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**ENVIRONMENTAL MANAGEMENT PROGRAMME, REHABILITATION  
PLAN & ENVIRONMENTAL RISK REPORT**

**Anniedale Quarry on Portion 405 of Vaalkop and Dadelfontein 885**

**Msunduzi Local Municipality**

**Tillite Tech (Pty) Ltd**

**KZN 30/5/1/3/2/10462MP**



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## This report was prepared by EnviroPro Environmental Consulting

*Details of the persons who prepared the plan and experience of the preparers provided in terms of section 3 (a) of Appendix 3, 4 and 5 of the “Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations” in accordance with the National Environmental Management Act 107 of 1998 as amended and the Mining and Petroleum Resources Development Act 28 of 2002.*

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## SECTION 1

## INTRODUCTION, PROJECT AND SITE DESCRIPTION

### 1.1. Background

Tillite Tech (Pty) Ltd propose to ultimately clear and mine 5 hectares of land in order to operate a commercial quarry on the property identified as Portion 405 of Vaalkop & Dadelfontein 885 in Camperdown. The EMPr has been submitted as part of the requirements for obtaining the mining Permit, in terms of section 27 of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) and section 24 of the National Environmental Management Act 107 of 1998 as amended (NEMA). Section 3 of the EMPr provides the Annual and Final / Closure Rehabilitation Plans as required in terms of the *Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations* published in Government Gazette No. 10526 No. 39425 dated 20<sup>th</sup> November 2015.

### 1.2. Scope of Work

Prepare a site specific EMPr for the set up and operation of a quarry in order to manage and mitigate potential environmental impacts during site set up and operation. The provisions of this EMPr are binding while the quarry continues to operate on Portion 405 of Vaalkop & Dadelfontein 885. The EMPr also includes rehabilitation measures once the operation has ceased and the holder of the permit is still responsible for.

### 1.3. General Principles and Purpose of This EMPr

The purpose of this EMPr is to provide guidance to all contractors and operators on how to operate in a responsible manner and ensure that the requirements of the legislation are met. The EMPr also provides rehabilitation measures to be implemented annually and during final closure of the Anniedale Quarry. This EMPr is a working document to be used during set up, operation and rehabilitation. The measures have been generated to ensure:

- The environment is protected during the set-up, operation and rehabilitation of the quarry.
- That all emissions to air, water and soil are controlled and managed so as to mitigate their impacts on the environment and surrounding communities.
- That nuisance factors associated with set up and operation are controlled as far as is reasonably possible.
- That the correct principles are followed from the very beginning during site set up thereby reducing frustrations on the part of the contractor when asked to comply with the strictures of the EMPr and relevant environmental legislation.
- That decommissioning is carried out correctly so as to avoid environmental impacts and meet the legislated requirements.

This EMPr is subject to change as brought about by variations in the project specification and any changes must be approved by the relevant authorities. As per the “*Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations*”, the rehabilitation plans in section 3 of the EMPr will be renewed on an annual basis.

### 1.4. Responsibilities

The Holder of the Mining Permit (Tillite Tech) is responsible for:

- Ensuring that contractors and plant operators comply with the approved EMPr.
- Ensuring compliance with the provisions for duty of care and remediation of damage in accordance with section 28 of the National Environmental Management Act (NEMA), (No. 107 of 1998) and its obligations regarding the control of emergency incidents in terms of Section 30 of NEMA.
- Notifying the relevant authorities (EDTEA) of any incident as defined in subsection 30(1)(a) of NEMA.
- Ensuring adherence to safety, health and environment (SHE) standards and ensuring the construction activities comply with the EMPr.
- Arranging for the site to be monitored on a daily basis to ensure compliance with the EMPr.

- Overall responsibility and accountability for the site during the construction phase.
- Mitigating impact on the environment through responsible operation and adherence to the EMPr.
- Ensuring transparency in their operation and environmental management of the site.

The Site Contractor(s) / Onsite Mining Engineer is/are responsible for:

- Operating in accordance with the EMPr and carrying out construction activities with due care and diligence.
- Ensuring that any communications from stakeholders are reported to the Environmental Control Officer (ECO).
- Maintaining relevant documentation for review by the ECO.

The Environmental Officer (EO) or designated Safety Health Environment (SHE) officer is responsible for:

- Arranging regular internal monitoring of construction during set up and of the operational phase of the plant against the requirements set out in this EMPr and the environmental authorization.
- Ensuring that all site staff are adequately trained in environmental matters.
- Liaising with site staff and I&APs through the Community Liaison Officer (CLO), if required.
- Being conversant with the applicable legislation pertaining to the environment.
- Liaising directly with the ECO on the audit findings.
- Identifying possible areas of improvement during construction.
- Monitoring the construction site on a regular basis and recording key findings.
- Advising the Applicant on environmental matters.
- Providing appropriate recommendations to address and rectify these matters.
- Monitoring implementation of the EMPr by the contractor and operators.
- Working hand in hand with the health and safety officer.
- Maintaining records pertinent to the requirements of the EMPr.

The Environmental Control Officer (ECO or Independent environment practitioner) is responsible for:

- Conducting required auditing against the requirements of the EMPr and Environmental Authorization.
- Liaising directly with the EDTEA and supplying them with copies of the audit reports.
- Liaising directly with the contractor and EO and supplying them with a copy of the audit reports.

### 1.5. Monitoring

The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. The onsite mine manager / contractor who is mining the material must be responsible for day to day monitoring and management of the quarry. An independent ECO must undertake quarterly ECO audits (i.e. four times a year) to monitor compliance and enforcement with regards to the authorised EMPr (section 2 and 3 below). Photographic records of all incidents and/ or non-conformances must be retained. Non compliances identified by the ECO must be resolved within fourteen days of being noted, incidents that are deemed by the ECO to have a large environmental impact must be resolved immediately. The Annual Rehabilitation Plan is to be reviewed on annually to ensure that mitigation measures and costings are up-to-date with mining activities. Any amendments to the Annual Rehabilitation Plan are to be followed through to the Final Rehabilitation Plan to ensure the overall closure vision of the Anniedale Quarry is clear.

### 1.6. Applicable Legislation

The mine manager should be aware of any compliance issues raised by the EO and ECO and must ensure that the necessary corrective measures are implemented. As per the National Environmental Management Act No 107 of 1998 (Section 28), and Mineral and Petroleum Resources Development Act, No 28 of 2002 (MPRDA), offending parties may be held financially accountable for any pollution or environmental damage.

The following environmental legislation must be adhered to:

- Constitution of South Africa (Act No. 108 of 1996)
- National Environmental Management Act (Act No 107 of 1998)
- Environment Conservation Act (Act No 73 of 1989)
- Mineral and Petroleum Resources Development Act, No 28 of 2002
- National Heritage Resources Act (Act No 25 of 1999)
- National Water Act (Act No 36 of 1998)
- Hazardous Substances Act (Act No. 15 of 1973)
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
- Occupational Health and Safety Act (Act No 85 of 1993)
- National Environmental Management: Waste Management Act (Act No. 59 of 2008)
- National Building Regulations and Building Standards Act 103 of 1977
- National Environmental Management: Protected Areas Act 57 of 2003
- Relevant local by-laws

This EMPr meets the requirements of the stipulations provided in Appendix 4 of the Environmental Impact Assessment Regulations (2014) published in terms of NEMA with regards to the content of EMPrs. This EMPr has been developed to specifically address the impacts related to the Anniedale Quarry in each phase of the mining operations. Section 3 of the EMPr meets the requirements of the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations.

### 1.7. Layout of the EMPr

The EMPr is divided into sections dealing with an introduction and description of the site, operational activities and rehabilitation activities. Sections 4 and 5 provide definitions and records that can be used to record training, incidents and complaints. The tables have been set up to enable ease of auditing with a section for the EO/SHE officer or ECO to state whether or not mitigation measures have been put in place and to make comment about any problems noted.

At present, there is no construction phase as mining will commence on approval of the Mining Permit. There will be very little activity associated with the construction phase apart from establishing a site office (containers) and setting up the screener and crusher in demarcated areas. The establishment of a site camp and associated processing structures has been included under section 2 of the EMPr.

### 1.8. Project Details

Tillite Tech (Pty) Ltd proposed, to mine stone on a privately owned portion of land in Ward 37 of the Msunduzi Local Municipality, Umgungundlovu District. Nikkel Trading 535 (Pty) Ltd own Portion 405 of Farm Vaalkop and Dadelfontein 885, where the mining will take place. The entire property is 178.16 hectares in extent. The mining area, including all stockpile areas, offices, parking etc. will ultimately measure a total area of 4.99 hectares. The site is located at 29°43'11.81"S; 30°28'54.44"E, approximately 1.3km west of the N3/P338 interchange "Umlaas Road". Figure 1 below provides an overview of the Anniedale Quarry.

The Mine Manager and workers at the quarry are to be made aware of the sensitive environmental features associated with the property so that there is no unintentional damage to the immediate area and long-term conservation management plans for the greater Mpushini Valley. The sensitive areas include primary and core primary grassland to the north and east of the quarry as well as the presence of Red-Listed avifaunal species which use the grassland for foraging [e.g. *Grey Crowned Crane* (Endangered), *Blue Crane* (Near Threatened) and *Secretary Bird* (Vulnerable)]. Open primary grassland and wetland areas with limited anthropogenic disturbance provide suitable foraging habitat. Provincially protected and Red-Listed plant species are associated with the quarry site and are to be relocated by an experienced botanist prior to any clearing taking place. Figure 2 provides a map of the sensitive environmental features with additional photographs and maps of the sensitive areas provided in section 2 of the EMPr.

The mining operation can be summarised as follows:

- The permitted area to be mined will be clearly demarcated using the stormwater control berms.
- The engineer will establish access for the plant on the eastern side of the quarry and plan out the excavation approach.
- A topsoil storage site will be established for storage of topsoil removed during the initial clearing (berm formation). This will be retained for use in rehabilitation at a later stage.
- Overburden will be cleared using an excavator (used to create berm) and soft material cut back.
- Controlled blasts will loosen material to create benches.
- Blasting to be conducted during day light hours only, while trucks may operate 18 hours a day, depending on demand, Monday to Saturdays.
- Material will be transported to the crushing and screening plant on site for processing.
- Material collected by top-loaders and distributed to consumers.
- All activity will be monitored and managed by a site foreman and flag men will be placed to ensure safe operation of the earth moving equipment in and out of the quarry.

The Anniedale Quarry has the potential to supply construction material to the immediate area increasing the development potential. The close proximity of the N3 highway provides an ideal access network to surrounding areas and the anticipated "development corridor" associated with this busy route should further see an increase in the construction of light industry / mixed-use developments in the immediate area. The tillite that will be mined will supply the construction industry contributing to municipal and provincial growth. The tillite is used for the manufacture of concrete and concrete precast products as well as in fill and road applications.

Figure 1: Mine Plan Showing the Proposed Anniedale Quarry on Portion 405 of Vaalkop and Dadelfontein 885 in The Msunduzi Local Municipality; Umgungundlovu District; KwaZulu Natal. Applicant: Tillite Tech (Pty) Ltd. Proposed Mining Area Shown in Red Measuring 4.99ha (29°43'11.81"S; 30°28'54.44"E; source: Google Earth Image, 2016)

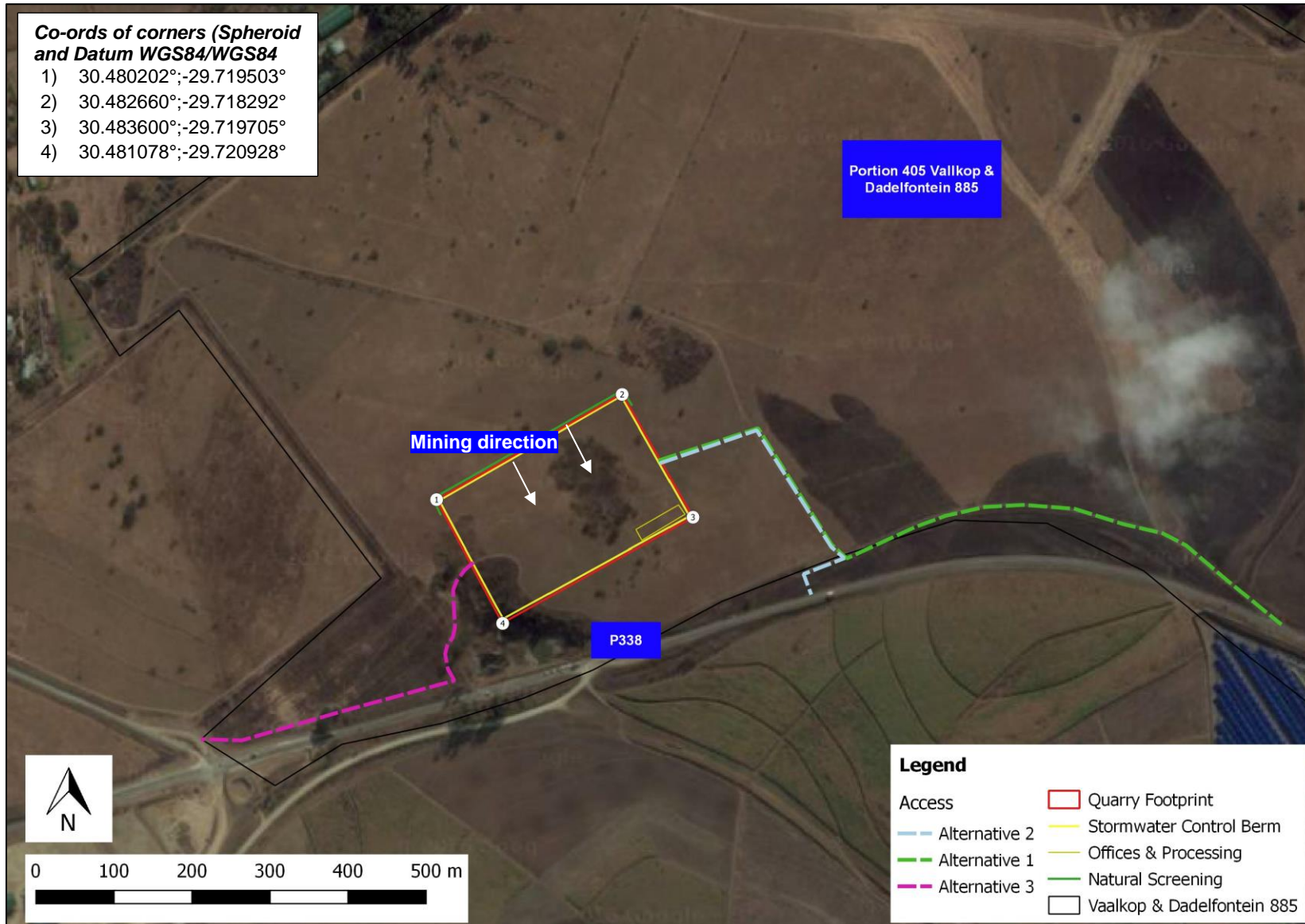
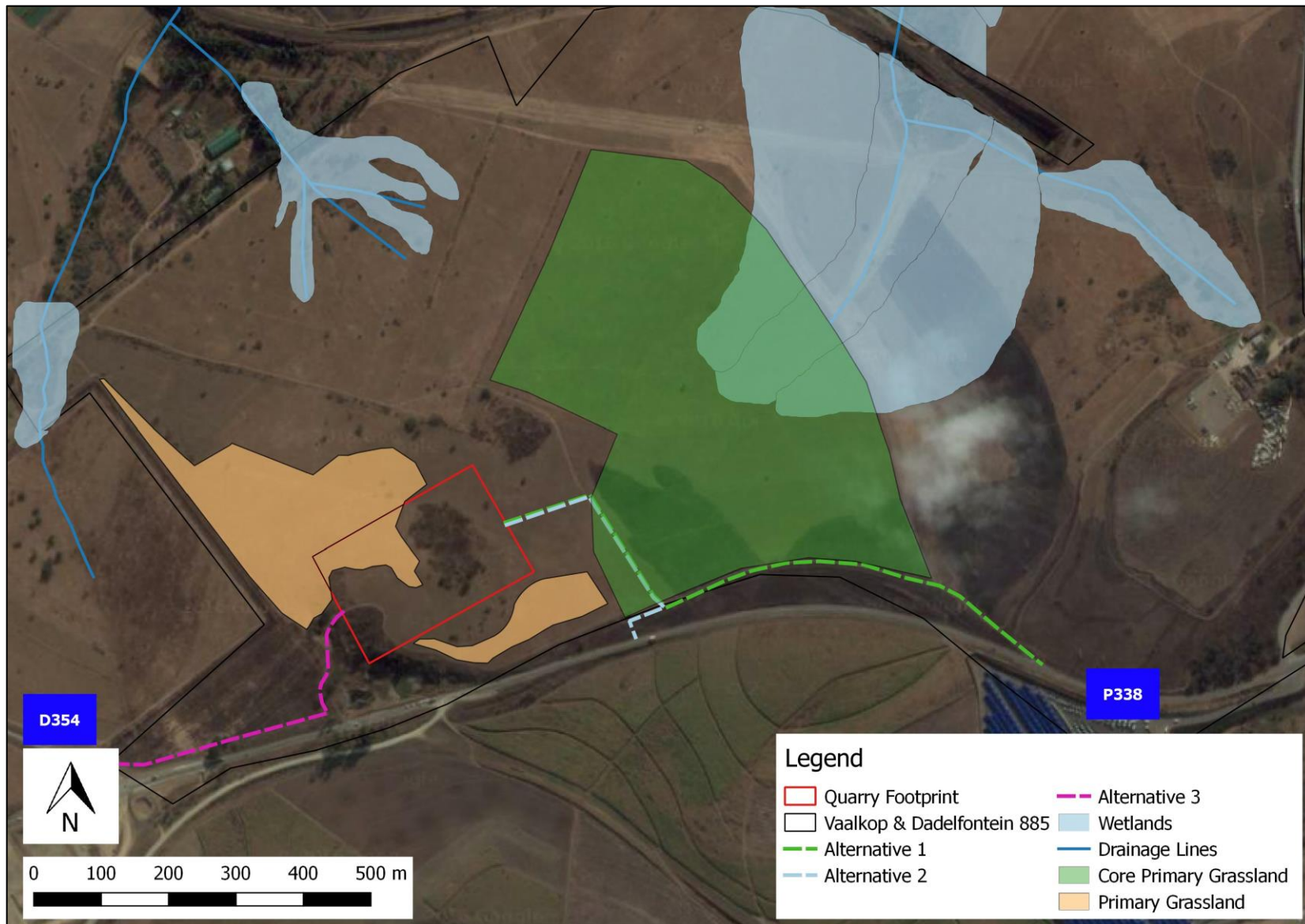




