AFRIMAT AGGREGATE (STONE AGGREGATE) MINE ON A PORTION OF LOT NO. 15773, MSUNDUZI LOCAL MUNICIPALITY, UMGUNGUNDLOVU DISTRICT MUNICIPALITY, KWAZULU-NATAL PROVINCE.

DRAFT

Environmental Impact Assessment Report and Environmental Management Programme

DMR Reference Number: KZN 30/5/1/2/2/248 MR

FEBRUARY 2023

DETAILS OF APPLICANT:
Afrimat Aggregate KZN (Pty) Ltd
25 Bloekom Street
Vryheid
3100

Tel: 034 492 0216
Fax: 034 983 2905
E-mail: Hulisani.nunga@afrimat.co.za

Table of Contents

i. LIST OF ABBREVIATIONS/ ACRONYMS 6

ii. APPENDICES 7

PART A 11

SCOPE OF ASSSSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT 11

1. Contact Person and correspondence address 11

ii. Expertise of the EAP 11

2) Summary of the EAP's past experience. 11

2. Description of the property. 12

Description of the scope of the proposed overall activity 14

i. Listed and specified activities 15

ii. Description of the activities to be undertaken 17

iii. Policy and Legislative Context 30

iv. Need and desirability of the proposed activities 36

v. 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. 37

i. Details of the development footprint alternatives considered. 37

2. Operational aspects of the activity 38

3. No-go Alternative: 38

5. The Environmental attributes associated with the development footprint alternatives 43

1. Baseline Environment 43

..... 53

Demographic 69

Employment 70

..... 72

Local economic development 72

b) Description of the current land use 73

vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; 79

vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected. 81

viii) The possible mitigation measures that could be applied and the level of risk. 82

6. Motivation where no alternative sites were considered. 86

7. Statement motivating the alternative development location within the overall site 86

8. 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 86

9. Summary of specialist reports. 100

2. Environmental impact statement 110

i. Summary of the key findings of the environmental impact assessment; 110

ii. Final Site Map 115

iii. Summary of the positive and negative implications and risks of the proposed activity and identified alternatives; 115
iv. Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; 116
v. Final proposed alternatives 119
n) Aspects for inclusion as conditions of Authorisation. 119
o) Description of any assumptions, uncertainties and gaps in knowledge. 120
ii. Conditions that must be included in the authorization 120
iii. Rehabilitation requirement 121
p) Period for which the Environmental Authorisation is required. 122
q) Undertaking 122
r) Financial Provision 122
i. Explain how the aforesaid amount was derived. 122
ii. Confirm that this amount can be provided for from operating expenditure. 122
s) Deviations from the approved scoping report and plan of study. 123
ii. Motivation for the deviation. 123
t) Other Information required by the competent Authority 123
2. Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act .. 124
v) Other matters required in terms of sections 24(4)(a) and (b) of the Act. 124
PART B 126
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT 126
1) Draft environmental management programme. 126
c) Composite Map 126
d) Description of Impact management objectives including management statements 127
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. 129
iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage. 130
v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage. 131
vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage. 131
vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation. ... 131
viii) Has a water use license has been applied for? 131
The Maritzburg quarry was granted a General Authorisation for Section 21 (c),(i) and (g) by the DWS in 2017 for water use on site. 131
3. Impacts to be mitigated in their respective phases 132
5. Impact Management Actions 160
1. Financial Provision 177
(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. 177
(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives. 178
(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline. 178

(f) Confirm that the financial provision will be provided as determined. 180
g. Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including 181
2. Indicate the frequency of the submission of the performance assessment report 187
3. Environmental Awareness Plan 188
b. Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment. 189
4. Specific information required by the Competent Authority 196
UNDERTAKING 196

List of Tables

Table 1: Demographics of Msunduzi Local Municipality (Municipalities, 2017) 69
Table 2: Employment of Msunduzi Local Municipality (Municipalities, 2017) 70
Table 4: Electricity (Municipalities, 2017) 71
Table 3: Water (Municipalities, 2017) 71
Table 5: Sewage and Sanitation (Municipalities, 2017) 72
Table 6: Solid waste water (Municipality, 2017) 72
Table 7: Impact assessment of Maritzburg quarry before mitigation 77
Table 8: Criteria used to determine the Consequence of the Impact 79
Table 9: Method used to determine the Consequence Score 80
Table 10: Probability Classification 80
Table 11: Impact significance ratings 80
Table 12: Impact Assessment Table after mitigation 88
Table 13: Management Objectives 116
Table 14: Maritzburg Financial Provision costing table - June 2021 178

LIST OF FIGURES

Figure 1: Locality Map of the site in the national context 13
Figure 2: Google Earth photo showing an aerial view of the proposed mining right area 14
Figure 3: Phase 5 of the mining process 21
Figure 4: Pit Slop Design 22
Figure 5: Mining activities in phase 5 23
Figure 6: Additional pushback outline 23
Figure 7: Pit design with surface roads 24
Figure 8: Pit access strategy – South Side 24
Figure 9: Pit Access Strategy - North Side 25
Figure 10: Topography of the study area 44
Figure 11: Average rainfall for Pietermaritzburg (Weather-atlas) 45
Figure 12: Average temperatures for Pietermaritzburg (weather atlas) 46

Figure 13: Extract of the 2018 SA Vegetation Map, showing the position of the site (outlined in red) inside Eastern Valley Bushveld and KwaZulu-Natal Hinterland Thornveld 47
Figure 14: Aerial photograph showing the biodiversity attributes of the study site 49
Figure 15: Good quality savanna vegetation on the eastern side of mining site. The tall aloe in the foreground is Aloe cf candelabrum 50
Figure 16: Savanna vegetation with a lush grass understory 51
Figure 17: New overburden spoil site (terraced) on northeastern side of mine 51
Figure 18: A few indigenous species recorded, with Vachellia karroo (top left), Euphorbia ingens (top right), Senegalia ataxacantha (bottom left) and Searsia pentheri (bottom right) 52
Figure 19: A few alien species recorded, with Glandularia aristigera (top left), Opuntia ficus-indica (top right), Solanum mauritianum (bottom left) and Ricinus communis (bottom right) 53
Figure 20: Simplified geology of the study area 56
Figure 21: Groundwater recharge in the study area 58
Figure 22: Groundwater harvest potential in the study area 59
Figure 23: Graphical representation of sound levels measured at each site (DAY-time) on 22 and 29 January 2021: Plant NON-OPERATIONAL 60
Figure 24: Graphical representation of sound levels measured at each site (DAY-time) on 22 January 2021: Plant OPERATIONAL 61
Figure 25: Extract of the KZN biodiversity network map, with the site outlined in red 66
Figure 26: Site Layout map 75
Figure 27: Schematic vertical cross-section from the Mpushini River cutting through the quarry 112

i. LIST OF ABBREVIATIONS/ ACRONYMS

BID	Background Information Document
DEA	Department of Environment Affairs
DFFE	Department of Forestry Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPR	Environmental Management Programme
GN	Government Notice
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
HOD	Head of Department
I&AP's	Interested and Affected Parties
IWMMP	Integrated Water and Waste Management Plan
IWULA	Integrated Water Use Licence Application
LED	Local Economic Development
NEMA	National Environmental Management Act, (Act No.107 of 1998)
NEMBA	National Environmental Management Biodiversity Act, (Act No.10 of 2004)
NFEPA	National Freshwater Ecosystems Priority Area
MHSA	Mine Health and Safety Act
MPRDA	Minerals and Petroleum Resources Development Act, (Act No. 28 of 2002)
PPE	Personal Protective Equipment
PPP	Public Participation Process
Ptn.	Portion
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SEAMS	Social & Environmental Assessment & Management System
SHE	Safety, Health and Environmental
SLP	Social and Labour Plan
SOM	Soil Organic Matter
WMA	Water Management Area

ii. APPENDICES

Appendix A: EAP Details and Affirmation
Appendix B: Site Maps
Appendix C: Site Layout Plan
Appendix D: Public Participation
- Appendix D1: Notification Letter
- Appendix D2: Newspaper Advert
- Appendix D3: Site Notice
- Appendix D4: I&AP Database
- Appendix D5: Comments and Response Report
- Appendix D6: Focus Group Meeting
- Appendix D7: Correspondence with I&APs
- Appendix D8: Correspondence with Commentary Authorities
- Appendix D9: Public Participation Report

Appendix E: Correspondence with the Competent Authority
Appendix F: Specialist Reports
- Appendix F1: Air Quality Impact Assessment Study
- Appendix F2: Botanical Assessment Report
- Appendix F3: Geohydrological Study
- Appendix F4: Heritage Impact Assessment
- Appendix F5: Noise Survey Study
- Appendix F6: Wetland Delineation Study
- Appendix F7: Storm Water Management Plan

Appendix G: Environmental Management Programme & Monitoring Plans

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: Afrimat Aggregates (KZN) (Pty) Ltd

TEL NO: 033 326 1932

FAX NO: 033 326 1368

POSTAL ADDRESS: PO Box 19984, Ashburton, 3213

PHYSICAL ADDRESS: 235 Pope Ellis Drive, Ashburton

FILE REFERENCE NUMBER SAMRAD: KZN 30/5/1/2/2/89 MR

(a) IMPORTANT NOTICE

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

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

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

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

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

(b) OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

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

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

(iii) 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;

(iv) determine the—-

- nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
- degree to which these impacts—
  (aa)can be reversed;
  (bb)may cause irreplaceable loss of resources, and (cc)can
  be avoided, managed or mitigated;

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

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

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

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

PART A
SCOPE OF ASSSSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. Contact Person and correspondence address

a) Details of

i. Details of the EAP

Name of the Practitioner: Hulisani Nunga
Tel No.: 011 439 3260
Cell No.: 081 402 3668
Fax No.: N/A
E-mail address: hulisani.nunga@afrimat.co.za

ii. Expertise of the EAP

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

Mrs. Hulisani Nunga has been assigned as the lead Environmental Practitioner to undertake the necessary environmental authorisation process. Hulisani holds an Honours degree in Environmental Management from University of South Africa with ten (10) years of professional experience as an environmental scientist in the consulting industry. EAP's qualifications are attached as **Appendix A** of this report.

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

Mrs. Hulisani Nunga is an Environmental Assessment Practitioner with ten (10) years of professional experience in the water and environmental sector. Hulisani specializes in environmental authorisations, environmental compliance monitoring, environmental management plans, water use authorisation, stakeholder engagement, risk assessments and conducting environmental awareness training. She has been involved in projects in the Petrochem industry, Energy both coal based and renewable energy, Bulk water processing and supply, Waste Management, Linear Infrastructure, as well as Mixed-Use developments. Hulisani is currently an Environmental Specialist based at Afrimat. A copy of Mrs. Hulisani Nunga's curriculum vitae is attached as **Appendix A.**

b) Details of the Reviewer

Name of the Practitioner: Siphumelelo Mbali
Tel No.: 021 917 8840
Cell No.: 063 409 4998

Fax No. : NA
E-mail address: Siphumelelo.mbali@afrimat.co.za

Siphumelelo Mbali is currently employed by Afrimat Shared Services (Pty) Ltd. He has completed his Masters (Cum Laude): Environmental Water and Sciences in mountain catchment hydrology from the University of the Western Cape. Siphumelelo has 6 years of Environmental assessment and management including compiling BARs, EIA-EMPs, Environmental Audit Reporting, Closure Applications within mining sector. Siphumelelo is registered with the following professional bodies:

- **EAPASA (2021-3789)**
- **SACNASP (Prof. Natural Sci.: 120808)**

2. Description of the property.

Farm Name	A portion of Lot 15773
Application area (ha)	84.0415
Magisterial district	Msunduzi Local Municipality and uMgungundlovu District Municipality
Distance and direction from nearest town	The Maritzburg Quarry is located approximately 10 km Southeast of Pietermaritzburg and 4 km Northeast of Ashburton. The nearest national road to the site is the N3. The main entrance to the quarry is off the P478 main road, immediately northwest of the bridge over the Mpushini River.
21 digit Surveyor General Code for each farm portion	N0FT00000001577300000
Locality Map	Attach a locality map at a scale not smaller than 1:250000 (Fig 1)
GPS Co-ordinates	29˚38’1410”S 30˚28’38.65”E

c) Locality Map

Figure 1: Locality Map of the site in the national context

Description of the scope of the proposed overall activity

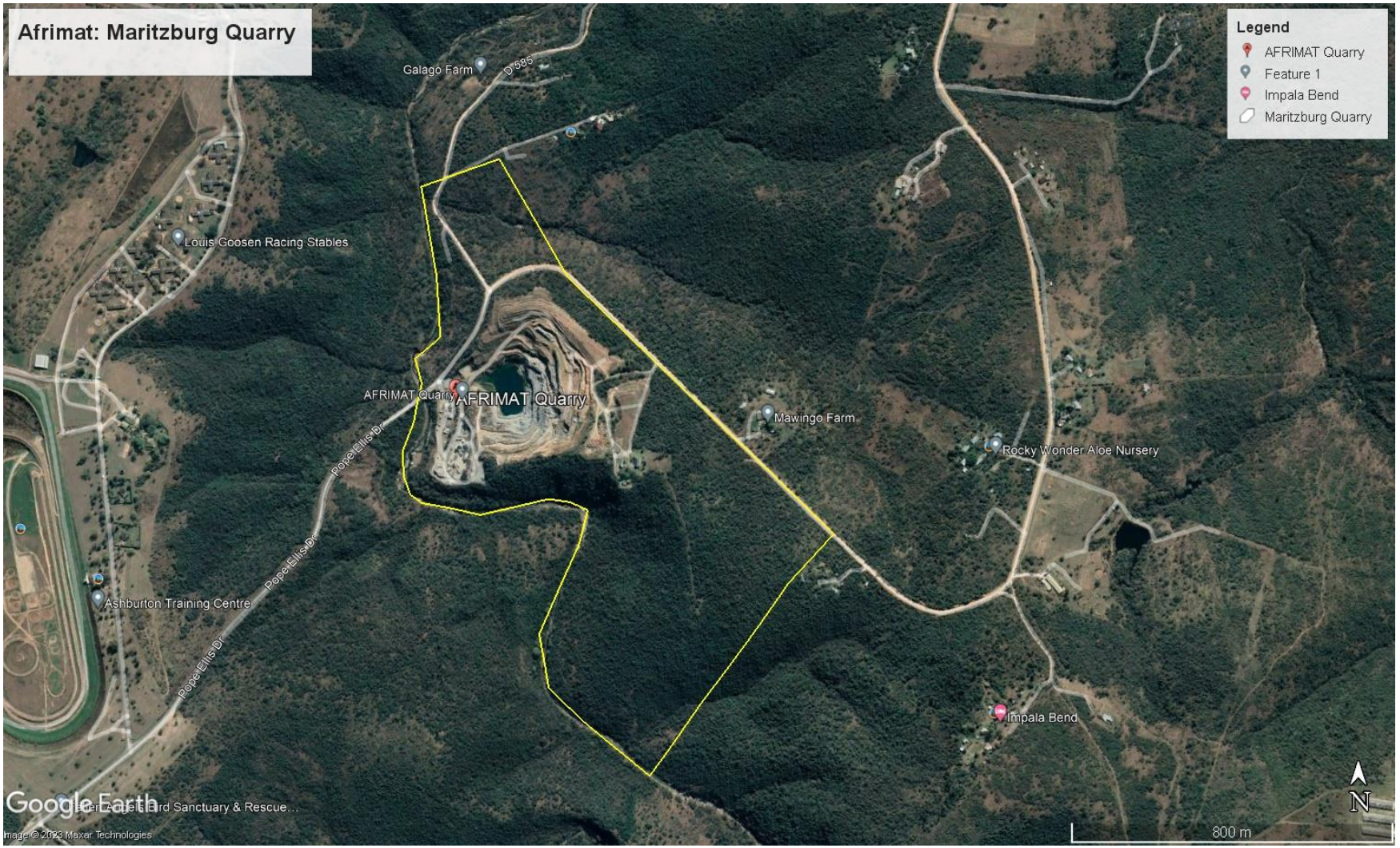


Figure 2: Google Earth photo showing an aerial view of the proposed mining right area

i. Listed and specified activities

In terms of Section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities which require authorisation as these activities may negatively affect the environment. Environmental Impact Assessment (EIA) Regulations were promulgated in December 2014 (as amended) in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998 and consist of the following:

- Regulation 982 provide details on the processes and procedures to be followed when undertaking an Environmental Authorisation process;
  - *Listing Notice 1* (Regulation 983) define activities which will trigger the need for a Basic Assessment process;
  - *Listing Notice 2* (Regulation 984) define activities which trigger an Environmental Impact Assessment (EIA) process. If activities from both R 983 and R 984 are triggered, then an EIA process will be required.
  - *Listing Notice 3* (Regulations 985) define certain additional listed activities for which a Basic Assessment process would be required within identified geographical areas.

The above regulations were reviewed to determine whether the proposed project will trigger any of the above listed activities, and if so, what Environmental Authorisation Process would be required. The Maritzburg quarry pit was established as an extension of the existing quarry (established in 1990), there has been not changes to the operational activities since inception and therefore, no listed activities are triggered. Water and electricity are supplied form the Msunduzi Local Municipality. Septic tanks are utilized for sewage effluent and is removed via a Honey Sucker serviced by Hazclean. The operation was granted a General Authorisation (GA) in terms of the National Water Act 36 of 1998. Authorisation is granted in terms of section (c) and (i) and (g). All diesel storage is below the threshold as mentioned in the EIA regulations of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended.

NAME OF ACTIVITY (All activities including activities not listed) **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**	**Aerial extent of the Activity** **Ha or m²**	**LISTED ACTIVITY** **Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985)/NOT LISTED**
1. Operational Phase	*84.0415 Ha (Mining Right area)*	N/A (Operational Activities commenced in 1993 pre-regulations)	N/A
Drilling and blasting			
Loading and hauling shot rock to crusher plant using haul road			
Crushing and screening.			
Loading and hauling crushed material to stockpile.			
Dispatch loading of delivery vehicles.			
Delivery along delivery route			
Conduct dust suppression on haul roads and plant.			
Refuelling and hydrocarbon management.			
2. Decommissioning Phase			
Remove all plant and structures.			
Consolidate retained stock neatly in designated area.	*As required*		
Rip/scarify hardened/compacted surface of plant and stockpiling area and access road if required.	*9 Ha*		
Construct safety berm and trench around excavation perimeter when needed			
Conduct final performance assessment for closure.			
Lodge Closure Application	*84.0415 Ha (Mining Right area)*		
Allow quarry floor to flood as a reed bed during the rainy season (retain haul road for access to floor)	*7 Ha*		
3. After Care Phase			

Remove alien vegetation if present and monitor revegetation success and reseed if required	*84.0415 Ha (Mining Right area)*		

ii. Description of the activities to be 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)

Afrimat (KZN) (Pty) Ltd currently mines 84.0415 ha of a portion of Lot 15773 for the extraction of aggregate. Maritzburg quarry is situated in Ward 33 of the uMgungundlovu District Municipality, in the KwaZulu-Natal province. The existing quarry pit was established in 1993 and since then has continuously been used for mining purposes.

Access Roads

The main entrance to the site is off the P478 road, immediately northwest of the bridge over the Mpushini River. The entrance is marked by a tarred lay-bye and turning area. The entrance area is serviced by an office and weighbridge. The vast majority of supplies, trucks and stone sales takes place through this entrance. A haul road traversing the benched quarry along the northwest boundary of the opencast pit, and another ramp rising to the terraced working /stockpile platforms on the southern boundary, provides access to the working areas. An extension around the north end of the pit links with a track leading to the eastern side of the farm. The property has two homesteads occupied by Afrimat employees. Both homesteads are located in the northern part of the farm, and accessed from the northeastern entrance to the property, off of the D389 district road. Some product deliveries will use the D389 road to the Bishopstowe area and the surrounding suburbs of Pietermaritzburg.

Mining Process

Rock extraction will follow the opencast mining procedure of drilling and blasting of benched form high walls or working faces. The gradient bench surfaces facilitate places for rock loading machines and transport vehicles. The proposed operation will develop benches that are separated by high walls of between 9 and 12m, to ensure rock breaking in periodic blasts of +-10 000m^3, every 6-8 weeks. The in-pit plant will include tracked excavators and 30 ton Articulated Dump Trucks (ADT's). The tracked excavators will load the ADT's with coarse shot rock. The 30 ton ADTs will convey the rock from the working benches along haul roads and ramps to the primary crusher site. Depending on the production rate and distance to the primary crusher, up to three ADT's will be required to service the rock loading machine. An additional excavator, fitted with a hydraulic hammer is used to break oversized blocks, eliminating the need for additional blasting.

When not used to clear blasted rock, the excavator or pay loader can excavate the softer weathered granite from a series of lower high walls along the eastern margin of the quarry. Where large orders justify rapid bench development, low energy blast can free higher volumes and facilitate more rapid excavation and loading. Much of this material is used as bulk gill or road base layer material, but limited crushing and screening can produce a more even textured product used as pipe bedding. The blasting and crushing process results in a "bulking" of material, commonly by a factor of 1.6 X 1.6. The in–situ volume stockpiling, that requires additional handling, is stockpiled in an area where there is adequate space for trucks to maneuver when loading product. A variety of covered tipper trucks with varying load capacities will be used to transport the finished product from the site. The transport route will be predominantly from the quarry entrance on the P478, at the office and weighbridge, towards the N3. Some trucks might use the D389 to access the south eastern suburbs of Pietermaritzburg.

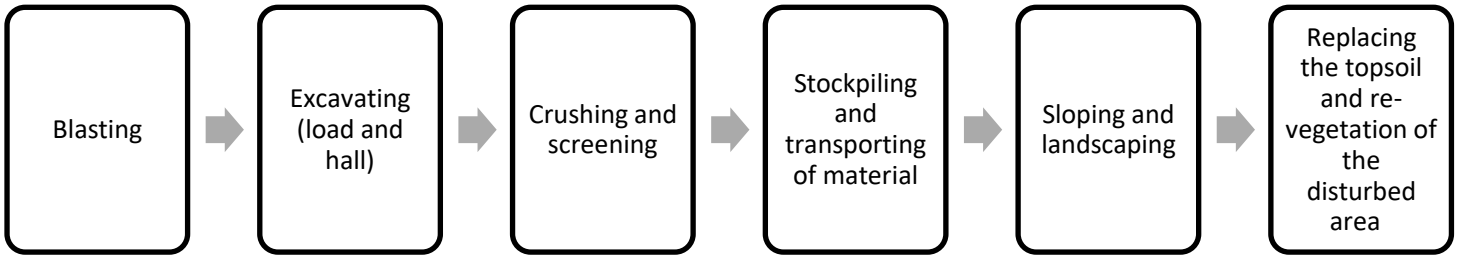
Working Hours

The quarry will be operational on weekdays from 07h00 to 18h00. The site will be closed on Saturday's and Sundays, expect for maintenance activities that are subject to the Sunday Labour Permission that has been granted by the DMRE inspectorate.

Life of Mine and Product Quantity

The life of the mine is calculated to be in excess of 26 years based on *in-situ* rock reserves of approximately 3 760 000 tons at current rate of production of approximately 140 000 tons/month. This includes the upper weathered granite, as well un-weathered hard granite. The quarry can produce crushed stone in hand stone, 19mm, 13.5mm, crusher run and crusher dust sizes as well as unsorted, bulk weathered granite suitable for bulk fill and pipe bedding.

The operational phase mining activities consist of the following:



The infrastructure at the mining area entails:

- Office and Administration (sales facilities) building;
- Ablution facilities;
- Workshop-steel structure;
- Oil store for hazardous substances;
- General and Hazardous waste storage area- bunded area for old oil storage;
- Salvage yard – demarcated;
- Septic tanks;
- Vehicle Service Area for minor services;
- Wash bay with oil sump;
- Fixed Crusher plant;
- Aboveground Diesel Tank bunded (23 000 Litres);
- One (1) x 60 ton Weigh Bridge;
- Guard house at gate; and
- Stormwater management berms.

Water and Sanitation

Municipal water is used for domestic purposes and human consumption on site and is tanked into 1 x 10 000L JoJo tank. Water is pumped from pit to a 3x 5000L JoJo tank and 195,3m³ (195302.43L) reservoir tank. Water is also pumped from the pit into a water truck for dust suppression on haul roads. The Maritzburg quarry was granted a General Authorization with Ref No: 27/2/2/V32E/11/1/2/3/7/9/10 in 2017 for Section 21 (c), (i) and (g). The water usage quantities on site are:

- Total volume of water used per annum for the mist sprayers: 15 488.000 m^3
- The total volume of water required per annum for domestic use: 174.24m^3

Stormwater Management

The site has a stormwater management plan that indicates how water is to be diverted around site. The use of berms and silt traps are implemented to keep runoff water and divert most of the stormwater towards the quarry pit. Storm water is collected on the quarry floor and pumped to the water storage facilities. Storm water in the remaining areas follows natural run off paths, as these are made up of undisturbed ground.

Waste Management

General waste is separated according to different waste streams (plastic, glass and cardboard) in colour coded waste bins. Hazardous waste (oil rags and oil filters) generated on site are placed in bins in a bunded area. Old oil is placed in an old oil storage tank in a bunded area. Hazardous waste is collected by an accredited contractor. Waste manifests are kept on file on site. The general waste produced during the operational phase of the project will be transported from site to the Msunduzi Local Municipality solid waste landfill site. Sewage from septic tanks is disposed of by a contractor using the honey sucker removal process.

Power Supply

An Eskom power line (11KV) supplies electricity to the crusher plant, workshop and offices.

