affect only the landowner.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Traffic and Safety	Road degradation. Increased potential for road incidences Potential distraction to road users	Neg	Reversible	All intersections with main tarred roads will be clearly signposted. drivers will be enforced to keep to set speed limits. Trucks will be road-worthy condition. A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from the main road. Ensure directional floodlights are utilized that focus light on the necessary areas and reduce light pollution to surrounding environment.	2	1	4	2	2	2	2	4,67	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
DECOMMISSIONING PHASE													
ACTIVITY:	**SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)**												

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med
Soils	Soils replaced and ameliorated	Pos	Reversible	Ensure activities occur only within the designated areas and stockpile and revegetated soil as soon as possible. Topsoil will be removed before mining activities commence and stored outside of the active mining cell.	1	3	4	3	2	3	3	6,67	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith	1	4	2	2	2	3	3	5,83	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
				and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.									
Topography	Alteration of topography	Neg	Irreversible	Keep mining in footprint. Excavation areas will be sloped during rehabilitation to even out depressions.	1	2	5	3	2	3	3	6,67	Low-Med
Topography	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Pos	Irreversible	Monitor, especially after first heavy rain falls to ensure adequate surface water drainage	1	2	5	3	2	3	3	6,67	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med
Visual aspect	Improved aesthetics through rehabilitation	Pos	Reversible	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Noise	Noise nuisance caused by machinery	Neg	Reversible	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.	2	1	4	2	3	3	3	7	Low-Med
Air quality	Dust nuisance caused during landscaping activities	Neg	Reversible	Dust will be contained within the property boundaries and will therefore affect only the landowner.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Fauna	Reintroduction of fauna attracted to flora to the area	Neg	Reversible	Inform staff, contractors and visitors to not harm fauna in the area. Conduct annual surveys to monitor faunal biodiversity.	2	2	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Fauna	Reintroduction of fauna attracted to flora to the area	Pos	Reversible	Inform staff, contractors and visitors to not harm fauna in the area. Conduct annual surveys to monitor faunal biodiversity.	2	1	3	2	1	3	2	4	Low
Social & Safety	Health and safety risk posed by un-sloped areas	Neg	Reversible	Ensure that all stuff are made aware of all working conditions on site	2	1	3	2	1	3	2	4	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Surface water	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Pos	Reversible	Specialist must be consulted f issues with surface water are observed and qualities do not fall within the DWS target qualities or water qualities for livestock watering. Any affected registered water user must be compensated if levels a quality are impacted by the mining activities. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Monitor area for erosion and pooling and rehabilitate if necessary. Continue with Surface water monitoring.	2	1	2	2	2	3	3	4,17	Low
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	1	3	4	3	2	5	4	9,33	Low-Med
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Improve response to issues relating to deterioration of groundwater quality or quantity	Pos	Reversible	Specialist must be consulted f issues with groundwater are observed and qualities do not fall within the DWS target qualities or water qualities for livestock watering. Any affected registered water user must be compensated if levels an quality are impacted by the mining activities	2	1	2	2	2	5	4	5,83	Low-Med
A+A190:X195CTIVITY: Application for Closure Certificate													

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 21: Impact Assessment Table

NAME OF ACTIVITY whether listed or not listed	POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..)	SIGNIFICANCE if mitigated
(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..)		(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))		E.g. Modify through alternative method. Control through noise control. Control through management and monitoring. Remedy through rehabilitation.	
DEMARCATION OF SITE WITH VISIBLE BEACONS.	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	N/A	Construction / Site Establishment phase	Low	Control: Implementation of proper housekeeping and site management.	Low
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Portable Toilets Potential harm through sewage leaks	Groundwater Surface Water Soil Social	Construction / Site Establishment phase	Med	Control through proper site management	Low-Med
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL EXCAVATION CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Deterioration in visual aesthetics of the area	The visual impact may affect the aesthetics of the landscape.	Operational phase	Low-Med	Control: Implementation of proper housekeeping	Low-Med
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Dust nuisance caused by the disturbance of soil.	Dust will be contained within the property boundaries and will therefore affect only the landowner.	Operational phase	Medium	Control: Dust suppression	Low
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Emissions caused by vehicles and equipment	Emissions will be contained within the property boundaries and will therefore affect only the landowner.	Operational phase	Medium	Control: Emissions	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	The noise impact should be contained within the boundaries of the property, and will represent the current noise levels of the farm.	Operational phase	Medium	**Control:** Noise control measures	Low
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Flora	Operational phase	Low-Med	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Low-Med
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL EXCAVATION CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Loss of topsoil will affect the rehabilitation of the processing area and the future agricultural potential of the site.	Operational phase	Med	**Control:** Storm water management Site Management Soil Management	Low – Medium
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Contamination of area with hydrocarbons or hazardous waste materials	Contamination may cause surface or ground water pollution if not addressed	Operational phase	Med	Control: Waste management	Low-Med
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Alteration of topography	Topography	Operational phase	Medium -High	Control: Surface water Monitoring	Medium-High
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION	Loss of and disturbance to surface archaeological sites	Artefacts or graves	Operational phase	Med	**Control:** Survey area before site clearance	Low-Med
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL EXCAVATION CRUSHING AND SCREENING OF AGGREGATES SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Groundwater pollution	Operational phase	Med	Control: Proper site management.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. DRILLING AND BLASTING EXCAVATION CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Surface water Bodies	Operational phase	Low-Med	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	Low
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. DRILLING AND BLASTING EXCAVATION CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	The impact of the fauna of the area will not be significant as vibration and noise will drive the fauna away	Operational phase	Med	Control: Implementation of fauna protection measures	Low-Med
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Land use	Operational phase	Low-Med	Control: Fire	Low-Med
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Social	Construction / Site Establishment phase	Med	Control through proper site management	Low-Med
STRIPPING AND STOCKPILING OF TOPSOIL EXCAVATION DRILLING AND BLASTING	Disturbance of geological strata	Geology	Operational phase	Medium -High	N/A	Medium -High
EXCAVATION	Unsafe working conditions for employees	The Unsafe working conditions should only impact the applicant. Safety measures will be implemented	Operational phase	Low-Med	Control: Implementation of safety control measures	Low-Med
TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS	Road degradation. Increased potential for road incidences Potential distraction to road users	All road users will be affected	Operational phase	Low-Med	Control & Remedy: Road management	Low
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Soils replaced and ameliorated	Loss of topsoil will affect the rehabilitation of the processing area and the future agricultural potential of the site.	Decommissioning phase	Med	**Control:** Storm water management Site Management Soil Management	Low-Med
	Contamination of area with hydrocarbons or hazardous waste materials	Contamination may cause surface or ground water pollution if not addressed	Decommissioning phase	Medium	Control: Waste management	Low
	Improve response to issues relating to deterioration of groundwater quality or quantity	Groundwater improvement	Decommissioning phase	Low-Med	Control: Proper site management.	Low-Med
	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Surface water Bodies	Decommissioning phase	Low-Med	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	Low
	Health and safety risk posed by un-sloped areas	The impact on health and safety due to un-sloped areas will be contained within the site boundary.	Decommissioning phase	Medium	Control: Sloping of areas upon decommission	0
	Reintroduction of fauna attracted to flora to the area	Fauna returning to area	Decommissioning phase	Low-Med	Control: Implementation of fauna protection measures	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Topography	Decommissioning phase	Low-Med	Control: Surface water Monitoring	Low-Med
	Improved aesthetics through rehabilitation	The visual impact may affect the aesthetics of the landscape.	Decommissioning phase	Low-Med	Control: Implementation of proper housekeeping	Low-Med

The supporting impact assessment conducted by the EAP is attached as an appendix, marked Appendix 11**.**

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):

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.
Archaeological Study	During the mining permit application of Raumix Aggregates (Pty) Ltd, SAHRA requested that a Heritage Impact Assessment and Paleontological study be done to confirm that the mining activity will not have an impact on any archaeological or cultural aspects. A desktop Heritage Impact Assessment and recommendation for exemption from further Paleontological studies was submitted to SAHRA. SAHRA subsequently responded that the development is unlikely to impact significant heritage resources and that the SAHRA Archaeology, Palaeontology and Meteorites Unit has no objection to the development on condition that, if any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources are found during development, constructing or mining, SAHRA and an archaeologist and/or palaeontologist, depending on the nature of the finds, must be alerted immediately. The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. The impact on heritage resources in the study area can be mitigated to an acceptable level and it is recommended that the proposed project can commence on the condition that the recommendations in this report are implemented as part of the EMPr and based on approval from SAHRA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project. HCAC was appointed to conduct a Heritage Impact Assessment to determine the presence of cultural heritage sites and the impact of the Mining Right for the mining of aggregate, gravel, granite and dolerite, 13.6 ha, on a portion of Portion 2 (Remaining Extent) of the farm Aroams 57, Registration Division of Namaqualand RD, Northern Cape on non-renewable heritage resources. The study area was assessed both on desktop level and by a field survey. The field survey was conducted as a non-intrusive pedestrian survey to cover the extent of the mining right footprint. The site is used for the mining of gravel, and significance disturbance from an archaeological point of view has already occurred. Within the area earmarked for the processing and stock piling area small stone cairns occur	X	**PART A – h(iv)(1)(a) t (i)**

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.
	as a result clearing of fly rock and are of no heritage significance. Within the mining area and alternative site an east west orientated outcrop of granite-gneiss occurs. To the south of this area the study area is characterised by quaternary sand cover with almost no archaeological traces. Rocky outcrops in the area are known to contain grinding hollows (Morris 2017) and a thorough inspection of the rocky outcrops revealed no such features. The granite gneiss outcrop on the northern portion of the study area is slightly elevated - isolated Stone Age lithics were recorded here as Find spots. These isolated artefacts are not considered as sites and are out of context and of no heritage significance apart from recording them in this report. At Find Spot 6 a lower grinding stone was recorded, the grinding stone is out of context as it placed on a rock. During the survey seven find spots were recorded. Six find spots (F1 – F6) consist of isolated Stone Age artefacts. Find spot seven is marked by a low-density scatter of modern glass fragments and metal cans of no heritage significance. The SAHRA paleontological sensitivity map indicated that the footprint as a whole is located on a paleontologically insignificant area and is not considered paleontologically vulnerable. The survey also did not reveal any historical farm steads, colonial era stone-walling (dwellings or kraals), graves or other sites of significance. Long term impact on the cultural landscape is considered to be negligible as the immediate surrounding area consists of an area that has been subjected to previous mining developments. Visual impacts to scenic routes and sense of place are also considered to be low due to the other developments in the area. There are no battlefields or concentration camp sites in the study area. The impact on heritage resources in the Mining Right area and the Alternative that was assessed is low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA: • Implementation of a chance find procedure as outlined in below. <u>Chance Find Procedures</u> The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below. This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting		

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.
	procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below. • 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 SAHRA. <u>Reasoned Opinion</u> The impact on heritage resources in the study area can be mitigated to an acceptable level and it is recommended that the proposed project can commence on the condition that the recommendations in this report are implemented as part of the EMPr and based on approval from SAHRA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project. <u>Potential risk</u> Potential risks to the proposed project are the occurrence of unknown and unmarked graves. The possibility exists that the study area could contain graves of which surface indicators have been destroyed and subsurface material could be uncovered during earth works. These risks can be mitigated to an acceptable level with monitoring and the implementation of a chance find procedure as outlined in above.		

Copies of the specialist reports is included in the FEIAR in Appendix 16.

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k) Environmental impact statement

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

The key findings of the environmental impact assessment entail the following:

- The project entails the excavation mining of granite in an area previously used for mining. Due to the small area used for grazing and mining, mining of granite in the area was identified as a more viable use. As a result of the agricultural activities no natural areas needs to be disturbed.
- The mining procedure will only entail the excavation and transporting of the granite by means of a front-end loader upon which it will be loaded onto trucks and transported from the mining site to the stockpiling site. The clients will then acquire the granite from the stockpiling site.
- The existing roads to the mine area can be used to gain access to the site. No new roads are needed.
- The proposed mining area will be visible from the N14 passing the property and will therefore have a visual impact on the immediate surrounding area.
- Mining activities will be contained within the boundaries of the permitted site. Proper storm water and waste management however needs to be implemented on the site in order to minimise the potential of pollution.

Other Site Specific Environmental Aspects:

- Viewshed, as mentioned above, the quarry will constitute of the lowest visual impact. The stockpiles will be visible from the N14.
- Although the proposed activity will have a cumulative impact on the ambient noise levels, the development will not take place in a pristine environment, and the impact is therefore deemed compatible with the current operations and of low significance.
- There are no rivers, streams or wetlands within close proximity of the mining area.
- The fauna at the site will not be impacted on by the proposed mining activity as they will be able to move away or through the site, without being harmed.
- No sites of archaeological or cultural importance were identified during the site inspection located in the mining footprint area.

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**

Please refer to Appendix 6 for the final site map of the proposed Aroams site. This map also indicates the site activities.

iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;

The Applicant, Aroams Quarry (Pty) Ltd intends to apply for a mining right, 13.6ha, on a portion of portion 2 (remaining extent) of the farm Aroams 57, which falls in the Khâi-Ma Municipality Local Municipality in the Registration Division of Namaqualand RD, Northern Cape Province.

Site Alternative 1 was identified during the assessment phase of the environmental impact assessment, by the applicant and project team, and was therefore selected as the **preferred alternative** due to the following:

- The mining site offers the mineral sought after;
- The site is located approximately 4.5km from the closest farm house with mitigation measures in place impacts such as dust and noise will be minimal.
- The mining site is more than 8.3km away for the town of closest town Aggeneys, and will not affect the community with regards to dust and noise;
- The mineral to be mined is already in Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite form and will not need to be blasted in order to loosen the material;
- The mining area can be reached by an existing farm access road that connects to N14. No new road infrastructure need to be constructed;
- Due to the small size of the activity and the remote location of the mining area the potential impacts on the surrounding environment, associated with mining is deemed to be of low significance; and
- No residual waste as a result of the mining activity will be produced that needs to be treated on site. Any general waste that may be produced on-site will be contained in sealed refuse bins to be transported to the local municipal landfill site. The amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental leakage. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site.

As mentioned earlier, the quarry pit on the property of the applicant has previously been used for mining purposes. In this light the applicant identified the proposed area as preferred and only viable site alternative. The establishment of a quarry pit in a greenfield area while the existing quarry pit has not yet been mined out or rehabilitated were not found to be the best option with regard to sustainable development. In the light of the above the impacts associated with establishing another quarry pit in a greenfield site on the property is believed to have a higher significance without the need or motivation to justify it.

Should the applicant be allowed to mine the proposed area, the quarry will be rehabilitated as part of the closure conditions of this mining right.

Site Alternative 1 (S1) (Preferred Alternative):

Positive Impacts:

- The mining site offers the mineral sought after;

- The proposed sites were previously used for mining activities, thus minimal environmental damage will occur;
- The mining area can be reached by an existing farm access road that connects to the N14. No new road infrastructure need to be constructed;
- Due to the small size of the activity and the remote location of the mining area the potential impacts on the surrounding environment, associated with mining is deemed to be of low significance; and
- No residual waste as a result of the mining activity will be produced that needs to be treated on site. Any general waste that may be produced on-site will be contained in sealed refuse bins to be transported to the local municipal landfill site. As maintenance and servicing of the equipment will be done at an off-site workshop the amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental leakage. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site.

Negative Impacts:

- Due to the remote location of the mining area very little negative impacts on the community could be identified that were deemed to be of significant importance. The dust and noise impacts that may emanate from the mining area during the operational phase could have a negative impact on the surrounding community if the mitigation measures proposed in this document is not implemented and managed on-site; and
- Negative impacts with regard to the environment include potential contamination of the area due to spillage of hydrocarbon products.

Site Alternative 2 (S2)

Positive Impacts:

- The site is near the mineral sought after;
- The alternative area will not have to compete with other land uses as all the activities can be contained within the boundaries of the site. Upon closure of the mining area, the land will revert back to agriculture; and
- The aggregate to be mined will be used for the upgrading of the roads in the vicinity of the activity. The alternative mining area will therefore contribute to the upgrading/maintenance of infrastructure in and around Aggeneys / Pela area and indirectly contribute to the economy of the area.

Negative Impacts:

- The site has not been previously disturbed before; thus the natural area needs to be cleared and is not preferred with regards to sustainable development;
- In the light of the above the impacts associated with establishing another quarry pit in a greenfield site on the property is believed to have a higher significance without the need or motivation to justify it;

- The dust and noise impacts that may emanate from the mining area during the operational phase could have a negative impact on the surrounding land users if the mitigation measures proposed in this document is not implemented and managed on-site; and
- Negative impacts with regard to the environment include potential contamination of the area due to spillage of hydrocarbon products.