Figure 2: Map Showing the Preferred Anniedale Quarry Including Environmentally Sensitive Areas Associated with the Property (Core Primary Grassland Shaded in Green and Water Resources Shaded in Blue; source: QGIS).





**1.10. Names and Telephone Numbers of Contact Persons**

The following list of contacts must be printed and made clearly visible on the site.


Contact List			
Designation	Organisation	Name	Contact number
Applicant	Tillite Tech (Pty) Ltd	Peter Pretorius	031 700 2099
Mine Manager			
Independent Environmental Practitioner and ECO	EnviroPro	Josette Oberholzer Iain Jourdan	082 568 3687 082 887 4362 031 765 2942
Mining Environmental Authority (Enforcement & Compliance)	DMR	Compliance Officer	031 305 5801
Reporting for Incidents involving Watercourses	DWS		
Wildlife Related Incident	Ezemvelo KZN Wildlife	Dominic Wieners	033 845 1455
Heritage Resources	AMAFA	Weziwe Tchabalala	033 394 6543
Fire Emergency	Fire Department	-	10111
Crime Emergency	Police	-	10111

**SECTION 2**

**SITE SET UP & OPERATION**

Construction will result in the very little activity occurring on the site (establishment of site office, setting up screening and crushing plants in demarcated areas as well as the upgrading of the relevant intersection). There is therefore no specific construction section, with all impacts being addressed in the operational and rehabilitation phase of the project (sections 2 and 3 of the EMPr).

**2.0 Site Camp, Storage & Handling of Hazardous and Non Hazardous Materials**

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
<p><b>Location &amp; Establishment of site camp</b></p>	<ul style="list-style-type: none"> <li>The site camp must be marked out with the approval of the ECO according to the Figure in the Mine Works Plan (see Figure 3 below).</li> </ul>	CON		
	<p><b>Figure 3: Anniedale Quarry Layout, as per the approved Mine Works Plan (source: Tillite Tech, 2016)</b></p> 			

	<ul style="list-style-type: none"> <li>The site camps should be located on a flat portion of land which will be disturbed during operational activity and will therefore be cleared anyway. This is to avoid the necessity of rehabilitating and replanting areas outside of the quarry area.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>The site camps must be clearly demarcated and fenced off to prevent illegal entry.</li> <li>All mining equipment is to be retained in the site camp.</li> <li>The construction of the berm around the mine area is to be established (orange in the figure above).</li> <li>The location of the sumps is to be determined to ensure water is captured in the mine area.</li> <li>The applicant is to commence with planting indigenous trees along the northern boundary of the quarry to provide natural screening for the residents across the valley (green in Figure 3 above).</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>The following areas must be demarcated and clearly marked within the site camps:                             <ul style="list-style-type: none"> <li>A waste storage area</li> <li>A materials storage area</li> <li>Areas for fuel and hazardous chemical / flammable goods</li> <li>Parking area</li> </ul> </li> </ul>	CON		
Establishing storage areas	<ul style="list-style-type: none"> <li>A waste storage area must be demarcated and suitable and sufficient waste bins must be provided within the camps. Storage of waste must be on a hard surface, and under cover. Liquid waste must be situated within a bunded area.</li> <li>Liquid waste and accumulated waste must be removed from site regularly by a recognized Waste Contractor.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>A materials storage area must be identified and designated within the Site Camps. The storage area must be under cover.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Areas for fuel and hazardous chemical / flammable goods must be identified and clearly signposted. An inventory of the materials and volumes stored must be maintained and updated once a week. These areas must be located within a bunded, hard surfaced impermeable area.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li><b>Bulk fuel storage:</b> No bulk fuel storage to occur on site.</li> </ul>	CON		

	<ul style="list-style-type: none"> <li>No <b>explosives</b> will be stored on site.</li> </ul>			
	<ul style="list-style-type: none"> <li><b>Parking:</b> designate parking areas on the sites and ensure that only these parking areas are used.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li><b>Vehicle servicing:</b> only emergency (breakdown where equipment is no longer mobile) and minor maintenance (e.g. greasing) may be done on the sites.                             <ul style="list-style-type: none"> <li>A designated area must be set aside for this which must be hard surfaced and bunded.</li> <li>Drip trays must be used.</li> <li>Any other planned or required maintenance must be done off site at a suitable location.</li> </ul> </li> </ul>	CON		
<b>Handling of liquids on site</b>	<ul style="list-style-type: none"> <li>All handling of hazardous materials including cement must take place on a hardened surface or within a drip tray or cement mixing tray.</li> </ul>			
	<ul style="list-style-type: none"> <li>Avoid spillage of materials onto the soil or where it may enter the stormwater runoff or adjacent wet area. Decanting of hazardous materials should take place within the site camp above drip trays or containers to prevent the potential spillage into these areas.</li> </ul>	CON		
<b>Inventory and record of substances stored on site</b>	<ul style="list-style-type: none"> <li>A full inventory of hazardous substances and Material Safety Data Sheet (MSDS) for each substance stored on site must be maintained and each substance must be stored and managed in accordance with the MSDS.</li> </ul>	CON		
<b>Storage of hazardous materials</b>	<ul style="list-style-type: none"> <li>Hazardous materials and liquids to be stored in the assigned storage area as per Section 2 of this EMPr.</li> </ul>	CON		

**2.1 Administration & Records**

Activity / Document	Required Action	Person	In place (Yes / No)	Comments
<b>EMPr, EA and Mining Permit</b>	<ul style="list-style-type: none"> <li>Keep a hard copy of the approved EMPr on site and ensure that it has been signed by the relevant personnel.</li> </ul>	CON		

	<ul style="list-style-type: none"> <li>Keep a hard copy of the EA and Mining Permit at the site camp.</li> </ul>			
	<ul style="list-style-type: none"> <li>Ensure all contractors as well as all engineers and the ECO have a copy of the EMPr prior to coming on to site.</li> </ul>	ECO/ ENG		
<b>Records</b>	<ul style="list-style-type: none"> <li>Keep records and proofs of all agreements, meetings etc. so as to demonstrate compliance with this EMPr.</li> </ul>	CON		
<b>Proof of training</b>	<ul style="list-style-type: none"> <li>Keep training attendance registers on file at all times (see section 2.2 below).</li> </ul>	EO		
<b>Incident records &amp; Photographs</b>	<ul style="list-style-type: none"> <li>Keep records of incidents that have occurred and how they were remediated. Take photographs when incidents occur and follow up pictures to demonstrate remediation and keep these on record.</li> <li>These records must be kept on site for review by DMR.</li> <li>Please see the definition of an incident in section 4 below.</li> </ul>	EO		
<b>Appointment of ECO / EO</b>	<ul style="list-style-type: none"> <li>Appoint an ECO (Environmental Control Officer) prior to commencement of operation to monitor the entire operation phase.</li> </ul>	ENG		
	<ul style="list-style-type: none"> <li>Keep proof of appointment and contact details as well as dates of audits.</li> </ul>	APP		
<b>Emergency response plan</b>	<ul style="list-style-type: none"> <li>An emergency response plan must remain on site as must a copy of the EMPr and the Environmental Authorization.</li> </ul>	ECO		
<b>Audits</b>	<ul style="list-style-type: none"> <li>A record of audits conducted on the site as well as findings must be kept on site.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>Quarterly audits are to be undertaken by an independent ECO to ensure the operation of the quarry is in line with the recommendations in the EMPr.</li> </ul>			
<b>MSDSs</b>	<ul style="list-style-type: none"> <li>Material Safety data Sheets (MSDSs) are to be kept on site for all hazardous material that is kept on site.</li> </ul>	CON		

2.2 Training & Awareness				
Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
<b>Who should be trained &amp; Frequency of training</b>	<ul style="list-style-type: none"> <li>All mining staff must have basic environmental awareness training, which can be conducted at the same time as the required health &amp; safety training.</li> </ul>	EO		
	<ul style="list-style-type: none"> <li>Staff must be trained on their environmental responsibilities before commencing work and refresher sessions can be conducted during toolbox talks on specific areas causing problems.</li> </ul>	EO		
	<ul style="list-style-type: none"> <li>Staff must sign training register and Records of training must be kept.</li> <li>These records must be maintained on site for review by DMR.</li> </ul>	EO		
<b>Training Content</b>	<ul style="list-style-type: none"> <li>Training must include                             <ol style="list-style-type: none"> <li>Reasons for conserving and protecting the environment within and around the quarry footprint;</li> <li>How the following activities can impact the environment: - Not using assigned ablutions, hazardous materials, uncleaned spills, waste management i.e. use of waste receptacles and waste separation for recycling, vehicle washing polluting soil &amp; ground water; litter;</li> <li>Why and how the steep banks of the quarry should be shaped at a 1:3 ratio.</li> <li>Consideration of neighbours.</li> <li>Use only the chemical toilets provided.</li> <li>No dumping to occur in sensitive areas on and adjacent to the quarry site.</li> <li>Use waste bins provided.</li> <li>Use drip trays provided on parked vehicles.</li> <li>Do not build fires for any purpose on the site.</li> <li>How to manage alien invasive vegetation on site.</li> <li>No collecting or digging out of any plants around the quarry or nearby grassland areas.</li> <li>Behave in socially acceptable manner and do not use drugs or alcohol on site.</li> <li>There is to be no hunting of wildlife on the site and no setting of snares or traps. No animals are to be harmed or harassed.</li> </ol> </li> </ul>	EO		



	<p>14. Drivers utilising the access roads are to be informed of how to pass other vehicles (i.e. on the western side of the road nearest the quarry to prevent encroachment into the core grassland).</p> <p>15. Identification of red listed and protected plant species, shown in the Figures 4, 5 and 7 in the following section. These species need to be relocated offsite and not destroyed.</p> <p>16. Venomous snake inductions should be provided to all construction and resident staff in order to minimise the threat of local mortalities</p>			
<b>Neighbours &amp; Working hours</b>	<ul style="list-style-type: none"> <li>The local community members must be notified of the commencement of operation. This can be achieved through placement of signboards.</li> <li>Site specific signboards must contain the contact details for the responsible mine manager/ engineer for the site.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Operating hours will depend on demand but should not exceed 18 hours / day.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>A complaints register is to be retained on the site so that any complaints can be logged and addresses timeously.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Neighbours to be advised prior to periods where work will be done outside normal working hours.</li> <li>The community must be made aware of the authorised mining activity prior to mining commencing.</li> </ul>	CON		

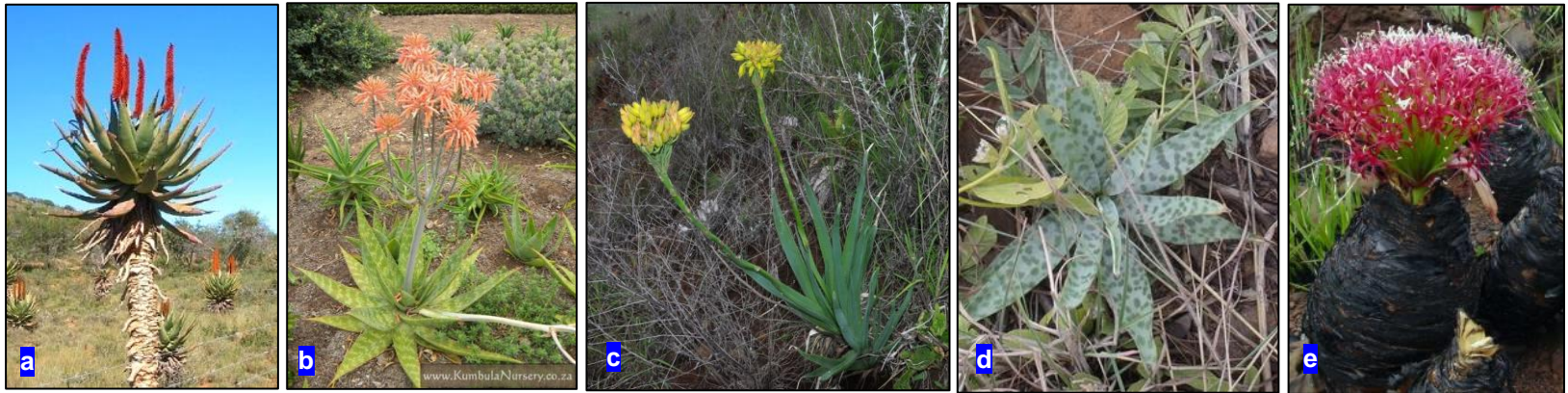
**2.3 Sensitive Areas**

<b>Activity</b>	<b>Required Action / remediation to control environmental impact</b>	<b>Person</b>	<b>In place (Yes / No)</b>	<b>Comments</b>
<b>Community</b>	<ul style="list-style-type: none"> <li>Indigenous trees are to be planted along the northern boundary of the quarry to provide natural screening for residents across the valley.</li> </ul>	CON		
<b>Watercourses</b>	<ul style="list-style-type: none"> <li>No material or surface water runoff must be allowed to flow into the nearby drainage line to the west of the site.</li> <li>No ad hoc roads may be created to access the P338 or D354.</li> <li>Mined material must be removed from site as it is mined to prevent 'sediment travel' outside the borrow pit area from high rain fall events.</li> </ul>			

<p><b>Vegetation</b></p>	<ul style="list-style-type: none"> <li>• The authorised mining area must be clearly demarcated to ensure that there is no unintentional clearing of grassland.</li> <li>• All mining vehicles are to remain within the boundaries of the demarcated area.</li> <li>• Vehicles are to remain on the existing dirt access track at all times with no turning circles created in the grassland areas.</li> <li>• There is to be no disturbance of the core primary grassland area, shaded in green in Figure 2.</li> </ul>	<p>CON/ EO</p>		
<p><b>Top soil</b></p>	<ul style="list-style-type: none"> <li>• Top soil removed during the excavations must be kept aside for use in rehabilitation.</li> <li>• The topsoil can be used as stormwater berms above and below the quarry.</li> <li>• The topsoil must be re-used for rehabilitation purposes once a section of the quarry has been closed or when the site has been exhausted and will not be mined further.</li> <li>• Soil stockpiles must not exceed 2m in height, must be covered or grassed to prevent erosion caused by exposure to heavy wind or rain.</li> </ul>	<p>CON/ EO</p>		
<p><b>Water resources</b></p>	<ul style="list-style-type: none"> <li>• Burying of rubble on site, or dumping into surrounding areas is prohibited.</li> <li>• Caution must be exercised near the wet area created from previous mining activities in the south-west corner of the Anniedale Quarry.</li> <li>• No spills must be allowed to enter this ponded area or the riparian zones and no materials must be stored within 32m of this area.</li> </ul>	<p>CON/ EO</p>		
<p><b>Protected / red listed plant species</b></p>	<ul style="list-style-type: none"> <li>• A permit from Ezemvelo KZN Wildlife is required to relocate or destroy the protected species occurring within the quarry footprint as identified by the vegetation specialist.</li> <li>• The following protected plants occur within the quarry area with photographs provided below for reference on site: <ul style="list-style-type: none"> <li>- <i>Aloe ferox</i> and <i>A. maculata</i> are common species in KZN. Given the larger size of the former, liaison needs to be made with Ezemvelo KwaZulu-Natal Wildlife to establish whether aloe relocation is indeed necessary.</li> <li>- <i>Aloe ferox</i> prefers drier, rockier parts on the property, not open grassland.</li> <li>- <i>A. maculata</i> also prefers somewhat scrubby grassland.</li> </ul> </li> </ul>	<p>CON/ EO</p>		

- *A. kraussii* (which is a less common species) and *Ledebouria cf. apertiflora* (which can be relocated without much difficulty) are to be relocated.
- *A. kraussii* can be planted in other open grassland.
- *Ledebouria cf. apertiflora* prefers areas where grass cover is somewhat sparse.
- *Boophone disticha* can be planted in other open grassland.