OPERATIONAL PHASE (±26 YEARS):

During the operational phase Afrimat Aggregates (KZN) (Pty) Ltd makes use of blasting by means of explosives in order to loosen hard rock. This material is then crushed and screened to produce aggregate. The quarry site is divided into the following areas that form part of the different aspects of the operation, or provide specific products:

- Overburden and soil stockpiles;
- Weathered granite walls, high walls and benches;
- Hard rock granite-gneiss pit and high wall;
- Access ramps and haul roads;
- Stockpile areas and working platforms;
- Process water storage;
- Workshops and storage facilities;
- Administrative and sales facilities; and
- Ablution facilities.

Overburden and soil stockpiles:

Indigenous trees have been panted on site to ensure soil stability and the upkeep of the conservation area biodiversity. Heaps of overburden has been situated along the eastern high wall perimeter, and additional stockpiles over on the lower north-eastern slopes above the road embankment. There is little evidence of separate stockpiling of the topsoil and subsoils.

Concurrent rehabilitation has been done throughout the mining process. Overburden stockpiles have been terraced to lower the slope gradients, flatten the profile and hydro-

seeded to reduce visual intrusion. Trees will be planted on these stockpiles to further reduce visual intrusion. Deposits will be removed and relocated to the excavated platform southeast of the quarry high wall, where the soil can be used for vegetable gardening.

During subsequent stages, the central and northern stockpiles will be relocated to the new stockpiles position on the northern and north-eastern margins of the quarry, sited 50m from the D389 road. It is envisaged that the upper benched #6 and #7 will only be developed after several years of lower bench expansion (Phases 4 and 5). New soil stockpiles will be created for the topsoil and subsoil for this area.

Weathered granite walls, high walls and benches

A unique aspect of the Mpushini valley is the deep weathering profile that exists in the area. Along the eastern high wall, the weathering extends down to 30m through the Dwyka group tillite and the granite gneiss. There are three (3) benches developed within the weathered profile with a bench height of 8-12m each.

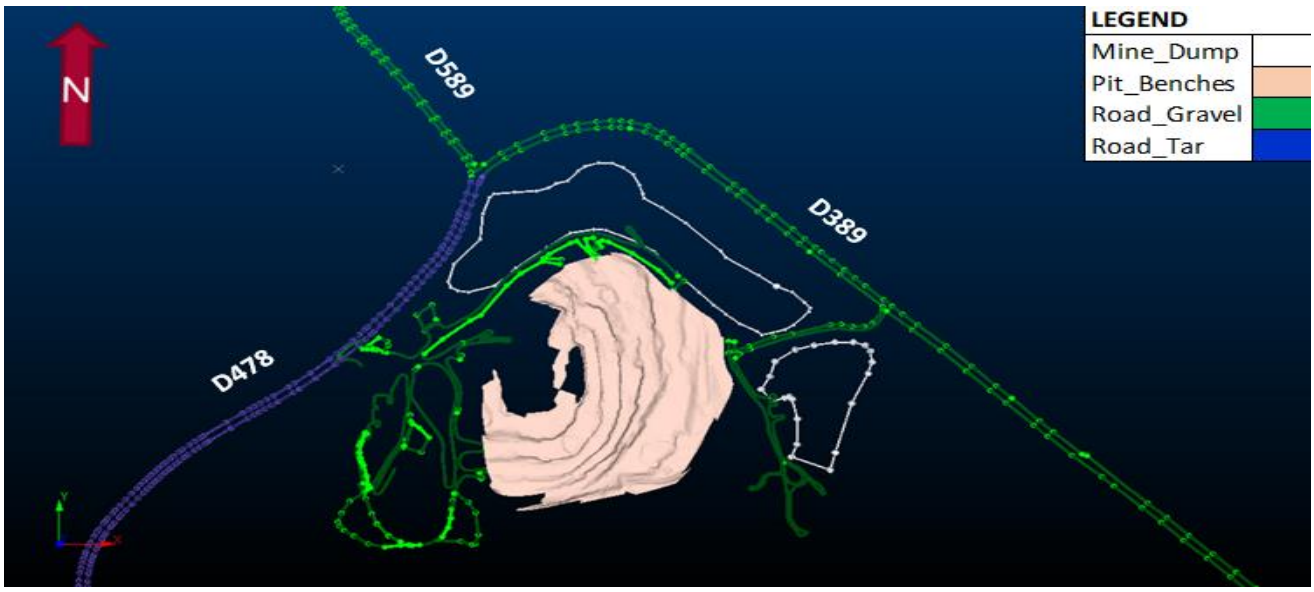


Figure 3: Phase 5 of the mining process

Hard rock granite-gneiss pit and high wall

The opencast pit floor with an elevation of 17m below river level at 543m asl, is surrounded by a high wall that has excavated rock from the hillslope, regressively towards the west. The are 4 benches developed in the fresh rock profile with a bench height of 12m each and a face angle of 90 degrees. The bench width is 12m and will be 2m between the final bench walls. Figure 4 illustrates the slope design outline of the pit.

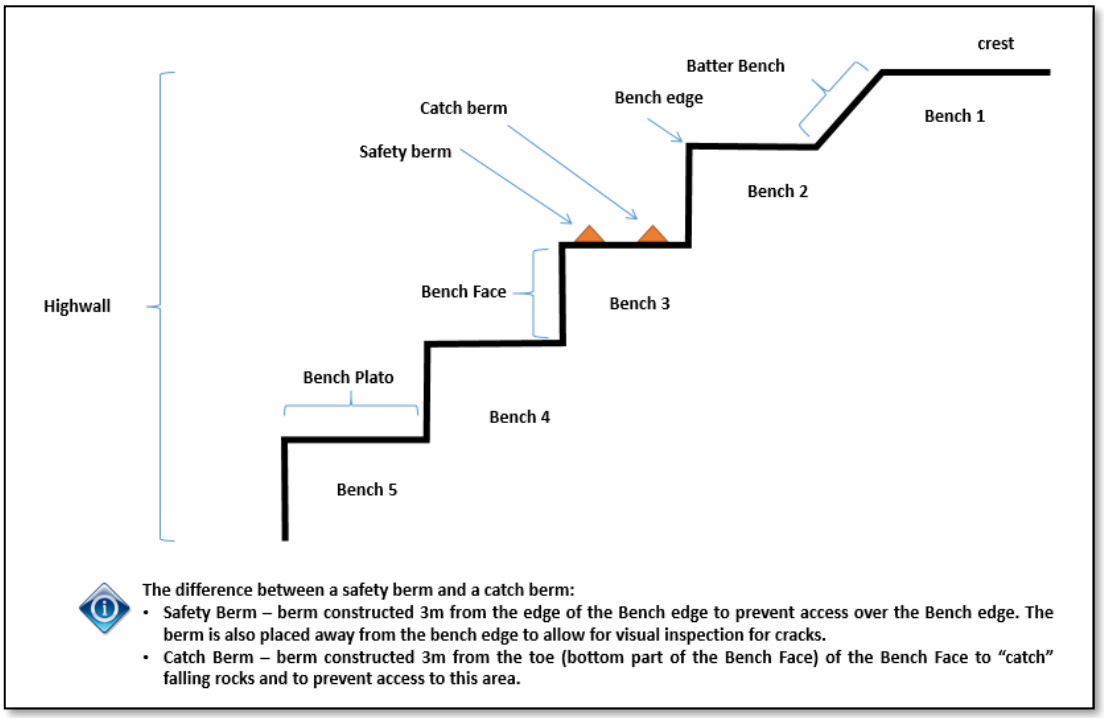


Figure 4: Pit Slop Design

The quarry is currently in phase 5 and the mining strategy is to advance the pit towards the north and in the northeastern direction. The mining sequence will be a top-down approach starting with the removal of the overburden followed by weathered rock to expose fresh rock. Figure 5 shows the mining blocks that classify the mining activities in phase 5, ore is mined from the benches where they must be drilled and blasted and with the overburden, excavators can do free digs and then load and haul the waste.

Figure 5: Mining activities in phase 5

An additional pushback will be done on the southwest side of the pit. The purpose of the pushback is to open up ground for fresh blue rock. The pushback will provide additional reserves that can be mined. Access to the benches will be maintained using the southern rim ramp. The sequence of mining should be as indicated in Figure 6 to ensure access to benches as mining progresses.

Figure 6: Additional pushback outline

Access ramps and haul roads

The main access will be from the P478 at the established entrance where the weigh station and offices are situated. This level provides access to the entire opencast pit floor. Figure 7 shows the design of the pit with surface haul roads. The pit benches are accessed from the southern and northern haul roads via access ramps from each bench.

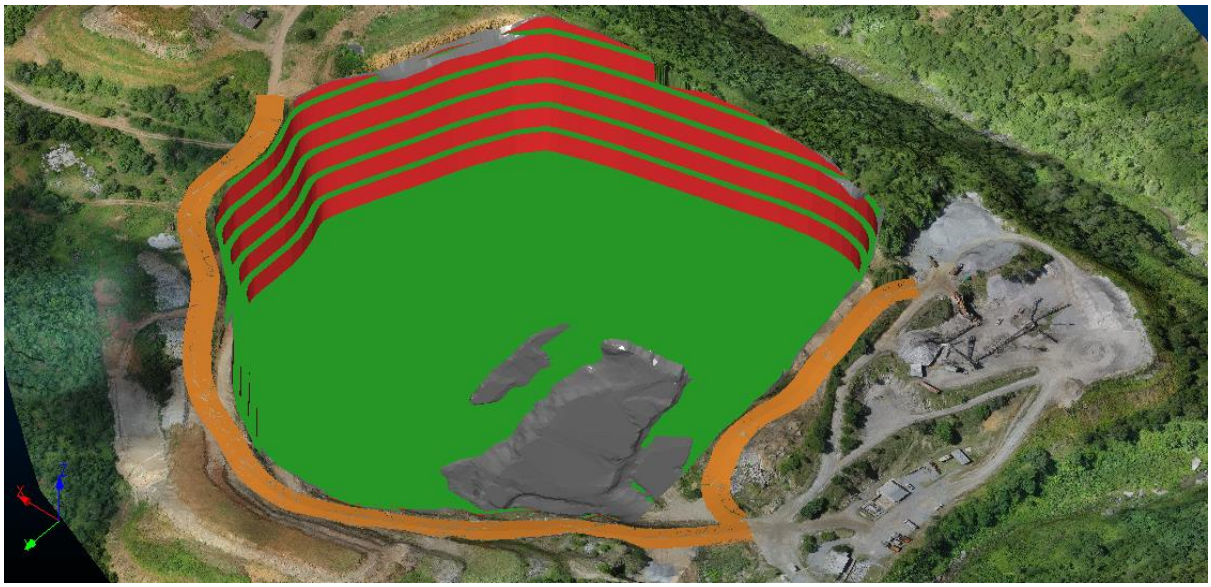


Figure 7: Pit design with surface roads

Pit Access Strategy – South Side

The southern haul road is used to access the benches on the southern side. There are access ramps on each bench leading towards the haul road as illustrated in Figure 8. The haul road has to be maintained at a gradient of not more than 11% so that equipment can travel up and down with ease.

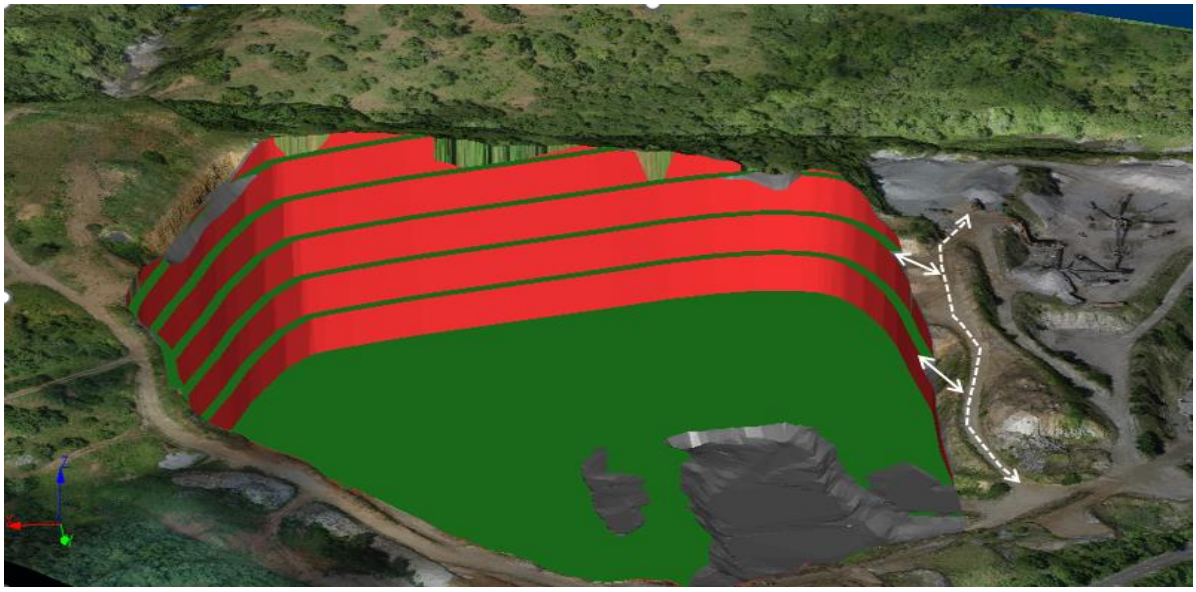


Figure 8: Pit access strategy – South Side

Pit Access Strategy – North Side

For the North side, the northern haul road is used to access the benches and there are access ramps on each bench leading towards the haul road as illustrated in Figure 9. The haul road must be maintained at a gradient of not more than 11% so that the equipment can travel up and down with ease. The haul road width allows for double-way traffic.

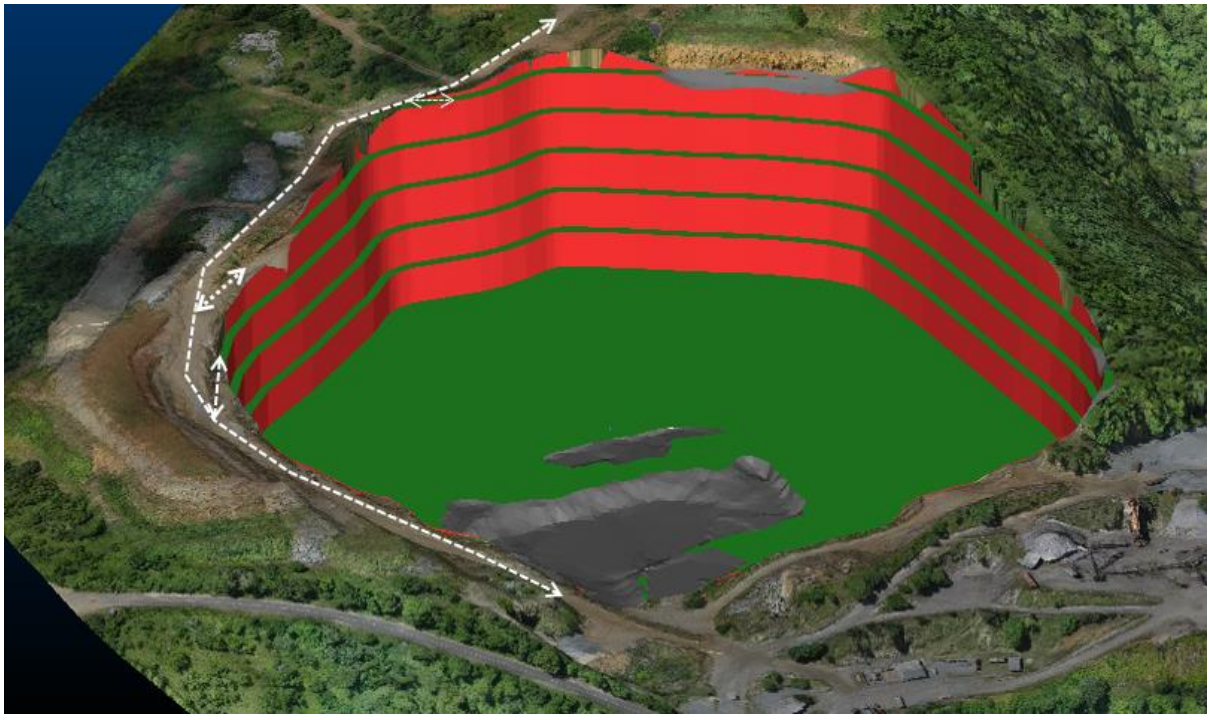


Figure 9: Pit Access Strategy - North Side

Stockpile areas and working platforms

There are three (3) working platform levels situated on embankment fills on the south-eastern margin of the opencast pit. Haul roads and access ramps link these platforms which previously served as product stockpile areas lined to the crusher / screen plants. These areas are now strictly used as haul roads.

This section was made, at the weighbridge, has as a filtering system for runoff water and for the case of rain (stormwater) as a filter in order to prohibit the passing of sediments to the Mphushini River.

Process water storage

Approximately 64 000 litres of recycled water is required daily for dust suppression sprayers on the crusher / screen and conveyors, and water cart or sprayers used on haul roads.
This water can be stored in ponds on the upper surface waste of the high wall, or recycled

form the attenuation ponds or the input sump. Total volume of water used per annum for the mist sprayers: 15 488.000 m^3

Workshops and storage facilities

One container is being used as a grading lab and the other as the mechanic office/stores. A container is also used as a storeroom for the plant and the rear section for the oil lubrications.

Pollution prevention measures including the bunding of fuel and storage of chemicals as described in the EMP and identified on site are sufficient to contain any spillages. The wash bay contains the necessary drainage and oil separator to ensure clean and dirty water is separated. Waste areas are sufficient as described in the EMP and identified on site as sufficient to contain contaminated water at the source.

Administrative and sales facilities

The weighbridge near the western portal will serve as an administrative office.

Accommodation and ablution facilities.

Two (2) homesteads are used by senior quarry staff. Other buildings include Administration building, change room and ablution block. All employees commute daily from the tribal areas in the east and the surrounding areas. All use septic tanks (calcamatite septic tank system) linked to French drains, to process sewage and grey water. These are services by Hazclean. The total volume of water required per annum for domestic use: 174.24m^3.

DECOMMISSIONING, REHABILITATION AND CLOSURE PHASE :

Decommissioning

The following activities will occur subsequent to the phase:

- All infrastructure (site offices, workshop), mining equipment (crushers, screens, haul vehicles) will be removed from site.
- All waste/rubble will be removed from site.

Rehabilitation

The closure objectives for the mining area are to be made safe, and the remainder of the site subject to rehabilitation. The perimeter of the site will be subject to top-dressing with topsoil and revegetated 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 rehabilitation activities will consist of the following:

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

Decommissioning phase

Rehabilitation Activities

In order to gain the best possible rehabilitation outcomes from the mining processes, different actions are required to occur at different times within the life of the project from commencement to closure. Similarly, there are management and monitoring actions that is required throughout the life of the mining project and for years after decommissioning and closure.

Traditional mining phases include Construction-, Operational- and Closure phase. Outlined below are the actions to occur through the Operational and Closure phases that are needed to ensure successful rehabilitation.

Land Preparation

The overall aim of land preparation is to ensure that the mining area is limited as far as possible and that pollution or contamination does not occur. The following points should be considered for the current operational phase of the project:

- Mine planning should be designed in a way so as to ensure the area to be occupied by mine infrastructure is minimized.
- The affected area should be kept as small as is practically possible and should be clearly defined and demarcated.
- Mine operators should restrict their activities to planned areas. Clear instructions and control systems should be in place and compliance to the instructions should be policed by inter alia the mine manager.
- All stockpiles should be located in demarcated and approved areas where they will not have to be removed far prior to final placement.
- Sand and soils which cannot be replaced directly onto rehabilitated land should be stockpiled.

- All stockpiles should be clearly and permanently demarcated and located in defined no-go areas, revegetated and monitored on an annual basis.

Sand Removal and Disturbance of Soils

Soil Stockpiling

The correct handling of topsoil is one of the most critical determining factors for successful rehabilitation. Soil disturbance is only envisaged within the demarcated stockpile area.

The stripping of soil must be carefully planned, executed and monitored by the Mine manager. This to ensure soils are being stripped from the correct areas within the mining footprint, at the correct depths and placed in the correct location. The stockpiles should be used to help buffer the mine site during operation against the elements. The locations of the stockpile area should be on a topographical crest to ensure free drainage in all directions. If this is not possible then an alternative is a side slope location with suitable cut-off berms constructed upslope. Soils are further at risk to compaction when there is a high moisture content. The dry winter months are thus preferred to commence stockpiling during the site establishment phase. If soil stripping can only occur during the wet months there should be the adoption of methods that cause minimum compaction.

The steps that should be taken during sand stockpiling are as follows:

1. Mark stockpile locations accurately on a plan to ensure that re-handling is minimized (i.e. sand will not have to be moved a second or third time);
2. The soils should be stockpiled on the parent soils and demarcated mining area close to stripped and final rehabilitation areas as possible;
3. Ensure that the location is free draining to minimize erosion loss and waterlogging;
4. Erosion control measure and berms be installed;
5. Minimize compaction during stockpile formation; and
6. Ensure that the stockpiled sand is only used for the intended purposes.

Soils should be exposed for the minimum time possible once cleared of vegetation, i.e. the timing of clearing and grubbing should be coordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. The latter will facilitate the succession of indigenous vegetation.

Once soils are stockpiled they should be managed and monitored progressively (during the mine operation phase) to ensure no damage or degradation of the soils occur. The soil stock pile areas should be strictly no-go areas and security measures in place to ensure there is no theft of the fertile soil. Assessing post-mining soil characteristics and associated land capability and land uses is necessary to ensure that the end land uses goals can be met.

Erosion Control

During all the phases of the mine, active soil erosion prevention and rehabilitation should occur. Active monitoring by the Mine Manager must occur to ensure prevention or early detection of soil erosion. Early detection will increase the successful chances of rehabilitation of that area. Surrounding vegetation must be kept to act as screens that reduces erosion.

Infrastructure Removal

All infrastructure that will not be used post-mining will be demolished. All mining machinery and designated waste bins will be removed off site.

There will also be the removal of all signage, traffic barriers, etc.

The haul roads on the mine should be ripped off except for the access road needed to access the mine for inspection after closure. A road that can and will be used by other users post closure should, however, be left provided this is agreed upon by all parties concerned.

Re-Vegetation and Biodiversity Establishment

The main aim when re-vegetating is to restore the area back to the pre-mining environmental state or an environmentally friendly end-use.

Aims and Objectives of Re-vegetation

The main aim of re-vegetation for the study area is to restore the area to the indigenous vegetation type. It is advised to restore the study area as far as possible to a stable and sustainable ecosystem. The overall objectives for the re-vegetation of reshaped and top soiled land are to:

- Prevent erosion,
- Restore the land to the agreed land capability,
- Re-establish eco-system processes to ensure that a sustainable land use can be established without requiring fertilizer additions, and
- Restore the biodiversity of the area as far as possible.

Closure

The site will be rehabilitated and left in an environmentally acceptable state. A closure plan will also be required for the proposed Quarry. The closure plan will ensure that the mining area is rehabilitated, and vegetation establishes effectively.

iii. Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT **(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);**	**REFERENCE WHERE APPLIED** **(i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g in terms of the National Water Act: Water use license has/has not been applied for).**
Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)	The environmental right is mentioned in Section 24 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996). This states the following: "...everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development".	The State must therefore respect, protect, promote, and fulfil the social, economic, and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities. The Constitution therefore recognises that the environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must cooperate with, consult and support one another if the State is to fulfil its constitutional mandate. The issuing of an environmental authorisation or other permits or licence for any aspect of the proposed Quarry will ensure that the environmental right enshrined in the Constitution contributes to the protection of the biophysical and socio- economic environment.
National Environmental Management Act, 1998 (Act No. 107 of 1998) Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44 of the National Environmental Management Act (NEMA; Act No 107 of 1998) when Applying for Environmental Authorisation, dated 2020 March 2020.	Specialist reports are required to be undertaken in line with Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44 of the National Environmental Management Act (NEMA; Act No 107 of 1998) when Applying for Environmental Authorisation, dated March 2020	The Biodiversity Assessment, Sound Level Survey, Heritage Impact Assessment, Wetland Assessment, Geohydrological assessment, Air Quality Assessment and the Storm water Management Plan were undertaken for the proposed project in terms of the Protocol for the specialist assessment.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT **(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);**	**REFERENCE WHERE APPLIED** **(i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g in terms of the National Water Act: Water use license has/has not been applied for).**
Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) (MPRDA) - Section 22	In terms of Section 22 of the MPRDA _ a Mining Right must be applied for and issued by the DMRE.	A Mining Right Ref No.: KZN 30/5/1/2/2/248MR was issued by the DMRE.
National Water Act, 1998 (Act No. 36 of 1998)	The National Water Act, 1998 (Act No. 36 of 1998) aims to provide for management of the national water resources in order to achieve sustainable use of water for the benefit of all water users. This act requires that the quality of water resources is protected as well as the integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. Chapter 4 of the act regulates water use, while Section 21 lists eleven water use types that are regulated [Section 21 (a) – (k)].	The Maritzburg quarry was granted a General Authorization with Ref No: 27/2/2/V32E/11/1/2/3/7/9/10 in 2017 for Section 21 (c), (i) and (g) by the Department of Water and Sanitation.
National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) and amendments	Biophysical Environment. Chapter 5 of the Act, part 1 and 2 relate to the management of alien and invasive species.	Assessment of biophysical environment. Weed / alien vegetation clearing was undertaken as one of the specialist studies.
National Forests Act, 1998 (Act No 84 of 1998)	The purpose of the Act is to promote the sustainable management and development of forests and to provide protection for certain forests and trees in terms of: • Section 15 (1) of the National Forest Act (Act 84 of 1998), any person wishing to cut, disturb, damage or destroy any	According to the Biodiversity Assessment undertaken, no protected species were noted within the study area.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);	REFERENCE WHERE APPLIED (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g in terms of the National Water Act: Water use license has/has not been applied for).
	protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree must apply for a license from the Minister or any delegated institution or authority. • Government Notice 38215, Notice of the List of Protected Tree Species under the National Forests Act, 1998 (Act No 84 of 1998) was gazetted in November 2014.	
National Environmental Management Air Quality Act (Act 39 of 2004) - 	The purpose of the act is to reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development. Section 32 of the Act relates to the control of dust and Section 34 of the Act relates to the control of Noise. National Dust Control Regulations (2013)	The principles provided in Section 32 and 34 of the Act has been included into the EMPr, in order to manage and minimise dust and noise related activities generated during the construction and operational phase of the project. Based on the information provided, An Air Emission Licence is not required as the anticipated dust released will be managed through the National Dust Control Regulations (2013).

