

**October
2016**

**DRAFT ENVIRONMENTAL IMPACT 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 in terms of
Appendix 1 to GNR 982**

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Executive Summary

Tillite Tech (Pty) Ltd have applied for a Mining Permit to mine stone from a private property along the P338, Msunduzi Municipality, Umgungundlovu District. The mine area is 4.99 hectares in extent and includes all stockpile areas, offices, parking etc. Weekly / bi-monthly controlled blasts will loosen material to create benches in the quarry with the material being screened and crushed on site. The material will be stored in stockpiles, collected by top-loaders and distributed to consumers. The preferred site has taken into account the location of existing infrastructure and servitudes. An alternative site, which was originally considered by the applicant, on the opposite side of the hill has also been assessed in this report.

The operation of the mine requires a Mining Permit in terms of section 27 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) and will result in the cumulative clearance of more than 1 hectare of indigenous vegetation. A Scoping Report and Environmental Impact Assessment are therefore in process in terms of section 28 of the National Environmental Management Act (107 of 1998 as amended).

The Final Scoping Report was approved by the Department of Mineral Resources (DMR) on the 05th July 2016. The Draft Environmental Impact Report (EIR) follows this acceptance and includes specialist studies with more detailed mitigation measures provided for the impacts identified during the Scoping Phase for the Anniedale Quarry. The Draft EIR has been made available to all registered Interested and Affected Parties for further comment before the Final EIR is submitted to DMR for assessment.

The following key impacts and mitigation measures have been identified in the EIR:

- **Risk of collapse of the mining face:** Excavations are to be carried out in accordance with the site specific Mine Works Programme (Appendix C) to ensure there is no collapse of the mine face.
- **Impacts associated with blasting (flyrock, noise and dust):** The Blasting Impact Report (Appendix C) concludes that the nearest blast receptors will not be impacted by flyrock and therefore no mitigation measures are required. Perimeter monitoring of dust will be conducted to monitor dust levels to ensure they remain within legislated limits and dust control mitigation measures will be put in place. The operation of the quarry will generate noise although the topography and increased distance to the nearest residential household are expected to assist in reducing this impact. Where necessary, noise mitigation measures can be implemented.
- **Increase in heavy truck traffic in the area:** The nature of the activity will result in a localised increase in haulage truck traffic. The site will have direct access onto the P338, which joins the N3 less than 2km east of the site, thereby preventing the need for any trucks to travel on private / residential roads. A B2 type intersection will be required to ensure safe vehicle access onto the P338.
- **Leaving the quarry un-rehabilitated resulting in a safety and environmental risk:** The holder of the permit is legally bound to make financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of mining. The Annual and Final Rehabilitation Plans are included in section 3 of the EMPr in Appendix E.
- **Visual impact:** The preferred mine site is located on the south facing slope of the hill, away from the residential households associated with the neighbouring farms. A row of indigenous trees is proposed to be planted along the northern boundary to further reduce the visual impact.
- **Cumulative impact on the biodiversity and fauna currently foraging and breeding on the property:** The majority of the faunal species are associated with the riparian/wetland habitats (avoided) and grassland areas (loss of 3.6 hectares). It is unlikely that the relevant species will enter the quarry area during operation due to the level of disturbance however the quarry is to be clearly demarcated and fenced off from the surrounding sensitive areas / open space system. Although there will be 3.6 hectares grassland lost, the entire property is 178 hectares, which currently remains undeveloped
- **Loss of core and primary vegetation:** An existing dirt access track passes near the portion of core primary grassland area (rated as high priority by the vegetation specialist). Vehicles are therefore to remain on existing tracks with any necessary expansions being carried out to the west, away from the core primary grassland. Dust suppression measures to be applied to prevent dust from settling on surrounding sensitive grasslands. An area of 0.9 hectares of primary grassland, 2.67 hectares of primary transitional grassland and 1.4 hectares of alien vegetation will be cleared from the preferred quarry site. Apart from preventing the unintentional clearance of vegetation and ensuring continual rehabilitation of areas not in use, this impact cannot be fully mitigated.
- **Loss of agricultural land in the Msunduzi Municipality:** Although there will be 5 hectares of potentially viable agricultural land lost, the entire property is 178 hectares, which remains undeveloped. The 5 ha area of land associated with the quarry footprint will however be lost to any future agricultural activities /

grazing. The site is currently undergoing rezoning with an application having been submitted to the Department of Agriculture for the land to be released from this zone.