**Figure 4: Plant species requiring a permit from Ezemvelo KZN Wildlife prior to relocation or destruction (a) *Aloe ferox*; (b) *Aloe maculata*; (c) *Aloe kraussii*; (d) *Ledebouria cf. apertiflora* and (e) *Boophone disticha***



- Relocation should also occur for red listed species (*Boophone disticha*, *Senecio umgeniensis* and *Helichrysum pannosum*). Photographs of the red listed plants are provided below for reference on site.
  - *Helichrysum pannosum* which has been relocated, must be watered twice a week for a month after relocation.
  - *Helichrysum pannosum* prefers scrubby grassland, usually on south and south-east-facing slopes.
  - *Boophone disticha* can be planted in other open grassland.
- If the quarry is not yet established by the early summer, or has not yet reached parts of the proposed footprint, it should be searched again for any more protected and red listed plants, as they will be more visible at this time.
- Relocation is to be carried out by suitably qualified personnel with good care without damage to roots or bulbs.
- The plants are to be relocated to suitable habitats on the property.

Figure 5: Red listed plant species requiring relocation off the Anniedale Quarry site (a) *Helichrysum pannosum* and (b) *Senecio umgeniensis*



<p><b>Alien vegetation control</b></p>	<ul style="list-style-type: none"> <li>• On-going control of alien vegetation within and along the edges of the mining footprint must be carried out in accordance with an Alien Vegetation Clearance program.</li> <li>• Alien vegetation removal is to be concentrated during the spring season (Sept – Dec).</li> <li>• Examples of the most common alien vegetation to be removed are shown in Figure 6 below.</li> <li>• As many as possible of the Eucalyptus trees outside the demarcated quarry area are to be retained as these are used by raptors foraging in the grassland.</li> <li>• The perimeter of the quarry should be regularly mowed to suppress alien vegetation from encroaching into the primary grassland around the edge of the quarry.</li> <li>• Alien vegetation and weeds must not be permitted to gain a foothold on site in cleared areas or on stockpiled material.</li> </ul>	<p>CON/ EO</p>		
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Figure 6: Alien vegetation to be removed from site (a) Black Wattle; (b) Syringa; (c) Slash Pine; (d) Bugweed; and (e) Lantana.



<p><b>Fauna</b></p>	<ul style="list-style-type: none"> <li>• If bullfrogs, hedgehogs or white-tailed rats are discovered mining should temporarily cease and an expert zoologist should be commissioned to perform an assessment. Photographs of these species are provided below for reference purposes.</li> <li>• If individual pythons are discovered on site, an expert herpetologist should be commissioned to remove the animal safely for the purposes of relocation.</li> <li>• Residential and feral owned dogs should not be allowed into the grassland systems.</li> </ul>		
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Figure 7: Endangered / declining faunal species to be removed from site during mining (a) White-tailed Mouse *Mystromys albicaudatus*; (b) Southern African Hedgehog *Atelerix frontalis*; and (c) Giant Bullfrog *Pyxicephalus adspersus*.



<p><b>Cultural and Heritage items</b></p>	<ul style="list-style-type: none"> <li>Should any items with historical or archaeological value be found during operation, these must be reported to AMAFA and work in the affected area must be stopped immediately.</li> </ul>	<p>CON</p>		
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**2.4 Slope, Soil, Stormwater Runoff & Erosion Management**

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
<p><b>Slope / quarry management</b></p>	<ul style="list-style-type: none"> <li>The working bench widths will be a minimum of 30m and only reduced under special conditions. The 30m wide bench will allow machines to work safely providing ample turning space.</li> <li>A safety berm will be erected around 3m from the crest.</li> <li>Benches to be spaced vertically at 8-14m with the ideal bench height being between 10-12m.</li> <li>The slope face must not be heavily undercut as this could lead to collapse of the slope.</li> <li>Undercutting of the slope and creation of over-steep slopes must not be permitted.</li> <li>No loose material is left in the face.</li> <li>Soft material will be cut back at a batter no steeper than 1:1.5 reducing the height of the suspended material.</li> </ul>	<p>CON/ ENG</p>		

	<ul style="list-style-type: none"> <li>• Final pit wall slopes will vary between 45° - 65° depending on the local rock mass classification.</li> <li>• Mining activity needs to take into account the final shape of the excavated area so as to reduce the risk of potential collapse and shifting.</li> <li>• The slope angle and stability must be regularly evaluated by the resident engineer and adjustments made to the area and angle of excavation as needed.</li> <li>• A fence surrounding the approved quarry footprint is to be erected to contain the entire permitted area.</li> <li>• No animals or children may enter this site.</li> <li>• The quarry benches must be shaped in such a way that no water is able to pool on site without being directed to the sumps.</li> </ul>			
<p><b>Blasting</b></p>	<ul style="list-style-type: none"> <li>• The blasting is to be carried out by a suitably qualified Contractor.</li> <li>• Surrounding farmers are to be notified prior to blasting commencing.</li> <li>• An assessment of ground conditions and desired fragmentation is to be done on each blast and blasting strategies and techniques tailored to deliver the desired outcomes.</li> <li>• Ground vibration from blasting operations must be monitored after each blast by means of a PPV (Peak Particle Velocity) meter.</li> <li>• Recordings must be kept of each blast in the Blast Analysis Sheet and filed in the Site Supervisor's office.</li> </ul>			
<p><b>Stormwater</b></p>	<ul style="list-style-type: none"> <li>• The stormwater management system is to be established prior to any excavation taking place to ensure the separation of clean and "dirty" water.</li> <li>• It must be ensured that run off through the quarry area is managed to prevent any sedimentation from exiting the quarry area potentially flowing into / accumulating in the drainage line to the west of the quarry.</li> <li>• A sump must be created to contain contaminated run off from the mining area.</li> <li>• Clean run off to be directed around the new quarry pit and sump into the surrounding environment.</li> <li>• Run off from the blasting and work areas to be directed into the sump pit where it can be tested and if necessary treated.</li> </ul>	<p>CON</p>		

	<ul style="list-style-type: none"> <li>Water stored in the sump will then be re-used on site for dust suppression.</li> <li>Stormwater from bunded fuel storage areas must not be allowed to enter the stormwater system.</li> </ul>			
	<ul style="list-style-type: none"> <li>No contaminated runoff or grey water is allowed to be discharged from the site into the surrounding environment.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Should a kitchen/ wash area be provided on site, this area must drain to a conservancy tank; this tank must then be drained regularly with the tank contents being disposed of at a licensed water treatment facility and proof of safe disposal maintained for review by DMR.</li> <li>Tool washing must be done within a container to allow for the capture of grey water generated during tool washing. This water can then be removed off site and safely disposed of.</li> <li>There must be no grey water generated from vehicle washing as this is not permitted on site unless a wash bay with sump is installed.</li> <li>Only clean stormwater may be allowed to leave the site.</li> </ul>	CON		
<b>Incidents</b>	<ul style="list-style-type: none"> <li>Entry of any substance (i.e. any material or substance that is not clean stormwater) into the stormwater or a water body is considered an incident and must be reported to the ECO <b><u>immediately</u></b> for the purposes of maintaining the site's incident records.</li> </ul>	CON/ EO		
<b>Stormwater flow</b>	<ul style="list-style-type: none"> <li>The drainage system must be regularly checked to ensure an unobstructed water flow.</li> <li>Channelled flow must not be permitted to cause damage to the surrounding environment.</li> </ul>	CON		
<b>Erosion Control</b>	<ul style="list-style-type: none"> <li>Install appropriate erosion barriers (gabion baskets, topsoil berms or diversion ditches, sandbags) and other sediment control structures (grates or grids, geofabric) before clearing in order to prevent substances from entering the surrounding environment.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Identify any steeper areas where erosion is more likely to occur and ensure adequate protection of these slopes. This can be achieved through planting of vegetation, placement of berms or use of hessian material.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>Regularly check and clean material from behind erosion barriers.</li> </ul>	CON/ EO		



2.5 Housekeeping, Waste Storage Handling and Disposal				
Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
General Waste Storage	<ul style="list-style-type: none"> <li>The waste area to be designated and demarcated within the site camp (as per section 2.1).</li> <li>Regular checks and clean ups are to be scheduled to ensure that there is no waste / refuse in the adjacent grassland.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Solid waste must be stored in covered, tip proof metal drums to be collected and disposed of by a certified waste contractor.</li> <li>Proof of safe disposal of solid waste must documented and these records must be maintained on site for review by DMR.</li> </ul>	CON		
Hazardous waste	<ul style="list-style-type: none"> <li>Hazardous materials that require disposal (cement, paints, solvents, old fuel / oil etc.) must be disposed of at a registered hazardous landfill site.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>These materials must be removed by an appropriate hazardous waste contractor. Proof of appropriate disposal must be available to the ECO for scrutiny and kept on record.</li> <li>Proof of safe disposal of solid waste must documented and these records must be maintained on site for review by DMR.</li> </ul>	CON		
Diesel Disposal	<ul style="list-style-type: none"> <li>Diesel Contaminated soil must be disposed of as hazardous waste at a permitted hazardous landfill and safe disposal certificates must be retained.</li> </ul>	CON		
Waste from Chemical toilets	<ul style="list-style-type: none"> <li>Install chemical toilets (1 per 15 workers) and insure appropriate disposal of waste at a licenced disposal facility.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Waste from the toilets must be collected on a weekly basis by a registered and reputable company.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Safe disposal certificates for toilet waste must be obtained and kept on site as assurance that the waste was properly disposed of.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Toilets must not be situated on slopes or within 32m of any water resource and must be secured to prevent them tipping over.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>Staff must use facilities provided and are not permitted to use any other areas on site as toilet facilities.</li> </ul>	CON		

	<ul style="list-style-type: none"> <li>• Chemical toilets must be checked daily and cleaned.</li> </ul>	CON		
<b>Waste storage and handling</b>	<ul style="list-style-type: none"> <li>• All waste must be disposed of at a licenced waste disposal facility. Proof of disposal must be kept on site at all times.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>• All skips must be covered to contain odours and prevent waste from blowing around the site.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>• A register of all waste generated and disposed of must be maintained.</li> </ul>	CON/EO		
	<ul style="list-style-type: none"> <li>• Ensure the correct waste containers are used by all site personnel.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>• No dumping is permitted. There must be no dumping on site under any circumstances. The contractor is liable to a fine should there be any evidence of illegal dumping.</li> <li>• The ECO to review damage and advise on rehabilitation measures if required.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>• Do not place waste containers, skip bins or building materials on steep slopes or within 32m of the water resources.</li> </ul>	CON/EO		
	<ul style="list-style-type: none"> <li>• Waste accumulated on site must be removed on a weekly basis. The waste must be moved to a licenced waste disposal facility.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>• Provide litter bins and ensure all litter is immediately cleared.</li> </ul>	CON		
<b>Waste separation</b>	<ul style="list-style-type: none"> <li>• <b>Hazardous:</b> Hazardous waste must be stored separately from general waste.                             <ul style="list-style-type: none"> <li>○ Hazardous waste must be disposed of at an approved hazardous waste landfill and safe disposal certificates must be obtained.</li> <li>○ Hazardous waste includes used oils, lubricants, solvents, solvent based paints, concrete waste and cement.</li> </ul> </li> </ul>	CON/EO		
	<ul style="list-style-type: none"> <li>• <b>Solvents and solvent based paints</b> must be disposed of by a licensed contractor as hazardous waste at an approved landfill.</li> </ul>			
	<ul style="list-style-type: none"> <li>• <b>Oils and lubricants</b> must be within a bunded storage area and treated as flammable waste.                             <ul style="list-style-type: none"> <li>○ Used oils to be recycled.</li> </ul> </li> </ul>			

	<ul style="list-style-type: none"> <li>○ Safe disposal certificates to be kept on site demonstrating appropriate disposal or recycling of the used oils.</li> <li>○ Solid paint waste may be disposed of as general waste.</li> </ul>			
	<ul style="list-style-type: none"> <li>● <b>Concrete waste / rubble:</b> <ul style="list-style-type: none"> <li>○ Return excess concrete with delivery truck to supplier for recycling or proper disposal.</li> <li>○ Any other excess concrete can be stored in a lined bin for eventual recycling or disposal.</li> </ul> </li> </ul>	CON/EO		

**2.6 Resource Use and Conservation**

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Water Use	<ul style="list-style-type: none"> <li>● Minimise and monitor water use on site.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>● Maintain records of water usage on site.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>● No water is to be abstracted from the nearby water resources but a municipal supply obtained, should additional water be required.</li> </ul>			
Electricity Use	<ul style="list-style-type: none"> <li>● Measures to conserve electricity use should be implemented, where feasible.</li> </ul>			

**2.7 Noise**

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Noise Generation and suppression	<ul style="list-style-type: none"> <li>● Use noise suppressors on machinery.</li> <li>● Earth mounds around the site boundary will assist in noise suppression.</li> <li>● A list of noise generating equipment and noise levels generated to be recorded in a register, which is to be retained on site.</li> <li>● All site vehicles must be fitted with standard silencers and be well maintained.</li> </ul>	CON		

	<ul style="list-style-type: none"> <li>Workers must be trained regarding noise on site.</li> </ul>	CON		
<b>Noise from Blasting</b>	<ul style="list-style-type: none"> <li>Ground vibration from blasting operations will be monitored after each blast by means of a PPV (Peak Particle Velocity) meter.</li> <li>Recordings will be kept of each blast in the Blast Analysis Sheet and filed in the Site Supervisor's office.</li> </ul>			

2.8 Dust & Emissions				
Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
<b>Dust from stockpiles</b>	<ul style="list-style-type: none"> <li>Cover any stockpiled fine material to prevent dust release.</li> </ul>	CON		
<b>Dust from surfaces</b>	<ul style="list-style-type: none"> <li>A water cart/tanker to be used which should remain on designated road ways.</li> <li>The site haulage roads to be regularly watered to prevent dust generation from the access tracks.</li> </ul>	CON		
<b>Dust from operation</b>	<ul style="list-style-type: none"> <li>Mining benches are only to be cleared of vegetation as and when required for mining. This will reduce the amount of soil exposed.</li> <li>If dust from the site becomes a problem for nearby residents, the area generating dust must be shielded with shade cloth.</li> <li>The material in the back of the haulage trucks must be covered when being transported off site.</li> <li>No water may be abstracted from water resources for dust suppression. Should water be required on site, a General Authorisation for the abstraction of this water must be obtained from DWS.</li> <li>Water used for dust suppression on site should be obtained from the sump areas. Alternatively, a municipal source is to be used.</li> <li>Dust from heavy vehicles will have a negative impact on roadside vegetation and therefore dust suppression is to be carried out along the access track as well as within the confines of the quarry area.</li> <li>Water from the sumps are not to be used for dust suppression along the access roads.</li> <li>Water use must be controlled and reduced wherever possible.</li> </ul>	CON/ EO		