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT **(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);**	**REFERENCE WHERE APPLIED** **(i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g in terms of the National Water Act: Water use license has/has not been applied for).**
Mine Health and Safety Act, 1996 (Act No 29 of 1996)	The mitigation measures proposed for the site includes specifications of the MHSA.	The mitigation measures proposed for the site includes specifications of the MHSA.
National Heritage Resources Act No 25 of 1999	Cultural and Heritage Environment	Assessment of the cultural and heritage environment was conducted by the specialist. No aspects of the project could be identified that triggers the NHRA.
KwaZulu-Natal Nature Conservation Act, 1997 (Act No. 9 of 1997)	Biophysical Environment	No aspects on site could be identified that needs protection in terms of the KCA.
Msunduzi local municipality Spatial Planning and Land Use Management By-laws and Spatial Development Framework (2015)	Part A(iv)(1)(b) Description of the current land uses	Land use zoning requirements.
Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) [SPLUMA]	Part A(iv)(1)(b) Description of the current land uses	
Land Use Planning Ordinance (Ordinance 15 of 1985)		Land use zoning requirements
Public Participation Guideline in terms of the NEMA EIA Regulations	GN.R 807 – Applies to the entire Public Participation Process.	Used during the public participation process

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT **(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);**	**REFERENCE WHERE APPLIED** **(i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g in terms of the National Water Act: Water use license has/has not been applied for).**
National Water Act 36 of 1998	General Authorisation in terms of Section 39 of the NWA	Water quality monitoring is conducted bi-annually

iv. **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).

Afrimat Aggregates KZN (Pty) Ltd is aware of the demand for aggregates used for road upgrades and the construction industry that is prevalent in the Pietermaritzburg area. The applicant holds the mining right to commercially source the available felsic rock. The aggregate from the mining area will be used for base course in the upgrading of roads, construction and brick making in the Pietermaritzburg and surrounding areas. The activity will therefore have a positive socio-economic impact on the surrounding environment, as it will aid the infrastructure development of the area.

Strategic Importance of the mine

The existing mine already employs 19 people of which the majority are sourced from the local area. More workers will continue to be sourced from the local area should the need arise. It must be noted the creation of employment opportunities is highly dependent on the economic conditions of the area which is in turn triggered by the demand of the material.

The mine will contribute numerous positive impacts to the community with regard to socio-economic aspects such as:

- Work opportunities to local residents as when required;
- Provision of bursaries and learnerships to those in need;
- Skills development plan for employees;
- Local economic development plan that entails a skill development training programme for the community in an effort to boost the socio-economic status of the area;
- Contribution to the construction industry that is an important economic sector in the surrounding area (KwaZulu-Natal PSDF, 2021), and
- Sourcing of local contractors for the cartage of finished product to customers.

In addition, the mine has provided two (2) bursaries for students studying mechanical and electrical engineering worth R 62 289.00 for the 2022 cycle. The mine is currently providing one (1) internship position, with three (3) internship positions provided since 2019. Twelve (12) external learnerships has also been committed to. The mine also provides continuous learning opportunities for employees including portable skills training, core skills training and participates in the Women in Mining (WIM) initiative, with two (2) ladies forming part of the initiative.

The Maritzburg quarry is also currently busy with a Local Economic Development (LED) project,

which was completed in 2022. The project includes building two (2) additional classrooms for the Unobhala High School in the Pietermaritzburg area.

v. 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.

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:

- the property on which or location where it is proposed to undertake the activity;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity; and
- the option of not implementing the activity.

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

1. Location Alternative

Afrimat Aggregates (KZN) Pty Ltd has identified the need for aggregate in the area due to an increase in building, construction and road maintenance projects. As mentioned earlier, the existing quarry pit was established in 1993 and since then, the area has continuously been utilised for mining purposes. In this light, the applicant identified the proposed area as preferred and the only viable site alternative. The establishment of a quarry pit in a green field area, while the existing quarry pit had not yet been mined out or rehabilitated would not be the best option, considering sustainable development. In light of the above statement, the impacts associated with establishing another quarry pit in a greenfield site on the property is believed to have a higher environmental impacts without the need or motivation to justify it.

2. Activity Alternatives

Two activity alternatives discussed below have been assessed as part of this Environmental Impact Assessment,

Opencast mining (Preferred Alternative)

- The opencast mining method is used when deposits of commercially useful minerals or rock are found near the surface where the overburden is relatively thin or where the material is structurally unsuitable for tunnelling.
- The opencast mining method will not produce any residual waste that has to be disposed of. Due to the location of the quarry the potential impacts on the surrounding environment, associated with opencast mining, is deemed to be of low significance. It is

proposed that all mining related infrastructure will be contained within the boundary of the mining area.

Underground Mining: (Alternative 1)

- Underground Mining is used where the mineral occurs deep below the surface and where the overburden is thick.
- Unlike opencast mining, underground mining extracting resources through the wells, which usually leads to land subsidence, water resources destruction, soil erosion, air pollution and biodiversity decrease. Those problems can interact with each other, and develop through time and space, which speed up the environmental deterioration of the mining area (Meng *et al.,* 2009:1281).

2. Operational aspects of the activity

The Applicant has considered two approaches to providing the requisite range of crushed stone products, static crusher/ screen plant and mobile crushing. These are as follows:

Static Crusher / screen plant

- The static plant is developed on a platform on the southern side of the opencast pit, with access to the hopper feeding a primary jaw crusher, gyratory and impact crushers, which feeds the screening decks. Chutes feed product conveyors that stockpile the various products. Gyratory and impact crushers produce crushed stone with less desirable flakiness and better overall shape for use in concrete.

- **Mobile Crusher (Preferred Alternative):**A Mobile crusher plant offers the possibility of moving a more compact plant close to the working face. Shot rock can be loaded directly into the crusher. In the case of the Maritzburg quarry opencast pit, it is possible to achieve more seclusion and vision screening of the process in area where noise is recued and the spread of a dust plume is limited. This also reduces the cost involved with double handling of rock, and achieving greater efficient in energy usage and vehicle emissions. This option is also popular from the perspective, that the plant can be used to service short term contracts elsewhere, should there be adequate stockpiles at Maritzburg quarry to satisfy the local market demand.

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 to be mined 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 mine the existing quarry, not being 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 and loss of income to the Pietermaritzburg business area.

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 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, and
- The existing quarry pit on the property could not be rehabilitated as it has been mined.

4. Details of the Public Participation Process Followed

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

The Public Participation Process for the EIA and EMP commenced on the 10th of February 2023.

During the public participation process, the following activities will be undertaken:

- Placing a newspaper advert in a local Newspaper;
- Placement of Site Notices at the site and surrounding community areas;
- Distribution of Background Information Document (BID) to all identified Stakeholders and Interested and Affected Parties;
- Distribution of the Draft Environmental Impact Assessment Report and Environmental Management Programme for public review period of 30-days;
- Placing the a copy of the Draft Environmental Impact Assessment Report and Environmental Management Programme for public review at the Ashburton Public Library, located on the C/O Wally Hayward Drive and Restdene Road;
- Conducting a public meeting; A public meeting will be held on 27th of February 2023; at 18:00, at the Peacock Lodge, 13 Pope Ellis Drive, Ashburton.
- Compilation of a Comments and Response Report;

- Compilation of a Public Participation Report to be submitted with the Environmental Impact Assessment Report and Environmental Management Programme.

ii) Summary of issues raised by I&APs

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

Note: This section of the report will be completed at the end of the PPP.

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues Raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated**
AFFECTED PARTIES					
Landowner/s					
N/A	N/A	N/A	N/A	N/A	N/A
Lawful occupiers/s of the land					
N/A	N/A	N/A	N/A	N/A	N/A
N/A					
N/A	N/A	N/A	N/A	N/A	N/A
Municipal councilor					
Municipality					
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA, etc					
N/A	N/A	N/A	N/A	N/A	N/A
Communities					
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
Traditional Leaders					
N/A	N/A	N/A	N/A	N/A	N/A
Dept. Environmental Affairs					
N/A	N/A	N/A	N/A	N/A	N/A
Other Competent Authorities affected					
N/A	N/A	N/A	N/A	N/A	N/A
OTHER AFFECTED PARTIES					
N/A		N/A	N/A	N/A	N/A
INTERESTED PARTIES					

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
		•		

5. **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).

This Section serves to describe the environmental setting of the area identified and will also provide a description of the overall character and other sensitivities that were identified in the surrounding environment.

TOPOGRAPHY AND DRAINAGE

The study area is located in quaternary drainage catchment U20J of the Pongola-Umzimkulu Water Management Area (WMA) (see **figure 6**). The study area is characterised by moderate to high relief, with ground elevation ranging from 544 amsl in the adjacent Mpushini River west of the quarry to about 740 metres amsl at the highest point about 3 kilometers southeast of the site. The quarry is located on the side of a hill. **Figure 6** shows the topography around the site. The site is drained by Mpushini River which discharges into the Msunduzi River, about 2 kilometers north of the quarry (Geohydrological assessment report, 2021).

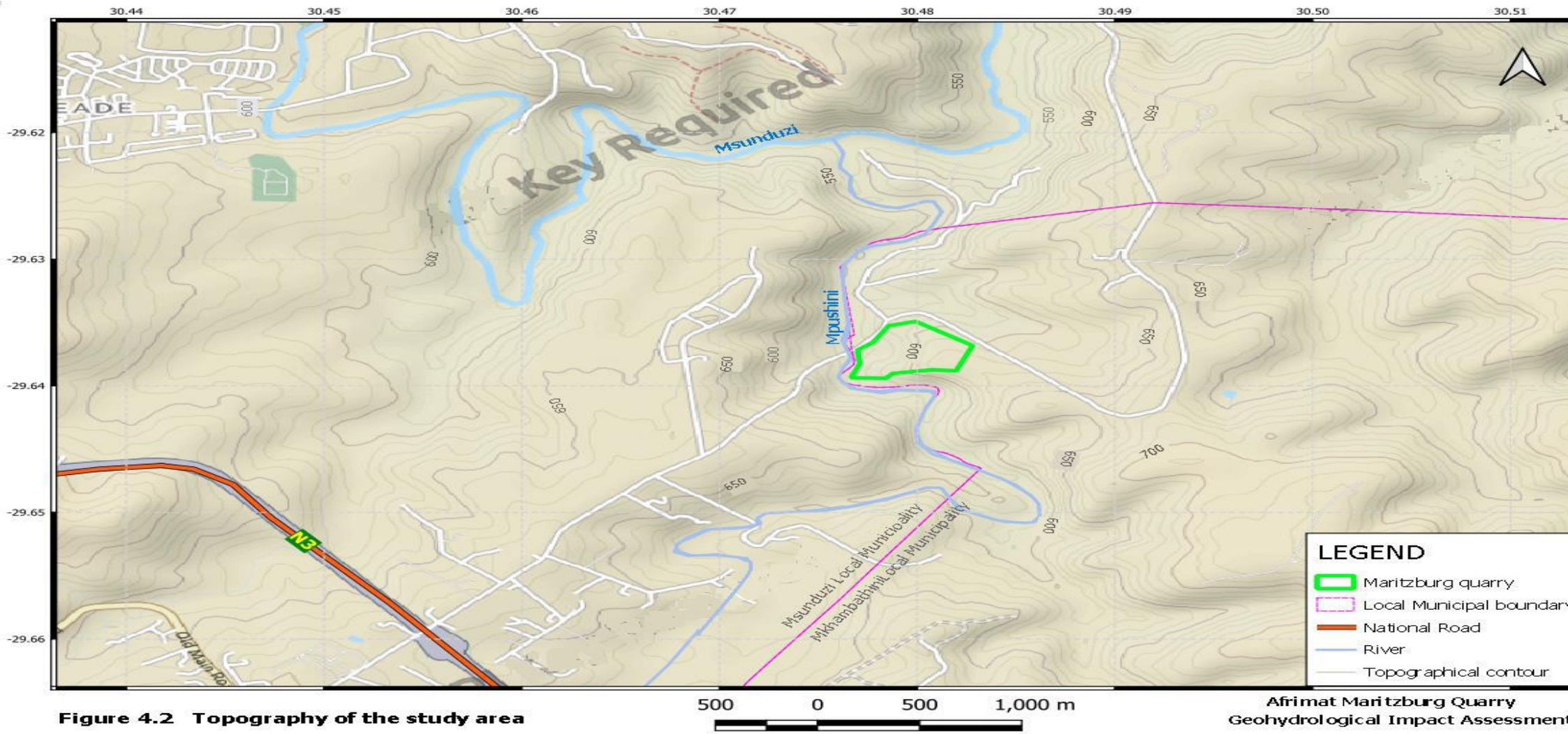


Figure 4.2 Topography of the study area

Figure 10: Topography of the study area

CLIMATE

The nearest weather station to the site is located in Pietermaritzburg, about 10 kilometers northwest of the site. Pietermaritzburg receives approximately 832mm of rain per year, with most rainfall occurring during summer. It receives the lowest rainfall (2mm) in July and the highest (155mm) in January.

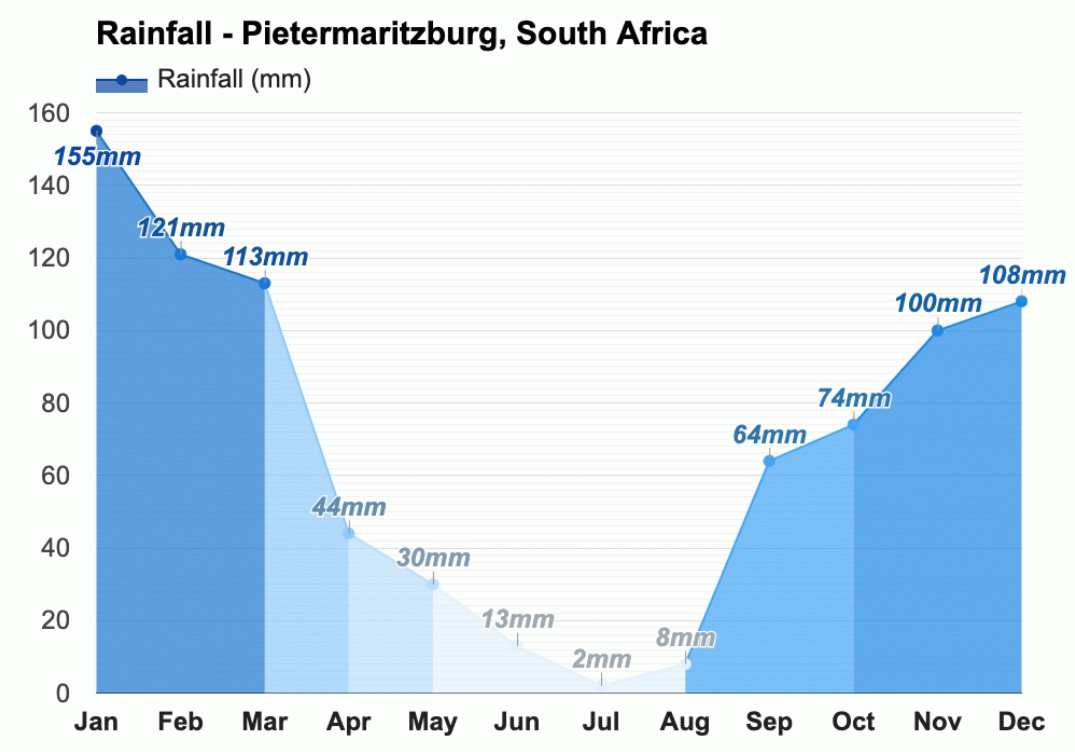


Figure 11: Average rainfall for Pietermaritzburg (Weather-atlas)

The average midday temperatures range from 11.9°C in June to 20.1°C in February. The region is the coldest during July when the temperature drops to 3°C on average during the night (Geohydrological assessment report, 2021).

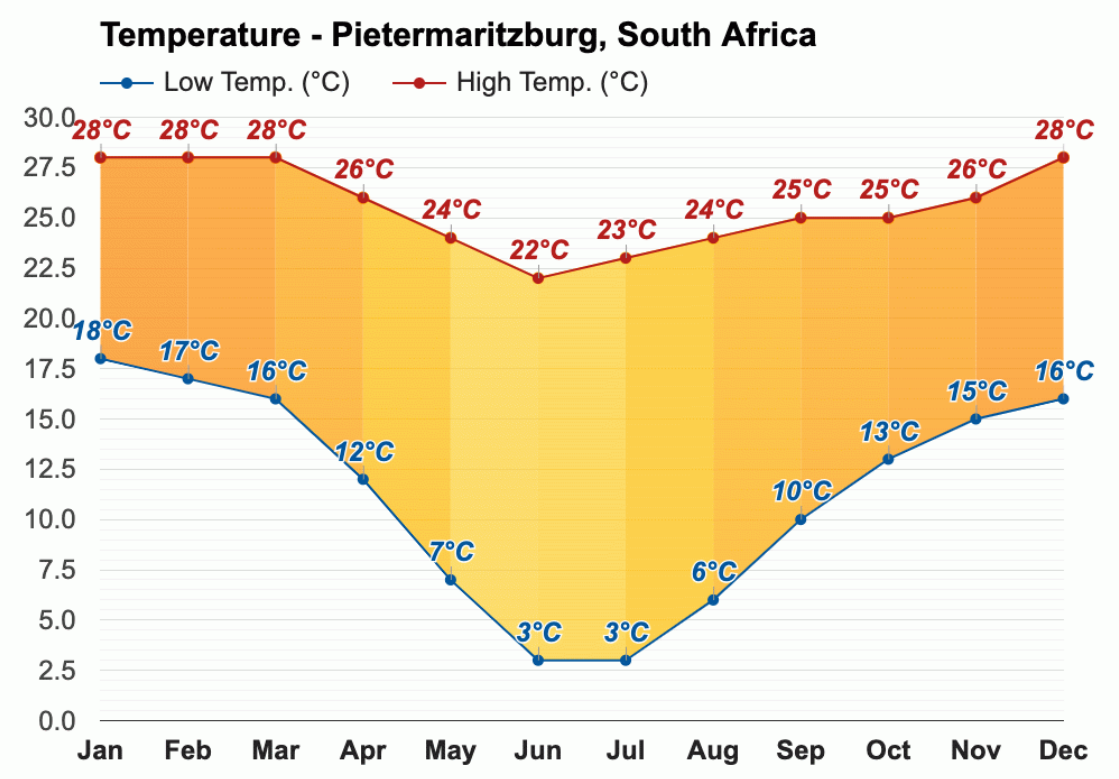


Figure 12: Average temperatures for Pietermaritzburg (weather atlas)

VEGETATION

Natural vegetation

According to the 2018 SA Vegetation Map, the site and its surrounding area have been mapped as Eastern Valley Bushveld and KwaZulu-Natal Hinterland Thornveld (see **figure 9**). Both are savanna vegetation types. The distinction on site between the two vegetation types is very difficult and may relate to steepness of the slopes and dominance of thorny acacias.

KwaZulu-Natal Hinterland Thornveld is an open thornveld dominated by the *Acacia* species on undulating plains found on upper margins of river valleys (Mucina & Rutherford 2006). It is restricted to KwaZulu-Natal and occurs in patches immediately above the Eastern Valley Bushveld in river valleys of mainly the Mpisi, Mvoti, Umgeni, Mlazi and Lufafa (Mucina & Rutherford 2006). Trees such as *Acacia natalitia, Ziziphus mucronata, Cussonia spicata* and *Euphorbia ingens*, and shrubs such as *Calpurnia aurea, Coddia rudis* and *Gymnosporia buxifolia* are typical (Mucina & Rutherford 2006). The vegetation type is underlain by Natal Group sandstones, Dwyka diamictites and Oribi Gorge Suite granite (Mark Berry Environmental Consultants, 2021).

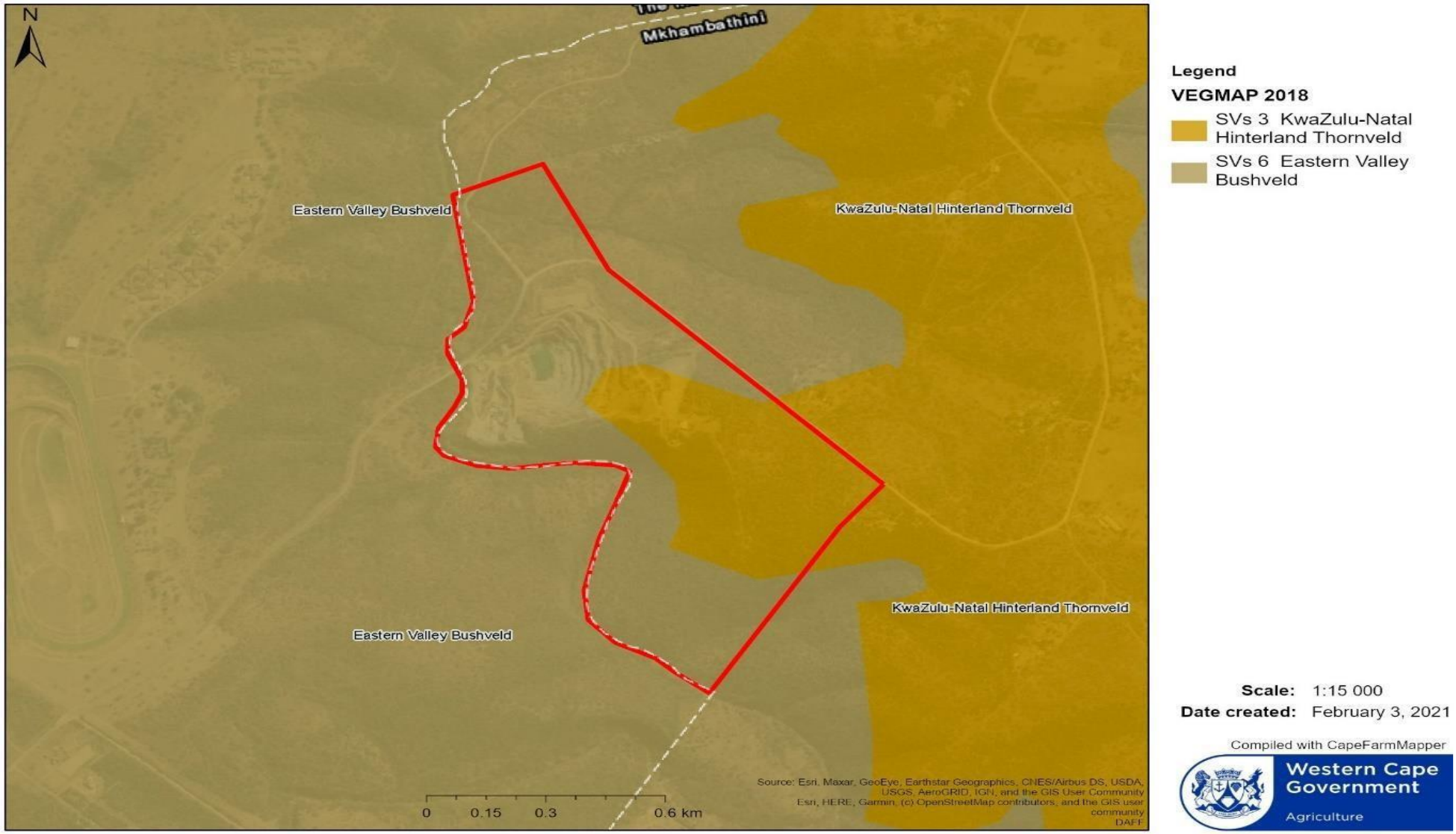


Figure 13: Extract of the 2018 SA Vegetation Map, showing the position of the site (outlined in red) inside Eastern Valley Bushveld and KwaZulu-Natal Hinterland Thornveld

Eastern Valley Bushveld occurs in the KwaZulu-Natal and the Eastern Cape Provinces. It is found in deeply incised river valleys, including the lower reaches of the Thukela, Mvoti, Mgeni, Mlazi and others (Mucina & Rutherford 2006). It is described as semideciduous savanna woodlands in a mosaic with thickets, often succulent and dominated by species of *Euphorbia* and *Aloe* (Mucina & Rutherford 2006). The steep north-facing slopes are sheltered from the rain and also receive greater amounts of insolation adding to xerophilous conditions on the slopes (Mucina & Rutherford 2006). The area is underlain by sediments of the Karoo Supergroup, in this instance, the Dwyka Group. Important taxa are similar to that of KwaZulu-Natal Hinterland Thornveld (Botanical assessment report, 2021).