The positive impacts associated with the project include:

- Job creation for up to 20 employees indirectly contributing to the socio-economic status of the Aggeneys area,
- The granite to be mined will be used for the upgrading of roads and construction industry in the vicinity of the mining site, thereby indirectly contributing to infrastructure development,
- The project will assist the landowner and lawful users in diversification of the land use of the property.

The negative impacts associated with the project that was deemed to have a Low-Medium or Medium significance includes:

- Visual intrusion due to the proposed project **Low – Medium**
- Loss of topsoil due to incorrect storm water **Medium**
- Weeds and invader plant infestation of the area **Low – Medium**
- Contamination of area with hazardous waste materials **Medium**
- Dust nuisance stemming from proposed project **Medium**
- Noise nuisance due to proposed activity **Medium**
- Impact on the access roads **Low – Medium**
- Health and safety risk posed by un-sloped areas **Low – Medium**
- Negative impacts of the fauna and flora **Medium**
- Contamination of surface or groundwater due to effluent runoff from excavation area **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 authorisation.

Table 22: Impact Management Objectives

Management Objectives	Responsibility	Management Role
Visual Aspect	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. • Control the height of the stockpiles to minimize the visual impact on the surrounding environment. • Remove all infrastructure upon rehabilitation of the processing area and return the area to its prior status.
Dust Handling	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. • Add water sprayers to the crushing infrastructure to control dust emissions from conveyor belts. • Dampen the stockpiles during periods of high wind spells. • Assess effectiveness of dust suppression equipment. • Limit speed on the access roads to 40km/h to prevent the generation of excess dust. • Spray Aggregate, Gravel, Granite and Dolomite roads with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. • Re-vegetate all disturbed or exposed areas as soon as possible to prevent any dust source from being created. • Thoroughly soak all stockpiles to ensure dust suppression on the site. • Conduct formal dust monitoring on a monthly basis.
Noise Handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	• No crushing or screening allowed on Sundays. • Ensure that employees and staff conduct themselves in an acceptable manner while on site. • No loud music may be permitted at the processing area. • Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. • Ensure that all mining vehicles are equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. • Plan the type, duration and timing of the blasting procedures with due cognisance of other land users and structures in the vicinity. • Notify surrounding land owners prior to blasting occasions. • Use soft explosives during blasting. • Compliance with the appropriate legislation with respect to noise will be mandatory. • Implement formal noise monitoring on a quarterly basis.
Management of weed/invader plants	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr.	• Implement a weed and invader plant management plan. • Control declared invader or exotic species on the rehabilitated areas. • Keep the temporary topsoil stockpiles free of weeds.

Management Objectives	Responsibility	Management Role
	Compliance to be monitored by the Environmental Control Officer.	
Topsoil management	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 500 mm of the soil and protect as topsoil. • Remove topsoil at right angles to the slope to slow down surface runoff and prevent erosion. • Conduct topsoil stripping, stockpiling and re-spreading in a systematic way. Ensure topsoil is stockpiled for the minimum possible time. • Protect topsoil stockpiles against losses by water and wind erosion through the establishment of plants on the stockpiles. • Place topsoil stockpiles along the northern and western boundaries of the site. Topsoil heaps may not exceed 1.5 m in order to preserve microorganism within the topsoil. • Conduct the processing activity in accordance with the Best Practice Guideline for small-scale mining as stipulated by DWS.
Protection of natural vegetation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	• Contain all activities within the boundaries of the approved processing area. • Demarcate, signpost and manage the 20 m buffer area as no-go area around areas with natural vegetation.
Fauna Management	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. • 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.
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 no waste storage area is established outside the boundaries of the mining area. • Ensure vehicle maintenance only take place within the service bay area of the off-site workshop. If emergency repairs are needed on site, ensure drip trays is present. Ensure all waste products are disposed of in a 200 litre closed container/bin inside the emergency service area. • Ensure diesel bowser is equipped with a drip tray at all times. • Use drip trays during each and every refuelling event. • Ensure the nozzle of the bowser rests in a sleeve to prevent dripping after refuelling. • Keep drip trays clean. No dirty drip trays may be used on site. • 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 recognised facility. • Clean spills immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognised facility. File proof on site.

Management Objectives	Responsibility	Management Role
		▪ Ensure the availability of suitable covered receptacles at all times and conveniently placed for the disposal of waste. ▪ Place all used oils, grease or hydraulic fluids therein and remove these receptacles from the site on a regular basis for disposal at a registered or licensed hazardous disposal facility. ▪ Store non-biodegradable refuse such as glass bottles, plastic bags etc., in a container with a closable lid at a collecting point. Collection should take place on a regular basis and disposed of at the recognised landfill site. Prevent refuse from being dumped on or in the vicinity of the mining area. ▪ Biodegradable refuse to be handled as indicated above. ▪ generated at the site recording the amount of different types of waste generated by the mine in excel spreadsheet format.
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.	▪ Divert storm water around the processing and stockpile areas to prevent erosion. ▪ Stockpile topsoil heaps along the northern and western boundaries of the study area to divert runoff water away from the processing area. ▪ Weekly monitor the stockpiles and if any signs of erosion become apparent implement soil erosion protection measures. ▪ Continuously monitor the effectiveness of the storm water infrastructure. ▪ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS. ▪ Conduct mining 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.
Management of access roads	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 roads to prevent erosion. ▪ Repair rutting and erosion of the access roads caused by the proposed activities. ▪ Maintain newly constructed access roads so as to minimise dust, erosion or undue surface damage. ▪ Erosion of access road: Restrict vehicular movement to existing access routes to prevent crisscrossing of tracks through undisturbed areas.
After care on rehabilitated areas	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	▪ Control run-off water via temporary banks to ensure that accumulation of run-off does not cause down-slope erosion. ▪ Only do topsoil spreading 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 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. ▪ Plant a cover crop immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. Fertilize the cover crop for optimum production. ▪ Ensure rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation must not be considered complete until the first cover crop is well established.

Management Objectives	Responsibility	Management Role
		• Monitor all rehabilitated areas for erosion, and appropriately stabilized if any erosion occurs.
Management of health and safety risks	Site Manager to ensure compliance with the guidelines as stipulated in the EMP. Compliance to be monitored by the Environmental Control Officer. Blasting contractor to comply with national blasting requirements.	• Plan the type, duration and timing of the blasting procedures with due cognisance of other land users and structures in the vicinity, • Inform the surrounding landowners and communities of any blasting event, • Use soft explosives during blasting, • Limit fly rock, • Give audible warning of a pending blast at least 3 minutes in advance of the blast, • Remove all fly rock (of diameter 150mm and larger) which falls beyond the working area, together with the rock spill. • Ensure that workers have access to the correct PPE as required by law. • Ensure all operations comply with the Occupational Health and Safety Act.
Protection of Cultural or Heritage Artefacts	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	• Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. • Notify Heritage and the ECO immediately.
Handling of Hazardous Materials and Substance	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer	• Store all hazardous materials or substances in a closed storage facility with an impermeable floor. • Storage area to meet the following conditions: • Construct storage area on a level area. • Floor of the storage area should be impermeable. • Storage area should be outside the 1:100-year flood line or further than 100m from the edge of a watercourse, whichever is greatest. • Access to the materials/substances may only take place with the prior notification of the site manager. • Fuel storage tanks should have an impermeable bund wall and base within which the tanks sits, raised above the floor, on plinths. The bund capacity should be sufficient to contain 110% of the tank's maximum capacity. • Consider the distance and height of the bund wall relative to that of the tank to ensure that oil does not spout beyond the confines of the bund. • Establish a formal inspection routine to check all equipment in the bund area, as well as the bund area itself for malfunctions or leakages. Inspection should be at least weekly and any accumulated rainwater should be removed. • All valves and outlets should be checked to ensure that they are intact and closed securely. • Slope the bund base towards a rainwater sump of sufficient size. • Contain contaminated water until it can be collected by a registered hazardous waste handling contractor or be disposed of at a registered hazardous waste handling facility.

Management Objectives	Responsibility	Management Role
		• Ensure availability of drip trays underneath all stationary equipment or vehicles.
Topsoil handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMP. Compliance to be monitored by the Environmental Control Officer.	• Remove the first 300 mm of topsoil in strips and store along the boundary of the site. • Keep the temporary topsoil stockpiles free of weeds. • Place topsoil stockpiles on a levelled area and implement measures to safeguard the piles from being washed away in the event of heavy rains/storm water. • Topsoil heaps should 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. • Seed the stockpiled topsoil heaps if vegetation does not re-establish within 6 months of mining. • Divert storm- and runoff water around the stockpile area and access roads to prevent erosion.
Blast Monitoring	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Monitoring to be conducted by blasting contractor. Compliance to be monitored by the Environmental Control Officer.	• Monitor ground vibration and air blast levels to USBM standards.
Fauna and Flora	Site Manager to ensure compliance with the guidelines as stipulated in the EMP. Compliance to be monitored by the Environmental Control Officer.	• Ensure no fauna is caught, killed, harmed, sold or played with. • 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. • Do not remove plants or trees without the approval of the ECO.

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 point *g) Motivation for preferred development footprint* the initial proposal was updated to incorporate the matters raised during the assessment process. This lead to the final layout of infrastructure and activities on the overall site as shown in the final site map attached Appendix 6.

- The establishment of the processing area using temporary infrastructure.

n) Aspects for inclusion as conditions of Authorisation.

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation

The management objectives listed in this report under *Point L Proposed impact management objectives* above must be considered for inclusion in the environmental authorisation.

Additional conditions was included into this section in the FEIAR document if any are received by the specialist.

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 property owner, as well as site inspections, and background information gathering. No uncertainty with regard to the proposed project or the receiving environment could be identified.

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

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

Should the mitigation measures and monitoring programmes proposed in this document be implemented on site, no fatal flaws could at this point and time be identified that were deemed as severe as to prevent the activity continuing.

ii) Conditions that must be included in the authorisation

(1) Specific conditions to be included into the compilation and approval of EMPr

The management objectives listed in this report under *Point L Proposed impact management objectives* and listed below must be included into the compilation and approval of the EMPr:

- Visual Aspect;
- Dust Handling;
- Noise Handling;
- Management of weed/invader plants;
- Topsoil Management;
- Protection of Natural Vegetation;
- Fauna Management;
- Waste Management;
- Storm Water Management;
- Management of Access Roads;
- After Care on Rehabilitated Areas;
- Health and Safety Risks; and
- Protection of Cultural of Heritage Artefacts.

(2) Rehabilitation requirements

The applicant must adhere to the following rehabilitation requirements:
The objective of the rehabilitation plan is to ensure that:

a) the areas disturbed by the prospecting and mining activities are rehabilitated and/or landscaped;
b) that the site and areas disturbed by prospecting and mining activities are visually appealing and are left in a neat and tidy condition;
c) contaminants/pollution sources are removed from the site or that appropriate measures are in place to control long-term contamination sources;
d) the site and surrounding disturbed areas are in a stable condition.

Rehabilitation of the excavated area:

Due to the impracticality of importing large volumes of fill to restore the quarry area to its original topography, the rehabilitation option is to develop the quarry into a minor landscape feature. This will entail creating a series of irregular benches along the quarry faces, the top edges of each face being blasted away to form slopes (40º) on the benches below, thereby reducing the overall face angle.

Fill and topsoil could be placed over the benches to provide a suitable medium for the establishment of vegetation, especially trees which will break up the line of the faces and enhance their appearance. The floor of the quarry should be capped with suitable soil material and re-vegetated.

Rocks and coarse material removed from the excavation must be dumped into the excavation.

No waste will be permitted to be deposited in the excavations. Once rocks and coarse natural materials has been dumped into the excavated area and profiled with acceptable contours and erosion control measures, topsoil shall be returned over the area.

The area shall be fertilized 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. If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager 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.

Rehabilitation of plant, office and service areas:

Coarse natural material used for the construction of ramps must be removed and dumped into the excavations. Stockpiles will be removed during the decommissioning phase, the area ripped and the topsoil returned to its original depth to provide a growth medium. On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):

- Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
- Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10km above the surrounding ground surface.
    - The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

Photographs of the office sites and workshop, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.

On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.

Prior to replacing the topsoil, the material that was removed from these areas will be replaced in the same order as it originally occurred. The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager 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 seed mix to his or her specification.

Final rehabilitation:

Rehabilitation of the surface area shall entail reshaping, levelling, top dressing, land preparation, seeding and maintenance, and weed / alien clearing.

All infrastructures, equipment, plant, temporary housing and other items used during the mining period will be removed from the site.

Waste material of any description, including receptacles, scrap, rubble and tyres, will 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.

Weed / Alien clearing will be done in a sporadic manner during the life of the mining activities. Species regarded as the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure. Final rehabilitation shall be completed within a period specified by the Regional Manager.

Seeding of the area:

Once the pit slopes have been shaped and the soil replaced, the initial goal is to establish a good cover of a robust grass that will stabilise the soil and start the accumulation of soil organic carbon. This will be done using a combination of hydro seeding and physical planting of runners to apply a mix of commercial and indigenous species that includes both tufted and creeping species. The plants that were collected during the establishment and operational phases and kept in the designated area will be replanted.

q) Period for which the Environmental Authorisation is required.

The applicant requests the Environmental Authorisation to be valid for a 30-year period in order to correspond with the validity of the mining right.

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.

The financial provision calculations for Aroams quarry undertaken by making use of the Department of Mineral and Resource (DMR) guideline document for financial provision, with the master rates of 2019 and amount to **R 1 448 000.61.** This amount when approved by the DMR will be provided in the form of a bank guarantee.

i) Explain how the aforesaid amount was derived.

The financial provision calculations for Aroams quarry undertaken by making use of the Department of Mineral and Resource (DMR) guideline document for financial provision, with the master rates of 2019 and amount to **R 1 448 000.61.** This amount when approved by the DMR will be provided in the form of a bank guarantee. A Bank Guarantee will be provided for the proposed site.

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).

The processing operation will be self-funded through income generated by sales of the aggregate, and will therefore be funded by Aroams Quarry (Pty) Ltd.

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 was also used in the Environmental Impact Assessment Report.

ii) Motivation for the deviation.

N/A

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 negative impacts were identified that are highly likely to have an impact on the socio-economic conditions of directly affected persons:

Visual exposure:

The presence of mining related infrastructure (i.e. crushing infrastructure, slimes dam, processing plant) as well as the opencast pit to be established will impact on the visual character of the study area in particular the “sense of place” of the MPE. The significance of this impact must be fully assessed during the EIA process taking site-, project-, design alternatives and screening methods into consideration in an attempt to reduce the impact as much as possible.

The mining area was identified to constitute the lowest possible visual impact on the surrounding environment. The surrounding areas have previously been disturbed by mining activities, and this application entails the extension of the existing mining areas. The applicant should however ensure that housekeeping is managed to standard, as this will mitigate the visual impacts during the operational phase of the mine.

Upon closure the site will be rehabilitated and sloped to insure that the visual impact on the aesthetic value of the area is kept to a minimum. The site will have a neat appearance and be kept in good condition at all times.

Air Quality:

The background air quality of the surrounding area is relatively good due to low industrial activity. Factors contributing to air pollution are the burning of veld and agriculture in the area. Given the surrounding extent of mostly covered areas, no extreme dust generation under windy conditions is experienced.

Dust will be generated by the proposed operation through blasting and the movement of machinery and vehicles. Dust suppression measures should be implemented to prevent excessive dust on site. Due to the remote setting of the proposed mining area the potential impact of dust nuisance on the surrounding environment is deemed to be of low significance.

Noise:

The surrounding areas are characterised by an agricultural setting in which vehicles and farm equipment operate. The traffic on the N14 surrounding the property contributes to the ambient noise of the area. The noise to be generated at the proposed site (site alternative 1) operation is expected to temporarily increase the noise levels of the area. Blasting noise will be instantaneous and of short duration. Loading and transportation of the material will generate noise daily. The significance of noise on the surrounding environment is therefore deemed to be of low significance. Mitigation measures should be implemented to ensure employees conduct them in an acceptable manner while on site in order to lessen the noise impact of the proposed activity on the surrounding environment.

Existing Infrastructure:

It is expected that the proposed processing activity will have a very low impact on the surrounding environment as activities will be contained within the boundaries of the site. The proposed (Site alternative 1) footprint area will not require the building of any permanent structures. The proposed production of granite on the property will also reduce the amount of trucks delivering granite, from outside sources. This will have a direct positive impact on the traffic volumes of the surrounding roads and price of the granite.

Increased traffic on the N14:

Currently it is expected that the proposed project will increase the present traffic load on the N14 with 12 trucks per day. Heavy vehicle traffic will be restricted to daylight hours. The degree of impact as well as the significance of increased traffic on the N14 will be assessed by the traffic engineer and recommendations and mitigation measures will be assessed during the EIA process.