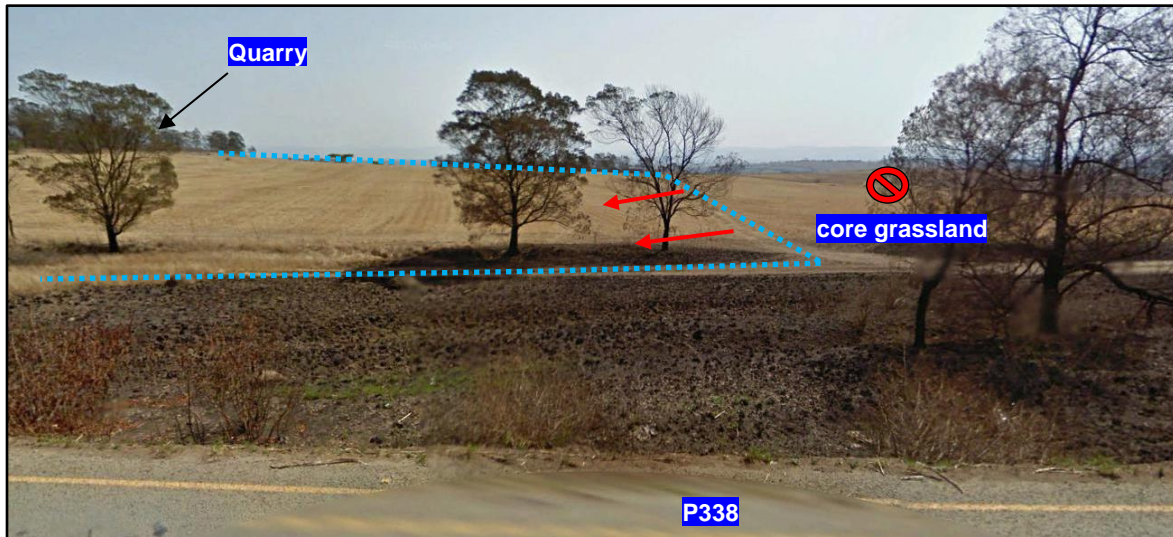
	<ul style="list-style-type: none"> <li>• Water wastage will not be tolerated.</li> <li>• Perimeter monitoring of dust will be conducted to monitor dust levels to ensure they remain within legislated limits.</li> <li>• Machines to be fitted with dust suppression equipment and localised water spraying with the addition of wetting agents will also reduce dust from specific activities and equipment.</li> <li>• If dust exceeds legislated guidelines, additional dust control measures will be implemented such as shielding of this equipment (use of hoods or enclosing within shade cloth barriers) as well as placement of equipment so that it is sheltered from prevailing winds will also assist in managing dust.</li> </ul>			
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2.9 Vehicle Maintenance, Operation, Driving On Site and Vehicle Washing				
Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Roads and Access	<ul style="list-style-type: none"> <li>• Haulage roads must be demarcated at site set up prior to mining commencing.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>• Temporary access roads must not be located within adjoining properties.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>• No ad hoc haulage roads or turning areas may be created outside of the quarry footprint apart from the authorised access track.</li> </ul>	CON/ EO		

- There are two alternatives to access the quarry. Option 2 will use an existing dirt track to the east of the quarry site with direct access onto the P338.
- Vehicles are to remain on existing tracks with any necessary expansions being carried out to the west (closest to the quarry), away from the core primary grassland to ensure there is no further encroachment into the core grassland area (see Figure below).
- Should DoT confirm access Option 3 as the preferred access route, vehicles are to form an access road through the grassland area and tie in with the existing track near the south-west corner of the quarry site.
- There are to be no multiple tracks formed through the adjacent grasslands.

CON/ EO

**Figure 8: Photograph showing access option 2 in blue with the red lines indicating which side vehicles should over take to prevent entrance into the core grassland area.**



- Limit vehicle entry point to the designated access point and ensure no other point of entry is used.

CON/ EO

- All vehicles to remain in the parking area designated within the quarry.

CON/ EO

	<ul style="list-style-type: none"> <li>• Type B2 intersections are to be constructed where the quarry access joins the P338, as recommended in the Traffic Impact Statement.</li> <li>• During the upgrading of the relevant intersection, clearance of vegetation must only take place in the intersection footprint (i.e. no excessive clearance of vegetation).</li> <li>• There is to be no dumping of waste or spoil material in the area once the intersection has been formalised.</li> </ul>			
<b>Vehicle servicing and repairs</b>	<ul style="list-style-type: none"> <li>• No major equipment or vehicle servicing to occur on site i.e. major disassembly and repair work, clutch replacements and oil or lubricant changes must be carried out at a suitably equipped workshop.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>• Only minor emergency repairs, i.e. those necessary to get the vehicle moving so that it can be taken to a repair facility to be carried out i.e. stopping of oil leaks, lubricating of hydraulics, changing of buckets / breakers on Excavators and TLBs or changing of tyres. This must be carried out in designated work shop areas within the allowed site camps. These areas to be hard surfaced and bunded.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>• Drip trays are to be used by all leaking vehicles and equipment.</li> <li>• All vehicles to be equipped with drip trays.</li> <li>• All small machinery used on site must be situated on a drip tray (i.e. pumps, generators, compressors etc.).</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>• All vehicles to be regularly maintained and maintenance records must be made available on request.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>• Any vehicles that are leaking must not be allowed entry to site.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>• Cement trucks are not permitted to wash out cement mixers on site.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>• Only emergency (breakdown where equipment is no longer mobile) and minor maintenance (e.g. greasing) may be done on site. Any other planned or required maintenance must be done offsite at a suitable location.</li> </ul>	CON		

2.10 Incidents, Spills and Emergency Response				
Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Spill kits	<ul style="list-style-type: none"> <li>Adequate spill kits and containers for spilled and contaminated material to be on standby on site.</li> </ul>	CON/EO		
	<ul style="list-style-type: none"> <li>Keep clearly marked booms and/or absorbent material on site to contain spills if they occur.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>All staff must be trained on how to react in the case of an emergency.</li> </ul>	CON-SHE		
	<ul style="list-style-type: none"> <li>If a spill occurs, stop the source, contain it, clean up in accordance with MSDSs and notify relevant authorities.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>Make staff aware of emergency phone numbers to use in the case of a large spill.</li> </ul>	CON/ EO		
Definition of incidents	<ul style="list-style-type: none"> <li>All incidents are to be recorded.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li><b>Minor incidents:</b> small spills less than 5 l that do not enter stormwater or the stream/river, minor noncompliance with EMP that does not cause major environmental impact i.e. housekeeping issues etc                             <ul style="list-style-type: none"> <li><b>Action:</b> Supervisor and staff on site to record and address and notify EO. Take photos of spill. Prevent spill from spreading and contain. Collect spilled material and contaminated soil and place in sealed container for disposal. EO to advise on remediation measures and to follow up on actions taken to address incident.</li> <li><b>Records:</b> On site incident register.</li> </ul> </li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li><b>Major incidents:</b> Large spills or any spills that enter stormwater or the stream/river, fires, explosions. Please see definition of a reportable incident provided below.                             <ul style="list-style-type: none"> <li><b>Action:</b> Report immediately to EO, action to be taken to prevent further damage and incident to be reported to authorities. EO to advise on remediation measures and to follow up on actions taken to address incident.</li> </ul> </li> </ul>	CON/ EO		



	<ul style="list-style-type: none"> <li>○ <b>Records:</b> On site incident register and report to authorities.</li> </ul>			
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2.11 Sewage & Grey Water Management				
Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
<b>Sewage</b>	<ul style="list-style-type: none"> <li>• Adequate toilet facilities (such as chemical toilets) sufficient in number to cater for the number of staff on site must be provided. One toilet per 15 staff must be provided.</li> <li>• As per the Msunduzi Municipality's comment on the Draft Scoping Report, the establishment and use of long-drop toilets is strictly prohibited.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>• Waste must be managed as per section 2.5 namely removed by licensed contractor and safe disposal certificates retained to prove proper disposal.</li> <li>• Safe disposal certificates must be kept on site for review by the DMR.</li> </ul>	CON/ EO		
<b>Grey water / wash water</b>	<ul style="list-style-type: none"> <li>• Vehicles, especially cement trucks, must not be washed on site these must be washed at a wash bay facility off site.</li> </ul>	/ EO		
	<ul style="list-style-type: none"> <li>• Grey water will not be permitted to enter the surrounding properties or stormwater.</li> </ul>			

## SECTION 3

## REHABILITATION AND CLOSURE

## 3.1 General Rehabilitation Measures

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Review of Rehabilitation Plans <sup>1</sup>	<ul style="list-style-type: none"> <li>The holder of the Mining Permit must ensure that a review is undertaken of the requirements for -               <ul style="list-style-type: none"> <li>(a) annual rehabilitation plan;</li> <li>(b) final rehabilitation, decommissioning &amp; mine closure plan; and</li> <li>(c) remediation of latent or residual environmental impacts which may become known in the future.</li> </ul> </li> </ul>			
	<ul style="list-style-type: none"> <li>The holder of the Mining Permit must ensure that the adequacy of the financial provision is assessed and any adjustments that need to be made to the financial provision are identified within one year of the commencement of the operations authorised in the permit and annually thereafter.</li> <li>The results of the assessment, including proof of payment or arrangements to provide for any adjustments to the financial provision, must be—               <ul style="list-style-type: none"> <li>(a) audited by an independent auditor;</li> <li>(b) included in any environmental audit report required in terms of the EIA Regulations; and</li> <li>(c) submitted for approval to the Minister responsible for mineral resources, in the form of an auditor's report, together with the Rehabilitation plans in the tables below within three months of the review and annually thereafter.</li> </ul> </li> </ul>			
	<ul style="list-style-type: none"> <li>Should the review indicate—               <ul style="list-style-type: none"> <li>(a) a shortfall in the financial provision, the holder of a right or permit must increase the financial provision to meet the reviewed, assessed and audited financial provision within 90 days from the date of signature on the auditor's report and must</li> </ul> </li> </ul>			

<sup>1</sup> As per Regulations 11 & 13 of the "Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations" published in terms of sections 24(5)(b)(ix), 24(5)(d), 24N, 24P and 24R of the National Environmental Management Act, 1998 in Government Gazette No. 39425 GN R1147 on the 20<sup>th</sup> November 2015.

	<p>provide proof of increasing the financial provision to the Minister responsible for mineral resources;                  (b) an excess, the amount in excess must be deferred against subsequent assessments.</p>			
	<ul style="list-style-type: none"> <li>• The holder of the Mining Permit must submit a declaration with the review reports signed by the independent auditor of the holder of the Mining Permit, reconciling the financial provision submitted for approval and any update thereof with estimates of exposure and liabilities with regard to environmental rehabilitation disclosed in the financial statement of the holder of the permit to the Minister responsible for mineral resources.</li> <li>• The financial declaration must include contingent liabilities and restricted cash associated with the financial provision liability.</li> </ul>			
	<ul style="list-style-type: none"> <li>• The holder of the Mining Permit must make this EMPr and any approved amendments available                         <ul style="list-style-type: none"> <li>(a) on a publically accessible website of the holder of the permit, if such holder has such a website;</li> <li>(b) available at the site office of the Anniedale Quarry; and</li> <li>(c) to the public on request.</li> </ul> </li> </ul>			

## 3.2 Annual Rehabilitation Plan<sup>2</sup>

Objectives of the annual rehabilitation plan is to -

- (a) review concurrent rehabilitation and remediation activities already implemented;
- (b) establish rehabilitation and remediation goals and outcomes for the forthcoming 12 months, which contribute to the gradual achievement of the post-mining land use, closure vision and objectives identified in the holder's final rehabilitation, decommissioning and mine closure plan;
- (c) establish a plan, schedule and budget for rehabilitation for the forthcoming 12 months;
- (d) identify and address shortcomings experienced in the preceding 12 months of rehabilitation; and
- (e) evaluate and update the cost of rehabilitation for the 12 month period and for closure, for purposes of supplementing the financial provision guarantee or other financial provision instrument.

### 3.2.1 Pertinent environmental and project context relating directly to the planned annual rehabilitation and remediation activity.

The holder of the Mining Permit as well as the Mine Works Manager are to be aware of the future development of the property, which must take into account the long-term conservation vision for the greater Mpushini Protected Area (see section 3.3.1. below). In this regard, the disturbance footprint is to be kept to a minimum with annual rehabilitation and remediation activities to concentrate on any areas where there has been unintentional damage outside of the Mining Permit area (i.e. access roads etc.). Specific measures are included in section 3.2.4 below aiming to ensure that there is no encroachment of alien vegetation into the surrounding grasslands as well as managing excavations to remain within the authorised 4.99 hectare footprint, thereby reducing the impact on fauna associated with the grassland habitat.

### 3.2.2 Results of monitoring of risks identified in the Final Rehabilitation, Decommissioning and Mine Closure Plan with a view to informing rehabilitation and remediation activities.

Not applicable. This section is to be completed on the annual review of the Rehabilitation Plan.

### 3.2.3 Identification of shortcomings experienced in the preceding 12 months

Not applicable. This section is to be completed on the annual review of the Rehabilitation Plan.

### 3.2.4 Planned annual rehabilitation and remediation activities for the Anniedale Quarry (Year 1)

Due to the small size of the proposed mining footprint (5 hectares) and the duration of the Mining Permit (2 year period with the option to be renewed 3 times allowing a maximum of 5 years validity of the permit), the areas where rehabilitation is required on an annual basis are restricted. As per section 3(e)(iii) of Appendix 3 of the Regulations Pertaining to Financial Provisions, the Figure below shows an area which is likely to be disturbed by earthwork activities during the first year of operation. This Figure is to be updated during the annual review assessment, where a better idea on the extent of mining will be available.

Since the mining will take place from the bottom upwards, benches created during initial excavations will continue to be used throughout the lifespan of the quarry. The re-vegetation of these benches on an annual basis is therefore not feasible as vehicles will utilise these benches to reach other areas of the quarry. The benches that have been mined (as shown in Figure 9) are however to be stabilised, which will be assessed by a qualified rock engineer as a requirement of the Mine Health and Safety Act, 1996.

<sup>2</sup> Information provided as per Appendix 3 of the "Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations" published in terms of sections 24(5)(b)(ix), 24(5)(d), 24N, 24P and 24R of the National Environmental Management Act, 1998 in Government Gazette No. 39425 GN R1147 on the 20<sup>th</sup> November 2015.

Figure 9: Map showing the area which is likely to be disturbed by mining activities in the first year of the permit being issued.



The areas listed below are available for annual rehabilitation concurrent with mining activities. As part of the Annual Rehabilitation Plan, the ECO is to undertake a site inspection of the following features of the Anniedale Quarry:

- a) Berms around the quarry site intact and preventing stormwater from entering and exiting the quarry area;
- b) Material storage areas suitably demarcated and positioned;
- c) Topsoil stockpiled for rehabilitation and free of weeds;
- d) Maintenance of access track to ensure no unnecessary encroachment into the core primary grassland;
- e) Condition / success of the relocated flora species;
- f) Assessment of the implementation of the alien vegetation removal program in and around the edge of the quarry area; and
- g) Clear demarcation of the authorised quarry boundary (check permit co-ordinates at corner of mine).

After the site inspection, the ECO is to compile a report which is to be submitted to the holder of the Mining Permit. Any non-compliances are to be rectified in a timeous manner to prevent any potential environmental degradation.

### **3.2.5 Review of the previous year's annual rehabilitation and remediation activities**

Not applicable. This section is to be completed on the annual review of the Rehabilitation Plan.