Vegetation and Flora

As noted above, the natural vegetation on site comprises of Eastern Valley Bushveld and KwaZulu-Natal Hinterland Thornveld, or rather a transitional form between the two (see f**igure 9**). It is not possible to draw a line between the two, but figure 8 above presents an approximation. KwaZulu-Natal Hinterland Thornveld is expected on the flatter eastern part of the site, spreading eastwards. The vegetation comprises a 4-6 m tall tree layer, with a prominent grass understorey (**see figures 10 and 11**). Structurally it can be described as short, closed woodland following Edward's (1983) classification (Botanical assessment report, 2021)

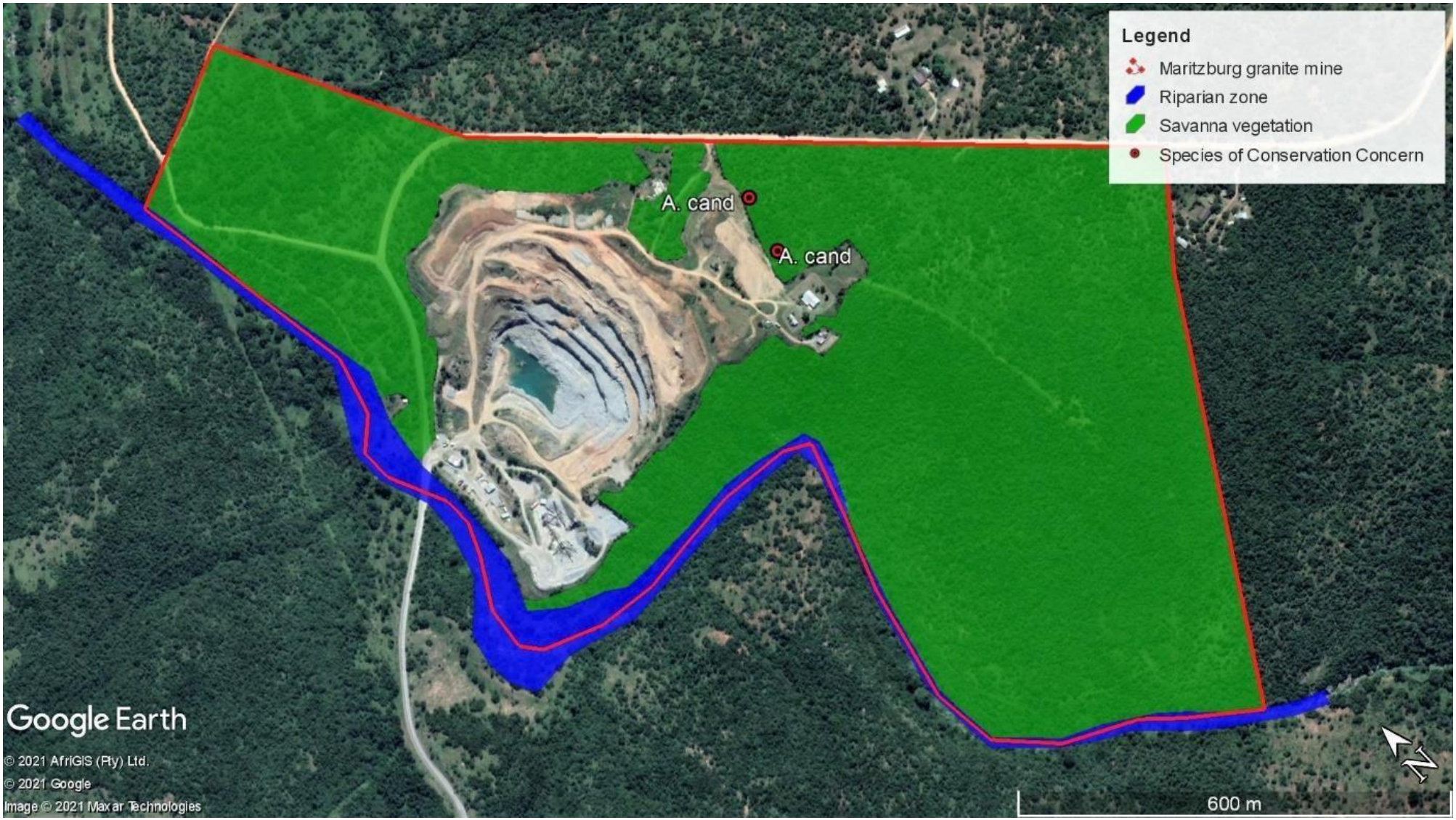


Figure 14: Aerial photograph showing the biodiversity attributes of the study site

The areas covered with savanna vegetation as shown in figure 9 seem to be in a fair to good condition with little disturbance. Botha (2005), however, noted that the mining site and surrounding areas have been disturbed by past agricultural activities. The scenery around the mining site was lush and green during the site visit. However, the dry winter situation may paint a different picture. As expected, some disturbances were noted on the edges of the mining area, such as localised erosion events, vehicular activities, spoiling of overburden and alien infestation (see **figure 12**). Of a total of 49 species recorded, 15 (31%) were alien.

Prominent tree and tall shrub species recorded include; Gymnosporia buxifolia, Vachellia natalitia, V. karroo, V. nilotica, Senegalia ataxacantha, Dalbergia obovata, Ziziphus mucronata, Ehretia rigida, Zanthoxylum capense, Brachylaena discolor, Croton sylvaticus, Spirostachys africana, Searsia pentheri, Grewia occidentalis and Cussonia spicata (see **figure 13**). Tall (tree like) succulents include Aloe cf candelabrum and Euphorbia ingens (Botanical assessment report, 2021).

Figure 15: Good quality savanna vegetation on the eastern side of mining site. The tall aloe in the foreground is Aloe cf candelabrum

Figure 16: Savanna vegetation with a lush grass understory

Figure 17: New overburden spoil site (terraced) on northeastern side of mine

Smaller shrubs and succulents recorded include Capparis sp, Azima tetracantha, Asparagus africanus, Euryops chrysanthemoides, Tecomaria capensis, Calpurnia aurea, Coddia rudis, Lantana rugosa, Aloiampelos tenuior and Sansevieria hyacinthoides. Creepers and herbaceous species recorded include Cyphostemma cirrhosum, Senecio inaequidens, S. deltoideus, Priva flabelliformis and Commelina sp. Hemicryptophytes recorded include; Typha capensis, Cyperus esculentus, Phragmites australis and a variety of grasses. Botha (2005) lists a few more species recorded on site, including Buddleja saligna, Searsia gueinzii, Diospyros lycioides, Euclea crispa, etc (Botanical assessment report, 2021).

A fair number of exotic species were also recorded including Phytolacca dioica, Yucca gloriosa, Opuntia ficus-indica, Ricinus communis, Tecoma stans, Argemone ochroleuca, A. mexicana, Tagetes minuta, Datura ferox, Malvastrum coromandelianum, Verbena brasiliensis, Solanum mauritianum, Manihot grahamii, Melilotus albus and Glandularia aristigera (see Photo 8). The majority of these are listed as Category 1b invaders in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) Alien and Invasive Species List (2016). Some of the species, such as Tecoma stans, have the ability to form dense stands that completely eliminate indigenous vegetation (Bromilow 2010) (Botanical assessment report, 2021).

Figure 18: A few indigenous species recorded, with Vachellia karroo (top left), Euphorbia ingens (top right), Senegalia ataxacantha (bottom left) and Searsia pentheri (bottom right)

Aloe cf candelabrum is the only Species of Conservation Concern (SCC) and regional endemic recorded on site (see **figure 9**). It is currently listed as near threatened and has a restricted distribution range from Pietermaritzburg southwards to the uMtamvuna River 2. About 50-56% of A. candelabrum's habitat is already transformed, mainly through loss to sugarcane cultivation, timber plantations and urban development around Pietermaritzburg and Durban. Other SCC known from the general area and vegetation types include *Aloe pruinosa* (Vul), *Brachystelma franksiae* (Vul), *Cineraria atriplicifolia* (Vul), *Drimia echinostachya* (Vul), *Hermannia sandersonii* (Vul) and *Woodia verruculosa* (Vul) (Botanical assessment report, 2021).

The previous EIA report for the mine made mention of *Encephalartos cerinus* (Criticallly Endangered), but no observation was made on site by the author (Botha 2005). It is known from Thukela Valley Bushveld much further away to the north. All the other recorded species seem to be widespread and common. None of the recorded tree species are protected in terms of the National Forests Act (Act 84 of 1998) (Botanical assessment report, 2021).

Figure 19: A few alien species recorded, with Glandularia aristigera (top left), Opuntia ficus-indica (top right), Solanum mauritianum (bottom left) and Ricinus communis (bottom right)

Fauna

According to the previous EIA report by Botha (2005), a fair number of mammal species are known (or expected) from the larger area, including black-backed jackal (*Canis mesomelas*), clawless otter (*Aonyx capensis*), African striped weasel (*Poecilogale albinucha*), striped polecat (*Ictonyx striatus*), large-spotted genet (*Genetta tigrina*, a common and widely distributed carnivore), slender mongoose (*Galerella sanguinea*), white-tailed mongoose (*Ichneumia albicauda*), water mongoose (*Atilax paludinosus*), aardwolf (*Proteles cristatus*), and possibly even leopard (*Panthera pardus*). During the site survey evidence of common duiker (*Sylvicapra grimmia*) was found. They prefer the presence of bush, which give shelter and shade, as well as leaves and twigs for food (Skinner & Smithers 1990).

Kudu (*Tragelaphus strepsiceros*), nyala (*Tragelaphus angasii*), impala (*Aepyceros melampus*), Burchell's zebra (*Equus quagga* ssp. *burchelli*) and vervet monkeys (*Cercopithecus aethiops*), have been observed on or around the mining site. Most of these are savanna woodland inhabitants and were probably introduced to the neighbouring conservation area (Botanical assessment report, 2021).

Most carnivore species naturally occurring within the area would have been heavily persecuted in the past. They may have been shot, poisoned, trapped for *muthi* and killed or out-competed by domestic dogs.

None of the animal species listed above will be materially affected by the operation of the quarry, since the quarry is an existing quarry and because of the small area that it will occupy in relation to overall habitat available to the animals (Geoscience, 2005).

GEOLOGICAL SETTING

Regional geology

The regional geology of the study area consists of rocks ranging in age from Mokolian to Recent. The stratigraphic sequence consists of basement metamorphic and intrusive igneous rocks of the Natal Metamorphic Province (NMP), overlain by the Karoo Super-group. The Natal Metamorphic Province is represented by Mapumulo Group, which consists predominantly of gneisses. The Karoo Super-group is represented by its basal units, the Dwyka and Ecca Groups. The study area marks the extreme eastern margin of the Karoo Supergroup. The Dwyka Group consists of tillite and diamictite, whilst the Ecca Group consists of mudstone and shale of the Pieterrmaritzburg Formation. Jurassic dolerite sheets, sill and dykes intruded all of the lithostratigraphic units but are predominantly associated with the argillaceous rocks of the Ecca Group. **Figure 16** shows the simplified geology of the study area respectively.

Faulting and fracturing of bedrock in the study area is significant. Two dominant fault orientations, north-northeast–northeast and north-northwest–northwest are developed (Geohydrological assessment report, 2021).

Local geology

At local level, the study area is underlain by gneiss of the Mapumulo Group, which is the target mineral extracted at the site. From the air, the gneiss consists of finger-like projections into the Dwyka Group.

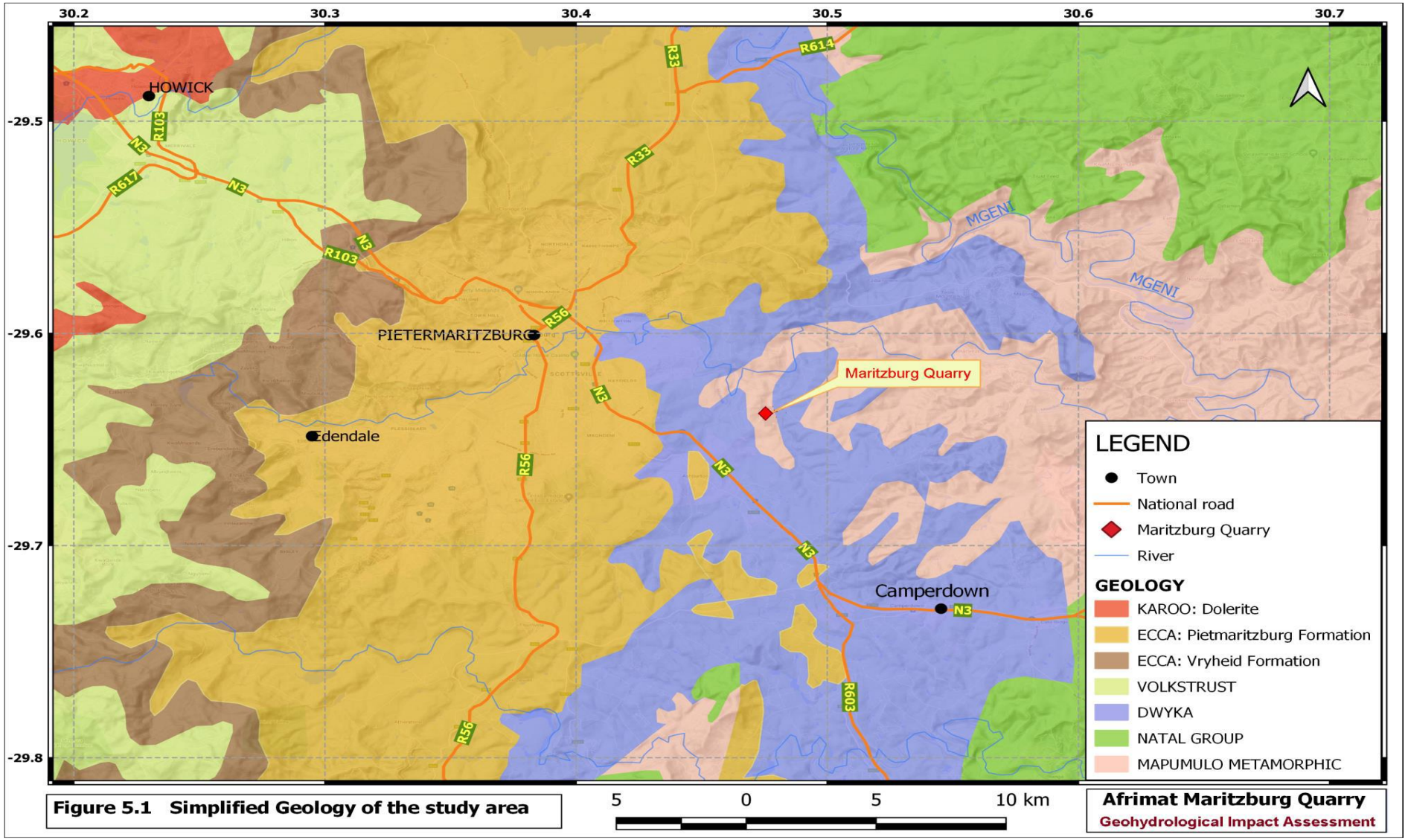


Figure 20: Simplified geology of the study area

GEOHYDROLOGICAL SETTING

The study area is underlain by rocks of the gneisses of the Mapumulo Group as described above. These are hard crystalline rocks characterised by very little, if any, primary porosity and permeability. Their water storage and transmission properties arise as a result of secondary processes of fracturing, jointing, faulting and weathering. Fracturing develops due to a number of factors that include tectonic movement in the earth crust, pressure relief due the erosion of overburden and shrinking during cooling of the rock mass. Weathering involves the breaking down of the rock mass into loose grains with the help of rainwater which acts as a weak acid after dissolving carbon dioxide in the atmosphere and in the soil. Groundwater occurs in both the weathered zone as well as the transition between the weathered and fresh gneiss. Basins of weathering normally coincide with the drainage pattern. Fault and fracture zones generally have porosity of less than 1% (Geohydrological assessment report, 2021).

Fault and fracture zones tend to narrow and pinch out at depth, with a corresponding decrease in permeability. The groundwater potential of the gneisses is classified as low with an average borehole yield of less than 0.5 L/s, (King, 1998). However, higher yields are not uncommon and are associated with well-developed faults and fractured dolerite dyke margins (Geohydrological assessment report, 2021).

Groundwater recharge

Groundwater recharge in the study area is estimated at between 50 and 75 mm per annum (Vegter 1995). The groundwater harvest potential, which defines the amount of groundwater that can be sustainably abstracted from one square kilometre per annum is estimated at between 10 000 to 15 000 m3/km2/annum (Seymour and Seward, 1996). **Figures 17 and 18** show groundwater recharge and harvest potential in the study area respectively (Geohydrological assessment report, 2021).

Groundwater quality

Groundwater quality is generally good and suitable for human consumption; however pockets of poor water quality do occur. Electrical conductivity (EC) is a useful parameter for evaluating water quality as it reflects the total salts in the water. Groundwater quality of the gneiss is characterised by mean electrical conductivity of less than 70 mS/m (King, 1998) (Geohydrological assessment report, 2021).

.

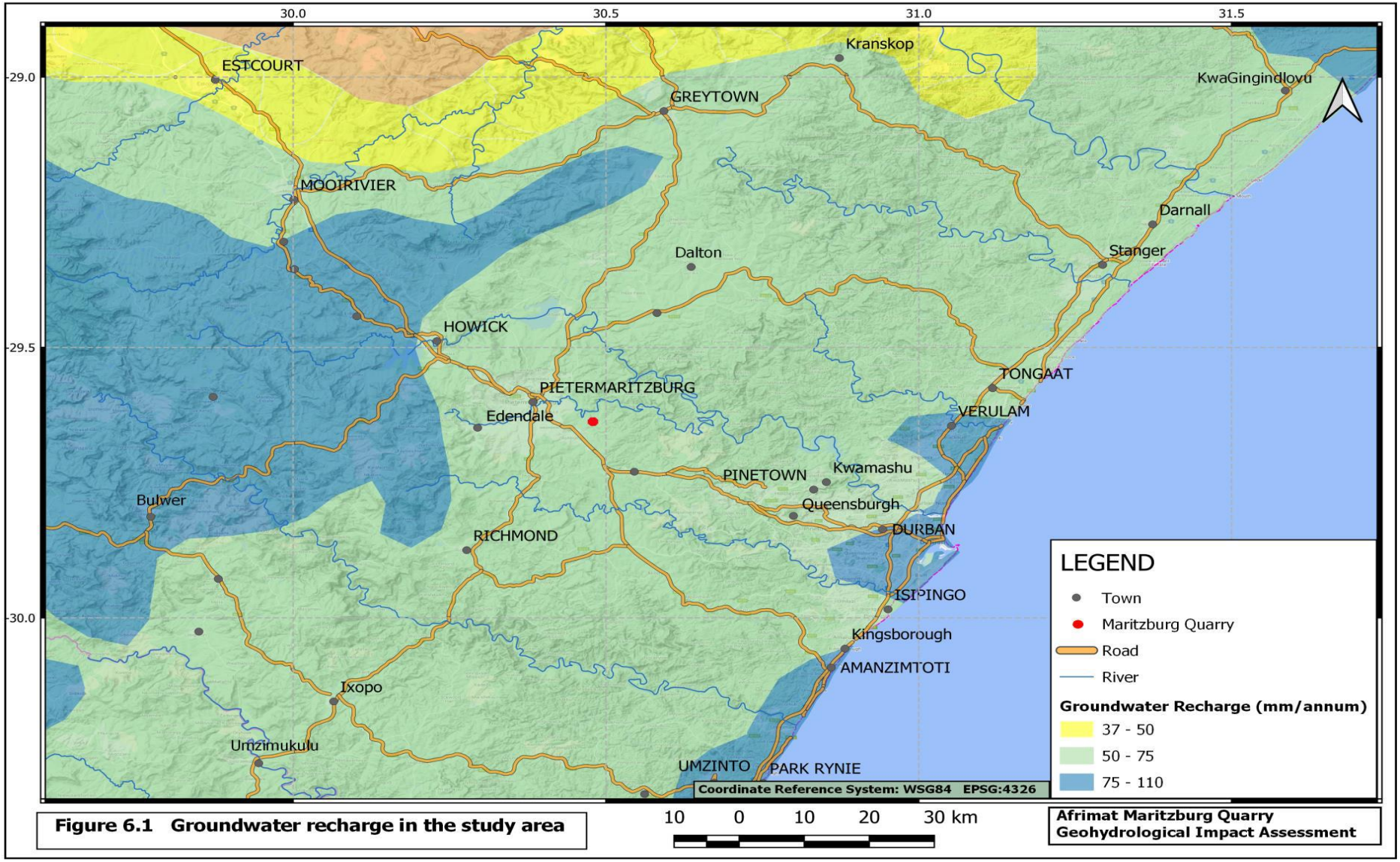


Figure 6.1 Groundwater recharge in the study area

Figure 21: Groundwater recharge in the study area

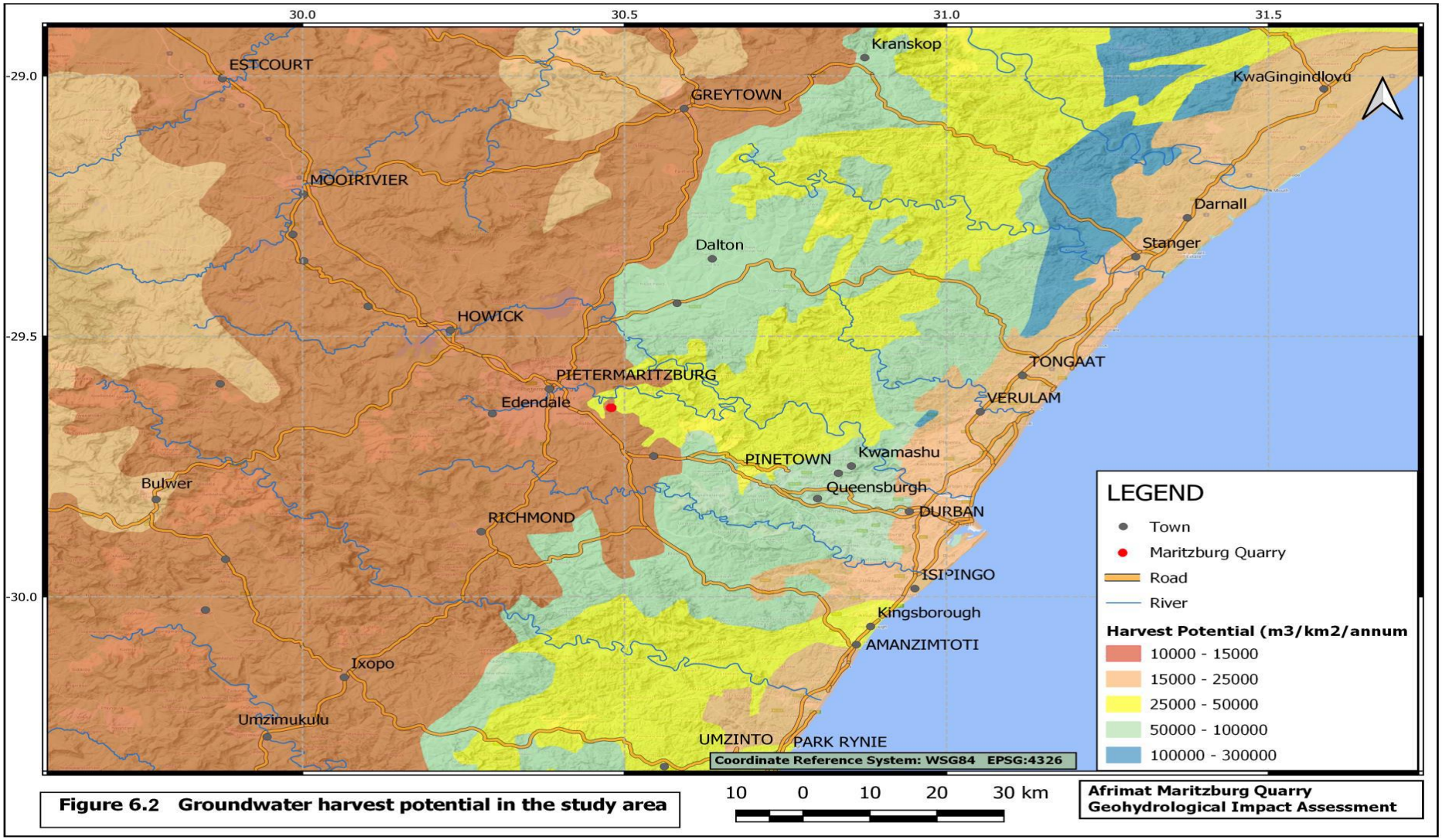


Figure 22: Groundwater harvest potential in the study area

NOISE AND AIR QUALITY

Noise quality

Maritzburg quarry is operational from 07:00 to 17:00 from Monday to Friday and on Saturday from 07:00 to 15:00. No production occurs on Sunday, only maintenance activities that are subject to a Sunday Labour Permission that has been granted by the DMRE Inspectorate. According to the Environmental Sound Level Survey, the site is classified as both rural and industrial (Sound Level Survey assessment report, 2021).

Figure 18 and 19 illustrates the findings of the sound level survey (according to SANS 10103:2004) that was conducted in both mine non-operational and operational hours. The purple diamond (LAeq) is compared against the applicable SANS sound rating levels.