Loss of agricultural- and tourism generated income during the operational phase of the mine (change of land use):

The Applicant applied for the mining right to be approved for a 30-year period during which (should the MR be granted) the proposed footprint becomes unavailable for farming, horse breeding, or other cultivation processes. The significance that the proposed mining activity will have on the receiving environment in particular the agricultural- and tourism sectors must be assessed as part of the socio-economic and agricultural impact assessments, upon which the conclusions will be presented in the FEIAR.

The following potential positive impacts where identified that are highly likely to have an impact on the socio-economic conditions of directly affected persons:

Increased income generated within the Aggeneys / Pofadder area:

The potential increase in income generated within the Aggeneys / Pofadder area as a result of the change of land use from agriculture to mining must be assessed by the socio-economic specialist during the EIA process. Should the proposed mine however generate a higher income than the current land use of the area, the multiplier effect will once again come into play through an increase in wages, improved socio-character of employees, support of the local economy and overall growth of the receiving community.

Contribution of the mine to local economic development:

A mining right holder is required by law to contribute to the local economic development (LED) of the local community. The presence of a mine within the Aggeneys and Pofadder area will therefore generate funds that can be used in the development of the area. Identifying a suitable LED project must be conducted in consultation with the local municipality, to be committed to in the Social and Labour Plan that needs to be approved prior to the granting of a mining right.

(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)..

No sites of archaeological or cultural importance were identified at the proposed mining area during the site inspection. The area was previously used for mining and no areas of cultural importance could be identified within the footprint area of the site.

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 alternatives to be considered during the impact assessment process was done at the hand of information obtained during the site investigation, public participation process, desktop studies as well as specialist studies conducted of the study area. As discussed earlier the following alternatives was assessed in the EIAR:

Site Alternatives

The applicant identified two alternative sites for the proposed mining activity namely:

Site Alternative 1 (S1) (Preferred Alternative): The Applicant, Aroams Quarry (Pty) Ltd intends to apply for a mining right, 13.6ha, on a portion of portion 2 (remaining extent) of the farm Aroams 57, which falls in the Khâi-Ma Municipality Local Municipality in the Registration Division of Namaqualand RD, Northern Cape Province.,

Site Alternative 2 (S2): Site Alternative 2 entails the mining of a 30.5 ha area within a Greenfield area. The applicant investigated the possibility of establishing the proposed mining area in a new greenfields area.

As mentioned earlier, the quarry pit on the property of the applicant has previously been used for mining purposes. In this light the applicant identified the proposed area as preferred and only viable site alternative. The establishment of a quarry pit in a greenfield area while the existing quarry pit has not yet been mined out or rehabilitated were not found to be the best option with regard to sustainable development. In the light of the above the impacts associated with establishing another quarry pit in a greenfield site on the property is believed to have a higher significance without the need or motivation to justify it.

Project Alternatives

Various project alternatives were considered during the planning phase of the project. These included the following:

1. Opencast mining (Preferred Alternative) **vs.** Underground Mining:
2. Temporary Infrastructure (Preferred Alternative) **vs.** Permanent Infrastructure:

Technology/Design Alternatives

As with the project alternatives, technology and design alternatives was considered during the EIA process and discussed in the FEIAR. The following technology/design principles was considered by the Applicant and project team:

- Alternative locations of topsoil and overburden stockpile areas;
- Alternative alignments of access road and haul roads;
- Alternative locations for mine infrastructure, including the locations of offices, workshops; refuelling bays, stores, magazines, and processing plants; and
- The implementation of renewable energy sources will be considered;

No-go Alternative

The no-go alternative entails no change to the *status quo* and is therefore a real alternative that needs to be considered. In the event that the no-go alternative is implemented the land use of the area will remain that of agriculture, conservation, livestock farming and tourism with the tungsten resources unmined. Amongst others, the socio-economic impact of mining on current, and future agriculture and tourism land uses of the study area was compared to the *status quo* and was considered as part of the EIA process, and discussed in the FEIAR.

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Final environmental management programme.

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

The details and expertise of Yolandie Coetzee of Greenmined Environmental that acts as EAP on this project has been included in Part A Section 1(a) as well as Appendix 1 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 final environmental management programme has been described and included in Part A, section (1)(h).

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, section (1)(L)(ii) this map has been compiled and is attached as Appendix 4 to this document.

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 objective of the rehabilitation plan is to ensure that:

a) the areas disturbed by the prospecting and mining activities are rehabilitated and/or landscaped;
b) that the site and areas disturbed by prospecting and mining activities are visually appealing and are left in a neat and tidy condition;
c) contaminants/pollution sources are removed from the site or that appropriate measures are in place to control long-term contamination sources;
d) the site and surrounding disturbed areas are in a stable condition.

Mining activities are to be undertaken in a manner which facilitates site rehabilitation and the restoration of existing land capabilities. The primary objectives for rehabilitation includes:

a) The facilitation of the re-establishment of the land use and capability to as close as reasonably to the original conditions;
b) Removal of all infrastructure and material introduced to site
c) Removal of all wastes and their and their related disposal; and
d) And promotion of the rapid re-establishment of natural vegetation and the restoration of site ecology.

The disturbed areas shall be rehabilitated to ensure that:

- The biodiversity habitat is encouraged by the new land use after the Mining;
- Future public health and safety are not compromised;
- The site is reversed to almost its original state;
- Environmental and resources are not subject to physical and chemical deterioration;
- The after-use of the site is beneficial and sustainable in the long term;
- Any adverse socio-economic impacts are minimized; and
- All socio-economic benefits are maximized.

This will be done by complying with the conditions in the environmental management program below, and relevant statuary requirements. The contractor and employee will be made aware of their environmental responsibilities and will be empowered to execute the work program in compliance with the requirements of this EMPR.

The following closure objectives are proposed with regard to rehabilitation of the Mining area:

- On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):
  - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
  - The topsoil will be placed back as a growth medium and the sides of the excavation will be sloped with acceptable contours (40º) to prevent soil erosion.
- No trees to be removed over areas where Mining is required.
- Rehabilitation will be conducted after the prospect drilling is complete.
- Rehabilitation will be ongoing and conform to 400 m^2 being stripped of topsoil and 400 m^2 being rehabilitated after the oversized and processed soil is worked back into the excavation.
- Thus there will only be 400 m^2 of land open for rehabilitation in operational times.
- Fill and topsoil could be placed over the slopes to provide a suitable medium for the establishment of vegetation.
- No waste will be permitted to be deposited in the excavations.

- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager 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.
- Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.
- Prior to replacing the topsoil, the material that was removed from these areas will be replaced in the same order as it originally occurred.
- All Temporary Infrastructures, equipment, plant, temporary housing and other items used during the mining period will be removed from the site.
- Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the mining area and disposed of at a recognized landfill facility, proof of this removal will be kept on file at the applicant's office. It will not be permitted to be buried or burned on the site.
- Weed / Alien clearing will be done in a sporadic manner during the life of the Mining activities. Species regarded as the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure. Final rehabilitation shall be completed within a period specified by the Regional Manager.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.

Rehabilitation of the excavated area:

Due to the impracticality of importing large volumes of fill to restore the quarry area to its original topography, the rehabilitation option is to develop the quarry into a minor landscape feature. This will entail creating a series of irregular benches along the quarry faces, the top edges of each face being blasted away to form slopes on the benches below, thereby reducing the overall face angle.

Fill and topsoil could be placed over the benches to provide a suitable medium for the establishment of vegetation, especially trees which will break up the line of the faces and enhance their appearance. The floor of the quarry must be capped with suitable soil material and re-vegetated.

Rocks and coarse material removed from the excavation must be dumped into the excavation.

No waste will be permitted to be deposited in the excavations. Once overburden, rocks and coarse natural materials has been dumped into the excavated area and profiled with acceptable contours and erosion control measures, topsoil shall be returned over the area.

The area shall be fertilized 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. If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager 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.

Rehabilitation of plant, office and service areas:

Coarse natural material used for the construction of ramps must be removed and dumped into the excavations. Stockpiles will be removed during the decommissioning phase, the area ripped and the topsoil returned to its original depth to provide a growth medium. On completion of operations, all structures or objects shall be dealt with in accordance with Section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002):

- Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
- Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10 cm above the surrounding ground surface.
- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.

On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200 mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.

Prior to replacing the topsoil, the material that was removed from these areas will be replaced in the same order as it originally occurred. The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager 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 seed mix to his or her specification.

Final rehabilitation:

Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding and maintenance, and weed / alien clearing.

All infrastructures, equipment, plant, temporary housing and other items used during the mining period will be removed from the site.

Waste material of any description, including receptacles, scrap, rubble and tyres, will 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.

Weed / Alien clearing will be done in a sporadic manner during the life of the mining activities. Species regarded as the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure. Final rehabilitation shall be completed within a period specified by the Regional Manager.

Seeding of the area:

Once the pit slopes have been shaped and the soil replaced, the initial goal is to establish a good cover of a robust grass that will stabilise the soil and start the accumulation of soil organic carbon. This will be done using a combination of hydro seeding and physical planting of runners to apply a mix of commercial and indigenous species that includes both tufted and creeping species. The plants that were collected during the establishment and operational phases and kept in the designated area will be replanted.

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 proposed processing activity, 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.

iii) Potential risk of Acid Mine Drainage. (Indicate whether or not the mining can result in acid mine drainage).

No acid mine drainage is expected. Therefore, not applicable.

iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.

No acid mine drainage is expected. Therefore, not applicable.

v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.

No acid mine drainage is expected. Therefore, not applicable.

vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.

No acid mine drainage is expected. Therefore, not applicable.

vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation.

Potable water will be transported to the site on a daily basis. Process water is obtained from the municipal pipeline that passes the site. Please refer to

Appendix 18 for this letter. A water truck will be used to spray access roads to alleviate dust generation. It is proposed that the mining activities will require to a maximum of 20 000 – 40 000 l of water per day.

viii) Has a water use license been applied for?

Application was made to the DWS for the water use on Aroams Quarry. After investigations and discussions, it was decided to obtain water from the municipal water supply. Please refer to letter pertaining to the water use included in Appendix 18.

ix) Impacts to be mitigated in their respective phases

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

Table 23: Impacts to be mitigated.

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
whether listed or not listed	**(volumes, tonnages and hectares or m^2)**	**In which impact is anticipated**			
(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. Construction, commissioning, operational Decommissioning, closure, post-closure))**			
DEMARCATION OF SITE WITH VISIBLE BEACONS.	13.6ha	Construction / Site Establishment phase	Demarcation of the site will ensure that all employees are aware of the boundaries of the processing area and that work stay within approved area.	Processing of the waste rock/stone is only allowed within the boundaries of the approved processing area. • MHSA, 1996 • OHSA, 1993	Beacons need to be in place throughout the life of the activity.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	13.6ha	Construction / Site Establishment phase	N/A	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	13.6ha	Construction / Site Establishment phase	Portable toilets are to be emptied and cleaned regularly. Ensure reputable contractors are utilize for management of facilities. Portable toilets will be managed by a reputable contractor and inspected daily for any potential leaks. Water should not be released into the surrounding environment unless relevant permission obtained from DWS	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS	13.6ha	Operational phase	<u>Visual Mitigation:</u> • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	<u>Land use zoning:</u> • Northern Cape LUPA • Local Municipality: Land Use Planning Bylaws • The property is zoned for agriculture as primary use.	Throughout operational phase
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase	**<u>Dust Handling:</u>** • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	<u>Dust Handling:</u> • NEM: AQA, 2004 Regulation 6(1)	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase	**Emission Handling:** All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	Dust Handling: • NEM: AQA, 2004 Regulation 6(1)	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase	**Noise Handling:** The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	**Noise Handling:** NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in.	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	Throughout operational phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.		
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING; EXCAVATION; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase Decommissioning phase	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply.	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase Decommissioning phase	Keep mining in footprint Excavation areas will be sloped during rehabilitation to even out depressions.		Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION	13.6ha	Operational phase	Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. Should graves be observed on site during activity progress then all activity should be ceased and the area	<u>Loss of Artefacts and Graves:</u> National Heritage Resources Act No. 25 of 1999	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			demarcated as a no-go zone. A specialists will need to be consulted and responsible action considered, whether grave relocation or ceasing activity		
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION CRUSHING AND SCREENING OF AGGREGATES SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase Decommissioning phase	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	Contamination of surface or groundwater due to hazardous spills not cleaned:	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase Decommissioning phase	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	NWA, 1998	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.; STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION CRUSHING AND SCREENING OF AGGREGATES SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	Throughout operational phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION CRUSHING AND SCREENING OF AGGREGATES SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Operational phase	Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	• Every precaution must be taken to prevent contamination. The precautionary principal must apply.	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	13.6ha	Construction / Site Establishment phase	Ensure advertising is limited to local and regional areas, and only specifically advertise for Jobs nationally if skills are not available. Ensure that all power-related structures are adequately marked with relevant signs and warnings and fenced off.	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase
DRILLING AND BLASTING	13.6ha	Operational phase	Blasting alternatives will be considered to reduce noise and associated vibrations	Noise Handling: _NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987	Throughout operational and decommissioning phases
DRILLING AND BLASTING	13.6ha	Operational phase	Ensure baseline photographs are taken of all structures which may be impacted for photographic evidence prior to any blasting. Ensure procedures in place to compensate for damage. All neighbours need to be notified of each blasting activity. The N14 needs to be beacons off during the blasting event. Ensure that all power-related structures are adequately marked with relevant signs and warnings and fenced off.	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993	Throughout operational and decommissioning phases
EXCAVATION	13.6ha	Operational phase	Ensure that all stuff are made aware of all working conditions on site	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993	Throughout operational and decommissioning phases
TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS	13.6ha	Operational phase	All intersections with main tarred roads will be clearly signposted. drivers will be enforced to keep to set speed limits. Trucks will be road-worthy condition. A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from the main road. Ensure directional floodlights are utilized that focus light on the necessary areas and reduce light pollution to surrounding environment.	Degradation of the gravel access road: • NRTA, 1996 The gravel access road needs to be monitored for signs of degradation. Should any signs become apparent immediate rectification actions must be implemented.	Throughout operational and decommissioning phases
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Decommissioning phase	Ensure soils are replaced to an adequate depth and ensure soil quality is adequate.	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	Throughout operational phases
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Decommissioning phase	Specialist must be consulted f issues with groundwater are observed and qualities do not fall within the DWS target qualities or water qualities for livestock watering. Any affected registered water user must be compensated if levels an quality are impacted by the mining activities	Contamination of surface or groundwater due to hazardous spills not cleaned:	Throughout operational and decommissioning phases
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Decommissioning phase	Specialist must be consulted f issues with surface water are observed and qualities do not fall within the DWS target qualities or water qualities for livestock watering. Any affected registered water user must be compensated if levels a quality are impacted by the mining activities. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Monitor area for erosion and pooling and rehabilitate if necessary. Continue with Surface water monitoring.	NWA, 1998	Throughout operational and decommissioning phases
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Decommissioning phase	Ensure that all stuff are made aware of all working conditions on site	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	13.6ha	Decommissioning phase	Monitor, especially after first heavy rain falls to ensure adequate surface water drainage		Throughout operational and decommissioning phases

e) Impact Management Outcomes

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

Table 24: Impact Management Outcomes

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
whether listed or not listed	**(Including the potential impacts for cumulative impacts)**		**In which impact is anticipated**	**(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. 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..)**		**(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))**	**E.g. Modify through alternative method. Control through noise control. Control through management and monitoring. Remedy through rehabilitation.**	
DEMARCATION OF SITE WITH VISIBLE BEACONS.	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	N/A	Construction / Site Establishment phase	<u>Control:</u> Implementation of proper housekeeping and site management.	Processing of the waste rock/stone is only allowed within the boundaries of the approved processing area. • MHSA, 1996 • OHSA, 1993
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	N/A	Construction / Site Establishment phase	N/A	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Portable Toilets Potential harm through sewage leaks	Groundwater Surface Water Soils Social	Construction / Site Establishment phase	Control through proper site management	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.; STRIPPING AND STOCKPILING OF TOPSOIL; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS	Deterioration in visual aesthetics of the area	The visual impact may affect the aesthetics of the landscape.	Operational phase	<u>Control:</u> Implementation of proper housekeeping	<u>Land use zoning:</u> • Northern Cape LUPA • Local Municipality: Land Use Planning Bylaws • The property is zoned for agriculture as primary use.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Dust nuisance caused by the disturbance of soil.	Dust will be contained within the property boundaries and will therefore affect only the landowner.	Operational phase	<u>Control:</u> Dust suppression	<u>Dust Handling:</u> • NEM: AQA, 2004 Regulation 6(1)
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; EXCAVATION CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Emissions caused by vehicles and equipment	Emissions will be contained within the property boundaries and will therefore affect only the landowner.	Operational phase	<u>Control:</u> Emissions	<u>Dust Handling:</u> • NEM: AQA, 2004 Regulation 6(1)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	The noise impact should be contained within the boundaries of the property, and will represent the current noise levels of the farm.	Operational phase	**Control:** Noise control measures	**Noise Handling:** NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Flora	Operational phase	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Loss of topsoil will affect the rehabilitation of the processing area and the future agricultural potential of the site.	Operational phase	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Contamination of area with hydrocarbons or hazardous waste materials. Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Contamination may cause surface or ground water pollution if not addressed Surface water Bodies	Operational phase Decommissioning phase	Control: Waste management Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Alteration of topography	Topography	Operational phase	Control: Surface water Monitoring	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION	Loss of and disturbance to surface archaeological sites	Artefacts or graves	Operational phase	**Control:** Survey area before site clearance	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL;	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential	Groundwater pollution	Operational phase	Control: Proper site management.	Contamination of surface or groundwater due to hazardous spills not cleaned:

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
DRILLING AND BLASTING EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	contamination through littering leeching into the groundwater table				
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Surface water Bodies	Operational phase	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	The impact of the fauna of the area will not be significant as vibration and noise will drive the fauna away	Operational phase	Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Land use	Operational phase	Control: Fire	• Every precaution must be taken to prevent contamination. The precautionary principal must apply.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Social	Construction / Site Establishment phase	Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
STRIPPING AND STOCKPILING OF TOPSOIL	Disturbance of geological strata	Geology	Operational phase	N/A	-
DRILLING AND BLASTING	Health and Safety Risk by Blasting Activities. Potential danger to surrounding communities	The Unsafe working conditions should only impact the applicant. Safety measures will be implemented	Operational phase	Control: Implementation of safety control measures	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993
DRILLING AND BLASTING; EXCAVATION	Disturbance of geological strata	Geology	Operational phase	N/A	-
EXCAVATION	Unsafe working conditions for employees	The Unsafe working conditions should only impact the applicant. Safety measures will be implemented	Operational phase	Control: Implementation of safety control measures	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993
TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS	Road degradation. Increased potential for road incidences Potential distraction to road users	All road users will be affected	Operational phase	Control & Remedy: Road management	Degradation of the gravel access road: • NRTA, 1996 The gravel access road needs to

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
					be monitored for signs of degradation. Should any signs become apparent immediate rectification actions must be implemented.
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Soils replaced and ameliorated	Loss of topsoil will affect the rehabilitation of the processing area and the future agricultural potential of the site.	Decommissioning phase	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Improve response to issues relating to deterioration of groundwater quality or quantity	Groundwater improvement	Decommissioning phase	Control: Proper site management.	Contamination of surface or groundwater due to hazardous spills not cleaned:
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Health and safety risk posed by un-sloped areas	The impact on health and safety due to un-sloped areas will be contained within the site boundary.	Decommissioning phase	Control: Sloping of areas upon decommission	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Reintroduction of fauna attracted to flora to the area	Fauna returning to area	Decommissioning phase	Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Topography	Decommissioning phase	Control: Surface water Monitoring	
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Improved aesthetics through rehabilitation	The visual impact may affect the aesthetics of the landscape.	Decommissioning phase	Control: Implementation of proper housekeeping	Land use zoning: • Northern Cape LUPA • Local Municipality: Land Use Planning Bylaws • The property is zoned for agriculture as primary use.

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 25: Management Actions

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
whether listed or not listed	**(Including the potential impacts for cumulative impacts)**	**(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. 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..)**	**E.g. Modify through alternative method. Control through noise control. Control through management and monitoring. Remedy through rehabilitation.**		
DEMARCATION OF SITE WITH VISIBLE BEACONS.	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	Control: Implementation of proper housekeeping and site management.	Processing of the waste rock/stone is only allowed within the boundaries of the approved processing area. • MHSA, 1996 • OHSA, 1993	Beacons need to be in place throughout the life of the activity.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	N/A	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Portable Toilets Potential harm through sewage leaks	Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS	Deterioration in visual aesthetics of the area	Control: Implementation of proper housekeeping	Land use zoning: • Northern Cape LUPA • Local Municipality: Land Use Planning Bylaws • The property is zoned for agriculture as primary use.	Throughout operational phase
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Dust nuisance caused by the disturbance of soil.	Control: Dust suppression	Dust Handling: • NEM: AQA, 2004 Regulation 6(1)	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Emissions caused by vehicles and equipment	Control: Emissions	Dust Handling: • NEM: AQA, 2004 Regulation 6(1)	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	**Control:** Noise control measures	**Noise Handling:** NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987	Throughout operational and decommissioning phases

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	Throughout operational phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Contamination of area with hydrocarbons or hazardous waste materials Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Control: Waste management Proper site management. Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply.	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Alteration of topography	Control: Surface water Monitoring		Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL DRILLING AND BLASTING; EXCAVATION;	Loss of and disturbance to surface archaeological sites	**Control:** Survey area before site clearance	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998	Throughout operational and decommissioning phases

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	Throughout operational phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Control: Fire	• Every precaution must be taken to prevent contamination. The precautionary principal must apply.	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase
STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION	Disturbance of geological strata	N/A	-	Throughout operational and decommissioning phases
DRILLING AND BLASTING	Health and Safety Risk by Blasting Activities. Potential danger to surrounding communities	Control: Implementation of safety control measures	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993	Throughout operational and decommissioning phases
EXCAVATION	Unsafe working conditions for employees	Control: Implementation of safety control measures	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993	Throughout operational and decommissioning phases
TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS	Road degradation. Increased potential for road incidences Potential distraction to road users	Control & Remedy: Road management	Degradation of the gravel access road: • NRTA, 1996 The gravel access road needs to be monitored for signs of degradation. Should any signs become apparent immediate rectification actions must be implemented.	Throughout operational and decommissioning phases
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Soils replaced and ameliorated	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	Throughout operational phases
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Improve response to issues relating to deterioration of groundwater quality or quantity	Control: Proper site management.	Contamination of surface or groundwater due to hazardous spills not cleaned: NWA, 1998	Throughout operational and decommissioning phases
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.		Throughout operational and decommissioning phases

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Health and safety risk posed by un-sloped areas	Control: Sloping of areas upon decommission	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993	Throughout operational and decommissioning phases
	Reintroduction of fauna attracted to flora to the area	Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	Throughout operational phases
	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Control: Surface water Monitoring		Throughout operational and decommissioning phases
	Improved aesthetics through rehabilitation	Control: Implementation of proper housekeeping	Land use zoning: • Northern Cape LUPA • Local Municipality: Land Use Planning Bylaws • The property is zoned for agriculture as primary use.	Throughout operational phase

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 closure objectives entail the sloping, landscaping and replacement of the topsoil over the processing area in order to rehabilitate the disturbance. The stockpiled topsoil will be spread over the disturbed area to a depth of at least 500 mm.

The primary objective is to obtain a closure certificate at the end of the life of the mine 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. To realise this, the following objectives must be achieved:

- Remove all temporary infrastructure and waste from the site as per the requirements of this EMPR and of the Provincial Department of Mineral Regulation.
- Demolish / rehabilitate all roads with no post - mining use potential.
- Clear all granite material from site;
- Clear boulders form site;
- Remove all waste from site;
- Future public health and safety are not compromised;
- Ensure that no threat to surface and underground water quality remains.
- Ensure that all permanent changes in topography are sustainable and do not cause erosion or the damming up of runoff.
- Shape and contour all disturbed areas in compliance with the EMPR.
- The stockpiled topsoil (that is available) will be spread over the disturbed area to a depth of at least 500 mm.
- Make safe any dangerous excavations or subsidence on the surface.
- Rehabilitate all disturbed areas in compliance with the EMPR and of the Provincial Department of Mineral Regulation.
- Final rehabilitation will entail the removal of all infrastructure and equipment from the site.
- Final sloping, landscaping, levelling and top dressing will be done on all areas.
- Ensure that all rehabilitated areas are safe, stable and self-sustaining in terms of vegetation.
- Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding has been done in an area.
- Site management will implement an alien invasive plant management plan during the 12 months' aftercare period to address germination of problem plants in the area.
- The applicant will comply with the minimum closure objectives as prescribed by DMR.

- Any adverse socio-economic impacts are minimised; and
- All socio-economic benefits are maximised.

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

This report, the Final Environmental Impact Assessment Report and Environmental Management Programme Report, includes all the environmental objectives in relation to closure and will be made available for perusal of I&AP's and stakeholders. Any additional comments received during the commenting period was added to the Final Environmental Impact Assessment Report and Environmental Management Programme Report to be submitted to DMR for approval.

(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 requested rehabilitation plan is attached as Appendix 7. Upon closure of the mining activity all infrastructure will be removed. The compacted areas will be ripped and levelled upon which the topsoil will be replaced. No permanent structures will remain upon closure of the site. The rehabilitation plan shall entail removal of all generated waste, infrastructures and materials, re-vegetation of disturbed and cleared areas, rehabilitation of access roads, ensuring the growth of the existing grasses and plants species and cleaning of spillages etc.

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

The rehabilitation of the mining area as indicated on the rehabilitation plan attached as Appendix 7 will comply with the minimum closure objectives as prescribed by DMR and detailed below, and therefore is deemed to be compatible.

The objective of the rehabilitation plan is to ensure that:

a) the areas disturbed by the prospecting and mining activities are rehabilitated and/or landscaped;
b) that the site and areas disturbed by prospecting and mining activities are visually appealing and are left in a neat and tidy condition;
c) contaminants/pollution sources are removed from the site or that appropriate measures are in place to control long-term contamination sources;
d) the site and surrounding disturbed areas are in a stable condition.

Listed below are the provisional requirements for rehabilitation of the site. These are intended as a guideline.

Actions to clear the site:

1. Remove all containers and temporary office structures from the site.

2. Drain all pollution sumps and dispose of all solid and liquid waste at a permitted landfill site.
3. Break up all concrete structures, cart concrete from the site and dispose of at a permitted landfill site.
4. Collect all litter and packaging from within the site as well as the peripheral areas and dispose at a permitted landfill site.
5. Remove all waste building components/parts from the site (whether scrap or not) including metal, wood, drums, plastic, cabling, tubing, etc.
6. Ensure that no waste is buried on site.
7. Disconnect all temporary power, water and sewerage connections.
8. Disassemble and remove all ablution facilities.
9. Ensure that all infrastructure routes are rehabilitated and stable.
10. Clear weeds from the construction site and peripheral disturbed areas.
11. Clear all litter and rubble from drainage lines and disposes of appropriately.
12. Ensure that all public roads are satisfactorily cleared of rubble
13. Repair damaged road curbs or other structures

Landscape the mine site:

1. Backfill all remaining voids or if not possible blast steps of 2 m high x 3 m wide to make the steep cliffs safer.
2. Flatten the heaps of over burden that remains after all voids have been filled
3. Remove all stockpiled rubble from the site and dispose of at a permitted disposal site
4. Ensure that no bare, vegetated areas remain.
5. Rehabilitate (rip and hydro seed) all disused compacted surfaces, tracks and roads
6. Make provision for the rehabilitation of peripheral areas not directly included within the site that were disturbed during the construction process. Rehabilitation may entail grading, levelling, fertilizing and re-grassing.
7. Identify actual and potential erosion sites and implement measures for control/prevention of erosion. Ensure that appropriate erosion control measures are installed around storm water outlets and stabilise and re-grass areas around storm water outlets with indigenous species.
8. Stabilise the watercourse banks and re-grassing to prevent erosion
9. Where possible indigenous plants must be used as part of the landscaping process.
10. The Landscape Contractor is to ensure that adequate planting of indigenous plants is catered for. The ECO is to review and approve the landscaping plans.
11. It is recommended that efforts on invasive species management, erosion control and rehabilitation is coordinated to avoid negative effects of one development on the environmental state on and around the other.

Rehabilitation of the excavated area:

- Due to the impracticality of importing large volumes of fill to restore the quarry area to its original topography, the rehabilitation option is to develop the quarry into a minor landscape feature.

- This will entail creating a series of irregular benches along the quarry faces, the top edges of each face being blasted away to form slopes on the benches below, thereby reducing the overall face angle.
- Fill and topsoil could be placed over the benches to provide a suitable medium for the establishment of vegetation, especially trees which will break up the line of the faces and enhance their appearance. The floor of the quarry must be capped with suitable soil material and re-vegetated.
- Rocks and coarse material removed from the excavation must be dumped into the excavation.
- No waste will be permitted to be deposited in the excavations.
- Once overburden, rocks and coarse natural materials has been dumped into the excavated area and profiled with acceptable contours and erosion control measures, topsoil shall be returned over the area.
- The area shall be fertilized 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.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager 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.

Rehabilitation of plant, office and service areas:

- Coarse natural material used for the construction of ramps must be removed and dumped into the excavations.
- Stockpiles will be removed during the decommissioning phase, the area ripped and the topsoil returned to its original depth to provide a growth medium.
- On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act [MPRDA], 2002 (Act No. 28 of 2002):
    - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
    - Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10 cm above the surrounding ground surface.
    - The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.
- Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.
- On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200 mm and graded to an even surface condition. Where applicable / possible topsoil needs to be returned to its original depth over the area.
- Prior to replacing the topsoil, the material that was removed from these areas will be replaced in the same order as it originally occurred.
- The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.

- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager 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 seed mix to his or her specification.

Final rehabilitation:

- Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding and maintenance, and weed / alien clearing.
- All infrastructures, equipment, plant, temporary housing and other items used during the mining period will be removed from the site.
- Waste material of any description, including receptacles, scrap, rubble and tyres, will 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.
- Weed / Alien clearing will be done in a sporadic manner during the life of the mining activities. Species regarded as weeds according to the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.
- Seeding of the area:
    - Once the pit slopes (40º) have been shaped and the soil replaced, the initial goal is to establish a good cover of a robust grass that will stabilise the soil and start the accumulation of soil organic carbon. This will be done using a combination of hydro seeding and physical planting of runners to apply a mix of commercial and indigenous species that includes both tufted and creeping species. The plants that were collected during the establishment and operational phases and kept in the designated area will be replanted.

(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.

Mine type and saleable mineral by-product

According to Tables BH1, BH1 and B.14

Mine type	Aggregate, Gravel, Granite and Dolomite
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

Table 26: 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	Yes	

Unit rates for closure components

According to Table B.6 master rates and multiplication factors for applicable closure components.

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**	-	-

Component No.	Main description	Master rate	Multiplication factor
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**	-	-
6	**Opencast rehabilitation** including final voids and ramps	225 186	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	118 924	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**	15 826	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)

Table 27: Quantum Calculation for Aroams Quarry (Pty) Ltd

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision							
CALCULATION OF THE QUANTUM							
Mine:	**Aroams Quarry (Pty) Ltd**			**Location:**	**Aggeneys**		
Evaluators:	**Yolandie Coetzee**			**Date:**	**18-Sep-19**		
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	16	1	1	R 0,00
2a	Demolition of steel buildings and structures	m^2	0	228	1	1	R 0,00
2b	Demolition of reinforced concrete buildings and structures	m^2	0	336	1	1	R 0,00
3	Rehabilitation of access roads	m^2	0	41	1	1	R 0,00
4a	Demolition and rehabilitation of electrified railway lines	m	0	395	1	1	R 0,00
4b	Demolition and rehabilitations of non-electrified railway lines	m	0	216	1	1	R 0,00
5	Demolition of housing and/or administration facilities	m^2	0	455	1	1	R 0,00
6	Opencast rehabilitation including final voids and ramps	ha	7,8	238 697	0,04	1	R 74 473,46
7	Sealing of shaft, audits and inclines	m^3	0	122	1	1	R 0,00
8a	Rehabilitation of overburden and spoils	ha	0	159 131	1	1	R 0,00
8b	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0	198 195	1	1	R 0,00
8c	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	575 653	0,51	1	R 0,00
9	Rehabilitation of subsided areas	ha	0	133 249	1	1	R 0,00
10	General surface rehabilitation	ha	5,8	126 059	1	1	R 731 142,20
11	River diversions	ha		126 059	1	1	R 0,00
12	Fencing	m		144	1	1	R 0,00
13	Water Management	ha		47 931	0,17	1	R 0,00
14	2 to 3 years of maintenance and aftercare	ha	13,6	16 776	1	1	R 228 153,60
15a	Specialists study	Sum				1	R 0,00
15b	Specialists study	Sum					R 0,00
							R 1 033 769,26
	Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)			1,05		**Sub Total 1**	R 1 085 457,73
	General and prelim		6% of subtotal 1				R 65 127,46
	Contingency		10.0% of Subtotal 1				R 108 545,77
	(Subtotal 1 plus management and contingency)					**Sub Total 2**	R 1 259 130,96
	Vat (15%)					**Sub Total 3**	R 188 869,64
	(Subtotal 3 plus VAT)					**GRAND TOTAL**	**R 1 448 000,61**

The amount 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 1 448 000.61.**

(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 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.

The financial provision calculations for Aroams quarry undertaken by making use of the Department of Mineral and Resource (DMR) guideline document for financial provision, with the master rates of 2019 and amount to **R 1 448 000.61.** This amount when approved by the DMR will be provided in the form of a bank guarantee.