- **Impact on long-term conservation plans for the Mpushini Protected Area:** The applicant and landowner have indicated a willingness to engage with the PMMBT regarding potential conservation corridors across the property. Since the current application is for a 5 hectare portion of the property, it is beyond the scope of this application to formulate conservation corridors and links on other portions of the property. All long-term plans for future development of the property will take into account the long-term vision towards conservation of the Mpushini Valley and the applicant will engage with the PMMBT during these processes to set aside such corridors.
- **Poor stormwater management increasing the risk of erosion and risk to water quality in nearby watercourses:** A berm will be created around the edge of the quarry to divert clean water away from the mine and prevent potentially contaminated run off from leaving the mine area. A sump/s are to be created at the low point of the quarry to capture runoff from within the mine area. This water is considered “dirty” and will be stored on the site and used for dust suppression. Any drainage off the mine area would flow in a southerly direction towards the P338 away from delineated watercourses. The wetland and aquatic specialists rated potential impacts on the water resources as “negligible to minor”. The Geohydrological Assessment has confirmed that there is no risk to groundwater associated with the quarry operations.

Detailed mitigation measures for these impacts have been included in the Impacts Table in section 7.0 of the EIR and include recommendations and input from the various specialist reports, summarised under section 3 of the EIR and attached under Appendix C. No fatal flaws have been identified during the EIA process and therefore the EAP is of the opinion that the Mining Permit for the Anniedale Quarry be granted, provided that the requirements of the EMPr, attached under Appendix E, are adhered to during the operation and rehabilitation of the quarry.

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Section 1: Scope of Work and Location of Activity

1.1 Project Title

Anniedale Quarry located within the Msunduzi Local Municipality.

1.2 Aim of the Environmental Impact Report

As per Appendix 3 of the Environmental Impact Assessment Regulations¹, the objective of the environmental impact assessment process is to, "through a consultative process-

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- (c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the--
 - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - (ii) degree to which these impacts-
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources, and
 - (cc) can be avoided, managed or mitigated;
- (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to avoid, manage or mitigate identified impacts; and
- (h) identify residual risks that need to be managed and monitored.

The Environmental Impact Report (EIR) follows the Final Scoping Report, which was accepted by the Department of Mineral Resources (DMR) on the 05th July 2016. The EIR provides more detail on the proposed mining operation, addresses comments raised during the "Scoping Phase" and includes specialist input on the impacts identified by the Environmental Assessment Practitioner (EAP) and new impacts identified by the specialists (section 7.0 of the EIR for the impacts section).

All registered Interested and Affected Parties (I & APs) will be given a legislated 30 day comment period to comment on the Draft EIR. Meetings will be held on request, if needed, to clarify or discuss aspects of the application before the Final EIR is compiled and submitted to the DMR². All comments are to be submitted to EnviroPro whose details are provided below.

1.3 Applicant and Independent Consultant Details

ITEM	APPLICANT CONTACT DETAILS
Name	Tillite Tech (Pty) Ltd
Tel no	031 700 2099
E-mail address	peter@tillitetechnology.co.za
Postal address	39 Alexander Road, Seasons Park, Westmead, Durban, 3610

ITEM	CONSULTANT CONTACT DETAILS
Name	EnviroPro Stephanie Williams / Josette Oberholzer
Tel no	031 765 2942
Fax no:	086 549 0342
Cellular no	083 929 4662

¹ Environmental Impact Assessment Regulations published on the 04th December 2014 in Government Gazette No. 38282 notice R982.