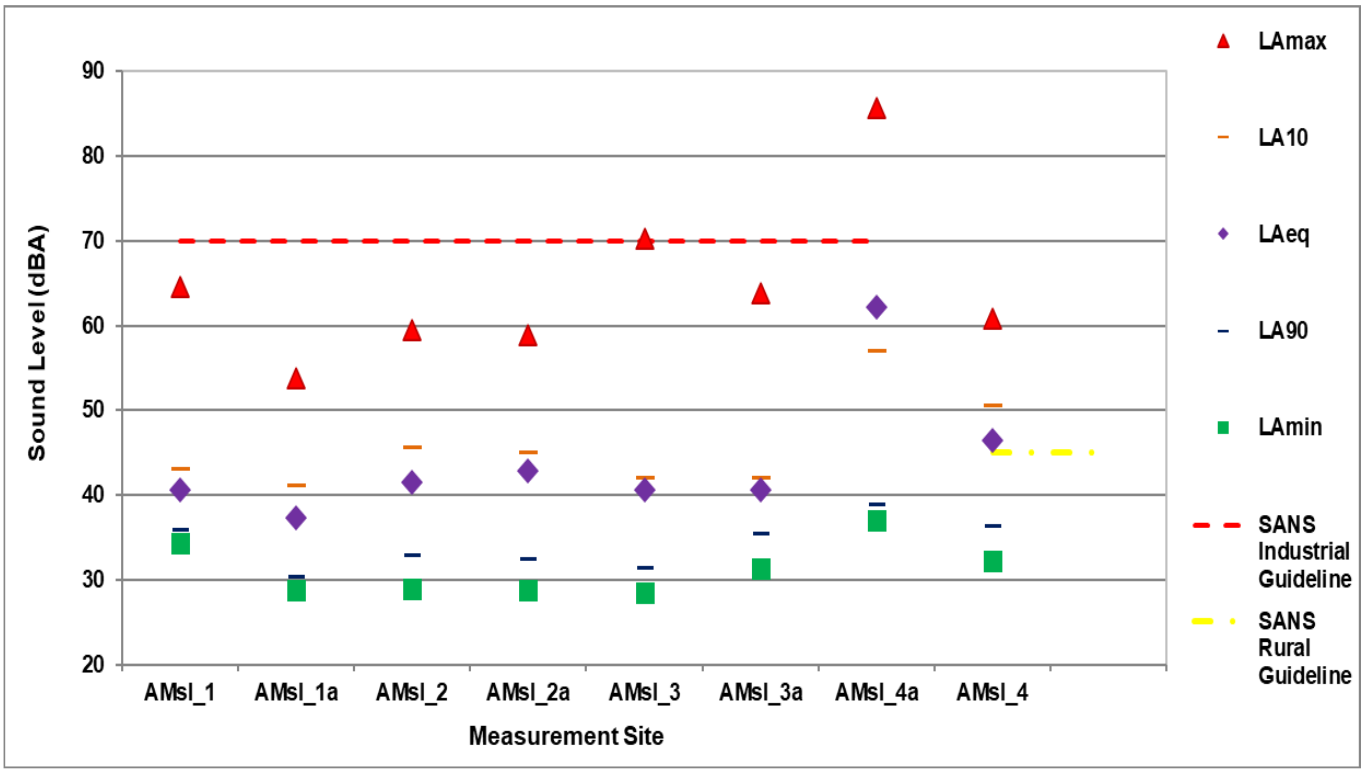


Figure 23: Graphical representation of sound levels measured at each site (DAY-time) on 22 and 29 January 2021: Plant NON-OPERATIONAL

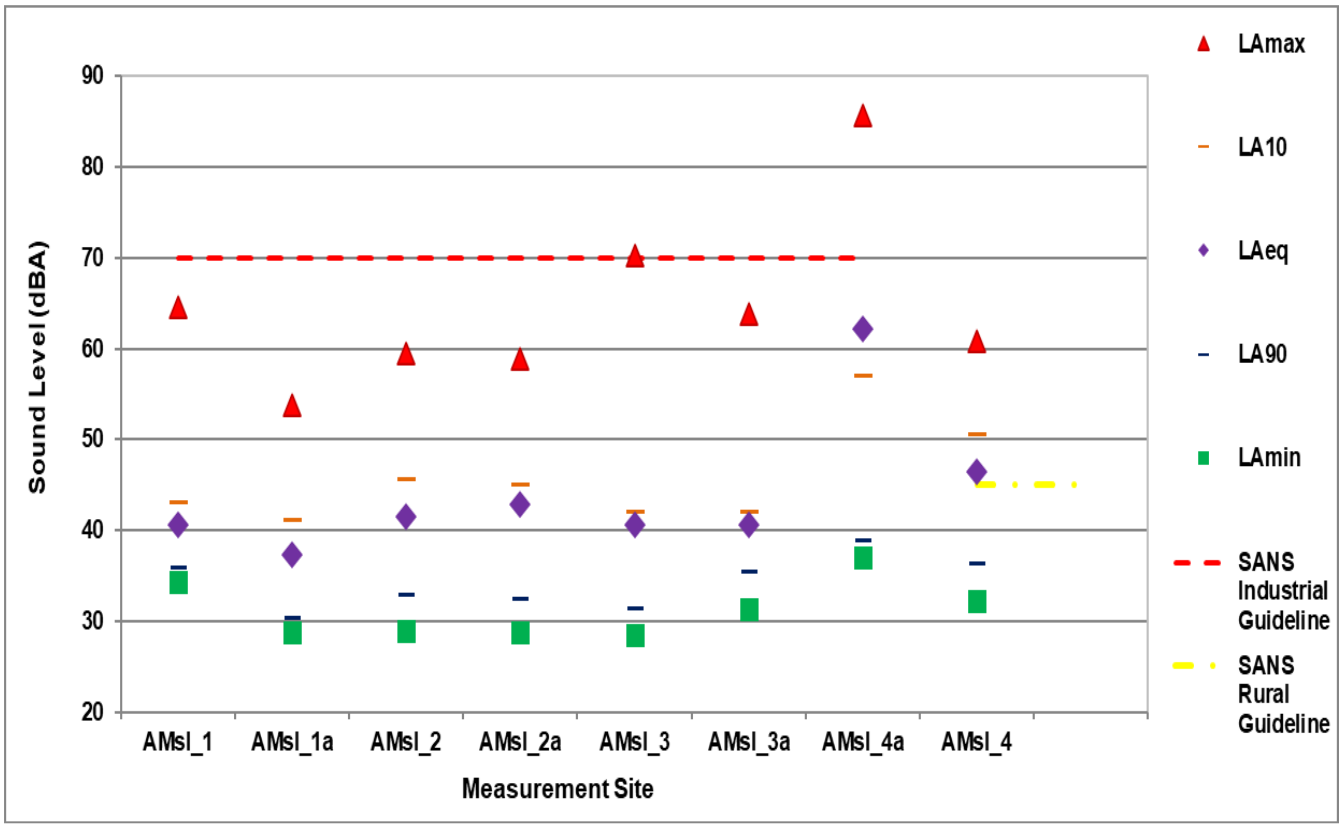


Figure 24: Graphical representation of sound levels measured at each site (DAY-time) on 22 January 2021: Plant OPERATIONAL

The specialist made the following conclusion on the ground of the data interpreted from the Sound Level Survey (IMA Trader, 2021);

In considering the data from all sites within the Mining Right area and the off-site community location, comparison of the sound levels between when the plant was operational and non-operational suggests that the operating mine plant (crushers and quarry activities) raised the ambient sound levels within the mine boundary and at the off-site community location.

- The Noise Control Regulations in terms of Section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989) defines a 'disturbing noise' as a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more. The increase in sound levels above 7 dBA during the operational survey at some industrial measurement sites does not constitute a 'disturbing noise' because these sites are within the mining right area and are not off-site receptor sites. At the off-site community location, the increase above ambient sound levels during the operational survey was below 7 dBA and thus, no 'disturbing noise' was identified.
- The following activities were observed to contribute to the increase in sound levels: mining related vehicles in the quarry pit, moving within the site boundary and entering

and exiting from the site (i.e. trucks, excavators, TLBs and bakkies); crusher/aggregate plant; and non-mining related vehicles on the public road adjacent to the mine.

- In terms of the SANS (10103:2004) day-time typical sound rating levels for Industrial Districts (70 dBA) and Rural Districts (dBA), the non-operational and operational sound levels (LAeq) measured at the industrial sites in January 2021 were **below** the typical rating levels for Industrial Districts; but the non-operational and operational sound levels (LAeq) measured at the off-site community locations (AMsl_4) were **above** the typical rating levels for Rural Districts.
- The apparent high sound levels measured at AMsl_4 is not conclusive as the noise sources in the valley below AMsl_4 (i.e. non-mining related traffic on the public road, mining activities in the quarry and aggregate plant, vehicle movement withing the mining right area) are exaggerated when recorded at AMsl_4 because of the parabolic reflector effect of the mine quarry wall. The potential of developing noise level trends at this rural measurement site, as associated with the mine activities, will continue to be a focus point of future surveys.

Air quality

The air quality impact assessment undertaken for the project includes a meteorological overview of the area. An emissions inventory was undertaken with the aim of quantifying emissions associated with the activities involved in the mining of coal. The emissions for specific activities such as bulldozing, blasting, tipping, wind erosion and materials handling activities were calculated and the cumulative impacts were compared to the relevant ambient air quality standards to determine legal compliance (Air quality assessment report, 2021).

The findings reported here is therefore a combination of historical, observed and previously modelled data and provided the background and predicted scenario of various pollutants in the Afrimat Maritzburg project mining area. The construction and operational phases were assessed. Based on the dispersion modelling simulations, the following conclusions can be summarized as follows:

PM10

For the unmitigated and mitigated Daily PM10 concentrations it was predicted not to be higher than the 75 µg/m³ limit for any of the sensitive receptors.
The annual average PM10 limit of 40 µg/m³ are not predicted to exceed at any of the identified sensitive receptors for any of the modelled scenarios (Air quality assessment report, 2021).

TSP

In the mitigated and unmitigated scenarios none of the sensitive receptors are predicted to exceed the monthly dust fallout for the highest month residential limit of 600 mg/m²/day.

The predicted annual dust fall out for the mitigated and unmitigated scenarios are not predicted to exceed the annual limit of 300 mg/m²/day at any of the sensitive receptors.

Recommendations and monitoring plans for the site recommended by the Air quality survey specialist (2021) will be further discussed in a later section (Air quality assessment report, 2021).

SURFACE WATER AND SENSITIVE LANDSCAPES

The Mpushini River located adjacent to the existing mining area falls within quaternary catchment U20J, which forms part of the Mvoti to Umzimkulu Catchment in KwaZulu-Natal. The overall zone contains Henley Dam, Pietermaritzburg and numerous other informal settlements. Upstream of Henley Dam the PES is a C, with non-flow related impacts causing the majority of deviation from reference state. Predominant impacts are poor water quality, rural settlements, sedimentation, overgrazing, agriculture and alien vegetation. Downstream of Henley Dam through Pietermaritzburg the PES ranges from C to an E (U20JD04364).

The Msunduzi (U20JD04364), flowing through Pietermaritzburg, is mainly impacted by poor water quality, canalisation, inundation, instream barriers and high intensity urbanisation. The Msunduzi from Pietermaritzburg to its confluence with the Mgeni River is mainly impacted by poor water quality, rural settlements, informal agriculture, clearing of vegetation, overgrazing and some erosion (Department of water affairs report number WP 10679).

(a) Surface Water Quality

The activity on the site will not abstract or use water from the Mpushini River in any way. No mining will take place in the river itself or on the banks of the river. Water monitoring is conducted quarterly (sampling points and results). Mitigation measures will also be implemented to prevent any sediment from being washed into the river.

The Mpushini River is subjected to one single large impact which transforms the system but several smaller impacts to affect the system. Several impacts occur in the upper reaches of the river. Several poultry farms are situated upstream of the mining area. It is clear that runoff from these poultry farms occur, which will have a negative impact on water quality and nutrient content. Large areas upstream have been cleared of savannah vegetation and consist of planted grassland which will also negatively impact on the river in terms of nutrient input and sediment runoff. The river is relatively free of impoundments and as a consequence the

flooding regime is not affected to a large degree. A sand mine is situated upstream which will have a negative impact in terms of sediment runoff. The quarry at the mining area will also likely contribute to sediment inputs to the river, however a stormwater filtration system has been constructed to filter out fines prior to silt laden stormwater entering the river.

(b) River diversion

The quarry is situated on a low hilltop. The majority of surface water drainage occurs in a south western direction although surface water drains in other directions as well although in lower quantities. The Mpushini River is located immediately south west of the site and also substantiates the main direction of runoff in the south western direction. Minor drainage lines also originate from the site and flows into the river. The closest portion of the mining area to the Mpushini River is approximately 30 meters. The river flows north and confluences with the uMsunduze River at a point approximately 2 km north of the site. The river is free of any containment dams or impoundments and the majority of the surrounding area consists of natural vegetation.

(c) Streamflow

There are no definable watercourses, including floodplains, situated within the mining area itself which can flood their banks to cover large areas. Stormwater runoff drains inwards within the mining pit and along the northern, western and southern slopes of the mining area and into the Mpushini River situated in the valley adjacent to the site.

(d) Flood dynamics

The flooding regime of the river is considered somewhat altered from the natural condition but not to a large degree. The mining activities are not anticipated to have a significant impact on the flooding regime of the river. The existing mine has essentially isolated a portion of the catchment of stream which has therefore reduced flooding magnitude within the stream. This is however of such small size that the impact on the river as a result of isolation of catchment is minimal (Environment, Wetland Delineation report for Pietermaritzburg Quarry, 2016.).

(e) Flow regime

The flow regime of the river is considered somewhat altered from the natural condition but not to a large degree. The mining activities are not anticipated to have a significant impact on the flow regime of the river. The existing mine has essentially isolated a portion of the catchment of stream which has therefore reduced runoff into the river. This is however of such small size that the impact on the river as a result of isolation of catchment is minimal (Environment, Wetland Delineation report for Pietermaritzburg Quarry, 2016.).

(f) Sensitive Landscapes

Eastern Valley Bushveld and KwaZulu-Natal Hinterland Thornveld are currently not listed as threatened vegetation types in National Environmental Management: Biodiversity Act (Act 10 of 2004) (DEA 2011). The threat status of Least Concern is supported for both vegetation types in the recent 2018 National Biodiversity Assessment (Skowno et al. 2019). Around 69-70% of their original extent remains, this suggests that both are still well represented. Interestingly, it is indicated as not formally protected! Mucina & Rutherford (2006), however, stated that <1% of Eastern Valley Bushveld is conserved in the Luchaba Wildlife Reserve and a few small patches in the Oribi Gorge Nature Reserve. The Mpushini Protected Environment, a stewardship site next to the mine, protects some of the vegetation on a contractual basis with support from the provincial conservation authority. The main threats to the vegetation types are alien plant infestations and cultivation (Botanical assessment report, 2021).

The mining site falls inside the KZN biodiversity network map (see **figure 21**) Apart from the active mining area and associated infrastructure which are already transformed, the site is mapped as a critical biodiversity area (CBA): irreplaceable. The mining site is strategically positioned amidst portions of the Mpushini Protected Environment. The CBA extends well beyond the boundary of the mining site towards the south and west. CBA's are defined as areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure (Skowno et al. 2019). Many of these areas support known occurrences of threatened plant species, and/or may be essential elements of designated ecological corridors. Loss of designated CBA's is therefore not recommended (IMA Trader, 2021).

Figure 25: Extract of the KZN biodiversity network map, with the site outlined in red

WETLAND ASSESSMENT

The main watercourse associated with the study site is classified as a 3rd order perennial river (Mpushini River), with additional 2nd and 1st stream orders flowing into this watercourse from the study site and the surrounding area. These smaller streams are classified as non-perennial episodic streams. Episodic streams are highly variable and unpredictable and generally has no flow for the majority of the year and usually only during rainfall events (Limosella Consulting, 2021).

A perennial river (such as the Mpushini River) on the other hand has low variability and high predictability. All the small tributaries flow into the Mpushini River which flows north into the uMnsunduze River, which in return flows into the uMngeni River which mouths into the ocean. The section of the Mpushini river associated with the study site generally has a well-defined bed rock channel with alluvial deposits and steep to very steep banks especially on the norther and southern banks. The Mpushini River and the associated tributaries generally form a lotic system (habitat of rapidly moving water) (Limosella Consulting, 2021).

ARCHAEOLOGICAL AND CULTURAL IMPACTS

The study revealed that the quarry site has been significantly altered by forestry plantations. It was anticipated that if any archaeological remains existed within the disturbed sites may have been exposed by the previous agriculture and mining activities. It should be borne in mind that the potential of encountering chance finds during mining is for ever present. The applicant and contractors must be diligent and observant during clearance of the site. The procedure for reporting chance finds has clearly been laid out (Integrated Specialist Services, 2021).

HERITAGE

From a heritage perspective supported by the findings of this study, the proposed EMPr upgrade is feasible (Integrated Specialist Services, 2021).

VISUAL

The visual impact of the quarry and associated buildings and plant results from the breaking of natural slopes and terrain patterns, contrast in colour and texture between man-made and natural material, and linear or tall structures on the landscape.

The mining area operates in an existing quarry that has been established in 1990’s. The existing quarry covers an area of approximately 19ha. The mining activity will therefore not have a cumulative negative visual impact on the surrounding environment.

Afrimat Aggregates (KZN) (Pty) Ltd must however ensure that housekeeping is managed to standard, as this will mitigate the visual impacts during the operational phase of the mine. Concurrent rehabilitation takes place with mining activities. 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.

SOCIO-ECONOMIC

Regional socio-economic structure

The Msunduzi Local Municipality is the second largest in KwaZulu-Natal, and is the capital of the province. The confirmation of the capital status of Msunduzi has entrenched its role and position as the administrative and political hub of KwaZulu-Natal. The municipality is moving in the direction of achieving Metropolitan status, and, as such, new and more strategic approaches to reviewing the Integrated Development Plan (IDP) have been adopted. The municipality is located along the N3 corridor that links Durban to Gauteng. The Municipality covers an area of approximately 630 km^2 and consists of 39 wards. It is predominantly urban to peri-urban in nature, with areas of rural residential. The main economic sectors distribution of this municipality is as follows; community services (29%), finance (24%), transport (13%), trade (12%), manufacturing (12%) (Municipality IDP, 2016/2017).

Demographic

Table 1: Demographics of Msunduzi Local Municipality (Municipalities, 2017)

	2016	2011
Population	679 039	621 793
Age Structure		
Population under 15	31.5%	26.7%
Population 15 to 64	64.7%	68.3%
Population over 65	3.9%	5.0%
Dependency Ratio		
Per 100 (15-64)	54.7	46.4
Sex Ratio		
Males per 100 females	92.9	90.8
Population Growth		
Per annum	2.00%	n/a
Labour Market		
Unemployment rate (official)	n/a	n/a
Youth unemployment rate (official) 15-34	n/a	n/a
Education (aged 20 +)		
No schooling	4.3%	5.3%
Matric	40.5%	33.2%
Higher education	14.5%	12.5%
Household Dynamics		
Households	180 469	164 772
Average household size	3.8	3.6
Female headed households	45.9%	45.2%
Formal dwellings	80.0%	73.5%
Housing owned	70.1%	58.0%
Household Services		
Flush toilet connected to sewerage	49.3%	51.4%
Weekly refuse removal	47.4%	53.1%
Piped water inside dwelling	41.7%	47.9%
Electricity for lighting	96.1%	91.8%

Employment

Table 2: Employment of Msunduzi Local Municipality (Municipalities, 2017)

	2015/16	2014/15	2013/14	2012/13	2011/12
Employment					
Employment Costs (R'000)	942 483	832 532	741 537	684 337	666 198
Remuneration of councillors (R'000)	41 763	34 657	37 100	33 422	31 427
Total Employee Positions	5 204	4 944	3 713	3 723	2 908
Total Vacant Employee Positions	2 765	163	136	280	249
Total Vacancy Percentage	53.13%	3.30%	3.66%	7.52%	8.56%
Managerial Positions - S57	6	6	6	4	3
Vacant Managerial Positions - S57	0	0	1	0	0
Managerial Positions - by organogram	64	82	82	65	68
Vacant Managerial Positions - by organogram	5	6	8	0	3
Community And Social Service Positions	335	395	312	296	452
Vacant Community And Social Service Positions	165	6	20	12	15
Finance And Administration Positions	689	669	668	635	497
Vacant Finance And Administration Positions	320	35	17	25	24
Electricity Positions	381	413	265	275	286
Vacant Electricity Positions	177	11	18	15	60
Enviromental Protection Positions	609	242	204	196	32
Vacant Enviromental Protection Positions	378	20	0	1	0
Health Positions	247	35	34	138	49
Vacant Health Positions	243	2	2	103	5
Public Safety Positions	527	508	507	490	398
Vacant Public Safety Positions	165	19	18	10	18
Road Transport Positions	1 235	330	300	231	285
Vacant Road Transport Positions	605	15	18	17	55
Sport And Recreation Positions	111	1 179	115	230	0
Vacant Sport And Recreation Positions	0	6	0	28	0
Waste Management Positions	461	502	479	560	407
Vacant Waste Management Positions	231	18	15	33	9
Waste Water Management Positions	0	169	267	124	109
Vacant Waste Water Management Positions	0	2	2	10	15
Water Positions	401	183	234	265	160
Vacant Water Positions	200	8	9	10	16
Other Positions	138	231	240	214	162
Vacant Other Positions	76	15	8	16	29

Note: For information on methodology, sources and definitions please see Sources.

Service delivery

Table 4: Water (Municipalities, 2017)

	2015/16	2014/15	2013/14	2012/13	2011/12
Water					
Blue Drop Score	n/a	n/a	97.97	n/a	95.38
Is the municipality responsible to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality have infrastructure to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality actually provide?	Yes	Yes	Yes	Yes	Yes
Is the service outsourced/commercialised?	No	No	No	No	No
Number of households and non-domestic customers to which provided	159 300	160 597	159 918	159 233	110 403
Number of domestic households/delivery points	155 496	154 735	154 056	153 371	106 872
Inside the yard	139 632	138 991	138 312	137 627	99 304
Less than 200m from yard	9 468	9 348	9 348	9 348	568
More than 200m from yard	6 396	6 396	6 396	6 396	7 000
Domestic households with access to free basic service	5 280	5 086	4 026	9 562	16 945

Table 3: Electricity (Municipalities, 2017)

Electricity					
Is the municipality responsible to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality have infrastructure to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality actually provide?	Yes	Yes	Yes	Yes	Yes
Is the service outsourced/commercialised?	Yes	Yes	Yes	Yes	Yes
Number of households and non-domestic customers to which provided	149 923	149 676	144 723	144 271	129 356
Domestic households with access to free basic service	2 800	2 368	1 910	864	2 764

Table 5: Sewage and Sanitation (Municipalities, 2017)

Sewerage and Sanitation					
Green Drop Score	n/a	n/a	n/a	0	0
Is the municipality responsible to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality have infrastructure to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality actually provide?	Yes	Yes	Yes	Yes	Yes
Is the service outsourced/commercialised?	No	No	No	No	No
Number of households and non-domestic customers to which provided	156 231	157 554	157 524	157 524	97 875
Number of households using					
Flush toilet - public sewerage	79 008	78 973	78 943	78 943	57 307
Flush toilet - septic tank	8 515	8 515	8 515	8 515	5 015
Ventilated pit latrine	59 415	58 715	58 715	58 715	32 434
Bucket system	0	0	0	0	0
Other	5 489	5 489	5 489	5 489	0
Domestic households with access to free basic service	5 052	2 009	2 669	7 201	3 976

Table 6: Solid waste water (Municipality, 2017)

Solid Waste Services					
Is the municipality responsible to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality have infrastructure to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality actually provide?	Yes	Yes	Yes	Yes	Yes
Is the service outsourced/commercialised?	No	No	No	No	No
Number of households and non-domestic customers to which provided	120 000	120 000	85 000	85 000	83 944
Domestic households with access to free basic service	5 182	2 046	2 725	6 665	4 386

Local economic development

Key Projects

- Legislature precinct development;
- Pietermaritzburg airport upgrade;
- Harry Gwala stadium upgrade; phase 2,
- Integrated transport system; and
- Fibre-optic cable network.

Key Investment Opportunities

- International convention centre;
- Five-star hotel.

b) Description of the current land use

The portion of Lot 15773, which the quarry is located on, is surrounded by various other farms. The land use on the farm and surrounding areas are mainly for grazing purposes. Additional workers required will be sourced from the local community. The aggregate from the mining area will be used in the upgrading of roads in the immediate vicinity. The P458 main road passes the proposed mining site to the west. The mining area is established in an existing quarry that still needs to be rehabilitated.

The activity will therefore have a positive impact on the surrounding environment as it will aid infrastructure development of the area.

c) Description of specific environmental features and infrastructure on site

As the mining activities entail the operation of an existing quarry that has been established in the 1990's very little natural environmental features are present at the site, and therefore no specific environmental aspects have been identified that may require protection or remediation. Monitoring is deemed an important aspect of the project, and management of mitigation measures as proposed under Part B Point 1.2 needs to be implemented by the applicant upon approval of the updated Environmental Management Plan to ensure continues conservation of all aspects of the environment on site.

The operational phase mining activities consist of the following:

- Blasting;
- Excavating;
- Crushing and screening;
- Stockpiling and transporting of material;
- Sloping and landscaping; and
- Replacing the topsoil and re-vegetation of the disturbed area.