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

h) Monitoring of Impact Management Actions

i) Monitoring and reporting frequency

j) Responsible persons

k) Time period for implementing impact management actions

l) Mechanism for monitoring compliance

Table 28: Mechanisms for monitoring compliance

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
WHETHER LISTED OR NOT LISTED			(FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	
(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.)				

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	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 processing area. • A 20m buffer area (if applicable) from any natural areas need to be demarcated. • A 30m buffer area from a watercourse needs to be demarcated if applicable.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer Role: • Ensure beacons are in place throughout the life of the activity.	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; **STRIPPING AND STOCKPILING OF TOPSOIL;** **DRILLING AND BLASTING;** **EXCAVATION;** **CRUSHING AND SCREENING OF AGGREGATES;** **TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS;** **SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)**	Groundwater	• Monitor portable toilets for any leaks • **<u>Groundwater Monitoring:</u>** Equipment's needs to be monitored to prevent any hydrocarbon spills.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Ensure beacons are in place throughout the life of the activity. • Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. • Notify Heritage Northern Cape and the ECO immediately. • Work may only commence once the area was cleared by Heritage Northern Cape .	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND	Surface Water	• Monitor portable toilets for any leaks. **<u>Surface water Monitoring:</u>**	• Responsibility: Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.	• Throughout Operational Phase

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; **STRIPPING AND STOCKPILING OF TOPSOIL;** **DRILLING AND BLASTING;** **EXCAVATION;** **CRUSHING AND SCREENING OF AGGREGATES;** **TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS;** **SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)**		• Ensure no litter or contaminants lie on the ground. • Inspect area for erosion and pooling.	• Compliance to be monitored by the Environmental Control Officer. Role: • Ensure beacons are in place throughout the life of the activity. • Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. • Notify Heritage Northern Cape and the ECO immediately. • Work may only commence once the area was cleared by Heritage Northern Cape. • Ensure regular vehicle maintenance only take place within the service bay area of the on-site workshop. If emergency repairs are needed on site, ensure drip trays is present. • Ensure all waste products are disposed of in a 200 litter closed container/bin inside the emergency service area. • 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. • Clean spills immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognized facility. File proof. • Ensure the availability of suitable covered receptacles at all times and conveniently placed for the disposal of waste. • Store non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., in a container with a closable lid at a	• Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			collecting point. Collection must take place on a regular basis and waste must be disposed of at the recognized landfill site at Robertson. Prevent refuse from being dumped on or near the processing area. • Biodegradable refuse to be handled as indicated above. • Ensure that chemical toilet facilities function properly, is not abused and does not pose any harm to the environment. • Ensure that pollution control measures are adequate and well maintained, e.g. bund walls, drop pan and concrete slabs, in order to prevent soil and water pollution.	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; **STRIPPING AND STOCKPILING OF TOPSOIL;** **DRILLING AND BLASTING;** **EXCAVATION;** **CRUSHING AND SCREENING OF AGGREGATES;** **TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS;** **SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED**	• Soil Management • Topsoil Management **Soil erosion:** • Loss of reinstated topsoil after rehabilitation.	• Monitor portable toilets for any leaks. **Soil Handling:** • Excavating equipment to remove the first 500 mm of topsoil from the proposed work areas. The applicant already has this equipment available. • Berms to be made to direct storm- and runoff water around the stockpiled topsoil area. • Ensure that topsoil is being kept separate form overburden. **Erosion monitoring:**	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer Role: • Ensure beacons are in place throughout the life of the activity. • Strip and stockpile the upper 500 mm of the soil and protect as topsoil. • Remove topsoil at right angles to the slope to slow down surface runoff and prevent erosion. • Conduct topsoil stripping, stockpiling and re-spreading in a systematic way. Ensure topsoil is stockpiled for the minimum possible time.	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
AREA (FINAL REHABILITATION)		• Grader to restore areas prone to soil erosion. • Planting of a cover crop to stabilize re-instated soil • Erosion prevention equipment.	• Protect topsoil stockpiles against losses by water and wind erosion through the establishment of plants on the stockpiles. • Topsoil heaps may not exceed 1.5 m in order to preserve microorganism within the topsoil. • Conduct the activity in accordance with the Best Practice Guideline for small-scale mining as stipulated by DWS.	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	• Social • Health and Safety Risk	• Monitor portable toilets for any leaks. • Ensure employment is in line with SLP initiatives. Inspect all complaints received and compare against photographic evidence. Inspect areas and ensue fences haven't been tampered with and no illegal connections have been added to lines. • Health and Safety Management	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Ensure beacons are in place throughout the life of the activity. • Ensure workers have access to the correct personal protection equipment (PPE) as required by law. • Manage all operations in compliance with the Occupational Health and Safety Act as well as the Mine Health and Safety Act.	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION;	• Monitoring of visual impacts. • Inspect area for illegal littering and dumping	• Ensure that the site have a neat appearance and is kept in good condition at all times. • Control the height of the stockpiles to minimize the visual impact on the surrounding environment.	• Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. • Role: • Minimize the visual impact of the activity on the surrounding environment	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)		• Remove all infrastructure upon rehabilitation of the processing area and return the area to its prior status.		• Annual compliance monitoring of site by an Independent Environmental Control Officer.
	Dust Monitoring: • The dust generated by the processing activities must be continuously monitored, and addressed by the implementation of dust suppression methods.	Dust Handling and Monitoring: • Dust suppression equipment such as a water car and water dispenser. The applicant already has this equipment available. • Dust Monitoring will also be conducted on site on a monthly basis.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Control the liberation of dust into the surrounding environment by the use of; inter alia, water spraying and/or other dust-allaying agents. • Dampen the stockpiles during periods of high wind spells. • Assess effectiveness of dust suppression equipment. • Limit speed on the access roads to 40km/h to prevent the generation of excess dust. • Spray Aggregate, Gravel, Granite and Dolomite roads with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits.	

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; CRUSHING AND SCREENING OF AGGREGATES; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Emission Monitoring: • The emissions generated by the processing activities must be continuously monitored, and addressed by the implementation of dust suppression methods.	Emission Handling and Monitoring: • Emissions will be monitored	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • All vehicles in good working order to reduce risk of emissions	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
	<u>Noise Monitoring</u> • The noise impact should be contained within the boundaries of the property, as it will represent the current activities.	**<u>Noise Handling and Monitoring:</u>** • Site manager to ensure that the vehicles are equipped with silencers and maintained in a road worthy condition. • Compliance with the appropriate legislation with respect to noise will be mandatory.	• Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer • Role: • Ensure that employees and staff conduct themselves in an acceptable manner while on site. • No loud music may be permitted at the processing area. • Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION;	• Management of weed or invader plants • The presence of weed and/or invader plants must be continuously monitored, and any unwanted plants must be removed. • Loss of natural vegetation.	• Inspect progress of construction & ensure activity is in designated areas • Inspect area for damage to flora species. • Establish alien invasive monitoring programme	• Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. • Role: • Implement a weed and invader plant management plan.	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)		Management of weed or invader plants: • Removal of weeds must be manually or by the use of an approved herbicide. Management of buffer areas: • Site management has to ensure the use of visible beacons to demarcate the boundaries of the approved area. Protection of fauna: • Site management has to protect fauna that enters the processing area.	• Control declared invader or exotic species on the rehabilitated areas. • Keep the temporary topsoil stockpiles free of weeds.	• Annual compliance monitoring of site by an Independent Environmental Control Officer.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Waste Management: • Management of waste must be a daily monitoring activity. • Hydrocarbon spills need to be cleaned immediately and the site manager must check compliance daily.	Waste Management: • Closed containers for the storage of general of hazardous waste until waste is removed to the appropriate landfill site. • A hydrocarbon spill kit to enable sufficient clean-up of contaminated areas. • Drip trays must be available to place underneath equipment parked for the night. • Should a vehicle have a break down, it must be decommissioned	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Ensure regular vehicle maintenance only take place within the service bay area of the on-site workshop. If emergency repairs are needed on site, ensure drip trays is present. Ensure all waste products are disposed of in a 200 litter closed container/bin inside the emergency service area. • Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		immediately and removed from site to be serviced. • Waste disposal register and file for the keeping of safe disposal records. • Ensure that hazardous substances if any are stored within a securely fenced area.	site, either for resale or for appropriate disposal at a recognized facility. • Clean spills immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognized facility. File proof. • Ensure the availability of suitable covered receptacles at all times and conveniently placed for the disposal of waste. • Store non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., in a container with a closable lid at a collecting point. Collection must take place on a regular basis and waste must be disposed of at the recognized landfill site at Robertson. Prevent refuse from being dumped on or near the processing area. • Biodegradable refuse to be handled as indicated above. • Ensure that chemical toilet facilities function properly, is not abused and does not pose any harm to the environment. • Ensure that pollution control measures are adequate and well maintained, e.g. bund walls, drop pan and concrete slabs, in order to prevent soil and water pollution.	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND	Protection of Cultural and Heritage Artefacts	Should any artefacts be discovered the area needs to	Responsibility:	• Throughout Operational Phase

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)		be demarcated and work needs to be stopped.	• Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. • Notify Heritage Northern Cape and the ECO immediately. • Work may only commence once the area was cleared by Heritage Northern Cape.	• Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Protection of fauna	Monitor any ecologically sensitive species should they be observed on site.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer Role: • Contain all activities within the boundaries of the approved processing area. • Demarcate, signpost and manage the 20 m buffer area as no-go area around areas with natural vegetation. • Ensure no fauna is caught, killed, harmed, sold or played with.	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			• 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.	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE; STRIPPING AND STOCKPILING OF TOPSOIL; DRILLING AND BLASTING; EXCAVATION; SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Fire Management	Fire Management	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer Role: • Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. • Notify Heritage Northern Cape and the ECO immediately. • Work may only commence once the area was cleared by Heritage Northern Cape.	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
TRANSPORTATION OF AGGREGATES FROM STOCKPILE AREA TO CLIENTS	• Management of Access Roads • The condition of the access road must be continuously monitored.	Management of Access Roads: • Dust suppression equipment such as a water car and dispenser. • Grader to restore the road surface when needed. Inspect intersections and	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role:	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		roads will be clearly signposted. • Drivers will be enforced to keep to set speed limits. • Trucks will be in worthy condition with reflective strips	• Divert storm water around the access roads to prevent erosion. • Restrict vehicular movement to existing access routes to prevent crisscrossing of tracks through undisturbed areas. • Repair rutting and erosion of the access roads caused by the processing activities	Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

l) Indicate the frequency of the submission of the performance assessment report.

The Mineral and Petroleum Resources Development Regulations stipulates that performance assessment reporting must be done annually. The applicant commits to submitting the performance assessment reports of the proposed processing activity annually to DMR for perusal.

m) Environmental Awareness Plan

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

The purpose of this section is to outline the methodology that will be used to educate the mine's employees and contractors of any environmental risks associated with their work and the manner in which these risks must be dealt with so as to avoid pollution and minimize the degradation of the environment.

Once approved, a copy of the Environmental Management Programme will be handed to the site manager. Issues such as topsoil handling, site clearance, fire principals and waste handling will be discussed with the manager to ensure that he understands the goals as set out in the EMPR. An induction meeting will also be held with all the site workers to inform them of the basic steps towards environmental awareness with regard to the environment. Please refer to Appendix 14 for the full Environmental Awareness Plan for Aroams Quarry.

The operations manager must ensure that he/she understands the EMPR document and its requirement and commitments. An Environmental Control Officer (ECO) needs to check compliance of the mining activities to the management programmes described in the EMPR.

Training Needs

A training needs analysis will be performed through all levels of the organization including those within the administration, plant and mining worker sectors. Each of the categories / levels of the organization have different responsibilities and roles, accordingly different knowledge requirements are applicable. These are summarized in Table 29 below.

After the training needs have been identified, it is the responsibility of the SHE Office to ensure that personnel attend the relevant identified training. Training will also address the specific measures and actions as listed in the EMP. This Environmental Awareness Plan (EAP) is intended to supplement the Safety, Health and Environmental (SHE) training and awareness requirements.

Table 29: Environmental Awareness Plan

OCCUPATION CATEGORY	ENVIRONMENTAL MANAGEMENT RESPONSIBILITY / ROLE	REQUIRED KNOWLEDGE AND INPUT	TRAINING REQUIRED	INTERVAL
Senior Management including Process Managers and Head of Department	Managing the Social & Environmental Assessment & Management System (SEAMS), and the Safety, Health & Environmental (SHE) Management System	Understanding the purpose of the SEAMS and SHE Management System	General in-house, management training	Once off
		Knowledge of the significant impacts as described in the EIA/EMP during the various phases		
		Knowledge of the commitments made in the EMP relevant to the various phases		
		Setting and reviewing the mine's Environmental objectives		
		Directing the SEAMS and SHE management system, and monitoring their progress		
		Accessing the legal register and searching for details	Training on the legal register	Once off
		Emergency preparedness and response		
Environmental Management Representative, SHE Officer & Internal Auditor	Managing the SEAMS and the SHE Management System Monitoring and auditing	Understanding the purpose of the SEAMS and SHE Management System	General in-house, management training	Once off
		Knowledge of the significant impacts as described in the EIA/EMP during the various phases		
		Knowledge of the commitments made in the EMP relevant to the various phases		
		Directing the SEAMS and SHE management system, and monitoring their progress		
		Current knowledge of South African regulatory requirements, best practice guidelines and applicable legislation	Training on the legal register	On going
		Emergency preparedness and response		
		Knowledge in spill management, stockpile management, discard management, water management and waste management	Meetings and Talk Topics	Continuous
		Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting		
		Knowledge of the SABS standards and other relevant legislation regarding the correct storage of chemicals	Training on the SABS standards and other legislation	Annual
		Knowledge of auditing techniques and report writing	Auditor training	Annual
Section Managers & Section Engineers	Implementation and daily management of the	Understanding the purpose of the SEAMS and SHE Management System	General in-house, management training	Once off
		Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases		

OCCUPATION CATEGORY	ENVIRONMENTAL MANAGEMENT RESPONSIBILITY / ROLE	REQUIRED KNOWLEDGE AND INPUT	TRAINING REQUIRED	INTERVAL
	SEAMS and the SHE Management System	Actively implementing actions to achieve SEAMS Management Plans and Environmental Objectives.	Meetings and talk topics	Continuous
		Knowledge in stockpile management, discard management, water management and waste management		
		Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting		
		Knowledge in the correct storage of chemicals		
Engineering HOD & General Engineering Supervisor	Implementation and daily management of the SEAMS and the SHE Management System	Understanding the purpose of the SEAMS and SHE Management System	General in-house, management training	Once off
		Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases		
		Actively implementing actions to achieve SEAMS Management Plans and Environmental Objectives.		
		Knowledge in spill management and waste management	Meetings and talk topics	Continuous
		Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting		
		Knowledge in the correct storage of chemicals		
Mine Captain & General Engineering Supervisors	Implementation and daily management of the SEAMS and the SHE Management System	Understanding the purpose of the SEAMS and SHE Management System Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases Actively implementing actions to achieve SEAMS Management Plans and Environmental Objectives.	General in-house, management training	Once off
		Knowledge in spill management and waste management Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting Knowledge in the correct storage and handling of chemicals Understanding the requirements for not polluting the environment	Meetings and talk topics	Continuous
Supervisors, Shift Boss & Forman	General Environmental Awareness and job specific impacts	Understanding the purpose of the SEAMS and SHE Management System Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting Knowledge in spill management and waste management	General in-house, management training	Once off

OCCUPATION CATEGORY	ENVIRONMENTAL MANAGEMENT RESPONSIBILITY / ROLE	REQUIRED KNOWLEDGE AND INPUT	TRAINING REQUIRED	INTERVAL
		Understanding the requirements for not polluting the environment		
Operators, tradespersons & Floor Employees	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SEAMS and SHE Management System Understanding the SEAMS Management Plan relevant to their operations Understanding the requirements for not polluting the environment General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Environmental Awareness Training	Annual
General Administration Staff	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SEAMS and SHE Management System Understanding the SEAMS Management Plan relevant to their operations Understanding the requirements for not polluting the environment General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Environmental Awareness Training	Annual
Security	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SEAMS and SHE Management System Understanding the requirements for not polluting the environment General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Environmental Awareness Training	Annual

Specialized Skills

The Training Department in conjunction with the SHE Officer are responsible for ensuring job specific training for personnel performing tasks, which can cause significant environmental and social impacts (e.g. receipt of bulk hazardous chemicals/fuel, hazardous materials handling, responding to emergency situations etc.). The Mine Manager with the assistance of the SHE Officer must identify relevant personnel and training courses.

On the job training is an essential tool in environmental awareness. Employees must be given details of the expected environmental issues and concerns specifically related to their occupation. Employees must be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be on-going, and all new employees will be provided with the same standard of training as existing employees.

Review of Training Material

Effectiveness of the environmental management training will be done by the management through task observations and during internal and external audits.