² "Timeframes" are outlined in Chapter 2 of the 2014 EIA Regulations.

E-mail address	steph@enviropro.co.za
Postal address	P.O Box 1391 Kloof 3640

1.4 A Description of the Activities to Be Undertaken Including Associated Structure and Infrastructure As per Section 3 (d) (ii)

Tillite Tech (Pty) Ltd have applied for a Mining Permit in terms of section 27 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002, MPRDA), 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. Nikkel Trading 535 (Pty) Ltd support the proposal (see letter from the landowners attached under Appendix B). The landowner has reached an agreement with Tillite Tech (Pty) Ltd regarding the surface rights to access the quarry area.

A 1:50 000 topographical map is provided in Figure 1 to show the location of the property and surrounding land uses. 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 different phases of the project are described below.

Construction

There will be very little activity associated with the construction phase apart from establishing a site office and setting up the screener and crusher in demarcated areas (south-east corner of the quarry footprint). The existing dirt road off the P338 will be used to access the quarry. The dirt road is located approximately 1 km west of the N3 highway and 860m in length (shown in white in Figure 2). Access to the mine area will be restricted and controlled during operation.

Operation

The applicant will commence with removing material using excavators on approval of this application. A Mine Works Programme, describing the mining methodology, has been prepared by the applicant and is attached under Appendix C. Mining will be carried out in phases so that only portions of the 4.99 hectare site will be cleared at any one time. In the long term, the activity will result in the clearance of more than 1 hectare of indigenous vegetation from the property, triggering an Environmental Impact Assessment (EIA).

The observed overburden thickness is in the order of 13 to 26m and is comprised of mixed Pietermaritzburg formation shale and passage beds which lie on top of decomposed Tillite (Mine Works Programme; Appendix C). Typically in a quarry, the rock needs to be drilled for blasting. Blasting is the first process in the reduction in the size of the material to those specified by the SABS and other building and construction bodies.

As per the Mine Works Programme, blasting will be required either weekly or bi-monthly to soften material so that it can be removed by excavator. The drilling of blast holes will be done by means of either pneumatic or hydraulic drill rigs. Both top and down-the-hole hammers may be used. Blast hole diameters vary between 76 and 115 mm. Blast hole depths vary between 3 and 16 meters, depending on the particular bench height. ANFO explosives will be used with a NONEL initiating system unless geology dictates otherwise. Oversize boulders are reduced to a suitable size by either secondary blasting with cartridge type or emulsion explosives, or by means of a hydraulic hammer. Toes are removed by means of inclined drilling and cartridge or emulsion type explosives, and preferably initiated with the main blast. Sub drilling is done to a maximum of 2, 5 meters.

A Blasting Impact Report has been prepared and included in Appendix C. The report concludes that all blast receptors identified are well below the US Bureau of Mines (USBM) recommended vibration limit of 25mm/s and are located outside of the 500m blast radius. The vibrations on the main road (P338) are also well below the applied limit of 150mm/s generally applied to this type of blast receptor.

The blasted rock will be loaded into articulated dump trucks and hauled to the processing plant. The blasted rock will then be further reduced in size by means of a selection of different crushers, from flaky (undesirable) to round or cubic (more desirable). The rock will then be sorted by mechanical screens (large inclined vibrating screens or trammel screens) to the required size grading. The various products will be stored in bins, silos or stockpiles prior to dispatch.

Anniedale Quarry will be a typical truck and shovel operation, the rock being blasted and loaded out for transport by truck to the crushing and screening plant. The loading formats will be 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 safety reasons, but under special conditions, may be reduced. A 30m bench width will enable the machines to work safely on the benches and provide 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 will reduce the height of the suspended material and make it manageable while working below. There will be no artificial support envisaged in the quarry faces.