The infrastructure at the mining area entails:

- Office and Administration (sales facilities) building;
- Accommodation and ablution facilities;
- Workshop-steel structure;
- Oil store for new hazardous substances;
- General and Hazardous waste storage area- bunded area for old oil storage;
- Salvage yard – demarcated but not fenced;
- Septic tanks;
- Vehicle Service Area for minor services;
- Wash bay with oil sump;
- Fixed Crusher plant;
- Aboveground Diesel Tank bunded (23 000 Litre);
- One (1) x 60-ton Weigh Bridge;
- Guard house at gate; and
- Stormwater management berms.

d) Environmental and current land use map.

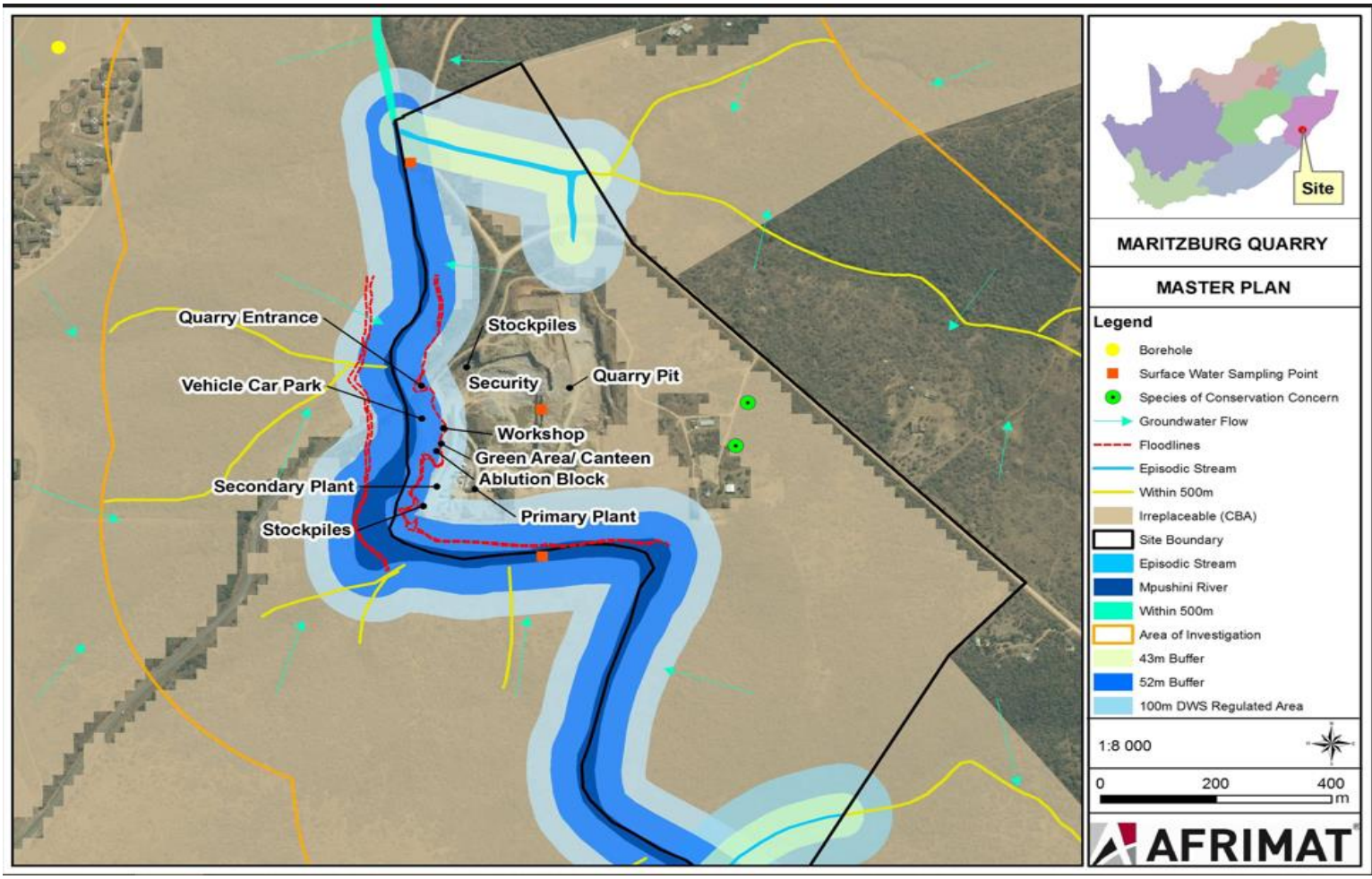


Figure 26: Site Layout map

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

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

The 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 7: Impact assessment of Maritzburg quarry before mitigation

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**SIGNIFICAN** if not mitigate
Land clearing activities	Dust resulting in decrease in ambient air	Air quality	Operational	Medium
	Destruction of natural vegetation including plant species of conservation concern	Vegetation	Operational	Medium - Hi
	Impacts on alien invasion of disturbed areas	Air quality	Operational	High
Blasting and operation of the plant	Dust resulting from blasting fly rock	Air quality	Operational	High
	On-going noise and disturbance related to operation and blasting	Faunal species	Operational	Medium
Stripping and stockpiling of topsoil	Soil erosion	Soil	Operational	Medium
	Dust created from stockpiling	Air Quality	Operational	Medium
Excavating	Noise generated by excavators	Noise quality	Operational	Medium
	Destruction of heritage resources	Archaeology and heritage resources	Operational	High

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**SIGNIFICAN** if not mitigate
Hauling and Transport	Dust created by mine vehicles	Air quality	Operational	Medium
Stormwater management	• Erosion on site • Increase of sediment in river	River and erosion	Operational and Closure	High
Waste Management	• Land pollution • Hazardous leachate • Illegal dumping	Land pollution	Operational and decommissioning phase	Medium
Fuel and oil storage	Soil and groundwater contamination	Soil	Operational and Decommissioning	High
Rehabilitation	Soil erosion	Soil	Operational and Closure	Medium
	Establishment of alien invasive plants	Alien invasive plant	Operational and Closure	Medium

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

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

Specialist studies identified key issues and impacts that required thorough investigation. All identified potential impacts and risks were assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria for the description and assessment of environmental impacts were drawn from the EIA Regulations 2014. The assessment of the impacts has been conducted according to a synthesis of criteria required by the integrated environmental management procedure.

The significance of both positive and negative potential impacts was determined through the evaluation of impact consequence and likelihood of occurrence. The significance of potential impacts that may result from the proposed project was determined in order to assist decision-makers

The significance of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The following risk assessment model has been used for determination of the significance of impacts.

SIGNIFICANCE = CONSEQUENCE X PROBABILITY

WHERE Consequence = Extent + Intensity + Duration

The criteria used to determine impact consequence are presented on the table below. Each rating has been allocated a score weighting.

Table 8: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
***1. Extent** - the area over which the impact will be experienced*		
Local	limited to the immediate area(s) around the project site -	1
Regional	extends over a larger area that would include a major portion of an area or province	2
National/International	nationally or beyond	3
***2. Intensity** - the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources*		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3

***3. Duration**– the lifetime of the impact, that is measured in relation to the lifetime of the proposed development and its reversibility*		
Short-term	(0 to 3 years)	1
Medium-term	(3 to 10 years) confined to the construction period	2
Long-term	(more than 10 years)	3
Permanent	beyond the anticipated lifetime of the project	4

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Table 9: Method used to determine the Consequence Score

***Combined Score* (A+B+C)**	3 – 4	5	6	7	8 - 9
Consequence Rating	Very low	Low	Medium	High	Very high

Once the consequence was derived, the probability of the impact occurring was considered, using the probability classifications presented in the table below.

Table 10: Probability Classification

***Probability**– the likelihood of the impact occurring*	
Improbable	1
Possible	2
Probable	3
Definite	4

The overall significance of impacts was determined by considering consequence and probability using the rating system prescribed below

Table 11: Impact significance ratings

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	INSIGNIFICANT	INSIGNIFICANT	VERY LOW	VERY LOW
	Low	VERY LOW	VERY LOW	LOW	LOW
	Medium	LOW	LOW	MEDIUM	MEDIUM
	High	MEDIUM	MEDIUM	HIGH	HIGH
	Very High	HIGH	HIGH	VERY HIGH	VERY HIGH

Practicable mitigation and optimisation measures are recommended and impacts are rated in the prescribed way both without and with the assumed effective implementation of mitigation and optimisation measures.

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.

- **Very low:** the potential impact is very small and should not have any meaningful influence on the decision regarding the proposed activity/development.
- **Low:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.
- **Medium:** the potential impact should influence the decision regarding the proposed activity/development.
- **High:** the potential impact will affect the decision regarding the proposed activity/development.
- **Very high:** the proposed activity should only be approved under special circumstances.

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

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

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 (2005 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 proposed footprint area was previously used for mining therefore very little indigenous vegetation needs to be disturbed in order to establish the mining area;
- The site is located within an industrial 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. 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.

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

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

The following preliminary mitigation measures are proposed to address/minimize the impact of the proposed activity on the surrounding environment:

Visual Mitigation

In order to mitigate the visual impact of the proposed activity on the surrounding environment the following mitigation measures are proposed:

- The site needs to have a neat appearance and be kept in good condition at all times.
- Concurrent rehabilitation needs to be done as strip mining progress to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.

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.
- 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 20km/h to prevent the generation of excess dust.
- 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.
- Demolition should not be performed during windy periods (August, September and October), as dust levels and the area affected by dust fallout will increase (Air quality impact assessment report, 2021).

- Cabs of machines should be swept or vacuumed regularly to remove accumulated dust (Air quality impact assessment report, 2021).
- Exhaust pipes of vehicles should be directed so that they do not raise dust (Air quality impact assessment report, 2021).
- Engine cooling fans of vehicles should be shrouded so that they do not raise dust (Air quality impact assessment report, 2021).
- Hard surfaced haul roads or standing areas should be washed down and swept to remove accumulated dust (Air quality impact assessment report, 2021).
- Dust suppression of roads being used during rehabilitation should be enforced (Air quality impact assessment report, 2021).

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 mining area.
- All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.
- An annual sound level monitoring survey, preferably conducted in winter, should continue to form part of the mine's EMP (Sound Level Survey, 2021).
- If community complaints are received from any of the residents in the surrounding area to the mine, then Afrimat should conduct a survey to measure and quantify the sound level at the site of receptor site of the complainant (Sound Level Survey, 2021).

Management of weed or invader plants

- A weed and invader plant control management plan must be implemented at the site to ensure eradication of all listed invader plants listed in 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:
    - The plants can be uprooted, felled or cut off and can be destroyed completely.
    - 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.

Waste Management

- General waste must be separated according to different waste streams (plastic, glass and cardboard) in colour coded waste bins.
- Hazardous waste (oil rags and oil filters) generated on site must be placed in bins in a bunded area.
- Old oil must be placed in an old oil storage tank in a bunded area.
- Hazardous waste must be collected by an accredited contractor. Waste manifests and safe disposal certificates must be kept on file on site.
- The general waste produced during the operational phase of the project must be transported from site to the uMsunduzi Local Municipality solid waste landfill site.
- Sewage from septic tanks must be disposed of by a contractor using the honeysucker removal process.
- Regular vehicle maintenance will take place within the service bay area of the applicants workshop. If emergency repairs is 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 litre closed container/bin to be removed from the emergency service area to the 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 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 of safe disposal should 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 and collected on a regular basis and disposed of at a recognised landfill site. Specific precautions must be taken to prevent refuse from being dumped on or in the vicinity of the mine area.
- Biodegradable refuse generated must be handled as indicated above.

<u>Protection of fauna and flora</u>

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

- 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.
- No plants or trees may be removed without the approval of the EO.
- With regards to the future extension of the mining area towards the north-eastern boundary, which is shared with the Mpushini Protected Environment, it is strongly recommended that an undisturbed buffer of a suitable width (e.g. 30-50 m) be determined and maintained between the latter and mining activities. This will allow the movement of fauna around the edges of the mine and prevent the undermining of conservation efforts next door.
- The presence of a fair number of alien species on the mining site is a great concern. As an operational phase impact, alien control is required as an ongoing management concern. The proliferation and spread of aliens into the adjacent protected area must also be prevented. One-year old seedlings can be hand-pulled, preferably when soil is wet after a rainfall. If left to grow, removal becomes more difficult and costly. The use of heavy plant, such as bush cutters or D9 Caterpillar, for alien clearing is not recommended. Certain species, such as *Opuntia ficus-indica*, requires the removal and destruction of the entire plant. Please note that herbicides may only be effective for certain species.

Management of Access Roads

- Stormwater must be diverted around the access roads to prevent erosion.
- 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 activities must be repaired by the applicant.

Storm water Handling:

It is recommended that the water in the surface impoundment be used to maintain and encourage the vegetal cover on the stockpiles by irrigating frequently as well as dust suppression on the internal roads. These uses will not trigger an additional water use license application (MSBR Consulting, 2021).

Management of Health and Safety Risks

- 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 85 of 1993 and the Mine Health and Safety Act 29 of 1996.

Topsoil Handling

- Upon removal of the vegetation the topsoil will be stripped of all areas to be affected by the proposed activities. Topsoil stripping will be restricted to the areas needed during the operational phase of the activity. The complete A-horizon (topsoil – the top 100 – 200 mm of soil which is generally darker colored due to high organic matter content) will be removed. If it is unclear where the topsoil layer ends the top 300 mm of soil will be stripped. The topsoil will be stockpiled in the form of a berm alongside the boundary of the area where it cannot be driven over, contaminated, flooded or moved during the operational phase. The topsoil berm will measure a maximum of 2 m high and must be planted with an indigenous grass seed mix if it does not naturally vegetate within 6 months. The grass will bind the soil and thus serve to control both wind and water erosion of the stockpiles, as well as assist in keeping the soil viable for rehabilitation purposes.
- The temporary topsoil stockpiles of each removed strip must be kept free of weeds.
- Storm- and runoff water must be diverted around the stockpile area and access roads to prevent erosion.

6. Motivation where no alternative sites were considered.

The hard rock is located on the mining right area, and therefore no alternative site recommended.

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

(Provide a statement motivating the final site layout that is proposed)

The opencast mining of the quarry has been identified as the most cost effective method to produce the desired aggregate. The proposed method will not produce any residual waste that has to be disposed of. Due to the remote location of the quarry the potential impacts on the surrounding environment, associated with opencast mining, is deemed to be of low significance. It is proposed that all mining related infrastructure will be contained within the boundary of the mining area.

8. 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 erer 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 12: Impact Assessment Table after mitigation

*The supporting impact assessment conducted by the EAP must be attached as an appendix, marked **Appendix E***

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
Vegetation clearing activities	Dust resulting in decrease in ambient air.	Air quality	Operational	Medium	Control though dust suppression measures such as watering of haul roads	Low
	Destruction of natural vegetation including plant species of conservation concern.	Vegetation	Operational	Medium - High	Control by keeping area to be disturbed to a minimum	Low
	Impacts on alien invasion of disturbed areas.	Air quality	Operational	High	• Control through the eradication of all identified alien vegetation • Control through continuous monitoring of alien plants during the life of the mine and within the decommissioned area until an effective cover of indigenous	Low

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
					perennial plants has established	
	Loss of faunal species will likely take place during the operational phase of the project as a result of clearance of vegetation.	Flora	Operational	High	• Restrict project footprint as per the layout plan. • Apply mitigation measures provided by the Ecological Specialists	Medium
Blasting and operation of the plant	Dust resulting from blasting fly rock	Air quality	Operational	High	• Maintaining good public relations with the surrounding communities, i.e warning the local communities in advance before blasts. • Control by evacuating all persons within 500m of a blast site. • Control by blasting during daylight hours when ambient noise levels are highest.	Low

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
					• Conduct seismograph calibration tests to ensure that blasting standards are met.	
	On-going noise and disturbance related to operation and blasting	Faunal species	Operational	Medium	• Fauna threatened by maintenance or operational activities should be removed to a safe location or left to move off on their own. • Fences around the site should be maintained to ensure that larger fauna do not enter the site. • All litter and rubbish should be handled appropriately and stored in closed bins to ensure that it does not attract fauna.	Low

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
Stripping and stockpiling of topsoil	Soil erosion	Soil	Operational	Medium	• Prevent by re-vegetating disturbed areas (in line with rehabilitation initiatives). • Control through rehabilitation by replacing topsoil on the stripped land before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 2m in height and must not be compacted • Control through implementation of storm water management measures	Low
	Dust created from stockpiling	Air Quality	Operational	Medium	• Control through watering the stockpiles. • Monitor trucks that collect aggregate by ensuring that they are covered.	

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
Excavating	Noise generated by excavators	Noise quality	Operational	Medium	• Control by Control by minimising noise through proper design and maintenance of silencers • On diesel powered equipment, systematic maintenance of all forms of equipment	Low
	Destruction of heritage resources	Archaeology and heritage resources	Operational	High	• Should any artefact of cultural significance be found, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. • If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police	Medium

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
					and SAHRA or HWC are informed.	
	Change in topography of landscape and drainage pattern due to the excavation of rock material. The impact on topography is permanent.	Topography	Operational, Decommissioning and Closure	High	• Control through the limiting of the footprint of the proposed mining activities • • Mining activities shall be demarcated in order to restrict the excavation footprint. • • Control through the appropriate rehabilitation measures	Medium
Hauling and Transport	Dust created by mine vehicles	Air quality	Operational	Medium	• Monitor dust by usage of appropriate dust suppression measures (i.e. spray unconsolidated areas with water/chemical stabilisers)	Low

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
					• Control generation excess dust by limiting speed limit to 30km/h • Minimised by equipping mine vehicles with silencers	
	Increase in traffic on the local road networks to due haulage	Traffic	Operational and Decommissioning	Medium	• Mine Manager to engage with the local traffic department when required.	Low
Stormwater management	• Erosion on site • Increase of sediment in river	River and erosion	Operational	High	• Divert storm water around the topsoil heaps, stockpile areas and access roads to prevent erosion and loss of material • Divert runoff water around the stockpile areas with trenches and contour structures to prevent erosion of the work areas.	Low

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
					• Ensure that water from the wash bay plant is tested before used for dust suppression purposes. • 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. * Comply with the requirements stipulated in the Water Use	

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
					Authorisation issued by the DWS for the water uses on site.	
Waste Management	• Land pollution • Hazardous leachate • Illegal dumping	Land pollution	Operational and decommissioning phase	Medium	• No burning of refuse wastes on the premises or on surrounding premises. • All hazardous material must be stored in bunded areas and then disposed of offsite by an accredited disposal company. • Locate waste bins and skips throughout the site. • No littering will be permitted on site and general housekeeping should be enforced	Low

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
					• Separate waste/skip bins for the different waste streams must be available on site.	
Fuel and oil storage	Soil and groundwater contamination	Soil	Operational and Decommissioning	High	• Store fuel in bunded tank with apron • Control by establishing a temporary waste storage facility with concreted floor, sloping concreted apron an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Control by maintain and servicing vehicles and	Medium

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
					machineries to minimise leaks and spills. • Control through use of drip trays during the servicing as well as parked leaking vehicles and machineries • Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products.	
Rehabilitation	Soil erosion	Soil	Operational and Closure	Medium	• Mitigating by re-vegetation of affected area.	Low
	Establishment of alien invasive plants	Alien invasive plant	Operational and Closure	Medium	• Control though ongoing alien invasive eradication programme • Control by replacing topsoil on the stripped land should take	Low

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and bor eholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g.Construction, commissioning, operational Decommissioning, closure, post-closure)**	**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)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
					place before the next strip is opened and mined • Mining should be phased, starting at the lowest point. Backfilling and rehabilitation of a mined out area should be undertaken immediately after mining has been completed in that area. • Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels	

9. 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.
Heritage Impact Assessment Study	1. From a heritage perspective supported by the findings of this study, the proposed EMPr upgrade is feasible. However, the proposed Environmental Management Plan Upgrade should be approved to proceed as planned under observation that the mining development dimensions do not extend beyond the surveyed sites. 2. Contractors and workers must be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the Amafa AkwaZulu Natali and Research Institute Act 05 of 2018 and National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1). 3. Noteworthy that any measures to cover up the suspected archaeological material or to collect any resources is illegal and punishable by law. In the same manner, no person may exhume or collect such remains, whether of recent origin or not, without the endorsement by Amafa AkwaZulu Natal. The footprint impact of the proposed mining development and associated infrastructure should be kept to minimal to limit the possibility of encountering chance finds. 4. Should any unmarked burials be exposed during mining, affected families must be tracked and consulted, relevant rescue/ relocation permits must be obtained from Amafa AkwaZulu Natal before any grave relocation can take place. Furthermore, a professional archaeologist must be retained to oversee the relocation process in accordance with the Amafa AkwaZulu Natali and Research Institute Act 05 of 2018. 5. Should chance archaeological materials or human burials remains be exposed during mining work on any section of the mining site, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption in mining scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the Amafa AkwaZulu Natali and Research Institute and SAHRA regulations (see appended Chance Find procedure for further details). 6. The Project Public Participation Process should ensure that any cultural heritage related matters for this project are given due attention whenever they arise and are communicated to PHRA throughout the proposed project development. This form of extended community involvement would pre-empty any potential disruptions that may arise from previously unknown cultural heritage matter that may have escaped the attention of this study. 7. Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project EMP there are no other significant cultural heritage resources barriers to the proposed development by Maritzburg Quarry (Pty) Ltd. The Heritage authority may approve the proposed development to proceed as planned with special commendations to implement the recommendations here in made.	**X**	Recommendations section (page 53) within the Heritage Impact Assessment and Archeological Impact Assessment report. **See attached Appendix F4.**

Ecological Impact Assessment Study	• As a matter of priority, the stockpile slopes must be stabilised to prevent erosion and the washing of silt into the green areas and the Mpushini River. This can be achieved by means of a variety of ways, such a log stabilisation, geo-netting, hydroseeding, etc. • With regards to the future extension of the mining area towards the north-eastern boundary, which is shared with the Mpushini Protected Environment, it is strongly recommended that an undisturbed buffer of a suitable width (e.g. 30-50 m) be determined and maintained between the latter and mining activities. This will allow the movement of fauna around the edges of the mine and prevent the undermining of conservation efforts next door. • In order to support the KZN biodiversity (CBA) network, the south-eastern and northern (north of bypassing public road) parts of the mining rights area should be conserved. • The presence of a fair number of alien species on the mining site is a great concern. As an operational phase impact, alien control is required as an ongoing management concern.	**X**	Section 12 (summary and recommendations) of the Botanical Assessment Study attached as **Appendix F8.**

Air Quality Impact Study	• Fallout monitoring is to be continued for the life of mine to better assess the level of nuisance dust associated with both mining and process related operations. Sampling of four different buckets in the main direction of the prevailing winds of the environment. • PM10 and PM2.5 dust monitoring must also be undertaken at the same sites as mentioned under the previous bullet but also in and around potential fugitive emission sources to determine mitigation measures and focus management efforts. • Fully sealed Pit and Access Haul Road to achieve 90-100% mitigation on these roads.	**X**	Section 11 of the Air Quality Impact assessment attached as **Appendix F1.**

Geohydrological Impact Study	• It is recommended that the site and drill one monitoring borehole downstream of the quarry. • Siting of the borehole should employ geophysical survey techniques to increase the chances of intersecting geological structures that influence groundwater flow at the site. • Electromagnetic horizontal profiling is recommended to locate saturated fracture zones and faults; and magnetic traversing to locate dolerite intrusions. The possible positions of the geophysical survey line and the monitoring borehole are shown in Figure 11.1. The drilling site will be located anywhere along the survey line where significant geophysical anomalies are identified. Please note that the positions depicted are for guidance purposes only, the exact positions will be decided on the ground taking local conditions into consideration. • The borehole should be pump-tested if it has water, to determine the hydraulic characteristics of the aquifer. • A groundwater flow model should then be developed to simulate the interaction between the quarry and the river. Please note that groundwater flow modeling will only be carried out if there is significant water in the proposed monitoring borehole, at least 0.2 L/s (0.72m3/h). • Groundwater monitoring should commence immediately after drilling the monitoring borehole. • Groundwater quality sampling should be conducted quarterly; whilst monitoring of groundwater level should be carried out monthly.	**X**	Section 11 of the Geo-hydrological assessment attached as **Appendix F3.**

	• The borehole should be pump-tested if it has water, to determine the hydraulic characteristics of the aquifer. • Groundwater monitoring should commence immediately after drilling the monitoring borehole. • Groundwater quality sampling should be conducted quarterly; whilst monitoring of groundwater level should be carried out monthly. • Water quality parameters to be monitored should include, but not limited to those for drinking water as given in Table 11.2 in the report. • Baseline groundwater quality should be established in the first 24 months of continuous collection of water quality data from the monitoring borehole. This will provide a robust long-term groundwater quality baseline that can be used to detect any changes in groundwater quality during operation and post mine closure. • Dust suppression water should not introduce contaminants onto the ground surface.	**X**	Section 11 of the Geo-hydrological assessment attached as **Appendix F3.**

	• Groundwater quality monitoring should continue after mine closure until the water quality complies with the Resource Quality Objectives (RQO) embedded in the water use licence for a period of 24 months. RQOs are determined by the Department of Water and Sanitation for the quaternary catchment in which the quarry is located, in this case quaternary catchment U20J. • Ideally the aggregate stockpile and processing areas should be lined with low permeability material or bunded to reduce the risk of groundwater contamination. However, due to the extent of the existing facilities, the cost of retro-fitting the liners or bunding would be astronomical. It is therefore recommended that the storm water management system in these areas should prevent water collecting on the surface for extended time; to reduce the chances of it seeping into the subsurface. **Parameters to be monitored:** • Electrical conductivity, EC. • Total dissolved solids, TDS. • Acidity/alkalinity, pH. • Turbidity • Colour • Calcium, Ca. • Magnesium, Mg. .		Section 11 of the Geohydrological assessment attached as **Appendix F3.**

	• Sodium, Na • Potassium, K. • Iron, Fe. • Manganese, Mn. • Copper, Cu. • Lead, Pb. • Zinc, Zn. • Cadmium, Cd. • Chromium, Cr. • Chloride, Cl. • Sulphate, SO4. • Fluoride, F. • Nitrate, NO3 as N. • Phosphate, PO4. • Total alkalinity, CaCO3. • Hydrogen carbonate, HCO3 • Faecal Coliform.		