### **3.2.6 Costing of Annual Rehabilitation**

Planned rehabilitation and remediation activities outlined in subsection 3.2.4 above, will be carried out using vehicles and machinery that already exists on the site, owned by the holder of the Mining Permit (i.e. no additional costs for vehicle / labour). The ECO conducting the site inspection will incorporate the annual review into the quarterly auditing required under the Mining Permit / Environmental Authorisation Monitoring requirements. The costs for the annual rehabilitation is included in the table below and is to be reviewed during the annual review assessment, as stipulated in section 3.1. of the EMPr.

Table 1: Anticipated Annual Rehabilitation Costs (Year 1) for the Anniedale Quarry

DESCRIPTION	UNIT	QTY	RATE	Amount R
<b>LANDSCAPING AND PLANTING</b>				
Trimming of steep embankments	m <sup>2</sup>	2530	4	R 10 120
Removal of excess rocks from cut benches	m <sup>2</sup>	2530	0	0
Top-soiling within the quarry area / benches	m <sup>3</sup>	2530	0	0
Hydro-seeding	ha	0	15 000	0
Removal of alien vegetation	ha	6.5	1000	R 6500
Maintenance of stormwater berm	m	1000	4	R 4000
Planting of additional indigenous trees along the northern boundary.	m <sup>2</sup>	2300	80	R24 000
	trees	300		
<b>LABOUR</b>				
Unskilled labour**	Hour	80	0	0
Semi-Skilled**	Hour	80	0	0
Skilled (landscaper / botanist)	Hour	100	60	0
<b>PLANT WORK</b>				
Tracked excavator (Bell HD 820 or similar)**	Hour	20	300	0
Tracked Loader Backhoe (CAT 428 or similar)**	Hour	20	220	0
Tip Truck (10m <sup>3</sup> )**	Hour	20	225	0
Water Tanker (10 000 litre)**	Hour	30	190	0
<b>Total</b>				<b>R 44 620</b>

\*\*Already available at the Anniedale Quarry site and accounted in the Quarry Financial & Technical Competence Report for the Operation of the quarry. These resources have therefore already been budgeted for.

### 3.3 Final Rehabilitation, Decommissioning and Closure Plan<sup>3</sup>

Objectives of the Final Rehabilitation, Decommissioning and Mine Closure Plan, which must be measurable and auditable, is to identify a post-mining land use that is feasible through -

- (a) *providing the vision, objectives, targets and criteria for final rehabilitation, decommissioning and closure of the project;*
- (b) *outlining the design principles for closure;*
- (c) *explaining the risk assessment approach and outcomes and link closure activities to risk rehabilitation;*
- (d) *detailing the closure actions that clearly indicate the measures that will be taken to mitigate and/or manage identified risks and describes the nature of residual risks that will need to be monitored and managed post closure;*
- (e) *committing to a schedule, budget, roles and responsibilities for final rehabilitation, decommissioning and closure of each relevant activity or item of infrastructure;*
- (f) *identifying knowledge gaps and how these will be addressed and filled;*
- (g) *detailing the full closure costs for the life of project at increasing levels of accuracy as the project develops and approaches closure in line with the final land use proposed; and*
- (h) *outlining monitoring, auditing and reporting requirements.*

#### 3.3.1 Information and issues that have guided the development of the Final Rehabilitation Plan (environmental and social context)

The Anniedale Quarry Mining Permit was subject to an Environmental Impact Assessment (EIA) in terms of section 24 of the National Environmental Management Act (No. 107 of 1998 as amended, NEMA) and section 27 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002, MPRDA). The assessment of the surrounding environment and the findings of the EIA have therefore guided the development of the Final Rehabilitation Plan. Since the stratigraphic sequence being intersected by mining activities covers the entire hill, the preferred quarry site, on the south facing slope, has taken into account the social issues raised during the EIA process (discussed in more detail in section 3.3.3 below). The alternative quarry site, located on the north facing slope, is in clear view of the neighbouring farms and has the potential to impact future conservation corridors associated with the northern portion of the property. The environmental and social context of the project is provided below, which is to guide the Final Rehabilitation of the Anniedale Quarry.

##### 3.3.1.1 Overview of the environmental context

The following information has been extracted from section 3 of the Environmental Impact Report (EIR), which is a summary of the findings from various specialist reports used in the compilation of the EIA.

There are no major rivers on the property however two tributaries of the Malkop Spruit originates in the north-east ( $\pm 600\text{m}$  east of the quarry) and north-west portions ( $\pm 310\text{m}$  west of the quarry) of the property. The Malkop Spruit flows in a northern direction away from the site into the Mpushini River. The drainage lines are preferential flow paths that direct water flows to the wetland areas and therefore contained wetland indicators<sup>4</sup>. Taking into account the location of the preferred quarry site, the specialist stated that there are no direct potential risks to any of the wetland areas. A hydrocensus was carried out showing seven open WARMS registered surface water users within a 1km radius of the property. The uses typical range from agricultural, schedule 1, and clean water dams<sup>5</sup>.

<sup>3</sup> Information provided as per Appendix 4 of the "Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations" published in terms of sections 24(5)(b)(ix), 24(5)(d), 24N, 24P and 24R of the National Environmental Management Act, 1998 in Government Gazette No. 39425 GN R1147 on the 20th November 2015.

<sup>4</sup> Section 8 of *The Biodiversity Company* "Wetland Assessment Report for the Anniedale Development Project" April 2016.

<sup>5</sup> Section 5.5 of Terratest "Geohydrological Desktop Assessment for Proposed Anniedale Quarry Site, KZN" August 2016.



The underlying tillite is typically low yielding and commonly offers poor success rates with borehole drilling. The localised fault to the east may provide a potential groundwater target and successful boreholes will be localised within the massive tillite. The contact between the shale and underlying tillite also provides a potential target. Should this depth occur below the water bearing strata, then the contact may offer low to medium yielding boreholes. The general outlook for the project area is that *groundwater potential is low*. The *groundwater vulnerability is considered low* and the associated Parsons Groundwater Quality Management System gives the site a Low Level of Protection index<sup>6</sup>. Due to the reliance on local surface water resources and the unknown provision of municipal bulk supply in the area, the strategic value of the groundwater is considered medium. The datasets reported five boreholes within 1km of the project area. Two of these resources are considered hydraulically downslope and are located 560 and 780m away from the site. These boreholes are being used for both domestic and irrigation purposes. No WARMS registered groundwater users were identified.

According to SANBI's Geographical Information System (GIS) overlay, the entire property falls within the Ngongoni Veld Ecosystem, which is described as "vulnerable". Although all the grassland on the property has been disturbed in some way (mowing / grazing), there are areas which are of higher quality compared to others. The following composition occurs within the preferred quarry site:

- Primary grassland contains modest to good herbaceous diversity, not limited to common pioneers, ruderal or weeds (0.9 hectares);
- Transitional primary grassland is intermediate in quality between primary and parts that have suffered more severe disturbance. *Aristida junciformis* is the most common grass in the transitional primary grassland but there is still a notable presence of herbs that are not ruderals or weeds (2.67 hectares); and
- Alien vegetation (1.4 hectares).

An important, "core area" of primary grassland is situated at the centre of the property, parts of which are characterized by notable forb abundance (shaded in green in Figure 2 of the EMP). A number of Red Listed species were identified on the site. Three species protected under the KZN Provincial Conservation Ordinance, were identified in or directly adjacent to the quarry area. These protected species may not be lawfully destroyed, damaged or relocated without permit authorisation from Ezemvelo KZN Wildlife.

The "habitat sensitivity" of the property was rated by a faunal specialist with the quarry area being rated as moderate-high with a small portion being identified as low sensitivity. The highly sensitive area is directly associated with the presence of primary grassland delineated in the proposed quarry site. Red-Listed (including Endangered) avifauna species were noted on the property, increasing the sensitivity to "high" status<sup>7</sup>. The grassland on site provides core foraging habitat for small mammals, small birds, raptors, reptiles, large red-listed avifauna species such as cranes & secretary birds and endemic millipede habitat.

### 3.3.1.2. Overview of the social context

One of the National Environmental Management Principles requires development to be not only environmentally sustainable but socially sustainable as well<sup>8</sup>. Public participation was therefore carried out for the Anniedale Quarry in terms of Chapter 6 of the 2014 EIA Regulations. Registered Interested and Affected Parties (I & APs) provided comment on the Draft Scoping and Draft EIR. As per section 3(b)(iii) of Chapter 4 of the Regulations Pertaining to Financial Provisions, the summary below incorporates stakeholder issues and comments that have informed the plan.

The quarry site is surrounded by agricultural activities such as grazing and sugarcane. There are scattered farm houses located to the north and west of the property. Light industry developments are located to the south-east of the proposed quarry site, directly adjacent to the N3 highway. It is anticipated that light industry / mixed-use developments will expand further north in the future, in anticipation of the N3 development corridor. According to the Msunduzi Environmental

<sup>6</sup> Section 6.3 of *Terratest* "Geohydrological Desktop Assessment for Proposed Anniedale Quarry Site, KZN" August 2016.

<sup>7</sup> *Enviro-Insight* "Ecological Assessment Fauna Assessment Proposed Anniedale Quarry, KZN".

<sup>8</sup> Section 2 (3) of NEMA

Management Framework (EMF), Pietermaritzburg has been identified as a focal area for development and economic growth. The N3 route has been identified as a provincial priority corridor creating urbanization and economic development pressures on Msunduzi. Based on these trends, it is anticipated that the pressure on land available for development and the demand for employment opportunities and social facilities will increase<sup>9</sup>.

The quarry is located within the Mpushini Valley, a high biodiversity area. Various landowners in the Mpushini Valley have been actively involved in conserving this area with private landowners having proclaimed their properties as “Protected Environments” in terms of the National Environmental Management: Protected Areas Act (No 57 of 2003; NEMPAA). The Preservation of the Mkhondeni Mpushini Biodiversity Trust (PMMBT) in conjunction with the Lower Mpushini Valley Biosphere Conservation Association and Upper Mpushini Conservancy Association currently manage and rehabilitate the conservancy areas in the Mkhondeni and Mpushini Valleys. One of the key long-term visions of the PMMBT is to form a conservation corridor linking areas of conservation significance, preventing fragmentation and degradation of the existing conservation areas within the Mpushini Protected Area.

Conservation corridors associated with the drainage lines, wetlands and core primary grassland areas associated with the northern portion of the property have been discussed with the applicant and landowner, who have indicated a willingness to engage with the PMMBT. Future plans for development of the site in the long-term are currently not available however there is to be further engagement between the applicant and the PMMBT once a clearer vision for the property has been formulated. The location of the conservation corridors has been taken into account during the formulation of the Final Rehabilitation Plan.

### 3.3.2 The Mine Plan and schedule for the full approved operations

A Mining Works Program was prepared by Tillite Tech (Pty) Ltd, which describes the Mining Operations and Technology to be used at the Anniedale Quarry. The operation will be a typical truck and shovel operation with the rock being blasted and loaded out for transport by truck to the crushing and screening plant. The loading formats are primarily wheeled front end loaders and tracked backhoe excavators ranging from 25 to 50t machines, the excavators used at Anniedale Quarry will ideally be 30 tons. The dumper fleet typically will comprise vehicles up to 50t carrying capacity and the ADT's used on site will be 25 -30 ton vehicles.

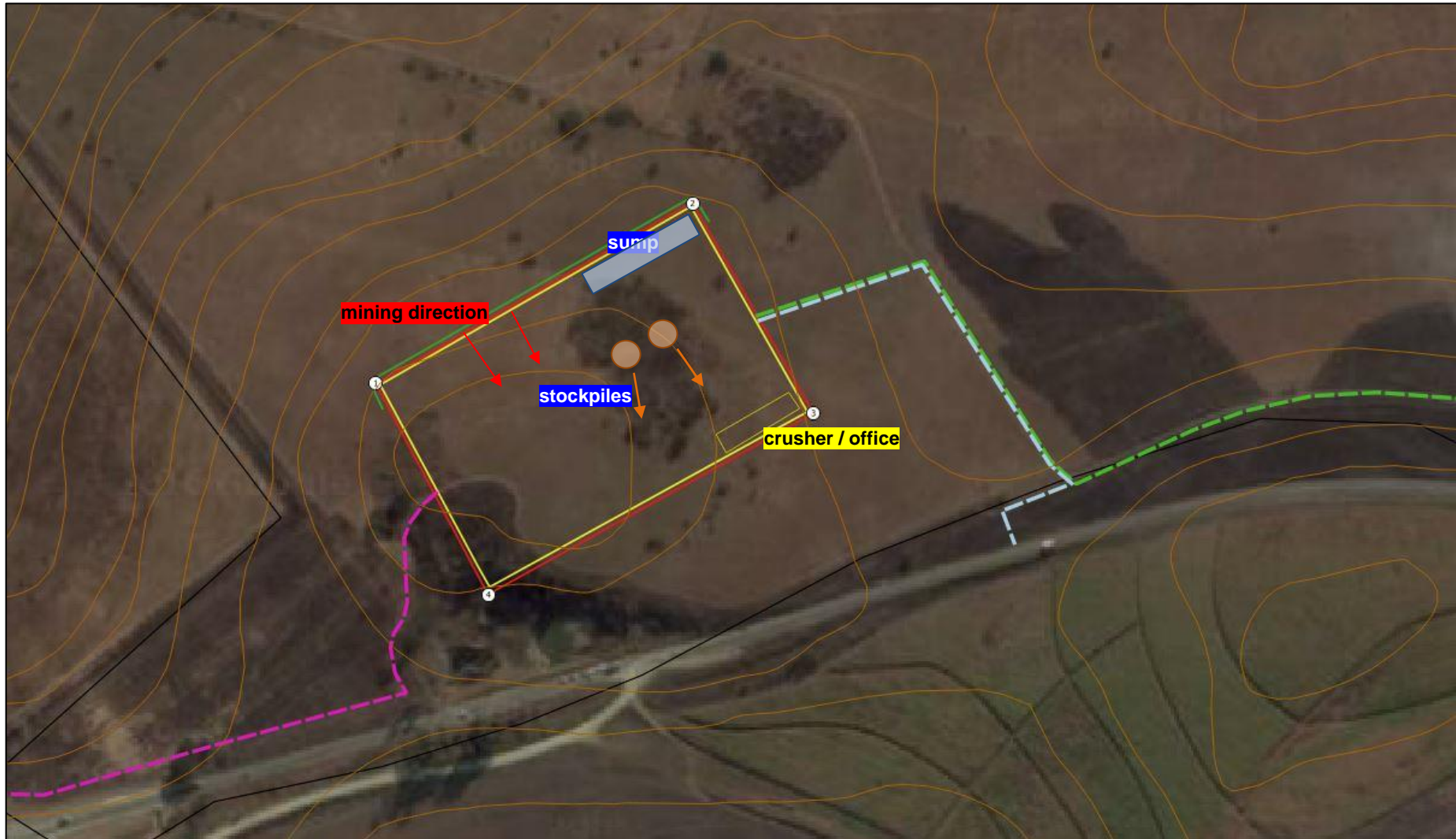
The working bench widths will be a minimum of 30m for stability reasons, but under special conditions, may be reduced. A 30m bench width will enable the machines to work safely on the benches and providing ample turning space. A safety berm will be erected around 3.0m from the crest. The quarry layout will conform to a conventional bench layout, with benches spaced vertically at 8 to 14 meters. The ideal bench height is considered to be 10 to 12 meters, but other heights may be used when dictated by geological conditions. This bench height range is matched to the loading equipment and enables the machines to have adequate reach to relatively easily clear any loose rock in the face.

The strategy employed will be to clear as much of the soft material (over burden) from the area above the blast using an excavator. The soft material will be cut back at a batter no steeper than 1:1.5. This reduces the height of the suspended material and makes it manageable while working below. There is no artificial support envisaged in the quarry faces.

Figure 10 indicates the proposed mine development and increasing area of disturbance as the operations progress. The location of the site offices and processing area (crusher, screener, parking etc.) will remain in the south-east corner of the mine area for the duration of the mining operations. The position of the stockpiles will vary depending on which portion of the quarry area is being mined. A sump will be created in the lowest lying area once mining commences. It is unlikely that the sump will move unless another low-lying area is created during operations. The approximate locations of the sump and stockpiles areas are indicated in Figure 10 however may need to be revised during the annual reassessment once mining begins.