Under stable geological conditions, double benching may be resorted to on final pit walls for the purpose of improving the extraction ratio. The final pit wall slopes will vary between 45° and 65°, depending on the local rock mass classification. The quarry will be developed from a northerly direction. Topsoil, where present, will be used for the rehabilitation of the final quarry boundaries, waste dumps and boundary or protection berms.

There are currently three alternative access routes to the quarry site. Alternative 1 and 2 (east of the quarry) are preferred from an environmental perspective, as these are existing tracks with direct access onto the provincial road however, the traffic engineers have provided the Department of Transport (DoT) and Msunduzi Municipality with a third access alternative. Alternative 3 is for a new track to be created to the west of the quarry linking up onto the District Road (D354). A Traffic Impact Statement (attached under Appendix C) has been submitted to DoT, who are to confirm the preferred access option from a traffic engineering perspective. The access alternatives are shown in white in Figure 2 and discussed in more detail in section 2 below.

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.

Rehabilitation/ Decommissioning

The Mining Permit will be 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, summarised below and outlined in more detail in section 3 of the EMPr attached under Appendix E.

On decommissioning, the processing equipment and offices will need to 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.

Please refer to section 3.0 of the attached EMPr, which outlines the Annual and Final Rehabilitation measures to be carried out for the Anniedale Quarry.

1.5 All Listed and Specific Activities to Be Triggered and Being Applied For as Per Section 3 (d) (i)

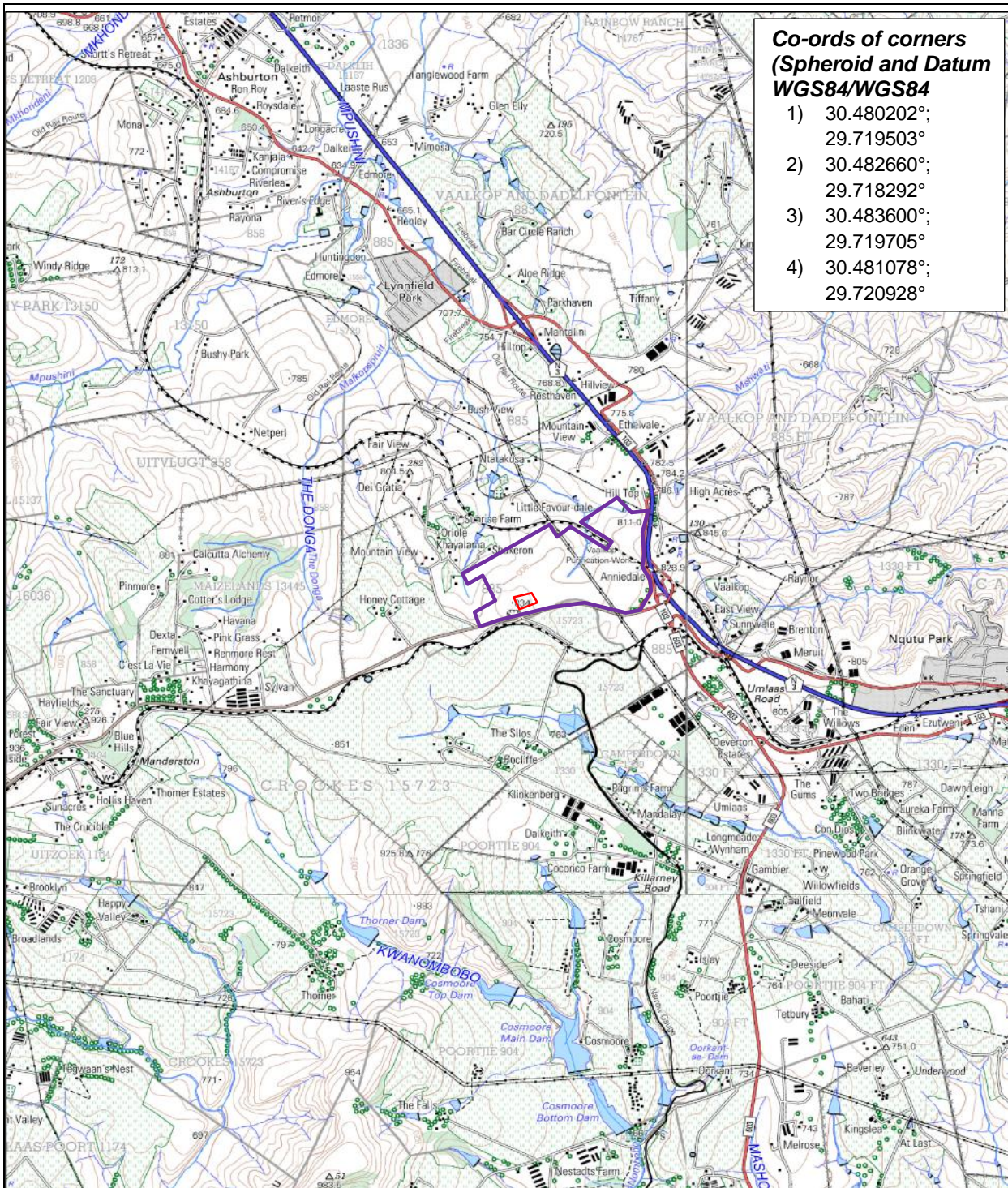
GNR	Activity Number	Activity as per the legislation	Activity as it applies to the proposal
GNR 983 Listing Notice 1; 04 th December 2014	21	<i>Any activity including the operation of that activity which requires a mining permit in terms of s27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</i>	A Mining Permit application was submitted to the Department of Mineral Resources and accepted on the 17 th March 2016.
GNR 983 Listing Notice 1; 04 th December 2014	27	<i>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</i>	The mining activities will require the clearance of more than 1 hectare of indigenous vegetation. The entire quarry area, including parking, stockpiling and crushing plant, is 4.99 hectares.