Noise Impact Study	• Although this study shows increasing sound levels associated with the mine within the Mining Right Boundary, this study has determined that the increasing sound levels measured at the off-site sampling site (AMsl_4) are due to the parabolic effect of the quarry and vehicle traffic on the public road. Therefore, it is recommended that the sound level survey frequency (a single annual survey) be maintained to monitor and assess the sound level environment and identify any new impacts that may arise. • An annual sound level monitoring survey, preferably conducted in winter, should continue to form part of the mine's environmental management programme (EMP). • If community complaints are received from any of the residents in the surrounding area to the mine, then Afrimat should conduct a survey to measure and quantify the sound level at the site of receptor site of the complainant.	**X**	Section 8 of the Noise Level Survey attached as **Appendix F5.**

Wetland/Riparian Study	• The footprint of activities should be as small as possible and must remain outside the delineated watercourse boundaries and buffer zones • A review of stormwater structures should be done to ensure that no erosion and/or sedimentation of the watercourses occur. • Effective stormwater management should be a priority during the construction phase. This should be monitored as part of the EMP. High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account. • Ensure that the activity does not result in downstream erosion or sedimentation • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. • Runoff from the quarry area and access road must be managed to avoid erosion and pollution problems. • Monitoring should be done to ensure that sediment pollution is timeously dressed	**X**	Section 3 of the study attached as **Appendix F6.**

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.
Stormwater management	It is recommended that the water in the surface impoundment be used to maintain and encourage the vegetal cover on the stockpiles by irrigating frequently as well as dust suppression on the internal roads. These uses will not trigger an additional water use license application.	**X**	See section 8 of the report. **Attached as Appendix F7.**

Attach copies of Specialist Reports as **Appendix F.**

2. 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:

TOPOGRAPHY

The topography of the area will be altered due to the mining activities.

LAND USE

The proposed quarry is established in an area that was previously used for mining purposes. The quarry will therefore not have to compete with other land uses at the site. Upon closure of the mining area, the land will revert back to agricultural grazing.

Due to the remote location of the quarry, very little to no 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.

SURFACE AND GROUND WATER

<u>The impact on surface water</u>

The surface water impact on the Maritzburg quarry:

- The impact of an influx of sediments in the Mpushini River and associated tributaries as a result of improper stormwater management.

The recommendations of the Wetland/Riparian specialist can be seen in section i (**Summary of specialist reports**) for the mitigation of the operational effects of the quarry on surface water.

<u>Impact on ground water levels in the operational phase</u>

The excavation of the quarry has reached its lowest vertical elevation, and extraction of rock is now progressing laterally. Available ground elevation data show that the quarry bottom is slightly lower than the section of the river adjacent to the pit (see **figure 21**). The quarry bottom lies at 541 meters amsl, whilst the section of the river adjacent to the pit lies between 548 and 544 meters amsl from upstream to downstream respectively. If it is assumed that there is a

water-table connecting the two, it would have a gradient of 3 meters over 200 meters or 1.5% from the river to the quarry. This would lead to little flow towards the pit. The flow would be further constrained by the permeability of the rock between the river and the quarry, which is presently unknown. The hydraulic properties of the intervening rock material need to be determined by drilling and pump-testing a monitoring borehole between the river and the quarry (Geohydrological assessment report, 2021).

.

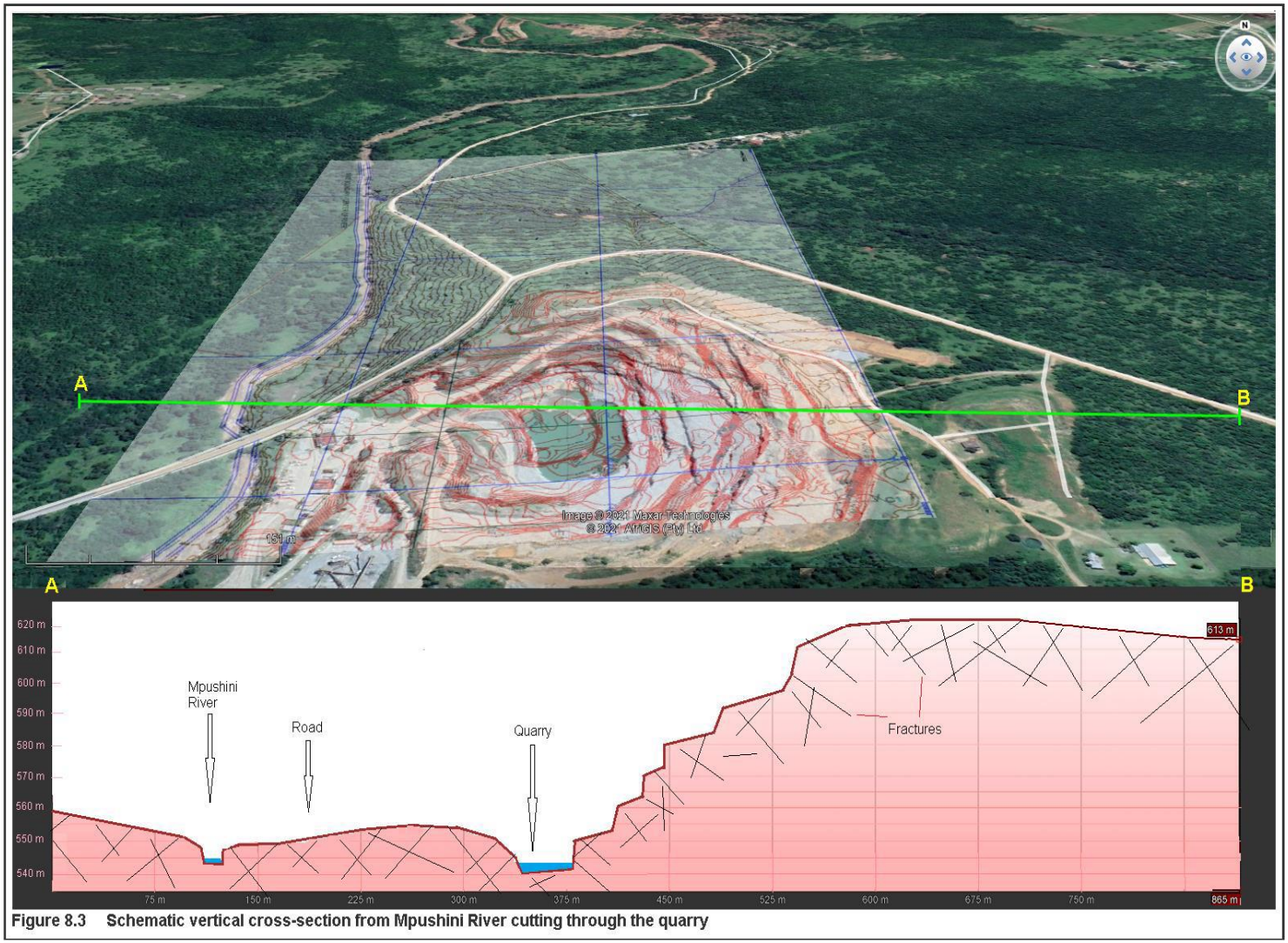


Figure 27: Schematic vertical cross-section from the Mpushini River cutting through the quarry

Impact on ground water quality

The processing of rock material consists of crushing and screening, and temporarily stockpiling at the site before sale. The entire process is a physical one, with no toxic chemical additives used. The process therefore does not generate any potential sources of groundwater contamination. No waste facilities such as tailings dams or evaporation dams exist at the site. No significant groundwater contamination is anticipated from these activities.

Other potential sources of groundwater contamination include:

- Septic tank that receives waste from ablution facilities,
- Vehicle wash bay and associated oil separator.
- Incidental fuel and oil leaks/spillages from vehicles and equipment,
- Explosives used for blasting has potential to taint the rocks with residual chemicals, particular nitrates. These chemicals get washed off the rocks by rain in the quarry and stockpile area, and find their way into the underlying aquifers.
- Dust suppression.
- Storm water from processing and stockpile areas.

The extent of the potential groundwater contamination at the site is presently unknown. Contaminated groundwater would be expected to daylight at the Mpushini River. As pointed out earlier, it is presently not known if there is hydraulic connection between the quarry and the river (Geohydrological assessment report, 2021).

The recommendations of the Geohydrology socialist can be seen in section i (**Summary of specialist reports**) for the mitigation of the operational effects of the quarry on ground water levels and quality.

Storm water management will be of paramount importance in ensuring that the impact on the Mpushini River is kept to a minimum. Dirty water and sediment runoff should not enter the river. This will ensure degradation of the physical and chemical properties of the river remain as is. It is also important that clean storm water runoff be diverted around the site in order to enter the river system and maintain stream flow at the current level.

The recommendations of the Geohydrology specialist can be seen in section i (**Summary of specialist reports**) for the mitigation of the operational effects of the quarry on ground water levels and quality.

VEGETATION

Impact on vegetation

Encroachment into the vegetation was noted around the stockpile areas, notable on the northern side of the overburden stockpiles and on the southern side of the material stockpile area above the Mpushini River. Further encroachment of stockpiling into the natural areas should be kept in check unless it is allowed for in terms of the mining plan. Associated with stockpiling is localised erosion and the washing of silt into the green areas. This needs to be addressed by means of stabilisation of the stockpile slopes.

As an indirect impact, soil disturbance caused by mining activities provides ideal conditions for the establishment of invasive alien species.

The recommendations of the Botany socialist can be seen in section i (**Summary of specialist reports**) for the mitigation of the operational effects of vegetation on site.

FAUNA

It was pointed out to the biodiversity specialist that the direction of mining is towards the north- eastern boundary of the site (see Map 2). This is the boundary shared with the Mpushini Protected Environment. It is strongly recommended that, in order to safeguard the integrity of the protected area, an undisturbed buffer of a suitable width (e.g. 30-50 m) be determined and maintained between the latter and mining activities. This will allow the movement of fauna around the edges of the mine and prevent the undermining of conservation efforts next door.

The recommendations of the Botany specialist can be seen in section i (**Summary of specialist reports**) for the mitigation of the operational effects on Fauna on site.

AIR QUALITY

PM10

For the unmitigated and mitigated Daily PM10 concentrations it was predicted not to be higher than the 75 µg/m³ limit for any of the sensitive receptors.

The annual average PM10 limit of 40 µg/m³ are not predicted to exceed at any of the identified sensitive receptors for any of the modelled scenarios.

TSP

In the mitigated and unmitigated scenarios none of the sensitive receptors are predicted to exceed the monthly dust fallout for the highest month residential limit of 600 mg/m²/day.

The predicted annual dust fall out for the mitigated and unmitigated scenarios are not predicted to exceed the annual limit of 300 mg/m²/day at any of the sensitive receptors.

The recommendations of the Air quality specialist can be seen in section i (**Summary of specialist reports**) for the mitigation of the operational effects of dust on site.

NOISE

The impact of noise on the surrounding community includes that of blasting, the plant, machines and vehicles moving around on site.

The recommendations of the Sound level specialist can be seen in section i (**Summary of specialist reports**) for the mitigation of the operational effects of noise on site.

EXISTING INFRASTRUCTURE

It is expected that the mining activity will have a very low impact on the surrounding environment as activities will be contained within the boundaries of the site. The proposed production of aggregate on the property will also reduce the amount of trucks delivering aggregate, from outside sources. This will have a direct positive impact on the traffic volumes of the surrounding roads and price of the aggregate.

VISUAL EXPOSURE

The surrounding area has previously been disturbed by mining activities. The applicant must 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.

ii. Final Site Map

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers .Attach as **Appendix A4**

Final Site Map has been attached as **Appendix A4**.

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

The positive impacts associated with the project include:

- The site falls within an already disturbed area;

- Work opportunity for ±20 workers;
- Contribution to the construction industry that is an important economic sector in the Pietermaritzburg area; and
- Opportunity for the landowner to diversify income on the property.

Additional negative impacts associated with the project that was deemed to have a medium or higher significance/risk includes:

- Flora and Fauna impacts Low
- Archaeological and cultural sites Low
- Surface water bodies and sensitive landscapes Medium

iv. 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.

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 13: 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. • Assess effectiveness of dust suppression equipment. • Limit speed on the access roads to 30km/h to prevent the generation of excess dust. • Spray gravel 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.

Management Objectives	Responsibility	Management Role
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 (expect for maintanance). • 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.
Management of weed/invader plants	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	• 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.
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	• 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.

Management Objectives	Responsibility	Management Role
	Officer.	
Waste management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	• No burning of refuse wastes on the premises or on surrounding premises • All hazardous material must be stored in bunded areas and then disposed of offsite by an accredited disposal company • Locate waste bins and skips throughout the site. • No littering will be permitted on site and general housekeeping should be enforced • Separate waste/skip bins for the different waste streams must be available on site. • Oil spills should effectively managed with drip trays for vehicles and machines when serviced
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. • Storm water berms divert water away from the office and weighbridge area to a gabion section, which filtrates the water before entering the river. In addition, the natural vegetation around the river also acts as a filtration system for the run-off water. • 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.
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. • 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 proposed activities.
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.

Management Objectives	Responsibility	Management Role
		• 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. • Monitor all rehabilitated areas for erosion, and appropriately stabilized if any erosion occurs.
Health and Safety Risk	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	• 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.
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.

v. 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.

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

- An Environmental Management Programme (EMP) for the construction and operational phases must be implemented for the duration of the proposed project. The EMPr is attached to Appendix.

- Afrimat is not negated from complying with any other statutory requirements that is applicable

to the undertaking of the activity. All necessary permits, licences and approvals must be obtained.

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

- Additional to those conditions the following must be considered as conditions of the Environmental Authorisation:
  - Although the site offers the mineral sought after, the mining area will be within 30m Mpushini River.

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. Various specialist studies have been conducted over the years for Maritzburg Quarry. Information issued by specialists are based on aspects that were seen on the day of the respective assessments.

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 authorization

The conditions for authorisation are recommended to include the following:

- All mitigation measures and management of identified impacts recommended by appointed specialists as part of this report and EMPr must be adhered to and implemented during the construction and operational phases of the project. Should the mitigation measures be deemed impractical, ineffective or cost prohibitive, Afrimat may apply to the DMRE to alter such mitigation measures accordingly. Any change in mitigation measures must be approved by the competent authority.
- Demarcate the site mining right boundary.
- Conditions stipulated in all other permits or authorisations must be implemented;

- A dust monitoring system is to be established and managed by the Applicant to determine the dust fallout generated on site by activities.
- Maintain lines of communication with the neighbours of properties close to the mine.
- Undertake continual closure and rehabilitation concurrently with active mining.
- Revise closure cost assessment on annual basis as required by NEMA.
- Conditions stipulated in the final EMPr and closure plan must be adhered to.
- In terms of monitoring, it is recommended that an ECO audit the activity against the EMPr annually throughout the life of the mine until the existing Mining Right expires. Should the EMPr be audited by the applicant then an independent EAP as per Regulation 13 (2) of the NEMA EIA Regulations 2014 needs to be appointed.

iii. Rehabilitation requirement

In the South African context and the world as a whole, the broad closure objectives include the three schools of thought, outlined below:

- Restoration of previous land capability and land use;
- No net loss of biodiversity; and
- Maintain peaceful relations with the affected community

The main objective for the Pietermaritzburg Operation is to reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas and allow for a suitable post-mining land use.

Other objectives include:

- Ensure adherence to all statutory and other legal requirements
- Removal of all infrastructure that will not be utilized post-closure
- Scarifying and levelling of all disturbed areas, topdressing with topsoil and vegetating these areas
- Removal of all heavy equipment and machinery upon completion of all earthworks required during rehabilitation of the site
- The demolishing of all concrete slabs and ripping of any hard surfaces
- Benching and shaping the top edges of the pit with overburden spoils
- Fencing off the pit to deny access

The overall rehabilitation objectives for the proposed project are as follows:

- Ensure adherence to all statutory and other legal requirements

- Re-establishment of the pre-mining land capability to allow for suitable post mining land use
- Ensure that closure supports productive uses considering pre-mining conditions
- Promote bio-diversity and biological sustainability to the maximum extent practicable
- To reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas, requiring minimum maintenance to facilitate a walk away situation
- To in-fill and slope ramps and voids to be free draining

p) Period for which the Environmental Authorisation is required.

Until closure has been obtained from the DMRE.

q) 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 EAP undertakes that the information provided in PART A is correct, and that the comments and inputs from stakeholders and IAPs have been correctly recorded in the report. This is only applicable to the Environmental Impacts Assessment Report and EMPr as a Basic Assessment Process has not been undertaken.

Refer to PART B: Section 2 for the EAP's signed undertaking.

r) Financial Provision

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

The Financial Provision for rehabilitation of the Martizbrurg quarry has been determined at a value of R4 217 744.13 (Incl. VAT) (as per 2022 financial provision calculations).

i. Explain how the aforesaid amount was derived.

The Financial Provision was determined utilising the Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine (2006).

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).

Afrimat will provide a bank guarantee to ensure the financial provision.

s) 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.

ii. Motivation for the deviation.

N/A.

t) 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 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The following potential impacts were identified that may impact on socio-economic conditions of directly affected persons:

Visual exposure:

Due to the previously disturbed area, and the current operational phase of the Maritzburg quarry, visual impacts are created. This can be managed through maintaining housekeeping of the site and ensuring that rehabilitation of the site is followed through.

Air Quality:

Due to excess dust in the air, the air quality of ambient air is impacted. This can be mitigated through ensuring dust suppression on haul roads and the plant on site.

Noise Quality:

Due to activities such as blasting, the plant and various vehicles and machines moving around on the plant, noise quality is impacted. This can be mitigated by monitoring sound levels, conducting annual sound level surveys and ensuring that community complaints are taken into consideration.

Existing Infrastructure:

It is expected that the processing activity will have a very low impact on the surrounding environment as activities will be contained within the boundaries of the site. The site already has established permanent infrastructure. The proposed production of aggregate on the property will also reduce the amount of trucks delivering aggregate, from outside sources. This will have a direct positive impact on the traffic volumes of the surrounding roads and price of the aggregate. This impact could be managed through the implementation of mitigation measures and needs to be fully investigated during the environmental impact assessment process.

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

No sites of archaeological or cultural importance were identified during the site inspection as the site has been extensively used for mining and agriculture purposes.

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

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

As mentioned earlier, 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 (2005 assessment), by the applicant and project team, and was therefore selected as the preferred alternative.

As discussed earlier the following alternatives were considered:

1. Opencast mining (Preferred Alternative) **vs** Underground Mining;

2. Static crusher / screen plant **vs** Mobile crusher plant; and
3. No-go Alternative.

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

The purpose of this section is to provide a baseline Environmental Management Programme (EMPr) to essentially form part of the Maritzburg Environmental Management System (EMS). The information provided in this section describes guidelines, operating procedures and rehabilitation/pollution control requirements. The EMPr is a legally binding document that the holder of the Environmental Authorisaton is responsible for implementing.

The recommendations and procedures stipulated in the EMPr are based on the findings discussed in Part A of this report. It is therefore essential that this portion be carefully studied, understood, implemented and adhered to at all times.

Part B of this report should be considered as a "living" document, to be reviewed and amended as deemed necessary.

The reasons for review and/or amendments may be the following:

- Failure to identify certain risk or impacts during the initial EIA process; and
- The inability of the EMPr to sufficiently provide for the avoidance, management, and mitigation of environmental impacts associated with the undertaking of authorised activities.

In the event that additional activities, not specified in the EIR and EMPr, are to take place, the impacts associated to those activities must be assessed according to the requirements stipulated by GN R. 982. Therefore this EMPr is only applicable to the listed activities stipulated in **Part A section d)i)** and/or those authorised in terms of the Environmental Authorisation.

1) Draft environmental management programme.

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

The details of the EAP are provided in Part A, Section 1 (h).

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 covered by the EMPr are detailed in Part A, Section 5.

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 any areas that should be avoided, including buffers)

A sensitivity Map has attached on this report under **Appendix A4**

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

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 10cm 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 200mm 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 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.
- Appropriate seed mixes that are indigenous to the site, will be planted during the rehabilitation phase to ensure the regrowth of grass species.

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.

This section describes the approach taken by the EAP in preparation of Part B of this report.

Environmental Management Approach

Globally, there are a number of tools or guideline documents available to assist or describe environmental management. The purpose of an EMPr (Part B of this report) is to describe the process for managing the identified potential environmental impacts or risks described in Part A of this report (EIR) throughout the entire life cycle (from design, to implement, operation, and decommissioning) of the Maritzburg Mine. The IEM (Integrated Environmental Management) tool used for managing the identified environmental impacts by the EAP in this document is the Environmental Management System (EMS). This approach will assist the Maritzburg quarry to achieve continual improvement in environmental performance.

The EMPr in essence will be adopting the approach of the internationally recognised ISO 14001 Environmental Management System (EMS) standard that is essentially based on the Deming Cycle rationale which is a simplified continuous improvement model consisting of four main iterative steps.

These steps are described as follows:

- Plan – Establish objectives and processes necessary to deliver results in accordance with the developed organisational environmental policy.
- Do – Implement the process.
- Check – Monitor and measure processes against environmental policy, objectives legal and other requirements and report the results.
- Act – Take action to continually improve environmental performance.

Continual improvement is achieved by periodically monitoring and reviewing the EMPr and implementing corrective actions when required. Therefore this document should be considered as a living document which must be continuously updated and possibly improved.
This approach taken in the development of the EMPr (Part B of this report) is in line with the requirements stipulated in GN R. 982 (2014 EIA regulations).

Legislative compliance
Throughout the development of management measures all legislative and other requirements associated to the Maritzburg quarry activities were considered and highlighted.

Specialist recommendations
A number of specialist investigations formed part of the EIA process and resulted in a number of findings and recommendations (Part A section **1)j)** summarises the findings). These reports provided specific mitigation and management measures as a recommendation. These findings have been considered throughout the development of the EMPr.

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

The mine activities do not pose any risks to the occurrence of acid mine drainage as the mining process does not use water which can react with rocks. Water will be used to suppress dust generated during the quarrying process.

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

Not applicable due to the nature of the project.

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

Due to the nature of the project as indicated above, there is a low probability of acid mine drainage occurring, no further steps were taken to investigate, assess, and evaluate the impact of acid mine drainage.

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

Due to the nature of the project as indicated above, there is a low probability of acid mine drainage occurring, therefore it is unlikely that design solutions to avoid or remedy acid mine drainage will be required.

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

viii) Has a water use license has been applied for?

The Maritzburg quarry was granted a General Authorisation for Section 21 (c),(i) and (g) by the DWS in 2017 for water use on site.