<sup>9</sup> SRK Consulting “Msunduzi Final Draft Environmental Management Framework” Report No. 376998/FDEMF (May 2010).

Figure 10: Map showing the mining operation progress including the likely movement of the stockpile area, as mining progresses (source: QGIS, 2016).



**3.3.3 Environmental Risk Assessment**

**3.3.3.1. Description of the risk assessment methodology**

As per the methodology used to assess impacts in the EIR, risks associated with all areas of infrastructure or activity or aspects for which a holder of a permit has a responsibility to mitigate, have been assessed qualitatively and quantitatively, looking at the duration / frequency of the activity and likely impacts associated with that activity during closure. If the activity happens frequently, the risk of the associated impact occurring is much higher than if the activity happens less frequently. The geographical extent of the impact is assessed i.e. will the impact be restricted to the point of occurrence or will have it have a local or regional effect. Impacts are also reviewed looking at severity levels and consequences should the impact occur i.e. will the severity be low, medium or high and then probability of the impact occurring is taken into account.

Whether or not the impact can be mitigated and the extent to which it can be avoided, managed, mitigated or reversed is assessed i.e. the probability of occurrence after mitigation has been applied. This also takes into account likelihood of human error based on previous mine auditing experience i.e. even though spills can be completely mitigated against and prevented, there is always a small chance that spills will still occur (residual risk). Based on all of these factors, the impact is then rated to determine its significance. For example an impact can have a regional affect with severe environmental implications, however the probability of it occurring is very low and the implementation of the proposed mitigation measures means that the ultimate rating is medium or low. Please see below a description of the scoring. The impact scoring matrix table detailing how the significance rating was calculated can be found in Appendix A of the EMPr.

**Table 2: Explanation of the scoring of the impacts identified in EIA**

Scoring of Impacts	
Duration / Frequency of activity likely to cause impact	0 = No impact 1 = short term / once off 2 = medium term / during operation 3 = long term / permanent
Geographical Extent	0 = No impact 1 = point of impact / restricted to site 2 = local / surrounding area 3 = regional
Severity (level of damage caused) if impact were to occur	0 = No impact 1 = minor 3 = medium 5 = major
Probability of impact without mitigation	1 - 5 = low. 6 -10 = medium. 11 -14 = high.
Significance before application of Mitigation Measures	A score of between 1 and 5 is rated as low. A score of between 6 and 10 is rated as medium. A score of between 11 and 14 is rated as high.
Will activity cause irreplaceable loss of resources?	10 = Yes 0 = No
Mitigation measures	0 = No impact - 5 = can be fully mitigated - 3 = can be partially mitigated

	-1 = unable to be mitigated
Probability of impact after mitigation	0 = No impact 1 = Low 2 = Medium 3 = High
Significance after application of Mitigation Measures	A score of between 1 and 5 is rated as low. A score of between 6 and 10 is rated as medium. A score of between 11 and 14 is rated as high.

The following potential risks associated with the Final Rehabilitation and Closure of the Anniedale Quarry have been identified and are to be suitably addressed during final rehabilitation:

1. Dismantling and removal of site offices including associated storage areas.
2. Removal of processing equipment (crusher, processing plant etc.) off site.
3. Long-term stability of the mining benches (i.e. avoidance of excessive high walls).
4. Deep excavation that may fill with water and become a social and environmental risk in the long-term.
5. Loss of grassland and associated habitat for important fauna species.

**Table 3: Risks and closure strategies associated with the final closure and rehabilitation of the Anniedale Quarry.**

Nature and Consequences of Risk	Significance rating of risk:	Proposed Closure Strategies	Re-assessment after implementation of closure strategy to determine significance of any residual risk:	Identification of indicators <sup>10</sup>
1. Potential for soil and water contamination at the Anniedale Quarry site as a result of uncleaned spills, left over mining materials (fencing, equipment, vehicles etc.).	8 (med)	<ul style="list-style-type: none"> <li>• Any infrastructure erected for mining must be demolished and removed from site, including vehicles and processing equipment.</li> <li>• All equipment, concrete footings, fencing, etc. must be removed from site.</li> <li>• All waste must be removed from site and disposed of at an approved landfill. No burying or burning of waste will be permitted.</li> <li>• Soil contaminated with oil, grease or fuel may not be disposed of in the excavation and must be disposed at a permitted landfill.</li> <li>• Stormwater berm preventing water from entering the quarry area during operation must only be removed once all equipment has been removed from the area below to prevent any water contamination.</li> </ul>	4 (low)	Visual indicator - No waste, spoil material, mining equipment etc. to be left in the mining area.

<sup>10</sup> Indicators are used to monitor the risks identified with a view of informing rehabilitation and remediation activities.

<p>2. Unsafe high walls with unstable surfaces making the mine area unsafe for people or animals accessing the area at a later date. There is the potential for collapse should the walls not be suitably stabilized prior to closure.</p>	<p>9 (med)</p>	<p>There are two phases to the final closure of the quarry (see section 3.3.4. for more details on the closure objectives). Phase 1 is temporary closure until the remainder of the site is developed. Phase 2 will take place when the remainder of the property is developed during a separate environmental process.</p> <ul style="list-style-type: none"> <li>• Once the Mining Permit expires slopes are to be “face wrecked”, a method of blasting a face as close as possible to a natural appearance to affect a footing where vegetation can take hold.</li> <li>• The quarry area is to be fenced off to ensure that other operators or opportunists do not re-visit closed areas and continue to remove material illegally. Fencing will not be required if face wrecking has been carried out effectively.</li> <li>• Any erosion channels that develop after re-vegetation should be backfilled and consolidated and the areas restored to a proper stable condition. The erosion should not be allowed to develop on a large scale before effecting repairs and all erosion damage should be repaired as soon as possible</li> <li>• During Phase 2 of the closure, the benches are to be expanded into platforms that can be used for light industrial / warehousing activities. The angle of the walls will decrease once more space is available to expand the platforms outside of the 5 hectare mining area (through a separate environmental authorization process).</li> <li>• All walls are to be stabilized with vegetation and engineering solutions (retaining walls, gabion baskets etc.) where required. This will ensure the long-term stability of the site.</li> </ul>	<p>5 (low)</p>	<p>Visual indicator - The angle of the slope must be measured by a suitably qualified engineer to ensure slope angle is at least 1:3.</p>
<p>3. Excavation resulting in deep pit which will fill with rain water over time resulting in a safety hazard to people and animals access the quarry area.</p>	<p>9 (med)</p>	<p>During Phase 1 of the closure, the excavated quarry pit will remain in the landscape post-mining operations where rain water will collect naturally over time. This has the potential to become a safety hazard for people and animals.</p> <ul style="list-style-type: none"> <li>• The mining area is therefore to be securely fenced off to prevent access.</li> </ul>	<p>5 (low)</p>	<p>Visual indicator - Ensure fencing and routine inspection of the pit by the Mining Permit holder.</p>

		<ul style="list-style-type: none"> <li>• A ramp is to be created in the excavated pit to ensure there is access out of the water in an emergency.</li> <li>• The holder of the Mining Permit is to install over-flow pipes from the pit if water needs to be drained after testing and treatment. Alternatively, a water tanker is to be used to pump water out of the pit for use in the surrounding environment (i.e. irrigation, dust suppression during further development etc.)</li> <li>• If the quality of the water is not within the DWS General Limits<sup>11</sup> for safe release into the environment, it is to be disposed of at registered water treatment works.</li> <li>• Ultimately the excavated pit is to be flattened out to prevent any pooling of water on the site (i.e. during Phase 2 of closure).</li> </ul>		
<p>4. Potential contamination of water in old sump and quarry area with nitrates from blasting.</p>	<p>7 (med)</p>	<ul style="list-style-type: none"> <li>• As part of the Phase 1 closure requirements, the water quality in the sump is to be tested to ensure there is no contamination of the water in the long-term. Contamination can result from nitrates left over from blasting as well as other minerals leaching out of the tillite draining off the exposed slopes and accumulating in the sump.</li> <li>• The quality of the water is to be tested bi-annually. If the quality is within the DWS General Limits, it can be released into the surrounding environment. If it is outside the limits, the water is to be treated to within the limits or alternatively disposed of at a registered waste water treatment works.</li> <li>• The long-term plan is for the quarry area to be incorporated into the future development plan for the entire property. Mining benches will become platforms and the central mining pit opened out reducing the slope substantially. At this stage, no more water will accumulate in the pit and the monitoring of the water quality will cease. The</li> </ul>	<p>3 (low)</p>	<p>Water quality testing - prior to any release into the surrounding environment / water resource. May need to be treated to reach DWS standards.</p>

<sup>11</sup> Wastewater limit values applicable to discharge of waste water into a water resource published in Government Gazette 36820 No. 665 dated 06<sup>th</sup> September 2013 for section 21(f) and (h) water users.

		reduction in the slope to open the quarry pit will require significantly more space (outside of the 5 hectare footprint) and will therefore only take place once the future development of the property is known.		
5. Loss of grassland vegetation type and association loss of habitat for important faunal species.	11 (high)	<p>There will ultimately be a loss of grassland habitat with the long-term development of the property.</p> <ul style="list-style-type: none"> <li>• During Phase 1 closure there is to be re-vegetation of exposed surfaces if there is a gap between the expansions of the benches into platforms for future development.</li> <li>• The floor of the quarry must be ripped (if possible) and topsoil removed at the beginning of the process can be used to cover this area to promote re-growth of vegetation.</li> <li>• Before placing topsoil across the floor of the quarry, all visible weeds must be removed</li> <li>• The stockpiled topsoil must also be spread evenly over the prepared surface on slopes of 1:3 or steeper.</li> <li>• Topsoil placement shall occur in a phased manner, concurrent with the phased operation of the quarry. Topsoil should be placed in the same area from which it was stripped. Where amounts are inadequate to cover the entire area, more gentle slopes are to receive priority treatment.</li> <li>• Final landscaping and re-vegetation of the old quarry will take place during Phase 2 where the quarry area will be incorporated into the landscaping plan for the entire property including corridors of indigenous vegetation and core grassland areas.</li> </ul>	10 (med)	Visual indicator – Monitoring of grass cover on exposed surfaces.

**3.3.3.2. Changes to the risk assessment results, as applicable in annual updates to the plan**

Not applicable. This section is to be completed on the annual review of the Rehabilitation Plan.



### 3.3.4. Design Principles

#### 3.3.4.1. Legal and governance framework for the closure design principles

Table 4: Description of the legal framework considered for the closure design.

National Legislation	Compliance of Activity
National Environmental Management Act 1998	<p>The National Environmental Management Act (Act 107 of 1998) is South Africa's overarching environmental legislation. It includes a set of principles that govern environmental management and against which all Environmental Management Programmes (EMPrs) and actions are measured. These principles include and relate to sustainable development, protection of the natural environment, waste minimization, public consultation, the right to an environment that is not harmful to one's health or wellbeing, and a general duty of care.</p> <p>The Environmental Impact Assessment (EIA) Regulations, 2014: GN R.982, R.983, and R.985 under Section 24 of the NEMA define the activities that require Environmental Authorisation and the processes to be followed to assess environmental impacts and obtain Environmental Authorisation.</p> <p>Environmental authorisation is required for the proposed mining activity including the processing of the raw material on site and clearance of vegetation. Therefore this application is in line with the requirements of NEMA.</p>
Environmental Conservation Act 1996	<p>Makes provisions for the application of general environmental principles for the protection of ecological processes, promotion of sustainable development and the protection of the environment. This Act has mostly been repealed by NEMA.</p>
Mineral and Petroleum Resource Development Act 28 of 2002	<p>Makes provisions for equitable access to and sustainable development of South Africa's mineral and petroleum resources. This EIA process forms part of the application for a Mining Permit, as contemplated in section 27 of the Mineral and Petroleum Resource Development Act (MPRDA).</p>
National Water Act 1998	<p>Provides for fundamental reform of the law relating to water resources in a water scarce country. Section 21 of the National Water Act (NWA) lists certain water uses requiring a Water Use License from the Department of Water and Sanitation (DWS).</p> <p>A Water Use Authorisation (WUA) will be required for the mining activities. The WUA application is running concurrently with the EIA process. The following water uses have been identified:</p> <ul style="list-style-type: none"> <li>s21 (a) – abstraction of water from the sump for dust suppression;</li> <li>s21 (g) – stockpile areas, sump and dust suppression.</li> </ul>
Municipal Planning Framework	Compliance of Activity
Umgungundlovu Municipality Integrated Development Plan 2015/2016	<p>The intention of the Anniedale Quarry is to supply material for future developments and service delivery within the uMgungundlovu Municipality. Infrastructure back log was identified as one of the key challenges that needs to be addressed in section 4 of the uMgungundlovu Municipality Integrated Development Plan.</p>
Msunduzi Environmental Management Framework (EMF)	<p>The Msunduzi Municipality, in partnership with the national Department of Environmental Affairs (DEA) and EDTEA, recognized the need for an appropriate policy to inform development planning that supports sustainable development within the Municipality. The framework identifies areas both suitable and unsuitable for development; provides information to assist decision making on matters such as development applications and thereby streamline the process; identifies sensitive areas that require protection to ensure ecosystem service delivery; provides environmental goals and mechanisms to achieve such goals.</p>

	<p>The EMF identifies nine Environmental Management Zones which are to be taken into account during the planning phase of any development. The specialist studies carried out for the proposed Anniedale Quarry and the incorporation of specialist recommendations into the EMPr fall in line with the “Precautionary Principle”, recommended in section 5.1 of the EMF.</p> <p>The findings of the EMF identifies the site to contain the following constraints:</p> <ul style="list-style-type: none"> <li>• High Wetland Development Constraint</li> <li>• High Agricultural Potential</li> <li>• High Biodiversity Constraint</li> <li>• Moderate Slope (10-18 degrees)</li> <li>• Low Flood Potential</li> <li>• Low Air Quality Constraints</li> <li>• Low Cultural Heritage Significance</li> <li>• Low Service Provision</li> </ul> <p>The Wetland Assessment has confirmed that there will be no net loss of wetland area. The wet area to the south of the quarry site is not a natural feature but comprised of quarry pits that have filled with water.</p> <p>The high agriculture potential of the site extends across the remainder of the 178 hectare property, which is currently undeveloped. The town planner is currently in the process of applying for the property to be released from the Department of Agriculture. The strategic location of the property, in close proximity to the P338 and N3, provides a prime development opportunity for the landowner. Section 5.3.1 of the Msunduzi Spatial Development Framework foresee that, as a result of the “development corridor associated with the N3, land along the N3 interface will be released for economic activity.</p> <p>The high biodiversity constraint shows the importance for development to retain goods and services provided by the ecosystems on the site, particularly the Mpushini Valley, north of the property. The 5 hectare quarry footprint falls on the south facing slopes and will not significantly impact on the goods and services provided by the ecosystems on the property (Wetland, Aquatic, Geohydrological, Fauna and Vegetation Assessments in Appendix C). The design and operation of the quarry is to adhere to specialist recommendations and the EMPr attached to the EIR.</p>
<p>Msunduzi Ecosystem Services Plan (ESP)</p>	<p>During the development of the Municipal Open Space System (MOSS), it was recognized that the MOSS should focus on identifying areas to be set aside to maintain ecosystem goods and services. The Msunduzi ESP, previously referred to as MOSS identifies the entire application area as a key biodiversity area. The ESP falls in line with the Biodiversity Constraints identified in the EMF, which have been addressed in the rows above.</p>

**3.3.4.2. Closure vision, objectives and targets**

The overall vision for the entire property has been taken into account to ensure that the quarry can be incorporated into the development plan without being left as a scar in the landscape. It is the intention of the landowner that portions of the 178 hectare property be developed in the future for light industrial / logistics / warehousing and therefore the quarry benches will be widened to form platforms. There are therefore two phases to the Final Rehabilitation and Closure Plan.