All training material for presentation to personnel and contractors will be reviewed annually to ensure consistency with organizational requirements and best practice guidelines. In addition to this, annual monitoring reports, audit results and all incident reports will be reviewed, any shortcomings and non-compliancy will be highlighted and management measures incorporated or improved upon within the training material.

Records

Records from the implementation of this EAP will be kept and controlled in accordance with the SHE Management System Control of Records Procedure, which is required to be implemented to provide evidence of conformity and effective operation of the relevant requirements of the SHE management system.

(2) 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 activity takes place. An Environmental Control Officer (ECO) needs to check compliance of the processing activities to the management programmes described in the EMPr. Please refer to Appendix 14 for the full Environmental Awareness Plan for Aroams Quarry.

EMERGENCY RESPONSE PLAN AND PROCEDURES

As part of its management tools, a mine must have an Emergency Response Plan. These plans will be disseminated to all employees and contractors in the event of an emergency.

In the case of a medical accident or problem, the mine has first aid kits available at various points and an emergency room. A First Aid officer will be on duty at all times. In the event of an emergency the checklist of emergency response units must be consulted and the relevant units notified.

Communication is vital in an emergency and thus communication devices, such as mobile phones, two-way radios, pagers or telephones, must be placed around the mine. Should the emergency have the potential to affect the surrounding communities, they will be alerted via alarm signals or contacted in person.

Emergency services will be sourced from the nearest main town, Aroams wherever possible. Contact details for the emergency services and local authorities are listed below; these will be displayed on site and made available to all employees and contractors.

Police Station (Aggeneys):	**054 983 2437**
Department of Water and Sanitation:	**056 811 5834**
Department of Mineral Resources:	**053 807 1700**
Department of Environment and Nature Conservation:	**053 807 7300**
Department of Roads and Public Works:	**053 839 2100**
Department of Economic Development and Tourism:	**053839 4000**
Department of Agriculture, land reform and rural development:	**053 838 9100**

The following list represents the basic steps towards environmental awareness, which all participants in this project must consider whilst carrying out 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; and
- 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;
- Do not swim in or drink from streams;
- After a heavy rainstorm or at least every 3 months, all water pollution control structures like storm water berms and trenches will be checked for signs of damage or change in its capacity;
- Any damage to any water pollution structures will be repaired immediately; and
- Any of the above actions will be included in the performance assessment report to the Department of Mineral Resources (DMR).
- Maintenance activities shall not lead to undue damage, blockages or disruption of the drainage lines or storm water channels on site or concentrate storm water sheet flow into erosive channels.

- Sediment to be removed on a need basis from all drainage channels, culverts and pipes under roads to prevent blocked pipes and erosion damage to road sides due to disrupted flow.
- Significant erosion in the drainage lines or storm water channels or swales shall be addressed by implementing water slowing measures e.g. temporary straw bales or sand bags or permanent gabion weirs and stabilised overflows and crossings to prevent recurrence.
- All erosion channels anywhere on site shall be repaired immediately through backfilling with appropriate material and stabilising to prevent recurrence.
- Where vegetation has been washed away or damaged as a result of the erosion this shall be reinstated once the area has been stabilised.
- Stabilisation measures e.g. grass blocks shall be maintained in good repair.
- No materials or wastes shall be dumped into storm water channels, in the drainage lines or their buffer zones. Any litter or foreign material blown or washed into these areas inadvertently is to be removed regularly (minimum monthly) without undue disturbance to the vegetation and stability of the area.
- Fuel or oil or other chemical spills anywhere on site should be treated immediately with an appropriate mop-up or bio-remedial product as directed by manufacturers to prevent contamination of runoff.

Flooding

There is potential for flooding during the rainy season. This could result in a large volume of water flowing downstream or accumulating in a water containment facility and could cause major damage to equipment and endanger the lives of employees on site. Procedures must be put in place to ensure that there is a quick response to flood events and damage is kept to a minimum.

The procedure for flooding is as follows:

- DWS's flood warning system will be reviewed annually;
- The use of emergency pumps if the water floods the underground, where it may be exposed to contamination;
- Mine management will be made aware of any such event so they can take appropriate action to ensure production losses are kept to a minimum;
- All dams and water containment facilities will have a 0.8 m freeboard and an overflow or outlet to ensure that no damage occurs to the facilities;

- All contaminated water will be contained on site, as far as possible and discharges to the environment will only occur if absolutely necessary in an extreme flood event.
    - Check that rainwater flows around work areas and are not contaminated;
    - Report any erosion;
    - Check that dirty water is kept from clean water; and
    - Do not swim in or drink from streams or the quarry.

Waste Management:

- Take care of your own waste;

- Keep waste separate into labelled containers – report full bins;
- Place waste in containers and always close lid;
- Do not burn waste; and
- Pick-up any litter laying around.

Hazardous Waste Management (Petrol, Oil, Diesel, Grease)

Hydrocarbons such as diesel, petrol, and oil which are used as fuel for mine machinery which is kept on site, increases the possibility that spillage may occur. As this is a product mine there is also the possibility of a product spillage occurring. In the event of a spillage, procedures must be put into place to ensure that there are minimal impacts to the surrounding environment.

Diesel, engine oil and hydraulic oil are the most likely hydrocarbons identified during impact assessments that can result in an emergency situation.

The following procedure applies to a hydrocarbon spill:

- If any spills take place the contaminant together with the soil will be removed and placed in acceptable container to be removed with industrial waste to a recognised licence facility or licenced company.
- Bioremediation will be done on site to the satisfaction of DENC
- A spill clean-up kit is available at the storage yard
- All personnel will be trained n spill clean-up methodologies.
- Every precaution will be taken to prevent the spill from entering the surface water environment;
- In the event of a large spillage, adequate emergency equipment for spill containment or collection, such as additional supplies of booms and absorbent materials, will be made available and if required, a specialised clean-up crew will be called in to decontaminate the area. The soil will be removed and treated at a special soil rehabilitation facility;
- If the spill is larger than 100 litres the Department of Environmental and Nature Conservation (Northern Cape) (DENC) will be notified by fax and or phone within 24-hour of the event.
- Reasonable measures must be taken to stop the spread of hydrocarbons and secure the area to limit access;
- Dispatch necessary services;
- The incident must be reported to the Environmental coordinator immediately;
- The Environmental Coordinator will assess the situation from the information provided, and set up an investigation team or relevant personnel. Included in this team could be the Mine Manager, Chief Safety Officer, the employee who reported the incident and any individual responsible for the incident;
- When investigating the incident, priority must be given to safety;
- Once the situation has been assessed, the Environmental Coordinator must report back to the Mine Manager;
- The Mine Manager and the investigation team must make a decision on what measures can be taken to limit the damage caused by the incident, and if possible any remediation measures that can be taken;
- The source / reason of the spill or leak will be addressed immediately;
- 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; and
- Label containers and move to approved storage area.

Breakdown of vehicles or equipment outside vehicle maintenance yard:

If any equipment of vehicles breaks down inside the excavation area or outside the storage yard the following emergency procedure will be followed:

- Drip pans will be placed at all point s where diesel, oil or any hydraulic fluid can rip and contaminate the oil;
- All efforts will be made to remove the vehicle or equipment to the storage area;
- If the vehicle or equipment cannot be removed the broken part will be drained of all fluid and the specific part remove to the service area;
- No repairs will be allowed to take place outside the maintenance yard or service area; and
- Any spills will be managed as described in the hydrocarbon section above.

Explosions

Explosions can occur in the plant and workshop areas when working with gas cylinders and chemicals. These could result in large numbers of employees being injured and requiring medical assistance.

The procedure to be followed is:

- Alternative evacuation routes will be devised, should a rock fall occur as a result of the explosion; and
- All relevant emergency response units must be notified and hospitals informed of incoming patients.

Discoveries:

- Stop work immediately;
- Notify site manager/supervisor; and
- 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:
  - Sweep paved roads;
  - Water all roads and work areas;
  - Minimize handling of material; and
  - 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 load noises; and
- Report or repair noisy vehicles.

Flora and Fauna including alien invasive species:

- 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; and
- Do not set snares or raid nests for eggs or young.

Fire Management:

Veld fires and fires resulting from other sources must be handled with extreme caution. Fire extinguishers will be placed around the mine.

The following procedures apply to fires:

- In the event of a fire an alarm will be activated to alert all employees and contractors;
- Identify the type of fire and the appropriate extinguishing material. For example, water for a grass fire, and mono ammonium phosphate based fire extinguisher for chemical and electrical fires;
- In the event of a small fire the fire extinguishers placed around the mine will be used to contain and extinguish the fire;
- In the event of a large fire, the fire department will be notified and must react timeously;
- All staff will receive training in response to a fire emergency on site;
- A Fire Association will be set up with the mine and surrounding land owners to facilitate communication during fire events and assist in fighting fires, where necessary;
- If possible all surrounding drains, such as storm water drains need to be covered and or protected to prevent any contaminated water from entering the drains;
- In case of a chemical or petroleum fire, run-off from the area will be contained as far as possible using the most appropriate measures e.g. spill absorbent cushions, sand or a physical barrier;
- Contaminated run-off must be diverted into an oil sump, or cleaned up;
- All firefighting equipment will be inspected at least monthly to ensure that these are functioning;
- Do not light any fires on site, unless contained in a drum at demarcated area;
- Put cigarette butts in a rubbish bin;
- Do not smoke near gas, paints or petrol;
- Know the position of firefighting equipment;
- Report all fires; and
- Don’t burn waste or vegetation.

Maintenance and Infrastructure Management

- Infrastructure visibly in good repair and operational areas kept tidy.
- The footprint of the operations and vehicular circulation is clearly defined with no "spill over" into other areas of the site.

- Roads are stable and in good repair and
- Fences and gates are in good repair.

In addition to the induction meeting to be held with the site employees to inform them of the basic steps towards environmental awareness, the operators of earth moving equipment should be informed of the following requirements:

- Mining within demarcated areas;
- No-go areas;
- Establishment of access roads;
- Handling of hazardous waste and their storage facilities;
- Handling of biodegradable and non-degradable waste;
- Vehicle maintenance;
- Mining methods to be followed;
- Handling and storing of topsoil;
- Sloping of excavations;
- Speed control in order to reduce dust;
- Emergency procedure awareness.
- Labourers must be informed of the following during “toolbox talks”:
- Reporting of unusual observations to management (e.g. fossils, graves, etc.);
- Reporting of spills to management;
- Felling or damaging trees for firewood not allowed;
- Making fires not allowed;
- Hunting and killing of animals not allowed;
- Demarcated areas for mining;
- Establishing of access roads and erection of gates in fence lines;
- Toilet facilities and hygiene measures;
- Handling of waste;
- Vehicle maintenance and vehicle maintenance yard;
- Handling of topsoil;
- Emergency procedures awareness.

n) Specific information required by the Competent Authority

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

The applicant undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMR for review and approved as being sufficient to cover the environmental liability at the time and for closure of the mine at that time.

The management through task observations and during internal and external audits will do effectiveness of the environmental management training. All training material for presentation to personnel and contractors will be reviewed annually to ensure consistency with organizational requirements and best practice guidelines. In addition to this, annual monitoring reports, audit results and all incident reports will be reviewed, any shortcomings and non-compliancy will be highlighted and management measures incorporated or improved upon within the training material.

2. 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

Name of Company:

17 September 2019

Date:

-END-

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Services, B. G. (2017). *LETTER OF MOTIVATION FOR EXEMPTION FROM PALAEONTOLOGICAL.*

Appendix 1: CV and Qualification of EAP

YOLANDIE COETZEE

OCCUPATION	Environmental Consultant
TOTAL YEARS WORK EXPERIENCE	10
AGE	32

CONTACT DETAILS

CELL PHONE	+27 (0) 66 2077 425
EMAIL	yolandiedup@gmail.com
RESIDENTIAL LOCATION	185 Simmetrie Street, Meyerspark, Pretoria

PERSONAL DETAILS

GENDER	Female
NATIONALITY	South African
SOUTH AFRICAN ID NO	8709020094080
LANGUAGE	English, Afrikaans (read, write, speak)
MARITAL STATUS	Married

PROFILE

Yolandie Coetzee is an Environmental Consultant with 10 years' experience in the environmental sector. She specialized the last 5 years in the rehabilitation of mines where she conducted the conceptual rehabilitation and management designs and the closure plans and programs. She has also been involved in a number of other environmental projects including railway sidings, filling stations, abattoir's, logistics hub and mining sites where she compiled environmental management plans, environmental impact assessments, environmental audits, due diligences, IWULA/IWWMP and alien invasive encroachment programs. She studied at the University of Potchefstroom where she has successfully completed her undergraduate degree in microbiology and biochemistry and her Honors degree in environmental sciences.

I am an administrative person who is adaptive to change confident in what I do and try to be creative as I can in what I do. I am enthusiastic about environmental issues and try to implement my people skills where I can and motivate those around me about the issues in South Africa. I am results driven, a quick learner and can work as a team with others. My passions are to campaign for causes that I belief in and working with people solving environmental issues.
My interest is creating things, reading about history and spending time with friends and family and travelling.

EDUCATION

2010
North-West University, Potchefstroom
BSc. Honours (Ecological Remediation and Rehabilitation)
Honours Project: Du Preez Y, Claasens S (2009)

2005-2008
North-West University, Potchefstroom
BSc. (Environmental Sciences) Majors: Microbiology and Biochemistry

PROFESSIONAL COURSES / TRAINING

2003	Secretarial Training Course	**Waterberg FET college**
2008	Soil Classification and Morphology	**Agriculture Resource Council (ARC)**
2009	Polymerase chain reaction (PCR)	**North-West University**
2009	Freeze Drying (Genetics)	**North-West University**
2010	Model Maker Introduction and Advanced Course	**Model maker (Centurion)**
2012	Road Maker Advanced Course	**Model maker (Centurion)**
2013	Lead Auditor Course (ISO14001)	**WTH**
2017	Fallout Dust Monitoring Course	**Dustwatch**
2017	SAGIC Invasive Species Training	**SAGIC**

PROFESSIONAL AFFILIATIONS

SACNASP	South African Council for Natural Scientific Professions	400324/13
SASM	South African Society for Microbiology	2011
EAPASA	Environmental Assessment Practioners Association of South Africa	Awaiting Registration

SKILLS & EXPERIENCE

Proficient in Microsoft Office.
Competent with 3D spatial modelling programme, Model maker, Global Mapper.and Google Earth, BGIS and DAFF: AGIS
Experience in Project Management.
Worked in laboratories at North-West University – Potchefstroom
Good working knowledge of NEMA, MRPDA, NWA, CARA, NEMAQA, NEMWA, NEM:BA etc.