3. Impacts to be mitigated in their respective phases

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

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Land clearing activities	Operational	• Control though dust suppression measures such as watering of haul roads • Control by keeping area to be disturbed to a minimum • Control through the eradication of all identified alien vegetation • Control through continuous monitoring of alien plants during the life of the mine and within the decommissioned area	• National Environment Management: Air Quality Act 39 of 2004 • National Environmental Management: Biodiversity Act 10 of 2004	During Operational phase

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		until an effective cover of indigenous perennial plants has established		
Blasting and operation of the plant	Operational	• Maintaining good public relations with the surrounding communities, i.e warning the local communities in advance before blasts • Control by evacuating all persons within 500m of a blast site • Control by blasting during daylight hours when ambient noise levels are highest • Conduct seismograph calibration tests to ensure that blasting standards are met	• National Environment Management: Air Quality Act 39 of 2004 • SANS 10103:2008	During operational phase

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Stripping and stockpiling of topsoil	Operational	• Prevent through restricting the disturbed area • Control through rehabilitation by replacing topsoil on the stripped land before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 2m in height and must not be compacted • Control through implementation of storm water management measures	• National Environmental Management: Biodiversity Act 10 of 2004 • Best Practice Guidelines for Small Scale Mining – January 2017	During operational phase
Excavating	Operational	• Prevent through restricting the disturbed area • Control through rehabilitation by	• National Heritage Resources Act 25 of 1999 • SANS 10103:2008	Operational phase

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		replacing topsoil on the stripped land before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 2m in height and must not be compacted • Control through implementation of storm water management measures	• National Environmental Management: Biodiversity Act 10 of 2004	
Hauling and Transport	Operational	• Monitor dust by usage of appropriate dust suppression measures (i.e. spray unconsolidated areas with water/chemical stabilisers) • Control generation excess dust by limiting speed limit to 30km/h	• National Environment Management: Air Quality Act 39 of 2004 • SANS 10103:2008 • MHSA Act 29 of 1996	Operational phase

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		• Monitor by equipping mine vehicles with silencers		
Stormwater management	Operational and Rehabilitation	• Divert storm water around the topsoil heaps, stockpile areas and access roads to prevent erosion and loss of material • Storm water berms divert water away from the office and weighbridge area to a gabion section, which filtrates the water before entering the river. In addition, the natural vegetation around the river also acts as a filtration	• National Water Act 36 of 1998	Operational and Rehabilitation phase

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		system for the run-off water. • • Divert runoff water around the stockpile areas with trenches and contour structures to prevent erosion of the work areas. • Ensure that water from the wash bay plant is tested before used for dust suppression purposes. • Conduct mining in accordance with the Best Practice Guideline for small scale mining that relates to storm		

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		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. • Comply with the requirements stipulated in the Water Use Authorisation issued by the DWS for the water uses on site.		
Waste Management	Operational	• No burning of refuse wastes on the premises or on surrounding premises	• National Environmental Management: Waste Act 59 of 2008	Operational and Decommissioning phase

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		• All hazardous material must be stored in bunded areas and then disposed of offsite by an accredited disposal company • Locate waste bins and skips throughout the site. • No littering will be permitted on site and general housekeeping should be enforced • Separate waste/skip bins for the different waste streams must be available on site.		
Fuel and oil storage	Operational	• Store fuel in bunded tank with apron • Control by establishing a	• National Environmental Management Act No. 107 of 1998	Operational and Decommissioning phase

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		temporary waste storage facility with concreted floor, sloping concreted apron an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Control by maintain and servicing vehicles and machineries to minimise leaks and spills. • Control through use of drip trays during the servicing as well as parked leaking vehicles and machineries		

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		• Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products.		
Rehabilitation	Operational and closure	• Prevent through restricting the disturbed area • Control though ongoing alien invasive eradication programme • Control by replacing topsoil on the stripped land should take place before the next strip is opened and mined • Prevent spraying of herbicides in the area as this also kills many	• National Environmental Management Act No. 107 of 1998	Operational to Closure phase

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		adjacent non-target species • Mining should be phased, starting at the lowest point. Backfilling and rehabilitation of a mined out area should be undertaken immediately after mining has been completed in that area. • Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels		

4. Impact Management Outcomes

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

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Land clearing activities	Dust resulting in decrease in ambient air	Air quality	Operational	Control though dust suppression measures such as watering of haul roads	Avoid creating health impact by reducing dust levels
	Destruction of natural vegetation including plant species of conservation concern	Vegetation	Operational	Control by keeping area to be disturbed to a minimum	Maintain natural vegetation

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
	Impacts on alien invasion of disturbed areas	Air quality	Operational	• Control through the eradication of all identified alien vegetation • Control through continuous monitoring of alien plants during the life of the mine and within the decommissioned area until an effective cover of indigenous perennial plants has established	Reduce colonization by alien invasive species
Blasting and operation of the plant	Dust resulting from blasting fly rock	Air quality	Operational	• Maintaining good public relations with the surrounding communities, i.e warning the	Minimise noise level and ensure safety of staff

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				local communities in advance before blasts • Control by evacuating all persons within 500m of a blast site • Control by blasting during daylight hours when ambient noise levels are highest • Conduct seismograph calibration tests to ensure that blasting standards are met	and community

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
	On-going noise and disturbance related to operation and blasting	Faunal species	Operational	• Fauna threatened by maintenance or operational activities should be removed to a safe location or left to move off on their own. • Fences around the site should be maintained to ensure that larger fauna do not enter the site. • All litter and rubbish should be handled appropriately and stored in closed bins to ensure that it does not attract fauna.	Ensure that faunal life is not disturbed by mining

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Stripping and stockpiling of topsoil	Soil erosion	Soil	Operational	• Prevent through restricting the disturbed area • Control through rehabilitation by replacing topsoil on the stripped land before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 2m in height and must not be compacted • Control through implementation of storm water management measures	Correct topsoil replacement should be implemented to ensure effective rehabilitation of the area

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
	Dust created from stockpiling	Air Quality	Operational	• Control through watering • Monitor trucks that collect aggregate by ensuring that they are covered	Dust generated must fall under the threshold as per the NEM:AQA National Dust Control Regulation Standards for industrial areas

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Excavating	Noise generated by excavators	Noise quality	Operational	• Control by Control by minimising noise through proper design and maintenance of silencers • On diesel powered equipment, systematic maintenance of all forms of equipment	Reduce noise levels
	Destruction of heritage resources	Archaeology and heritage resources	Operational	• Should any artefact of cultural significance be found, work must cease at the site of the find and this person must report this find to their immediate	Protection of archaeological and heritage resources occurring on site

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				supervisor, and through their supervisor to the senior on-site manager. • If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and SAHRA or HWC are informed.	
Hauling and Transport	Dust created by mine vehicles	Air quality	Operational	• Monitor dust by usage of appropriate dust	Dust generated

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				suppression measures (i.e. spray unconsolidated areas with water/chemical stabilisers) • Control generation excess dust by limiting speed limit to 40km/h • Monitor by equipping mine vehicles with silencers	must fall under the threshold as per the NEM:AQA National Dust Control Regulation Standards for industrial areas

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Stormwater management	• Erosion on site • Increase of sediment in river	River and erosion	Operational	• Divert storm water around the topsoil heaps, stockpile areas and access roads to prevent erosion and loss of material • Divert runoff water around the stockpile areas with trenches and contour structures to prevent erosion of the work areas. • Ensure that water from the wash bay plant is tested before used for dust suppression purposes.	Reduce sediment influx in Mpushini River and erosion on site

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				• 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. * Comply with the requirements stipulated in the Water Use	

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				Authorisation issued by the DWS for the water uses on site.	
Waste Management	• Land pollution • Hazardous leachate • Illegal dumping	Land pollution	Operational and decommissioning phase	• No burning of refuse wastes on the premises or on surrounding premises • All hazardous material must be stored in bunded areas and then disposed of offsite by an accredited disposal company • Locate waste bins and skips throughout the site.	To avoid land and contamination of ground water resources

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				• No littering will be permitted on site and general housekeeping should be enforced • Separate waste/skip bins for the different waste streams must be available on site.	
Fuel and oil storage	Soil and groundwater contamination	Soil	Operational and Decommissioning	• Store fuel in bunded tank with apron • Control by establishing a temporary waste storage facility with concreted floor,	Avoid soil and groundwater contamination

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				sloping concreted apron an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Control by maintain and servicing vehicles and machineries to minimise leaks and spills. • Control through use of drip trays during the servicing as well as parked leaking vehicles and machineries	

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				• Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products.	
Rehabilitation	Soil erosion	Soil	Operational and Closure	• Prevent through restricting the disturbed area	Rehabilitation standards/ objectives
	Establishment of alien invasive plants	Alien invasive plant	Operational and Closure	• Control though ongoing alien invasive eradication programme • Control by replacing topsoil on the stripped land should take	Rehabilitation standards/ objectives

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				place before the next strip is opened and mined • Prevent spraying of herbicides in the area as this also kills many adjacent non-target species • Mining should be phased, starting at the lowest point. Backfilling and rehabilitation of a mined out area should be undertaken immediately after mining has been completed in that area.	

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
				• Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels	

5. Impact Management Actions

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

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
Land clearing activities	Dust resulting in decrease in ambient air	Control though dust suppression measures such as watering of haul roads	Operational phase	• National Environment Management: Air Quality Act 39 of 2004
	Destruction of natural vegetation including plant	Control by keeping area to be disturbed to a minimum	Operational phase	• National Environmental Management:

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
	species of conservation concern			Biodiversity Act 10 of 2004
	Impacts on alien invasion of disturbed areas	• Control through the eradication of all identified alien vegetation • Control through continuous monitoring of alien plants during the life of the mine and within the decommissioned area until an effective cover of indigenous perennial plants has established	Operational and Decommissioning phase	• National Environmental Management: Biodiversity Act 10 of 2004

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
Blasting and operation of the plant	Dust resulting from blasting fly rock	• Maintaining good public relations with the surrounding communities, i.e warning the local communities in advance before blasts • Control by evacuating all persons within 500m of a blast site • Control by blasting during daylight hours when ambient noise levels are highest	Operational phase	• National Environment Management: Air Quality Act 39 of 2004

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		• Carry out blast monitoring by utilizing calibrated seismograph equipment to measure ground vibration and air blast at the nearest structures to the blast		
	On-going noise and disturbance related to operation and blasting	• Fauna threatened by maintenance or operational activities should be removed to a safe location or left to move off on their own.	Operational phase	•SANS 10103:2008

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		• Mining right area not fully fenced off. Consider fencing the disturbed area. • All litter and rubbish should be handled appropriately and stored in closed bins to ensure that it does not attract fauna.		
Stripping and stockpiling of topsoil	Soil erosion	• Prevent through restricting the disturbed area • Control through rehabilitation by replacing topsoil on the stripped land	Operational and Decommissioning phase	• National Environmental Management: Biodiversity Act 10 of 2004 • Best Practice Guidelines for Small

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 2m in height and must not be compacted • Control through implementation of storm water management measures		Scale Mining – January 2017
	Dust created from stockpiling	• Control through watering • Monitor trucks that collect aggregate by ensuring that they are covered	Operational phase	• National Environment Management: Air Quality Act 39 of 2004

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
Excavating	Noise generated by excavators	• Control by Control by minimising noise through proper design and maintenance of silencers • On diesel powered equipment, systematic maintenance of all forms of equipment	Operational phase	• SANS 10103:2008
	Destruction of heritage resources	• Should any artefact of cultural significance be found, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through	Operational and Decommissioning phase	• National Heritage Resources Act 25 of 1999

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		their supervisor to the senior on-site manager. • If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and SAHRA or HWC are informed.		
Hauling and Transport	Dust created by mine vehicles	• Monitor dust by usage of appropriate dust suppression measures (i.e. spray unconsolidated areas with water/chemical stabilisers)	Operational phase	• National Environment Management: Air Quality Act 39 of 2004

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		• Control generation excess dust by limiting speed limit to 30km/h • Monitor by equipping mine vehicles with silencers		
Stormwater management	• Erosion on site • Increase of sediment in river	• Divert storm water around the topsoil heaps, stockpile areas and access roads to prevent erosion and loss of material • Divert runoff water around the stockpile areas with trenches and contour structures to	Operational and Decommissioning phase	• National Water Act 36 of 1998

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and** **boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		prevent erosion of the work areas. • Storm water berms divert water away from the office and weighbridge area to a gabion section, which filtrates the water before entering the river. In addition, the natural vegetation around the river also acts as a filtration system for the run-off water. • Ensure that water from the wash bay plant is		

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

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		which that Department may impose. * Comply with the requirements stipulated in the Water Use Authorisation issued by the DWS for the water uses on site.		
Waste Management	• Land pollution • Hazardous leachate • Illegal dumping	• No burning of refuse wastes on the premises or on surrounding premises • All hazardous material must be stored in bunded areas and then disposed of offsite by an accredited disposal company	Operational Decommissioning phase	• National Environmental Management: Waste Act 59 of 2008

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		• Locate waste bins and skips throughout the site. • No littering will be permitted on site and general housekeeping should be enforced • Separate waste/skip bins for the different waste streams must be available on site.		
Fuel and oil storage	Soil and groundwater contamination	• Store fuel in bunded tank with apron	Operational Decommissioning phase	• National Environmental Management Act No. 107 of 1998

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and** **boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		• Control by establishing a temporary waste storage facility with concreted floor, sloping concreted apron an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Control by maintain and servicing vehicles and machineries to minimise leaks and spills.		

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		• Control through use of drip trays during the servicing as well as parked leaking vehicles and machineries • Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products.		
Rehabilitation	Soil erosion	• Prevent through restricting the disturbed area	Operational and Decommissioning phase	• National Environmental Management Act No. 107 of 1998

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and** **boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
	Establishment of alien invasive plants	• Control though ongoing alien invasive eradication programme • Control by replacing topsoil on the stripped land should take place before the next strip is opened and mined • Prevent spraying of herbicides in the area as this also kills many adjacent non-target species • Mining should be phased, starting at the lowest point. Backfilling and rehabilitation	Operational and Decommissioning phase	• National Environmental Management Act No. 107 of 1998

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and** **boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance ,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be**.	**COMPLIANCE WITH STANDARDS** **(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)**
		of a mined out area should be undertaken immediately after mining has been completed in that area. • Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels		

1. Financial Provision

1.1 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 of the mine is guided by the closure vision that was developed for the mine's conceptual closure plan, with the closure objectives and post closure strategy developed to support the vision. The closure objectives, identified in the extension of Maritzburg quarry Closure and Liability plan, which will drive the closure criteria and which have been developed to support the closure vision are:

- Ensure adherence to all statutory and other legal requirements;
- Re-establishment of the pre-mining land capability to allow for suitable post mining land use;
- Ensure that closure supports productive uses considering pre-mining conditions;
- Promote bio-diversity and biological sustainability to the maximum extent practicable
- To reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas, requiring minimum maintenance to facilitate a walk away situation;
- To in-fill and slope ramps and voids to be free draining;
- Remove mine infrastructure that cannot be used by the applicant or a third party. Where buildings can be used by a third party, arrangements will be made to ensure their long term sustainable use; and
- Ensure that community safety is not adversely impacted (i.e. the pit area is adequately fenced off to restrict entry by humans and animals).

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

The above environmental objectives with regards to closure and rehabilitation have been incorporated into this report and will be made available to the landowner and I&APs.

(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.

Find in **Appendix E**

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

Find in **Appendix E**

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

Section 24(P)(1) of NEMA states that an Applicant for an environmental authorisation relating to mining or related activities on a mining area must make the prescribed financial provision for the rehabilitation, management and closure of environmental impacts, before the Minister responsible for mineral resources issues the environmental authorisation.

In order to ensure that the Applicant provides sufficient funds for the total quantum to cover the rehabilitation, management and remediation of negative residual environmental impacts, the quantum for closure-related financial provision in terms of Regulation 4 of the NEMA Regulations on Financial Provision (GN940 of 2014) has been determined.

Determination of the financial provision (closure costing) has been undertaken, aligned to these requirements. The estimated closure cost for unscheduled closure as of 2022 is R4 217 744.13 including Vat. The details of the closure costing can be found on the **Table 14** below.

Table 14: Maritzburg Financial Provision costing table - 2022

CALCULATION OF THE QUANTUM

Mine	**Maritzburg Quarry**		
Applicant :	**Afrimat Aggregates (KZN/FS)**		
Evaluator:	**BRIAN WEVELL**	**Location:**	**Pietermaritzburg**
Reference :	**KZN30/5/1/2/2/89MR**	**Date:**	**Jun 2021**

Environmental Parameters

Risk Class	B
Area sensitivity	Medium
Nature of terrain	Undulating

	Proximity to Urban Ara		Peri - urban				
No.	**Description**	**Unit**	**A** **Quantity**	**B** **Master Rate**	**C** **Multiplication factor**	**D** **Weighting factor 1**	**E=A*B*C*D** **Amount (Rands)**
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	800	R 17.20	1	1.1	R 15 138.36
2 (A)	Demolition of steel buildings and structures	m2	94	R 239.63	1	1.1	R 24 777.41
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	R 353.13	1	1.1	R 0.00
3	Rehabilitation of access roads	m2	0	R 42.88	1	1.1	R 0.00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	R 416.19	1	1.1	R 0.00
4 (B)	Demolition and rehabilitation of non-electrified railway lines	m	0	R 227.01	1	1.1	R 0.00
5	Demolition of housing and/or administration facilities	m2	175	R 479.25	1	1.1	R 92 256.32
6	Opencast rehabilitation including final voids and ramps	ha	8.72	R 243 914.87	0.52	1.1	R 1 216 608.33
7	Sealing of shafts adits and inclines	m3	0	R 128.64	1	1.1	R 0.00
8 (A)	Rehabilitation of overburden and spoils	ha	3.81	R 167 486.53	1	1.1	R 701 936.03
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	R 208 601.44	1	1.1	R 0.00
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	R 605 877.47	0.76	1.1	R 0.00
9	Rehabilitation of subsided areas	ha	0	R 140 244.74	1	1.1	R 0.00
10	General surface rehabilitation	ha	3.69	R 132 677.58	1	1.1	R 538 538.30
11	River diversions	ha	0	R 132 677.58	1	1.1	R 0.00
12	Fencing	m	0	R 151.34	1	1.1	R 0.00
13	Water management	ha	0.62	R 50 447.75	0.6	1.1	R 20 643.22
14	2 to 3 years of maintenance and aftercare	ha	16.22	R 17 656.71	1	1.1	R 315 031.06
15 (A)	Specialist study	Sum	1.00	R 30 268.65	1	1.1	R 33 295.51
15 (B)	Specialist study	Sum	1.00	R 30 268.65	1	1.1	R 33 295.51
					Sub Total 1		R 2 991 520.06
1	Preliminary and General		R 358 982.41		**weighting factor 2** 1.05		R 376 931.53
2	Contingencies		R 299 152.01				R 299 152.01
					Subtotal 2		R 3 667 603.59
					VAT (15%)		R 550 140.54
					Grand Total		**R 4 217 744.13**

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

Afrimat has the technical and financial ability to manage and rehabilitate the environment. Details of their technical ability were included in the Mine Works Programme. The financial provision will be provided by means of a bank guarantee.

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

g) Monitoring of Impact Management Actions
h) Monitoring and reporting frequency
i) Responsible persons
j) Time period for implementing impact management actions
k) Mechanism for monitoring compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Land clearing activities	Alien vegetation	• Certain plants, such as Aloes and bulbs, should be translocated to an adjacent suitable habitat if threatened by the development • Monitoring of alien vegetation during the life of the mine and within the decommissioned area for at least 2 years after construction or until an effective cover of indigenous plants	Site Manager and ECO	• During construction and operational phases • During life of the mine and post-closure
Blasting and operation of the plant	Management of health and safety risks	• Maintaining good public relations with the surrounding communities in advance before blasts	Site Manager and ECO	• Compliance upon every blast

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		• Control by evacuating all persons within 500m of the blast site		
Stripping and stockpiling of topsoil	Soil erosion	• Prevent soil erosion through restricting the disturbed area • Control by restricting topsoil stockpiles to 0.5m in height and must not be compacted • Control through implementation of storm water management measures • Soil stripping should forbidden on areas of retained vegetation • Separately stockpiling subsoils and overburden to be returned for backfilling in the correct soil horizon order	Site Management and ECO	• Throughout the Operational Phase • Daily compliance monitoring by site management • ECO Quarterly Compliance Monitoring Reports
Excavating	Noise and heritage	• Manage and monitoring depth spreading to ensure that coverage is adequate and uneven	Site Manager and ECO	• Throughout the Operational Phase • Daily compliance monitoring by site management

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		• Minimizing noise through proper design and maintenance of all forms of equipment • Should any artefact of cultural significance be found, work must cease at the site of find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager • If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and SAHRA or HWC are informed		
Hauling and Transport	Dust	• Monitor dust by usage of appropriate dust suppression measures (i.e. spray unconsolidated areas with water/chemical stabilisers) • Control generation of excess dust by limiting speed 20km/h	Site Management	• Throughout the Operational Phase • Daily compliance monitoring by site management

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Stormwater management	Surface and groundwater contamination	• Implement stormwater management measures as per stormwater management plan • Divert contaminated runoff to evaporation ponds • Pipelines used to transport clean water for processing should be inspected frequently to ensure its integrity and take pro-active action if required	ECO or any other assigned responsible person	Weekly
Waste Management	Land pollution, leachate and soil and ground water contamination	• No burning of refuse wastes are on the premises or on surrounding premises • All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site • Locate waste bins and skips throughout the site. • No littering will not be permitted on site and general housekeeping should be enforced • Separate waste skips/ bins for the different waste streams must be available on site. • Clean up all oil spills immediately by digging out soil to the depth of penetration	Site Management and ECO	• Throughout the Operational Phase • Daily compliance monitoring by site management • ECO Quarterly Compliance Monitoring Reports

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		and storing contaminated soil in sealable containers and disposing in a suitable landfill site		
Fuel and oil storage	Soil and groundwater contamination	• Store fuel in bunded tank with apron • Control by establishing a temporary waste storage facility with concreted floor, sloping concreted apron an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Control by maintenance and servicing vehicles and machinery to minimise leaks and spills • Control through use of drip trays during the servicing as well as parked leaking vehicles and machineries • Used parts like filters should be contained and disposed of at a site licensed for dumping of these products	Site Management and ECO	• Throughout the Operational Phase • Daily compliance monitoring by site management • ECO Quarterly Compliance Monitoring Reports
Rehabilitation	Rehabilitation	• Prevent through restricting the disturbed area	Site Management and ECO	• Concurrent rehabilitation during operational phase

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		• Control though ongoing alien invasive eradication programme • Control by replacing topsoil on the stripped land should take place before the next strip is opened and mined • Prevent spraying of herbicides in the area as this also kills many adjacent non-target species • Mining should be phased, starting at the lowest point. Backfilling and rehabilitation of a mined out area should be undertaken immediately after mining has been completed in that area. • Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels • Regular follow up clearing of alien invasive species would be required in order to obtain successful rehabilitation		• Compliance after mining ceases

2. Indicate the frequency of the submission of the performance assessment report

Section 34 of GN R. 982 (published under the National Environmental Management Act (NEMA), Act 107 of 1998) stipulates requirements for auditing compliance with the Environmental Authorisation (EA), the Final EMPr, and the Rehabilitation plan.

It requires the holder of the authorisation, for the period during which the EA, EMPr, and closure plan (if applicable) are valid, to ensure compliance with all the conditions stipulated in these documents and that is be audited. This audit report must then be submitted to the competent authority.

The Environmental Audit Report (EAR) must be undertaken annually until such time as the existing Mining Right expires. A report must be compiled and submitted to the competent authority.

The purpose of this audit report is defined as follows:

- On an ongoing basis, determine the ability of the EMPr (and where applicable the closure plan) to sufficiently provide for:
  - the avoidance;
  - management; and
  - mitigation of environmental impacts; and
- To determine the level of compliance with the provisions of:
  - Environmental Authorisation (EA);
  - EMPr; and
  - where applicable the closure plan.

In the event that findings of the environmental audit report indicate insufficient mitigation of environmental impacts of the activity or insufficient levels of compliance with the requirements, the holder of the EA must:

- Submit recommendations to amend the EMPr or closure plan in order to rectify the shortcomings identified in the audit report.
- Allow for a public participation process (which process has been agreed to by the competent authority and was appropriate) to access the proposed amendment to the EMPr (and where applicable the closure plan); and
- Allow for the potential and registered interested and affected parties (I&AP), including organs of state which have jurisdiction in respect of any aspect of the relevant activity and the competent authority, to comment on these changes.

Operational internal environmental inspections will need to be done once a month by the Applicant's

Environmental Representative. All findings and data are to be recorded in an on-site Environmental File.

3. Environmental Awareness Plan

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

General environmental awareness will be promoted among everyone working on the Maritzburg quarry (including consultants and contractors) to encourage the implementation of environmentally sound practices throughout its duration.

This will ensure that environmental incidents are minimised and environmental compliance maximised.

The objectives of the Environmental Awareness Plan are as follows:

- To inform employees, contractors of any environmental risks which may result from their work;
- To inform employees and contractors of the relevant environmental procedures and actions required to be taken;
- To improve the knowledge of employees and provide the relevant training

Environmental policies will be posted on notice boards, thereby making employees aware of the company's commitment to protect the environment. Environmental management practices are also included in the induction of new employees, contractors and returning employees as a form of creating environmental awareness.

The environmental awareness plan must at least communicate the following:

- Importance of conformance with the environmental policy, procedures and other requirements of good environmental management;
- The significant environmental impacts and risks of an individual's work activities and the environmental benefits of improved performance;
- Individual's roles and responsibilities in achieving the aims and objectives of the environmental policy; and
- The potential consequences of not complying with environmental procedures.

All employees and contractors are to undergo induction, a part of which is environmental awareness training. At the end of this training, personnel will be required to sign a register noting their completion of the training and their understanding thereof.

All personnel performing tasks which can cause significant or major environmental impacts shall be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

Environmental awareness training will include the identification of significant environmental impacts,

actual or potential, which their work activities could result in, as well as mitigation and prevention measures. Training is appropriate to the activity of individual employees. Monthly environmental topics will be generated to raise awareness of employees on environmental issues.

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

The EMPr details commitments in order to avoid pollution or the degradation of the environment. Compliance to and implementation of the management and mitigation measures contained in the EMPr is important. Compliance with the EMPr commitments will form part of the daily operations of the mine, and a copy of the EMPr commitments will be provided to the contractors. Employees will also be briefed regarding the EMPr commitments prior to the commencement of operations. In addition to this, monitoring by internal Environmental Representative as well as by the external auditor will be conducted on a regular basis.

Site Inductions

All employees are required to undergo environmental awareness induction training on appointment. All records of such training must be kept. Refresher induction training must periodically take place.

Toolbox talks

Regular meetings (recommended to be done daily, at least once a week) communicating the following is recommended:

- Findings of environmental performance reports;
- Awareness raising campaigns discussing environmental topics; and
- Information of any environmental risk which may result from employee's work.

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. 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 Department:	**033 845 2400**
Ambulance:	**033 897 5299**
Msunduzi Municipality Call Centre:	**080 000 1868**
Fire and Rescue:	**080 003 3911**

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 and Energy (DMRE).

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 0.8m 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;
- Don't 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 license facility or licensed company;
- Bioremediation will be done on site to the satisfaction of Department of Environmental Affairs (DEA);

- 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 DEA will be notified by fax and or phone within 24hours 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 pit 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 loud noises; and
- Report or repair noisy vehicles.

Flora and Fauna

- 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 Protection 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;
- Fire breaks has been established and will be maintained around the mining area for the duration of the project;
- 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.

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.
- Laborers 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; and
- Emergency procedures awareness.

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

The Financial Provision will be reviewed on an annual basis. This Financial Provision assessment will be accompanied by an annual Environmental Audit of the EMPr.

UNDERTAKING

The EAP herewith confirms

c) the correctness of the information provided in the reports ☒

d) the inclusion of comments and inputs from stakeholders and I&APs ; ☒

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

f) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☒

-END-