GNR 984 Listing Notice 2; 04 th December 2014	21	<i>Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.</i>	Blasting, crushing and screening of rock material will take place on site. These activities are considered "primary processing of the raw material".
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1.6 Location Of Activity As Per Section 3 (b)(i)-(iii)

District Municipality	Umgungundlovu District Municipality.	
Local Municipality	Msunduzi Local Municipality.	
Ward	37	
Area / Town / Village	Camperdown	
Co-ordinates:	Latitude	Longitude
Quarry Corner 1	29°43'10.21"S	30°28'48.73"E
Quarry Corner 2	29°43'05.85"S	30°28'57.58"E
Quarry Corner 3	29°43'10.94"S	30°29'0.96"E
Quarry Corner 4	29°43'15.34"S	30°28'51.88"E
Property Description:	Parent Farm:	Farm Portion:
	Vaalkop and Dadelfontein 885	Portion 405
21 Digit Surveyor General's numbers:	NOFT00000000088500405	

Figure 1: 1 in 50 000 Locality Map Showing Proposed Quarry on Portion 405 of Vaalkop and Dadelfontein 885, Msunduzi Local Municipality, Umgungundlovu District Municipality, KwaZulu Natal. Applicant: Tillite Tech (Pty) Ltd. Property boundary in purple; Proposed Mining Area Shown in Red Measuring 4.99ha.