AWARDS & ACHIEVEMENTS

- Achieved distinctions in University for Microbiology

AREAS OF EXPERTISE

- Conceptual rehabilitation and management designs
- Rehabilitation closure plans and programs and associated mine closure costing assessments
- Alien invasive encroachment programs
- Rehabilitation programs
- Waste Management Plans
- Financial closure cost assessments (Financial provisions)
- Mine Closure Applications
- 24G Rectification Applications
- Basic Assessment Applications
- Environmental Impact Assessments Applications
- Environmental Management Plans
- Environmental Auditing
- Mining Permit/Right and Prospecting Right Applications
- Integrated water use licenses and applications (IWWMP and IWULA)
- Due diligence
- Plant Permit Removal Applications

CAREER HISTORY

1.	**MAY 2017 - CURRENT**
Greenmined Environmental	

ENVIRONMENTAL CONSULTANT

Responsibilities

- Compilation Environmental Impact Assessments and Environmental Management Plans;
- Compilation of Basic Assessments;
- Conduct Water Use Licence Applications (IWULA) and Integrated Waste Water Management Plans (IWWMP);
- Compilation of Waste Management Plans;
- Liaise with client and the suitable government departments; and
- Compilation of Environmental Performance Assessment Programs (EMP PAR)

Major Projects

ENVIRONMENTAL REPORT	PROJECT	CLIENT
Environmental Control Officer (ECO)	• Hendrina Quarry, • Roodekranz Quarry, • Balmoral Quarry, • Middelburg Quarry, • Aroams Quarry, • Bambi, • Pomona, and • Witkloof Quarry	B&E International (Pty) Ltd
	Zwartkop	Baitumetse (Pty) Ltd
	Aroams Quarry, Brandvlei Quarry, and Barrage Bulk Sand Mine (Tja Naledi Beafase Investment Holdings).	SPH Kundalila (Pty) Ltd
	Thembisa	Raubex Construction (Pty) Ltd
Environmental Performance Assessment (EPA)	• Aroams Quarry • Witkloof Quarry • Balmoral Quarry • Middelburg Quarry • Hendrina Quarry • De Roodepoort Quarry • Roodekrans Quarry	B&E International (Pty) Ltd
	• Aroams Quarry • Kersfontein Sand • Bridgetown Dolomite Quarry • Barrage Bulk Sand Mine	SPH Kundalila (Pty) Ltd
	Stilfontein	OMV
	• Alfa Sand • Crushco Quarry • Donkerhoek Quarry • Rosslyn Quarry • Rossway Quarry • SPH Sand • Willows Quarry • Butterworth Quarry • Mthatha Quarry	Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite (Pty) Ltd

Dust Monitoring	Balmoral Quarry	B&E International (Pty) Ltd
	Zwartkop	Baitumetse (Pty) Ltd
	Stilfontein	OMV
	Potchefstroom	
	Aroams Quarry	SPH Kundalila
	Witkloof Quarry	B&E International (Pty) Ltd
	Aroams Quarry	B&E International (Pty) Ltd
BAR & EMPr	Witkloof Mining Permit	B&E International (Pty) Ltd
	Piet Retief Prospecting Right	Lomeza Mining Services (Pty) Ltd
	Geluk Prospecting Right	
	Barrage Bulk Sand Mine Section 102 EMP Ammendment	SPH Kundalila
	Rugron Exploration Co (Pty) Ltd	
	Middelwater Exploration (Pty) Ltd	
	Aroams 3 Mining Permit	
	Driefonteinen Quarry	Haw and Inglis Civil Engineering (Pty) Ltd
	Sillimanite Prospecting	Van Zyl Mining (Pty) Ltd
EIA & EMPr	Middelburg Quarry Mining Right	Inzalo Crushing and Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite (Pty) Ltd
	Aroams Quarry Mining Right	
	Sileco Lime Mining Right	Lomeza Mining Services (Pty) Ltd
	Yomba Umgodi Mining Right	Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite
	Aroams Quarry Mining Right	SPH Kundalila (Pty) Ltd
Closure Application	• Witkloof Quarry • Roodekrans Quarry • Dwaalfontein Quarry • Hendrina Quarry • Aroams Quarry (Review) • De Roodepoort Quarry (Review)	B&E International (Pty) ltd
	Howards Quarry	Howards Crushers (Pty) Ltd
	SPH Sands	Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite (Pty) Ltd
	Brandvlei Quarry	SPH Kundalila (Pty) Ltd
IWULA/ IWWMP	• Umfolozi Quarry • Hluhluwe Quarry • Rietfontein Quarry • Denver Quarry • Dundee Quarry	Afrimat (Pty) Ltd

	• Vryheid Quarry • Qwa Quarry • Bethlehem Quarry	
	Alfa Sand Quarry	Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite (Pty) Ltd
	Crushco Quarry	
	Lichtenburg Plant	Lafarge Cement
	Tlkowe Local Municipality	Tlkowe Local Municipality
Waste Management Plan	Wouterspan Boerdery (Pty) Ltd	Wouterspan Boerdery (Pty) Ltd
	Dukathole Brickworks CC	Dukathole Brickworks CC
Rehabilitation Plan	• Witkloof Quarry • Middelburg Quarry • Roodekrans Quarry • Balmoral Quarry	B&E International (Pty) ltd
	• Alfa Sand • Butterworth Quarry • Crushco Quarry • Donkerhoek Quarry • Mthatha Quarry • Rosslyn Quarry • Rossway Quarry • SPH Sands Quarry • Willows Quarry	Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite
Asbestos Management Plan	Dukathole Brickworks CC	Dukathole Brickworks CC
COP for Hydrocarbons	Dukathole Brickworks CC	Dukathole Brickworks CC
Financial Provision in terms of NEMA 2015	Letama Quarry	Letama Quarry
	• Alfa Sand • Crushcho • Donkerhoek Quarry • Rosslyn Quarry • Rossway Quarry • SPH Sand • Willows Quarry	Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite
EMPr	• Vryheid Quarry • Pietermaritsburg Quarry	Afrimat (Pty) Ltd
Sec 30 Spillage Incident	Tosas	Tosas
Sec 102	Barrage Bulk Sand Mine	SPH Kundalila
Mine Works Programme (MWP)	Aliwal Quarry	Raumix Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite
	Barrage Bulk Sand Mine	SPH Kundalila
24G Rectification Application	Golden Valley Poultry Farm Welkom	Golden Valley Poultry Farm Welkom

Achievements

- Assisted in client' understanding of relevant environmental regulations thus improving customer relations.
- Achieved project goals through consistent engagement with the client.
- Received authorisations for the projects applied for.

2.	APRIL 2015–APRIL 2017

Genis Consultants CC

Contract Work

ENVIRONMENTAL CONSULTANT, PROJECT MANAGER

Responsibilities

- Compilation Environmental Impact Assessments and Environmental Management Plans
- Compilation of Basic Assessments
- Conduct Water Use Licence Applications (IWULA) and Integrated Waste Water Management Plans (IWWMP)
- Liaise with client and the suitable government departments
- Compilation of Mine Closure Liability Assessments (MCL)
- Compilation of Rehabilitation Strategic Implementation Plans (RSIP)
- Compilation of Environmental Performance Assessment Programs (EMP PAR)
- Compilation of Legal Compliance and GN704 Audits
- Compilation of Soil, Alien Invasive and Biodiversity Management Plans

Major Projects

- Bosveldsrus Abattoir

Achievements

- Assisted in client' understanding of relevant environmental regulations thus improving customer relations.
- Achieved project goals through consistent engagement with the client.

3.	JUNE 2014 – APRIL 2015

Environmental Assurance (ENVASS)

SPECIALIST ENVIRONMENTAL CONSULTANT

Responsibilities

- Reporting to Directors
- Compilation Environmental Impact Assessments and Environmental Management Plans
- Compilation of Basic Assessments
- Conduct Water Use Licence Applications (IWULA) and Integrated Waste Water Management Plans (IWWMP)
- Liaise with client and the suitable government departments
- Compilation of Mine Closure Liability Assessments (MCL)
- Compilation of Rehabilitation Strategic Implementation Plans (RSIP)
- Compilation of Environmental Performance Assessment Programs (EMP PAR)

- Compilation of Legal Compliance and GN704 Audits
- Compilation of Soil, Alien Invasive and Biodiversity Management Plans

Major Projects

- Coal of Africa – Mooiplaats Colliery: IWWMP Update, RSIP and MCL
- Coal of Africa – Woestalleen Colliery: MCL, Legal Compliance Audit, EMP PAR
- Coal of Africa – Vele Colliery: MCL
- Samancor – Western Chrome Mine: MCL
- Eastplats Western and Eastern Limb (Rhodium Reefs Limited) – MCL, EMP PAR, Total Compliance Project: Environmental Awareness Campaign, GN704 Audit, Sol Management Plan, Biodiversity Management Plan, Alien Invasive Management Plan
- Various sand and clay brick mine MCL – Sterkfontein Bricks, Victoria Bricks, Roosema (Olifantsfontein & Delmas), SA Brix (Boekenhout and Zandfontein), and Kilo Sand.
- Mamatwan Manganese Land Capability Study, Visual Impact Assessment (VIA)
- Kongoni EMP PAR, MCL
- Assmang Technical Training College – Tree Removal Licence
- Umlabu: MCL
- LE Vervoer (Sandtoria): Rehabilitation and Terrestrial Ecology Plan, Storm water Management Plan, EMP
- HJG Vervoer - EMP
- Stuart Coal: MCL
- Yoctolux EMP

Achievements

- Assisted in client' understanding of relevant environmental regulations thus improving customer relations.
- Achieved success in the closing of mine sites.
- Achieved project goals through consistent engagement with the client.

Reason for Leaving

Pregnancy. I wanted to be a stay at home mom.

4.	NOV 2013 –MAY 2014
African Innovative Solutions and Projects CC	

SENIOR ENVIRONMENTAL CONSULTANT/ PROJECT MANAGER

Responsibilities

- Business Development and Marketing
- Financial Administration Duties
- Office management
- Reporting to Directors
- Managing Junior Environmental Consultants
- Compilation Environmental Impact Assessments and Environmental Management Plans
- Compilation of Basic Assessments
- Conduct Water use licence applications
- Liaise with client and the suitable government departments
- Compilation of Rehabilitation Models and the relevant reports
- Compilation of Alien invasive encroachment programs
- Compilation of Rehabilitation programs

- Conducting of pre-mining assessments (Biodiversity and Basic Soil Studies)
- Compiling operational procedure documents

Major Projects

- Thabazimbi Local Municipality (TLM) – upgrading and construction of a bulk water pipeline – BA, EMPR and IWULA
- Dr. Ruth Segamotsedi Municipality – EIA/EMP for waste water treatment works and for the bulk water pipeline
- Various prospecting rights applications in Limpopo

Achievements

- Assisted in client' understanding of relevant environmental regulations thus improving customer relations.
- Achieved success in the rehabilitation of mine sites and closing the sites.
- Achieved project goals through consistent engagement with the client.

Reason for Leaving

Company has been liquidated.

5.	JAN 2013 – OCT 2013

Kai Batla Minerals Industry Consultants

SENIOR ENVIRONMENTAL CONSULTANT

Responsibilities

- Reporting to Directors
- Managing Junior Environmental Consultants
- Compilation Environmental Impact Assessments and Environmental Management Plans
- Compilation of Basic Assessments
- Conduct Water use licence applications
- Liaise with client and the suitable government departments
- Compilation of Rehabilitation Models and the relevant reports
- Compilation of Alien invasive encroachment programs
- Compilation of Rehabilitation programs
- Conducting of pre-mining assessments (Biodiversity)
- Compiling operational procedure documents

Major Projects

- Imaforce (Pty) Ltd - Prospecting Rights Application and associated Environmental Management Plans for various properties in Kwa Zulu Natal and Northern Cape
- AEMFC - Environmental and Social prefeasibility report
- PMG- IWULA / IWWMP for Koedoeskloof and Paling Pan; Rehabilitation Program and Report for Bishop Mine
- Barleda 625cc - EMP and associated PPP
- Mogale City Municipality - Environmental Impact Assessment (EIA) Guideline Report for a Logistics Hub in the West Rand

Achievements

- Assisted in client' understanding of relevant environmental regulations thus improving customer relations.

- Achieved success in the rehabilitation of mine sites and closing the sites.
- Achieved project goals through consistent engagement with the client.

Reason for Leaving
No growth opportunities.

6.	JAN 2010 – NOV 2012
Cabanga Concepts	

JNR ENVIRONMENTAL CONSULTANT

Responsibilities

- Reporting to Senior Environmental Consultant
- Compilation entire Environmental Impact Assessments and Environmental Management Plans
- Compilation of Basic Assessments
- Conduct Water use licence applications
- Liaise with client and the suitable government departments
- Compilation of Rehabilitation Models and the relevant reports
- Compilation of Alien invasive encroachment programs
- Compilation of Rehabilitation programs
- Conducting of pre-mining assessments (Biodiversity)
- Compiling operational procedure documents

Major Projects

- Sakoa Coal Madagascar – Prefeasibility Study
- Pembani Coal Carolina – New Areas EIA and 24G EIA
- Pembani Coal Carolina – Alien Encroachment Program
- Pembani Coal Carolina – Rehabilitation Models and Program
- Pembani Coal Carolina – Pre-mining assessments (Biodiversity)
- Pembani Coal Carolina – Creating a wetland to treat AMD water
- Pembani Coal Carolina – Audits and IWULA audits
- Coal of Africa – 24G EIA/EMP
- Shanduka Resources – Rehabilitation Models and Reports
- Homelands Kendal Colliery – Alien Encroachment Program
- Homelands Kendal Colliery – Rehabilitation Models and Reports
- Sekoko Resources – Scoping report for the Railway siding

Achievements

- Assisted in client' understanding of relevant environmental regulations thus improving customer relations.
- Achieved success in the rehabilitation of mine sites and closing the sites.
- Achieved project goals through consistent engagement with the client.

Reason for Leaving
Retrenched.

VOLUNTEER EXPERIENCE

- Involved in the Climate Change Community Forum – Centurion
- Involved in the feeding of the animals at the game reserve in Mokopane
- Involved in the feeding of the animals at the Cheetah project in Limpopo
- Involved with the annual Santa shoe box Christmas presents for the under privileged in South Africa.

PROFESSIONAL STRENGTHS

- Creative thinker
- Versatile and able to learn new tasks/skills quickly
- Good interpersonal skills - works well with others
- Focused, self-motivated and target driven; determined to succeed.
- Willing to learn and adapt to changing environments
- Focus on accuracy and attention to detail
- Strong planning, organising and monitoring abilities and an efficient time-manager

REFERENCES

Name Emile van Druten	Environmental Assurance	082 554 8051
Name Hennie Du Preez	Genis Consultants	083 407 4522
Name Chris Weideman	Greenmined Environmental	082 602 6133

Appendix 2: Regulation 42 Map

Appendix 3: Land Use Map

Appendix 4: Locality Map

Appendix 5: 1: 250 000 Map

Appendix 6: Site Activities Map

Appendix 7: Rehabilitation Map

Appendix 8: Landowner Consent

Appendix 9: Comments and Response Report

Appendix 10: Proof of Public Participation Report

Appendix 11: Supporting Impact Assessment

A “significant impact” is defined as it is defined in the EIA Regulations (2014): “an impact that may have a notable effect on one or more aspects of the environment or may result non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as by its duration, magnitude, intensity or probability of occurrence”. The objective of this EIA methodology is to serve as framework for accurately evaluating impacts associated with current or proposed activities in the biophysical, social and socio-economical spheres. It aims to ensure that all legal requirements and environmental considerations are met in order to have a complete and integrated environmental framework for impact evaluations.

1. IMPACT ASSESSMENT METHODOLOGY

The process of determining impacts to be assessed is one of the most important parts of the environmental impact assessment process. It is of such high importance because the environmental impacts identified can and are often linked to the same impact stream.

In this method all impacts on the biophysical environment are assessed in terms of the overall integrity of ecosystems, habitats, populations and individuals affected. The Environmental Impact Assessment (EIA) 2014 Regulations promulgated in terms of Sections 24 (5), 24M and 44 of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) [as amended] requires that all identified potential impacts associated with the proposed project be assessed in terms of their overall potential significance on the natural, social and economic environments.

The criteria identified in the EIA Regulations (2014) include the following:

- Nature of the impact;
- Extent of the impact;
- Duration of the impact;
- Frequency of the Impact;
- Probability of the impact occurring;
- Degree to which impact can be reversed;
- Degree to which impact may cause irreplaceable loss of resources;
- Degree to which the impact can be mitigated; and
- Cumulative impacts.

Greenmined Environmental has developed an impact assessment methodology (as defined below) whereby the significance of a potential impact is determined through the assessment of the relevant temporal and spatial scales determined of the extent, magnitude and duration criteria associated with a particular impact.
This method does not explicitly define each of the criteria but rather combines them and results in an indication of the overall significance.

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 recognised from the various interpretations:

- Environmental significance is a value judgement;
- 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; and
- 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 realised (Environment Australia (1999) Environmental Risk Management).

Nature of the impact

The nature of an impact can be defined as “a brief description of the impact being assessed, in terms of the proposed activity or project, including the socio-economic or environmental aspect affected by this impact”.

Extent of the impact

The extent of an impact can be defined as “a brief description of the spatial influence of the impact or the area that will be affected by the impact”.

Table 30: Determining the extent of an impact

EXTENT Extent or spatial influence of impact	**Footprint**	Only as far as the activity, such as footprint occurring within the total site area
	Site	Only the site and/or 500m radius from the site will be affected
	Local	Local area / district (neighbouring properties, transport routes and adjacent towns) is affected
	Region	Entire region / province is affected
	National	Country is affected

Severity of the impact

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 31: Rating of Severity

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

Duration of the impact

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 32: Rating of Duration

Rating		Description
1	Very Short Term	Up to three months (quarter) after construction
2	Short Term	Three months to one year after construction
3	Medium Term	One year to six years after construction
4	Long Term	Six to ten years after construction
5	Permanent	Beyond ten years after construction

Probability of the impact occurring

The probability of an impact can be defined as “the estimated chance of the impact happening”. Probability refers to how often the activity or aspect has an impact on the environment.

Table 33: Determining the probability of an impact

PROBABILITY	**1**	Almost never / almost impossible	*Impossible* to occur (0 – 20% probability of occurring)
	2	Very seldom / highly unlikely	*Unlikely* to occur (20 -40% probability of occurring)
	3	Infrequent / unlikely / seldom	*May* occur (40-60% chance of occurring)
	4	Often / regularly / likely / possible	*Likely* to occur (60-80% chance of occurring)

	5	Daily / highly likely / definitely	Will *certainly* occur (80-100% chance of occurring)

Degree to which impact can be reversed

The reversibility of an impact can be defined as "the ability of an impact to be changed from a state of affecting aspects to a state of not affecting aspects".

Table 34: Determining the reversibility of an impact

REVERSIBILITY	**Reversible**	Impacts can be reversed through the implementation of mitigation measures
	Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures

Determination of Likelihood:

The irreplaceability (likelihood) of an impact can be defined as "the amount of resources that can/can't be replaced". 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 6 and 7.