- (a) *Phase 1* will ensure that the quarry area is closed off in a sufficiently safe manner prior to Phase 2 closure taking place. There may be a gap between the two phases however closure strategies provided in table 3 above will ensure that the quarry will not have any long-term impacts in this interim phase. Slopes/high walls will be stabilized and re-vegetated, water collecting in the quarry pit will be monitored and re-used and the quarry area fenced off to prevent illegal access.
- (b) *Phase 2* will see the quarry area being incorporated into the final development layout (i.e. expansion of the benches into large platforms outside of the 5 hectare mining area). The angle of the bench slope will be decreased and the bench width increased to allow construction of infrastructure. This will be carried out in accordance with another EMPr prepared through a separate environmental authorization process for the development of the remainder of the property. This development is to take into account the long-term visions of the PMMBT (i.e. formation of conservation corridors within this area of the Mpushini Protected Area). As the plans for the property progress, Phase 2 of the Final Rehabilitation and Closure Plan for the Anniedale Quarry will be generated (i.e. during the annual review assessments).

#### **3.3.4.3. Practicable alternative closure and post closure options and motivation for preferred closure action**

The only other alternative considered for the Anniedale Quarry is to return the area as close to its original state as possible. Since the landowner has informed the EAP about the future development of the property, this alternative was considered short sighted as it did not take into consideration the long-term vision for the area. The preferred closure action, as described above, will make use of a 5 hectare area of the property that has already been impacted.

#### **3.3.4.4. Definition and motivation of the closure and post closure period**

*Phase 1:* 1-3 months to get the quarry into a fit state for the interim period.

An independent ECO is to visit the quarry site once a year after Phase 1 closure is complete to ensure the site remains in a safe, stable state. A site inspection report is to be submitted to the Mining Permit holder, who is to rectify any non-compliances in a timeous manner.

*Phase 2:* 6 months – 18 months once the long-term development plan for the entire property commences.

An independent ECO will be required to monitor the excavations and construction of the property through the additional Environmental Authorisation issued by EDTEA. The monitoring of this will phase will therefore be included in the separate EIA.

#### **3.3.4.5. Details associated with any on-going research on closure options**

The landowner is in the process of investigating potential development layouts through another separate EIA process. Additional specialist studies and landscaping input will be required before the report is circulated to I & APs and finally submitted to EDTEA for assessment. The EIA will take into account the Final Rehabilitation of the site.

#### **3.3.4.6. Assumptions made to develop closure actions**

The site has been fully assessed by the EAP and a series of specialists during the EIA. Full Public Participation was carried out in accordance with the 2014 EIA Regulations. Few assumptions have therefore been made. Potential changes in economic climate / state of the applicant as well as the long-term vision for company and property changes have not been taken into account and may result in the amendment of the Final Rehabilitation and Closure Plan. This will be incorporated into the annual review.

### **3.3.5. Proposed final post-mining land use which is appropriate, feasible and possible of implementation**

As discussed in section 3.3.4.2 above, the final post-mining land-use will be in line with the long-term development proposal for Portion 405 of Vaalkop and Dadelfontein 885. A detailed map for the property, including the quarry site, will be developed through another EIA once the long-term plan is more secure.

### 3.3.6. Closure actions

#### 3.3.6.1 Specific technical solutions related to infrastructure and facilities for the preferred closure option or options

Technical solutions associated with both phases of the Final Rehabilitation and Closure Plan include:

- Face wrecking (pay loader used to roughen the surfaces of the benches, suitably qualified professional to sign off on the angle of slope prior to the Mining Permit holder vacating the site. Should face wrecking not be carried out, a fencing contractor will be required to erect suitable fence during Phase 1);
- Water quality tests to be carried out and sent to an accredited analytical laboratory for testing.
- Installation of over flow pipes from quarry pit if water needs to be drained after testing and treatment (if required). The alternative technology is to use a water tanker to pump water out the pit and if clean can be used for dust suppression during development of site or disposed of at water treatment works.

#### 3.3.6.2 Threats and opportunities and any uncertainties associated with the preferred closure option

Threats, opportunities and uncertainties have been discussed in sections 3.3.3.1 and 3.3.4.6 above.

### 3.3.7. Schedule of actions for final rehabilitation, decommissioning and closure which will ensure avoidance, rehabilitation and management of impacts

As per section 1.4 of the EIR, the Mining Permit is valid for a 2 year period. It can be renewed three times for a year at a time allowing a maximum of 5 years validity of the permit. On expiration of the Mining Permit, the site is to be decommissioned and rehabilitated according to the Rehabilitation Plan. On decommissioning, the processing equipment and offices will be removed, the roads ripped and rehabilitated. The quarry will need to be rehabilitated by shaping slopes and ensuring that there is no loose material or areas where slippage could occur. Topsoil will be re-laid over exposed areas and indigenous grassland species re-introduced.

Before the quarry is legally abandoned, the DMR requirements of long-term drainage, environmental and public access issues will be adequately considered and controlled. Adequate geotechnical data is normally available at the time of a quarry closure to address all long-term geotechnical concerns regarding the abandonment of the mine. By making geotechnical engineering input to the quarry planning and design process an integral part of the mining operation, improvements can be made to quarry safety, productivity, economic efficiency as well as closing concerns when abandoning the mine.

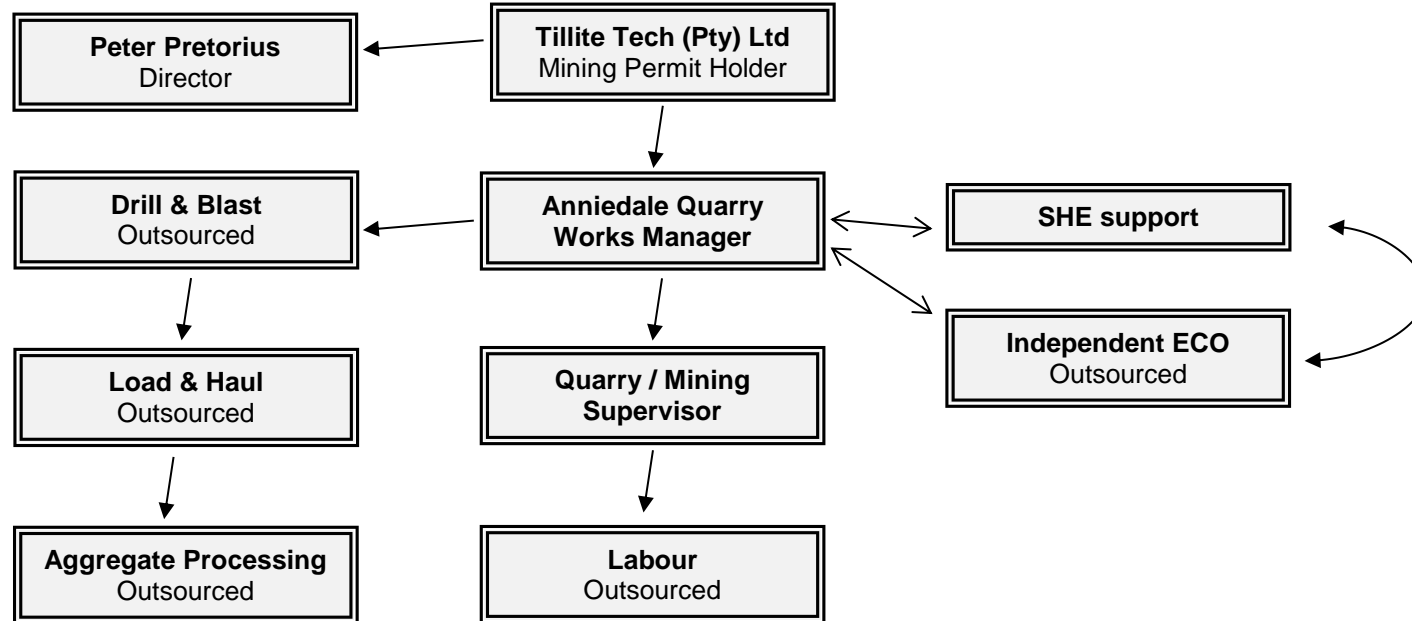
A number of environmental impacts may remain after a site has been mined as the area may be vulnerable to stormwater runoff and erosion. Stormwater flow must be managed by placing diversion berms and ditches at the top of the slope which will act to divert and slow water flow down the slope. The ditch and berms will be vegetated. Even with rehabilitation, an excavated area will remain on the hillside. The visual aspect of this will be mitigated as far as possible through shaping, re-vegetation and screening with vegetation.

The aim of the rehabilitation will be to reduce visual and safety impacts and to control risk of erosion and slippage in the long-term. The following key points must be followed to ensure appropriate closure.

- Rehabilitation will occur as soon as practically possible on completion of mining, following the cessation of the work in a specific section.
- No more than one month will pass between cessation of mining and rehabilitation.
- Any infrastructure erected for mining will be demolished and removed.
- All equipment, concrete footings, fencing, etc. will be removed from site.
- All waste will be removed from site and disposed of at an approved landfill.
- Soil contaminated with oil, grease, fuel may not be disposed of in the excavation but will be disposed at a permitted landfill.

- The floor of the quarry will be left level and ripped to allow re growth of vegetation. Topsoil removed at the beginning of the process can be used to cover this area.
- Before placing topsoil, all visible weeds will be removed.
- The topsoil will be spread evenly over the prepared surface to a depth of 75 to 150mm on slopes of 1:3 or steeper.
- Topsoil placement will occur in a phased manner, concurrent with the phased operation of the quarry. Topsoil will be placed in the same area from which it was stripped.
- Where amounts are inadequate to cover the entire area, slopes will receive priority treatment.
- Site access will be blocked to ensure that other operators or opportunists do not re-visit closed areas and continue to remove material.
- Re-vegetated areas will be protected until vegetation has become established. No vehicles or equipment will be allowed access to areas that have been vegetated.
- Any erosion channels that develop after re-vegetation will be backfilled and consolidated and the areas restored to a proper stable condition. The erosion will not be allowed to develop on a large scale before effecting repairs and all erosion damage should be repaired as soon as possible.
- Any large rocks uncovered by the mining activity must be placed in the pit and covered with overburden material and topsoil.
- The site will not be used further once it has been closed. The area will be shaped and re vegetated to ensure that it does not pose a safety or erosion and environmental hazard.

**3.3.8. Indication of the organisational capacity that will be put in place to implement the plan**



**3.3.9. Indication of gaps in the plan, including an auditable action plan and schedule to address the gaps**

As discussed in section 3.3.4.6 above, the final long-term rehabilitation plan for the Anniedale Quarry is dependent on the future development of the property, which is currently unknown. A separate environmental authorisation process will be required for further development of the property, which will incorporate the quarry area into the design. At present, no gaps have been identified however this will be reviewed on an annual basis.

**3.3.10. Relinquishment criteria for each activity or infrastructure in relation to environmental aspects with auditable indicators**

The table below shows final relinquishment criteria for each of the risks identified for the closure strategies. The relinquishment criteria are the final tests which are to be carried out to ensure the risk has been avoided. Once the risk has been closed out, this is to be signed off by the ECO and Mining Permit holder and retained in a file to keep a record of all the close out activities undertaken.

**Table 5: Auditable relinquishment criteria for each risk associated with final close out activities**

Activity	Relinquishment criteria
1. Potential for soil and water contamination at the Anniedale Quarry site as a result of uncleaned spills, left over mining materials (fencing, equipment, vehicles etc.).	The quarry area is to be free of litter, equipment or any material left over from mining operations. Sign off from the ECO is required.
2. Unsafe high walls with unstable surfaces making the mine area unsafe for people or animals accessing the area at a later date. There is the potential for collapse should the walls not be suitably stabilized prior to closure.	The angle of the slopes are to be more than 1:3. Sign off from a suitably qualified engineer.
3. Excavation resulting in deep pit which will fill with rain water over time resulting in a safety hazard to people and animals access the quarry area.	Phase 1 – pit fenced off to prevent access and a ramp created to ensure emergency exit point. Phase 2 – Pit opened up and leveled to prevent any water from pooling on the site.
4. Potential contamination of water in old sump and quarry area with nitrates from blasting.	Phase 1 – Bi-annually water quality tests to be retained before water released to surrounding environment. If water falls outside of the General Limits, the water is to be treated prior to release. Phase 2 – Once the quarry pit is opened there will be no water collecting on site (i.e. no relinquishment criteria).
5. Loss of grassland vegetation type and association loss of habitat for important faunal species.	Phase 1 – Sufficient vegetation cover to prevent erosion of the exposed surfaces. Phase 2 - Ultimately the area will be developed (i.e. no relinquishment criteria).

**3.3.11. Closure cost estimation**

Since the application is for a Mining Permit, the below cost calculations have an accuracy of ±90%. Closure cost estimate must be updated annually during the operation’s life to reflect known developments, including changes from the annual review of the closure strategy assumptions and inputs, scope changes, the effect of a further year’s inflation, new regulatory requirements and any other material developments. Uncertainties that will impact the costs calculations listed in the table below include fuel prices, material costs, labour, availability of materials and the overall plan for future development.

Table 6: Anticipated Final Rehabilitation Costs for the Closure of the Anniedale Quarry

DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
<b>LANDSCAPING AND PLANTING</b>				
Trimming	m <sup>2</sup>	5000	4	R20 000
Preparing areas for grassing	ha	5	750	R3 750
Topsoiling within the quarry area & access road	m <sup>3</sup>	6000	15	R90 000
Hydro-seeding	ha	5	15000	R75 000
<b>LABOUR</b>				
Unskilled labour	Hour	160	20	R3 200
Semi-Skilled	Hour	160	40	R6 400
Skilled	Hour	150	70	R10 500
<b>PLANT WORK</b>				
Tracked excavator (Bell HD 820 or similar)	Hour	20	300	R6 000
Tracked Loader Backhoe (CAT 428 or similar)	Hour	20	220	R4 400
Tip Truck (10m <sup>3</sup> )	Hour	20	225	R4 500
Water Tanker (10 000 litre)	Hour	30	190	R5 700
<b>Total</b>				<b>R229 450</b>

### 3.3.12. Monitoring, auditing and reporting requirements

Since Phase 1 of the Final Rehabilitation Plan will be carried out in 1-3 months, an independent ECO is required prepare an audit report ensuring all requirements listed in the table below have been adhered to. The ECO is to visit the quarry site once a year after Phase 1 closure is complete to ensure the site remains in a safe, stable state. A site inspection report is to be submitted to the Mining Permit holder, who is to rectify any non-compliances in a timeous manner. During Phase 2, the monitoring will be included under a separate EIA. The ECO is to prepare a report to the holder of the Mining Permit once Phase 2 is complete. Reports are to be made available to any registered I & APs on request.

Table 7: Monitoring plan to be carried out by the ECO during the closure of the Anniedale Quarry (Phase 1).