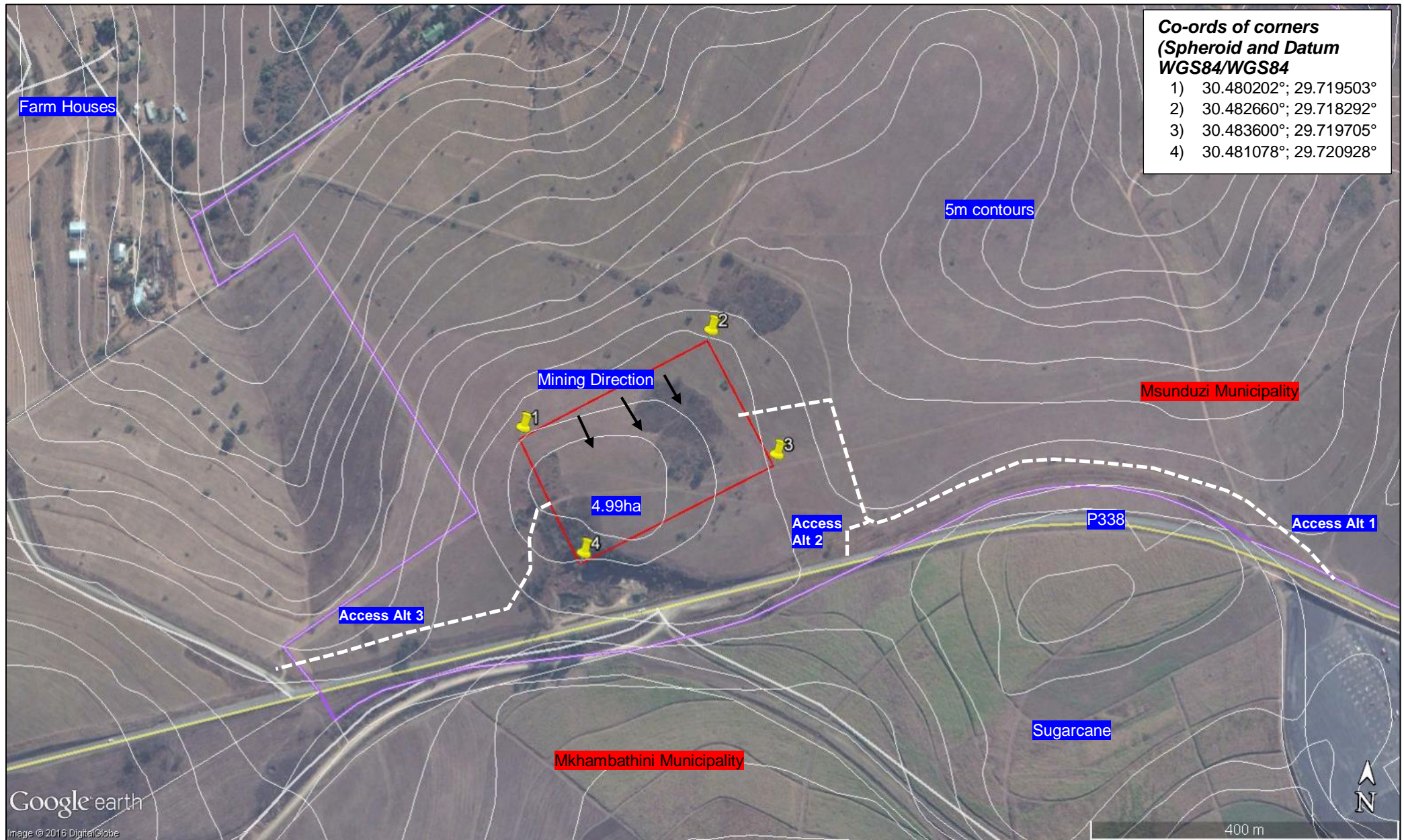


Title	Anniedale Quarry	Legend
Co-ordinates	29°43'10.21"S; 30°28'48.73"E	Watercourses
Scale	1:50 000	Property
Topographical Sheet No.	2930CB	Quarry site
Drawing No.	Anniedale Quarry #01	20m Contour
Date Prepared	22 nd March 2016	Eskom Powerlines
Prepared By	Stephanie Williams	Urban Areas

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Figure 2: Aerial Photograph Showing Permitted Area (4.99ha) in the Msunduzi Municipality; KZN; Portion 405 of of Vaalkop and Dadelfontein 885, Msunduzi Local Municipality, Umgungundlovu District Municipality, KwaZulu Natal. Applicant: Tillite Tech (Pty) Ltd. Property boundary in purple; Proposed Mining Area Shown in Red Measuring 4.99ha. The 5m contour lines are shown in white with access alternatives shown in white dashed lines.