Overall Likelihood

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

Example of calculating Overall Likelihood

Consequence	**Rating**
Duration	Example 4
Probability	Example 2
SUBTOTAL	**6**
TOTAL LIKELIHOOD **(**Subtotal divided by 2)	**3**

Determination of Frequency

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

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 Overall Environmental Significance:

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

Environmental Significance = Overall Consequence X Overall Likelihood

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.

Significance or Risk	**Low**	**Low-Medium**	**Medium**	**Medium-High**	**High**
Overall Consequence	1 - 4.9	5 - 9.9	10 - 14.9	15 – 19.9	20 - 25

X Overall Likelihood					

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 fairly 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.

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 the purpose of 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 above.

Degree to which the impact can be mitigated

The degree to which an impact can be mitigated can be defined as “the effect of mitigation measures on the impact and its degree of effectiveness”.

Table 35: Determining the mitigation rating of an impact

MITIGATION RATING	**MITIGATED**	High	*Impact 100% mitigated*
		Medium	*Impact >50% mitigated*
		Low	*Impact <50% mitigated*

	Degree impact can be mitigated		

Cumulative Impacts

The effect of cumulative impacts can be described as "the effect the combination of past, present and "reasonably foreseeable" future actions have on aspects".

Table 36: Determining the confidence rating of an impact

CUMULATIVE RATING	**CUMULATIVE EFFECTS**	Low	*Minor* cumulative effects
		Medium	*Moderate* cumulative effects
		High	*Significant* cumulative effects

The positive and negative impacts that the proposed activity will have on the environment and the community that may be affected.

No other alternative sites needed to be investigated as this is an amendment of the current EMPR.
The site was identified during the assessment phase of the environmental impact assessment, by the applicant and project team, and was therefore selected as the **preferred alternative** due to the following:

Positive Impacts:

- The mining site offers the mineral sought after;
- The site is located within a mining area, and will minimally affect the community with regards to dust and noise;
- The mining area can be reached by an existing access; no new road infrastructure need to be constructed;
- Due to the small size of the activity and the remote location of the mining area the potential impacts on the surrounding environment, associated with mining is deemed to be of low significance; and
- No residual waste as a result of the mining activity will be produced that needs to be treated on site. Any general waste that may be produced on-site will be contained in sealed refuse bins to be transported to the local municipal landfill site (Aggeneys). The amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental leakage. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site.

Negative Impacts:

- Due to the remote location of the mining area very little negative impacts on the community could be identified that were deemed to be of significant importance. The dust and noise impacts that may emanate from the mining area during the operational phase could have a negative impact on the surrounding community if the mitigation measures proposed in this document is not implemented and managed on-site; and

- Negative impacts with regard to the environment include potential contamination of the area due to spillage of hydrocarbon products.

Most of the land is used for grazing, by sheep (for mutton, wool and pelts) and goats, which can be commensurate with conservation. However, under conditions of overgrazing, many indigenous species may proliferate, including *Three thorn Rhigozum trichotomum, Bitterbos Chrysocoma ciliata* and Sweet Thorn Acacia karroo, and many grasses and other palatable species may be lost. There are very few rare or Red Data Book plant species in the Nama Karoo Biome.

The current land use can be identified as for grazing. Woodland/Open bush is scattered throughout the site covering Low shrub land which covers majority of the site, there is also evidence of isolated Grasslands.

Table 37: Impact Assessment of Aroams Quarry MR

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
CONSTRUCTION / SITE ESTABLISHMENT PHASE																							
ACTIVITY:	**DEMARCATION OF SITE WITH VISIBLE BEACONS.**																						
	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	Neg										Low	Y	Demarcation of the site will ensure that all employees are aware of the boundaries of the processing area and that work stay within approved area.									Low
ACTIVITY:	**ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.**																						
	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	Neg										Low	Y	None.									Low
Social & Safety	Influx of unsuccessful job seekers, which may informally settle in area. Potential danger to surrounding communities	Neg	Reversible	1	3	5	3	3	5	4	12	Med	Y	Ensure advertising is limited to local and regional areas, and only specifically advertise for Jobs nationally if skills are not available. Ensure that all power-related structures are adequately marked with relevant signs and warnings and fenced off.	1	2	5	3	2	5	4	9,33	Low-Med
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Medium -High	Y	None.	1	3	5	3	5	5	5	15	Medium-High
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented.	1	3	4	3	2	4	3	8	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
														• The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.								
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	2	4	2	3	5	4	9,33	Low-Med	Y	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med	Y	Keep mining in footprint	1	2	5	3	2	3	3	6,67	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med	Y	Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. Screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
														bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.									
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	4	1	5	3	11	Med	Y	Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.	1	5	5	4	1	3	2	7,33	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Dust nuisance caused by the disturbance of soil.	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y	Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Aggregate, Gravel, Granite and Dolomite roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly, especially during times of high dust generation.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med	Y	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low-Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed	3	2	4	3	1	1	1	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
														under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.									
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: ABLUTION FACILITIES																							
Groundwater	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	2	3	5	3	3	5	4	13,3	Med	Y	Portable toilets will be managed by reputable contractors and inspected daily for potential leaks	2	2	5	3	2	5	4	10,5	Med
Surface water	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	2	3	5	3	3	5	4	13,3	Med	Y	Portable toilets will be managed by reputable contractors and inspected daily for potential leaks	2	2	5	3	2	5	4	10,5	Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med	Y	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. Screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Soils	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	1	3	5	3	3	5	4	12	Med	Y	Portable toilets will be managed by reputable contractors and inspected daily for potential leaks	1	2	5	3	2	5	4	9,33	Low-Med
SUB ACTIVITY: ACCESS ROADS																							
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. O Dirty water must be collected and contained in a system separate from the clean water system. O Dirty water must be prevented from spilling or seeping into clean water systems. O Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). O The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium	Y	Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Dust nuisance caused by the disturbance of soil.	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y	Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Aggregate, Gravel, Granite and Dolomite roads must be sprayed with water	2	2	1	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
														or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly, especially during times of high dust generation.									
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium	Y	Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med	Y	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med	Y	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: SITE OFFICES																							
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med	Y	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med

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Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: VEHICLE SERVICE AREA																							
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: WASH BAY																							

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: WORKSHOP																							

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	2	4	2	3	5	4	9,33	Low-Med		Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in	1	4	2	2	2	3	3	5,83	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
														connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.									
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: SALVAGE YARD																							
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: BUNDED DIESEL AND OIL STORAGE FACILITIES																							

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: GENERATOR AREA (BUNDED)																							

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: WEIGH BRIDGE																							
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Dust nuisance caused by the disturbance of soil.	Neg	Reversible	2	2	4	3	4	5	5	12	Medium		Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Aggregate, Gravel, Granite and Dolomite roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
SUB ACTIVITY: PARKING AREA																							
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
SUB ACTIVITY: WASTE AREA																							
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med		Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low-Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
ACTIVITY:	**STRIPPING AND STOCKPILING OF TOPSOIL**																						
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Medium -High		None.	1	3	5	3	5	5	5	15	Medium-High

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	4	3	8	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	2	4	2	3	5	4	9,33	Low-Med		Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med		Keep mining in footprint	1	2	5	3	2	3	3	6,67	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med		Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	4	1	5	3	11	Med		Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.	1	5	5	4	1	3	2	7,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil.	Neg	Reversible	1	2	4	2	5	5	5	11,7	Medium		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Dust generation	Neg	Reversible	2	2	4	3	4	5	5	12	Medium		Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Aggregate, Gravel, Granite and Dolomite roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Medium		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med		Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	3	3	3	5	4	10,7	Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
OPERATIONAL PHASE																							
ACTIVITY:	**#REF!**																						

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med
Noise	Noise nuisance generated by drilling equipment and blasting	Neg	Reversible	2	2	1	2	1	3	2	3,33	Low		Blasting alternatives will be considered to reduce noise and associated vibrations	2	1	1	1	1	3	2	2,67	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. 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 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • 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. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	1	3	4	3	2	5	4	9,33	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	4	2	2	2	5	4	8,17	Low-Med		Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med		Keep mining in footprint	1	2	5	3	2	3	3	6,67	Low-Med
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Med		None.	1	3	5	3	5	1	3	9	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med		Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med
Visual aspect	#REF!	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		#REF!	2	1	3	2	2	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	4	1	5	3	11	Med		Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.	1	5	5	4	1	3	2	7,33	Low-Med
Noise	Noise nuisance generated by drilling equipment and blasting	Neg	Reversible	2	2	1	2	1	3	2	3,33	Low		Blasting alternatives will be considered to reduce noise and associated vibrations	1	1	1	1	1	3	2	2	Low
Air quality	Dust generation	Neg	Reversible	1	2	1	1	1	3	2	2,67	Low		Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Aggregate, Gravel, Granite and Dolomite roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	1	1	1	1	1	3	2	2	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Low-Med		Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential	Neg	Reversible	3	3	4	3	2	1	2	5	Low-Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a	3	3	4	3	1	1	1	3,33	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	contamination through littering leeching into the groundwater table													reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.								
Social & Safety	Health and Safety Risk by Blasting Activities. Potential danger to surrounding communities	Neg	Reversible	1	3	1	2	1	3	2	3,33	Low		Ensure baseline photographs are taken of all structures which may be impacted for photographic evidence prior to any blasting. Ensure procedures in place to compensate for damage. All neighbours need to be notified of each blasting activity. The N14 needs to be beacons off during the blasting event. Ensure that all power-related structures are adequately marked with relevant signs and warnings and fenced off.	1	3	1	2	1	3	2	3,33	Low
ACTIVITY:	**EXCAVATION**																						

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med		Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Med		None.	1	3	5	3	5	1	3	9	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med		Keep mining in footprint	1	2	5	3	2	3	3	6,67	Low-Med
Hazardous Waste	Dust nuisance due to loading and transportation of the material	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Aggregate, Gravel, Granite and Dolomite roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly ,especially during times of high dust generation.	1	3	4	3	2	5	4	9,33	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med		Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	2	4	3	4	5	5	12	Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	1	2	1	1	1	2,33	Low		Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.	1	4	1	2	1	1	1	2	Low
Noise	Noise nuisance generated by excavation equipment	Neg	Reversible	1	1	3	2	2	5	4	5,83	Low-Med		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	1	1	3	2	2	3	3	4,17	Low
Air quality	Dust generation	Neg	Reversible	2	2	4	3	4	5	5	12	Med		Dust Handling: • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. • Aggregate, Gravel, Granite and Dolomite roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	3	4	5	5	12	Med		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med		Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low
Social & Safety	Unsafe working conditions for employees	Neg	Reversible	1	2	4	2	3	3	3	7	Low-Med		Ensure that all stuff are made aware of all working conditions on site	1	2	4	2	2	3	3	5,83	Low-Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	2	2	2	5	4	8,17	Low-Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
ACTIVITY:	**CRUSHING AND SCREENING OF AGGREGATE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE**																						

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Noise	Noise nuisance caused by crushing plant.	Neg	Reversible	2	2	4	3	4	5	5	12	Med		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.	2	1	4	2	3	5	4	9,33	Low-Med
Hazardous Waste	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	1	3	4	3	2	5	4	9,33	Low-Med

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Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Air quality	Dust generation	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med		Dust will be contained within the property boundaries and will therefore affect only the landowner.	2	2	1	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med		Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • 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.	2	2	4	3	2	5	4	9,33	Low-Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	2	2	2	5	4	8,17	Low-Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
ACTIVITY:	**TRANSPORTATION OF AGGREGATE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE, GRANITE, AGGREGATE, GRAVEL, GRANITE AND DOLOMITE AND DOLERITE FROM STOCKPILE AREA TO CLIENTS**																						

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med
Hazardous Waste	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	1	3	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Noise	Noise nuisance caused by vehicles	Neg	Reversible	2	2	4	3	3	2	3	6,67	Low-Med		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.	2	1	4	2	2	2	2	4,67	Low
Air quality	Dust generation	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med		Dust will be contained within the property boundaries and will therefore affect only the landowner.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Traffic and Safety	Road degradation. Increased potential for road incidences Potential distraction to road users	Neg	Reversible	2	2	4	3	3	2	3	6,67	Low-Med		All intersections with main tarred roads will be clearly signposted. drivers will be enforced to keep to set speed limits. Trucks will be road-worthy condition. A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from the main road. Ensure directional floodlights are utilized that focus light on the necessary areas and reduce light pollution to surrounding environment.	2	1	4	2	2	2	2	4,67	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	2	2	2	5	4	8,17	Low-Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to	2	1	2	2	2	3	3	4,17	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
														capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.									
DECOMMISSIONING PHASE																							
ACTIVITY:	**SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)**																						
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted 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 of Mineral Resources may impose: o 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. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	1	3	4	3	2	3	3	6,67	Low-Med
Soils	Soils replaced and ameliorated	Pos	Reversible	1	3	4	3	3	5	4	10,7	Med		Ensure activities occur only within the designated areas and stockpile and revegetated soil as soon as possible. Topsoil will be removed before mining activities commence and stored outside of the active mining cell.	1	3	4	3	2	3	3	6,67	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	4	2	2	2	5	4	8,17	Low-Med		Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	1	4	2	2	2	3	3	5,83	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med		Keep mining in footprint. Excavation areas will be sloped during rehabilitation to even out depressions.	1	2	5	3	2	3	3	6,67	Low-Med
Topography	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Pos	Irreversible	1	2	5	3	2	5	4	9,33	Low-Med		Monitor, especially after first heavy rain falls to ensure adequate surface water drainage	1	2	5	3	2	3	3	6,67	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	2	3	5	4	6,67	Low-Med		Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	1	2	2	2	3	3	3	5	Low-Med
Visual aspect	Improved aesthetics through rehabilitation	Pos	Reversible	2	1	3	2	2	5	4	7	Low-Med		Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.	2	1	3	2	2	3	3	5	Low-Med
Noise	Noise nuisance caused by machinery	Neg	Reversible	2	2	4	3	4	3	4	9,33	Low-Med		Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.	2	1	4	2	3	3	3	7	Low-Med
Air quality	Dust nuisance caused during landscaping activities	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med		Dust will be contained within the property boundaries and will therefore affect only the landowner.	2	2	1	2	2	3	3	4,17	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	1	2	2	5	4	5,83	Low-Med		Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	2	2	1	2	2	3	3	4,17	Low
Fauna	Reintroduction of fauna attracted to flora to the area	Neg	Reversible	2	2	4	3	3	5	4	10,7	Med		Inform staff, contractors and visitors to not harm fauna in the area. Conduct annual surveys to monitor faunal biodiversity.	2	2	4	3	2	5	4	9,33	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation Yes or No	Mitigation	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Fauna	Reintroduction of fauna attracted to flora to the area	Pos	Reversible	2	1	3	2	1	5	3	6	Low-Med		Inform staff, contractors and visitors to not harm fauna in the area. Conduct annual surveys to monitor faunal biodiversity.	2	1	3	2	1	3	2	4	Low
Social & Safety	Health and safety risk posed by un-sloped areas	Neg	Reversible	1	3	4	3	3	3	3	8	Low-Med		Ensure that all stuff are made aware of all working conditions on site	2	1	3	2	1	3	2	4	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	2	1	2	2	2	5	4	5,83	Low-Med		Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	2	1	2	2	2	3	3	4,17	Low
Surface water	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Pos	Reversible	2	3	2	2	2	5	4	8,17	Low-Med		Specialist must be consulted f issues with surface water are observed and qualities do not fall within the DWS target qualities or water qualities for livestock watering. Any affected registered water user must be compensated if levels a quality are impacted by the mining activities. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Monitor area for erosion and pooling and rehabilitate if necessary. Continue with Surface water monitoring.	2	1	2	2	2	3	3	4,17	Low
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	3	3	5	4	10,7	Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	1	3	4	3	2	5	4	9,33	Low-Med
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	2	2	2	5	4	8,17	Low-Med		Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	2	1	2	2	2	3	3	4,17	Low
Groundwater	Improve response to issues relating to deterioration of groundwater quality or quantity	Pos	Reversible	2	1	2	2	2	5	4	5,83	Low-Med		Specialist must be consulted f issues with groundwater are observed and qualities do not fall within the DWS target qualities or water qualities for livestock watering. Any affected registered water user must be compensated if levels an quality are impacted by the mining activities	2	1	2	2	2	5	4	5,83	Low-Med
A+A190:X195CTIVITY: Application for Closure Certificate																							

Appendix 12: Aroams Photo Report

AROAMS QUARRY (PTY) LTD PHOTO REPORT

SITE PHOTOGRAPHS










































ACCESS ROADS TO SITE


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Appendix 13: Alien Invasive Management Plan

Appendix 14: Environmental Awareness Plan

Appendix 15: Application form for EA

Appendix 16: Specialist Study - Heritage

Appendix 17: Closure Plan

Appendix 18: Water use- municipal.