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
<b>Closure Audit</b>	<ul style="list-style-type: none"> <li>Clearance from the ECO must be obtained to ensure the all of the requirements have been complied with.</li> </ul>	ECO		
<b>Stormwater</b>	<ul style="list-style-type: none"> <li>The Contractor is to check that the stormwater berm has been removed</li> <li>Any stormwater channels must be free from building rubble, spoil materials and waste materials.</li> </ul>	CON		
<b>Waste &amp; Spills</b>	<ul style="list-style-type: none"> <li>All spillages must be cleaned and contaminated soil must be removed and disposed of appropriately.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>All remaining waste bins and / or skips must be removed and disposed of.</li> <li>Records of disposal must be retained.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>All excess concrete must be removed from site on completion of works and disposed of. Washing of the excess into the ground is not allowed.</li> </ul>	CON/ EO		
	<ul style="list-style-type: none"> <li>All excess aggregate must also be removed.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>No litter must be left or burnt on site.</li> </ul>	CON/EO		
<b>Structures and materials</b>	<ul style="list-style-type: none"> <li>Any fences, barriers or demarcations utilized for the operation phase must be removed and disposed of.</li> </ul>	CON		
	<ul style="list-style-type: none"> <li>All structures and imported materials within the site camp must be removed.</li> </ul>	CON		
<b>Slope Shaping</b>	<ul style="list-style-type: none"> <li>The area must be shaped and re vegetated to ensure that it does not pose a safety or erosion and environmental hazard.</li> <li>Slopes must not be left at an angle steeper than 1:3. This will also act as a safety measures as it will clearly demarcate the edge of the slope and make it less easy for people or animals to fall off the top of the slope of the cut face.</li> <li>The floor of the quarry must be left flat and ripped to prevent the pooling of water and to allow for the re-growth of vegetation.</li> </ul>	CON		



<b>Damage</b>	<ul style="list-style-type: none"> <li>Any damage incurred on the neighbouring properties by the contractor must be repaired by the Mining Permit holder.</li> </ul>	MPH		
	<ul style="list-style-type: none"> <li>Any damage to existing infrastructure (i.e. water pipelines, electricity lines and residential property) must be repaired or replaced on completion of the mining.</li> </ul>	MPH		
<b>Close Out</b>	<ul style="list-style-type: none"> <li>A meeting must be held between Engineer, the environmental practitioner and the contractor to approve all remediation activities and ensure that the site has been restored to a condition, which has been approved by the Engineer and ECO.</li> </ul>	ECO		
<b>Vegetation</b>	<ul style="list-style-type: none"> <li>All vegetation planting must be completed and any areas that have been disturbed or cleared must have been rehabilitated and re vegetated.</li> </ul>	ECO		
	<ul style="list-style-type: none"> <li>Re-vegetation of cleared land must utilize only 100% locally indigenous plant material to ensure no erosion occurs once the site is vacated.</li> </ul>	CON/EO		
	<ul style="list-style-type: none"> <li>Where possible, vegetation that was removed during clearing must be kept aside and re-used. This can be kept on site in nursery areas or if the replanting occurs within a few days of clearing, can be kept to one side and immediately re-planted.</li> <li>Grass can be reintroduced by hydro-seeding or planting of grass plugs.</li> </ul>	CON/EO		
	<ul style="list-style-type: none"> <li>Ensure that no sensitive habitats have been damaged during the operational phase.</li> </ul>	ECO		
	<ul style="list-style-type: none"> <li>Where habitats have been damaged outside of the quarry area these must be reported to the ECO and procedures for rehabilitation of these habitats must be undertaken.</li> </ul>	CON/EO		
<b>Erosion</b>	<ul style="list-style-type: none"> <li>Any eroded soil on paths / roadways / other areas must be collected and replaced in the area from which it was eroded. These high risk erosion areas must be protected from further soil erosion.</li> </ul>	CON/EO		
<b>Rehabilitation of the excavated area</b>	<ul style="list-style-type: none"> <li>Re-vegetation must not only take place at the end of operation but must on an on-going process if an area of the mining operations has ceased.</li> <li>Cleared areas may not be left exposed for long periods of time and must be re- vegetated in stages as each section is completed.</li> </ul>	CON/ EO		

<b>Top Soil</b>	<ul style="list-style-type: none"> <li>• Top soil removed during the excavations must be kept to one side and re-used in the same area that it was excavated from. Much of this topsoil, especially the top 30cm will retain grass and vegetation seeds.</li> <li>• This top soil to be used when re-vegetating and rehabilitating areas cleared for operation/ excavation.</li> <li>• All weeds must be removed from site before placing the topsoil on the excavated areas.</li> <li>• Top soil must be spread evenly over the prepared surface, with a thickness between 75-150mm.</li> <li>• Slopes must receive priority treatment of topsoil.</li> </ul>	CON/ EO		
<b>Rehabilitation of eroded areas</b>	<ul style="list-style-type: none"> <li>• Any erosion damage caused during operation must be repaired. The affected area must be reshaped and soil replaced.</li> <li>• The eroded area must be re-vegetated or measures put in place to control further erosion.</li> </ul>	CON/ EO		
<b>Removal of alien invasive species</b>	<ul style="list-style-type: none"> <li>• Alien invasive species must be removed on an on-going basis.</li> <li>• Use of chemical pesticides must be avoided and mechanical removal by hand is preferred.</li> </ul>	CON/ EO		

**3.3.13. Motivations for any amendments made to the final rehabilitation, decommissioning and mine closure plan, given the monitoring results in the previous auditing period and the identification of gaps as per 3.3.11.**

Not applicable. This section is to be completed on the annual review of the Rehabilitation Plan.

### 3.4. Remediation of Latent or Residual Impact<sup>12</sup>

The objective of the environmental risk assessment report is to -

- (a) ensure timeous risk reduction through appropriate interventions;*
- (b) identify and quantify the potential latent environmental risks related to post closure;*
- (c) detail the approach to managing the risks;*
- (d) quantify the potential liabilities associated with the management of the risks; and*
- (e) outline monitoring, auditing and reporting requirements.*

A latent or residual risk can be defined as the risk remaining following the application of all reasonable efforts to mitigate impacts. The measures that have been proposed above in the Final Rehabilitation Plan and applied by the Mining Permit holder may not be suitable and sufficient to reduce the certain risk to tolerable levels resulting in a latent risk. Due to the nature of the mining operations (struck and shovel) and the extent (<5 hectares), there are unlikely to be any latent or residual risks associated with the Anniedale Quarry. All impacts and risks will be mitigated during Final closure and have been addressed in the sections above (see section 2 for the EMPr stating all the risks with an assessment of risks attached under section 3.3.3.1 above and Appendix A of the EMPr).

Provided that the mitigation and rehabilitation measures prescribed in the EMPr during operation and rehabilitation phases of the Anniedale Quarry, there are unlikely to be latent risks manifesting. This is to be confirmed each year during the annual review.

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<sup>12</sup> Environmental impacts which may become known in the future including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report (Regulation 6(c) of the *Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations*).

**SECTION 4****DEFINITIONS*****Stormwater***

Clean rainwater which should be allowed to enter the stormwater system or natural water bodies without causing erosion. Stormwater should not be contaminated with any other substance including soaps, washings, hazardous materials, soil etc.

***Raw materials for which source statement must be obtained***

Topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, timber etc. E.G: sand may only be obtained from an approved sand winning operation which is licensed and has an approved EMPr for operation.

***Incidents***

All incidents should be recorded. Minor incidents could include small spills of less than 5l that do not enter a water body or any stormwater drains, as well as housekeeping issues and general small non compliances with the requirements of the EMPr. Major incidents are those that must be reported to the authorities and include all incidents involving contamination of a water body or stormwater or other reportable incidents as defined below.

***Reportable incident*** is defined as 'an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed' NEMA Section 30, 'includes any incident or accident in which a substance (a) pollutes or has the potential to pollute a water resource; or (b) has, or is likely to have, a detrimental effect on a water resource.' NWA Section 20.







**Environmental Emergency Response and Definition of an Incident**

<p><b>Aim of this document</b></p>	<ul style="list-style-type: none"> <li>To effectively manage response to emergency incidents and control these incidents should they occur.</li> <li>To ensure that such incidents are recorded and, where possible, all measures are taken to prevent them from re-occurring.</li> <li>To provide a definition for what would be considered a reportable incident in terms of the environmental legislation.</li> </ul> <p>Activities covered in this procedure include:</p> <ul style="list-style-type: none"> <li>Identification and definition of an incident and whether or not it needs to be reported to the authorities.</li> <li>Reporting to the relevant authorities in the event that a reportable incident occurs</li> <li>Procedure to follow in the event of a spill or fire.</li> </ul>
<p><b>Personnel Duties and Responsibilities</b></p>	<p>The contractor is responsible for:</p> <ul style="list-style-type: none"> <li>Ensuring all activities are carried out as per this procedure and that the company complies with relevant legislation.</li> <li>Maintaining a register of all incidents as well as ensuring that an incident report is generated for each incident, including details of the incident and how it was closed out.</li> <li>Ensuring that safe disposal certificates are obtained for any waste materials generated as a result of an incident and that this waste is recorded.</li> <li>Providing the necessary spill kit equipment and drums for storage of contaminated soil etc.</li> </ul>
<p><b>Training Requirements</b></p>	<ul style="list-style-type: none"> <li>All personnel and manpower to undergo a site safety and environmental induction prior to starting work on site. All employees to be trained on how to respond to an environmental incident and who to contact in order to ensure that the incident is addressed and recorded and if necessary reported.</li> </ul>
<p><b>Definition of a “reportable incident”</b></p>	<ul style="list-style-type: none"> <li>In terms of the National Environmental Management Act, major incidents must be reported to the authorities. In terms of the National Water Act, any incident involving a substance which has the potential to pollute a water resource must be reported i.e. any spill of into a watercourse or into the stormwater system must be reported. The relevant sections from the legislation are provided below:</li> </ul>
<p><b>National Environmental Management Act</b></p>	<p><i>As defined by NEMA, section 30 “Control of emergency incidents” .</i></p> <p><i>(1) In this section—</i></p> <p><i>(a) “incident” means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed;</i></p> <p><i>(b) “responsible person” includes any person who—</i></p> <p><i>(i) is responsible for the incident;</i></p> <p><i>(ii) owns any hazardous substance involved in the incident; or</i></p> <p><i>(iii) was in control of any hazardous substance involved in the incident at the time of the incident;</i></p> <p><i>(c) “relevant authority” means—</i></p> <p><i>(i) a municipality with jurisdiction over the area in which an incident occurs;</i></p> <p><i>(ii) a provincial head of department or any other provincial official designated for that purpose by the MEC in a province in which an incident occurs;</i></p> <p><i>(iii) the Director General;</i></p> <p><i>(iv) any other Director General of a national department.</i></p>
<p><b>National Water Act</b></p>	<p><i>As defined by the National Water Act section 20 “Control of emergency incidents”</i></p> <p><i>(1) In this section “incident” includes any incident or accident in which a substance -</i></p> <p><i>(a) pollutes or has the potential to pollute a water resource; or</i></p> <p><i>(b) has, or is likely to have, a detrimental effect on a water resource.</i></p>



**Reporting to the authorities**

In the event that a reportable incident occurs, the Site Agent / Project Manager and Environmental Control Officer must be notified immediately. No site staff may communicate directly with the authorities.  
 The relevant sections from the legislation are included below:  
 As taken from NEMA, section 30: Control of Emergency Incidents:  
 (3) *The responsible person or, where the incident occurred in the course of that person’s employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available—*  
 (a) *the nature of the incident;*  
 (b) *any risks posed by the incident to public health, safety and property;*  
 (c) *the toxicity of substances or byproducts released by the incident; and*  
 (d) *any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to—*  
 (i) *the Director General;*  
 (ii) *the South African Police Services and the relevant fire prevention service;*  
 (iii) *the relevant provincial head of department or municipality; and*  
 (iv) *all persons whose health may be affected by the incident.*  
 (4) *The responsible person or, where the incident occurred in the course of that person’s employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident—*  
 (a) *take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;*  
 (b) *undertake cleanup procedures;*  
 (c) *remedy the effects of the incident;*  
 (d) *assess the immediate and long term effects of the incident on the environment and public health.*  
 (5) *The responsible person or, where the incident occurred in the course of that person’s employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including—*  
 (a) *the nature of the incident;*  
 (b) *the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;*  
 (c) *initial measures taken to minimise impacts;*  
 (d) *causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and*  
 (e) *measures taken and to be taken to avoid a recurrence of such incident.*  
 (6) *A relevant authority may direct the responsible person to undertake specific measures within a specific time to fulfil his or her obligations under subsections (4) and (5): Provided that the relevant authority must, when considering any such measure or time period, have regard to the following:*  
 (a) *the principles set out in section 2;*  
 (b) *the severity of any impact on the environment as a result of the incident and the costs of the measures being considered;*  
 (c) *any measures already taken or proposed by the person on whom measures are to be imposed, if applicable;*  
 (d) *the desirability of the State fulfilling its role as custodian holding the environment in public trust for the people;*  
 (e) *any other relevant factors.*  
 (7) *A verbal directive must be confirmed in writing at the earliest opportunity, which must be within seven days.*  
 (8) *Should—*  
 (a) *the responsible person fail to comply, or inadequately comply with a directive under subsection (6);*  
 (b) *there be uncertainty as to who the responsible person is; or*

	<p>(c) there be an immediate risk of serious danger to the public or potentially serious detriment to the environment, a relevant authority may take the measures it considers necessary to—</p> <p>(i) contain and minimise the effects of the incident;</p> <p>(ii) undertake cleanup procedures; and</p> <p>iii) remedy the effects of the incident.</p>
<b>National Water Act section 20: Control of emergency incidents</b>	<p>(2) In this section, "responsible person" includes any person who -</p> <p>(a) is responsible for the incident;</p> <p>(b) owns the substance involved in the incident; or</p> <p>(c) was in control of the substance involved in the incident at the time of the incident.</p> <p>(3) The responsible person, any other person involved in the incident or any other person with knowledge of the incident must, as soon as reasonably practicable after obtaining knowledge of the incident, report to -</p> <p>(a) the Department;</p> <p>(b) the South African Police Service or the relevant fire department; or</p> <p>(c) the relevant catchment management agency.</p> <p>(4) A responsible person must -</p> <p>(a) take all reasonable measures to contain and minimise the effects of the incident;</p> <p>(b) undertake clean-up procedures;</p> <p>(c) remedy the effects of the incident; and</p> <p>(d) take such measures as the catchment management agency may either verbally or in writing direct within the time specified by such institution.</p>
<b>Spill response</b>	
<b>Responsible Person/s</b>	<p>The spill is reported to the site foreman who must notify his superior.</p> <p>All employees should be made aware of the procedure in case of a spill.</p>
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Identify nature of spill e.g. paint, oil or lubricants</li> <li>2. Locate spill kit</li> <li>3. Contain spill according to the training provided</li> <li>4. Where necessary, contact external spill control contractors</li> <li>5. Ensure spill does not cause any external contamination (such as storm/ground water or soil)</li> <li>6. Ensure that cleanup measures are taken if any contamination has occurred</li> <li>7. Record in emergency response record the: <ul style="list-style-type: none"> <li>• Nature of incident</li> <li>• Cause of incident</li> <li>• Clean up measures</li> <li>• Mitigation measures taken</li> </ul> </li> <li>8. Record in non-conformance register</li> <li>9. The ECO and Project Manager will determine if the event qualifies as an incident and take steps to report the incident to the necessary authorities i.e. DMR and DWS.</li> <li>10. The ECO shall review all spill reports</li> </ol>
<b>Fire</b>	
<b>Responsible Person/s</b>	<p>The fire is reported to the site foreman</p> <p>All employees should be made aware of the procedure in case of fire.</p>
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Identify source and nature of fire.</li> <li>2. In case of small fire extinguish with material appropriate to the nature of the fire</li> <li>3. In case of a large fire contact Fire Department</li> </ol>

	<ol style="list-style-type: none"> <li>4. In the site camp, seal off exposed stormwater drains to ensure fire water does not cause any external contamination. If on site, take measures to prevent fire water entering any water body.</li> <li>5. Ensure that clean-up measures are taken if any contamination has occurred</li> <li>6. Record in emergency response record the: <ul style="list-style-type: none"> <li>• Nature of incident</li> <li>• Cause of incident</li> <li>• Clean up measures</li> <li>• Mitigation measures taken</li> </ul> </li> <li>7. Record in non-compliance register</li> <li>8. The ECO and Project Manager will determine if the event qualifies as an incident and take steps to report to the authorities.</li> <li>9. The EO shall review incident / non-conformance reports</li> <li>10. Adjustments will be made, if necessary, to the operational and emergency procedures and the Environmental Management System to prevent future occurrences</li> </ol>
<b>Explosion</b>	
<b>Responsible Person/s</b>	<p>The explosion is reported to the site foreman who must notify his superior. All employees should be made aware of the procedure in case of explosion.</p>
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Identify source and nature of explosion.</li> <li>2. In case of small fire as a result of the explosion, extinguish with material appropriate to the nature of the fire</li> <li>3. In case of a large fire as a result of the explosion contact Fire Department</li> <li>4. In the site camp, seal off exposed stormwater drains to ensure fire water does not cause any external contamination. If on site, take measures to prevent fire water entering any water body.</li> <li>5. Ensure that clean-up measures are taken if any contamination has occurred</li> <li>6. Record in emergency response record the: <ul style="list-style-type: none"> <li>• Nature of incident</li> <li>• Cause of incident</li> <li>• Clean up measures</li> <li>• Mitigation measures taken</li> </ul> </li> <li>7. Record in non-compliance register</li> <li>8. The ECO and Project Manager will determine if the event qualifies as an incident and take steps to report the incident to the necessary authorities i.e. DMR and DWS.</li> <li>9. The ECO shall review spill reports</li> </ol>
<b>Resource Requirements</b>	
<b>Materials</b>	<ul style="list-style-type: none"> <li>• Separate drums for contaminated soil.</li> <li>• Spade and clean soil</li> <li>• Fire equipment</li> </ul>