Section 2: Alternatives as Per Section 3 (h)

2.1 Description of Process Followed to Reach Proposed Preferred Activity, Site and Location within the Site as Per Section 3 (h) (i), (ix) and (x)

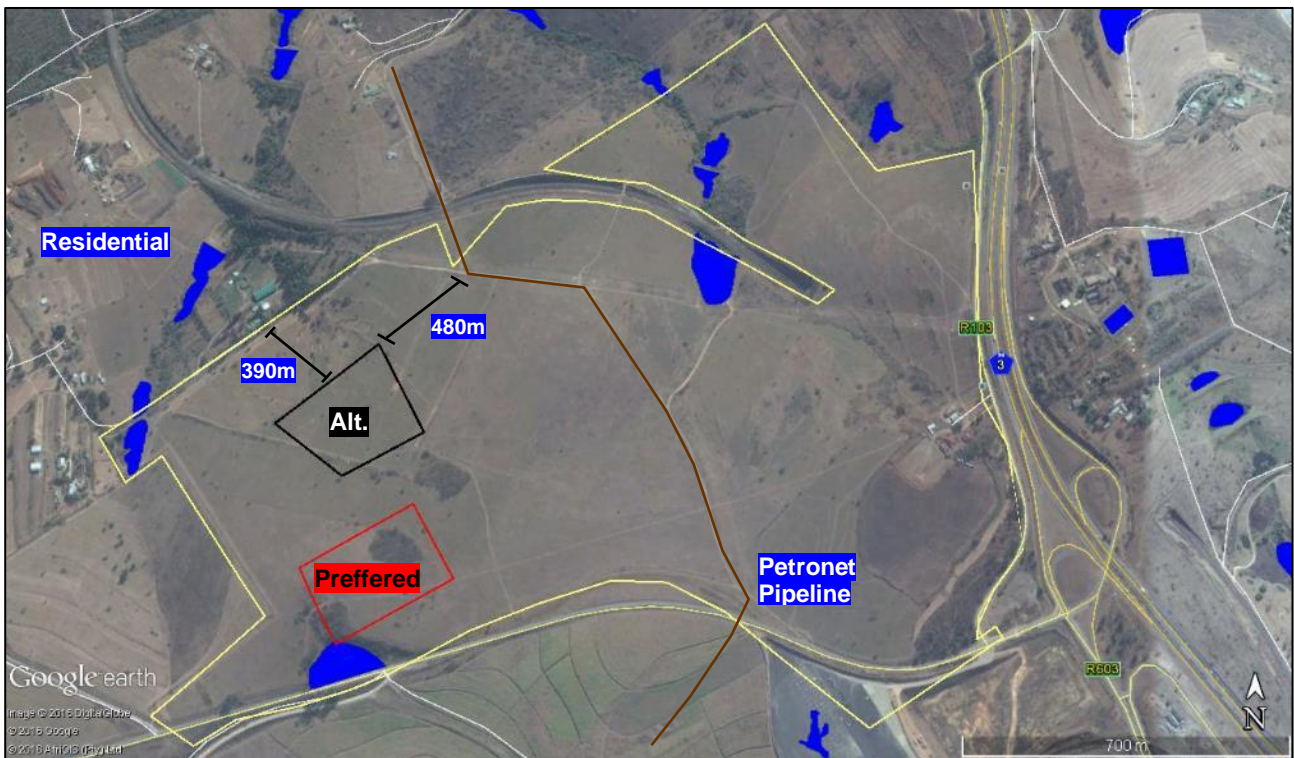
Site Alternatives

Nikkel Trading 535 (Pty) Ltd purchased this property after determining that it had development and mining potential. The mining operations have been outsourced to Tillite Tech (Pty) Ltd, who carried out initial investigations which indicated that a number of factors including availability of material made it feasible to commence a mining operation on the site. The proposal is therefore ultimately to clear and mine a 4.99 hectare portion of land to operate a commercial quarry. An application for a mining permit at the co-ordinates provided in section 1.5 has been submitted, acknowledged and accepted by the Department of Mineral Resources (DMR). Based on the findings of the Geotechnical Investigation (Appendix C), which confirmed the location of the desired stone, as well as restrictions imposed by infrastructure and sensitive environmental areas across and adjacent to the property, a preferred layout alternative on the site was formulated.

It is to be noted that, although an alternative layout was considered at the beginning of the EIA process (Alternative 1 discussed below), only one site can be lodged with DMR at the start of the Mining Permit application process. No amendments to the preferred quarry footprint can therefore be made at a later stage of the process.

The initial layout alternative presented to the Environmental Assessment Practitioner (EAP) by the applicant, was located on the northern side of the hill (outlined in black in Figure 3). Layout Alternative 1 was purely based on a desktop assessment by the applicant and did not take into account any social or environmental aspects. This side of the hill was anticipated to contain good quality material for mining. Once various servitudes and restrictions were identified on the property, the proposed 5 hectare mine area was relocated to the southern side of the hill (outlined in red in Figure 3). The layout alternatives are described in more detail below.

Figure 3: Proposed Layout Alternatives for the Anniedale Quarry on Portion 405 of Vaalkop and Dadelfontein 885. Layout Alternative 1 is outlined in black with the preferred Layout Alternative 2 outlined in red. National Freshwater Ecosystem Priority Areas are shaded in blue (source: Google Earth Pro with SANBI GIS overlay).



Layout Alternatives
Alternative 1

The original mine area was located on the northern side of the hill, approximately 130m north of the preferred mine area. As stated above, the desktop assessment showed good quality material in this portion of the property however various other restrictions were not considered. A map showing the servitudes traversing the site is shown in Figure 4. The mine site needs to take into account the various buffers associated with the infrastructure as well as the relevant safety distance to be maintained from Transnet’s New Multi-Product Pipeline (NMPP; illustrated in brown in Figure 4). The South African National Road Agency Limited (SANRAL) was included as an Interested & Affected Party to provide comment on the location of the quarry during the Scoping Phase. As part of best practice guidelines, the applicant intends to blast more than 500m from any residential dwellings. The distance from the NMPP and nearest residential households is shown in Figure 3 above. Both fall closer than 500m and therefore the quarry location was not considered ideal with blasting taking place closer to these sensitive receptors.

From a social perspective, a number of residential households and farms located to the north of the site look onto this side of the hill. In order to retain the aesthetic value associated with the view, it is preferable for the quarry to be located on the southern slope (i.e. Layout Alternative 2). Photographs of the alternative site location, as seen from the residential properties to the north have been included in Figure 5. Access to the alternative layout is available, using an existing dirt track which links to a dirt farm road, later joining the D354 (see Figure 5c). Vehicles access the quarry will be travelling on smaller dirt farm roads for a greater distance and there will be a greater risk of nuisance to residents from these vehicles which will be required to pass in close proximity to farm houses (i.e. dust, noise, road maintenance etc.).

Although the entire property is comprised of Ngongoni Veld [identified as “vulnerable” by the South African Biodiversity Institute’s (SANBI)], the vegetation specialist identified the alternative quarry location to fall entirely in “secondary grassland” (see Figure 14 below). Vegetation associated with the two alternate sites is discussed further in section 3.4 of the EIR. Similar to the vegetation, fauna associated with the two mine areas is unlikely to differ significantly between the two layout alternatives due to the distance between the two and the similar vegetation type (see section 3.5 below).

Figure 4: Portion 405 of Vaalkop & Dadelfontein 885 outlined in yellow with the various servitudes associated with the site (source: Terratest Site Assessment, 2014).

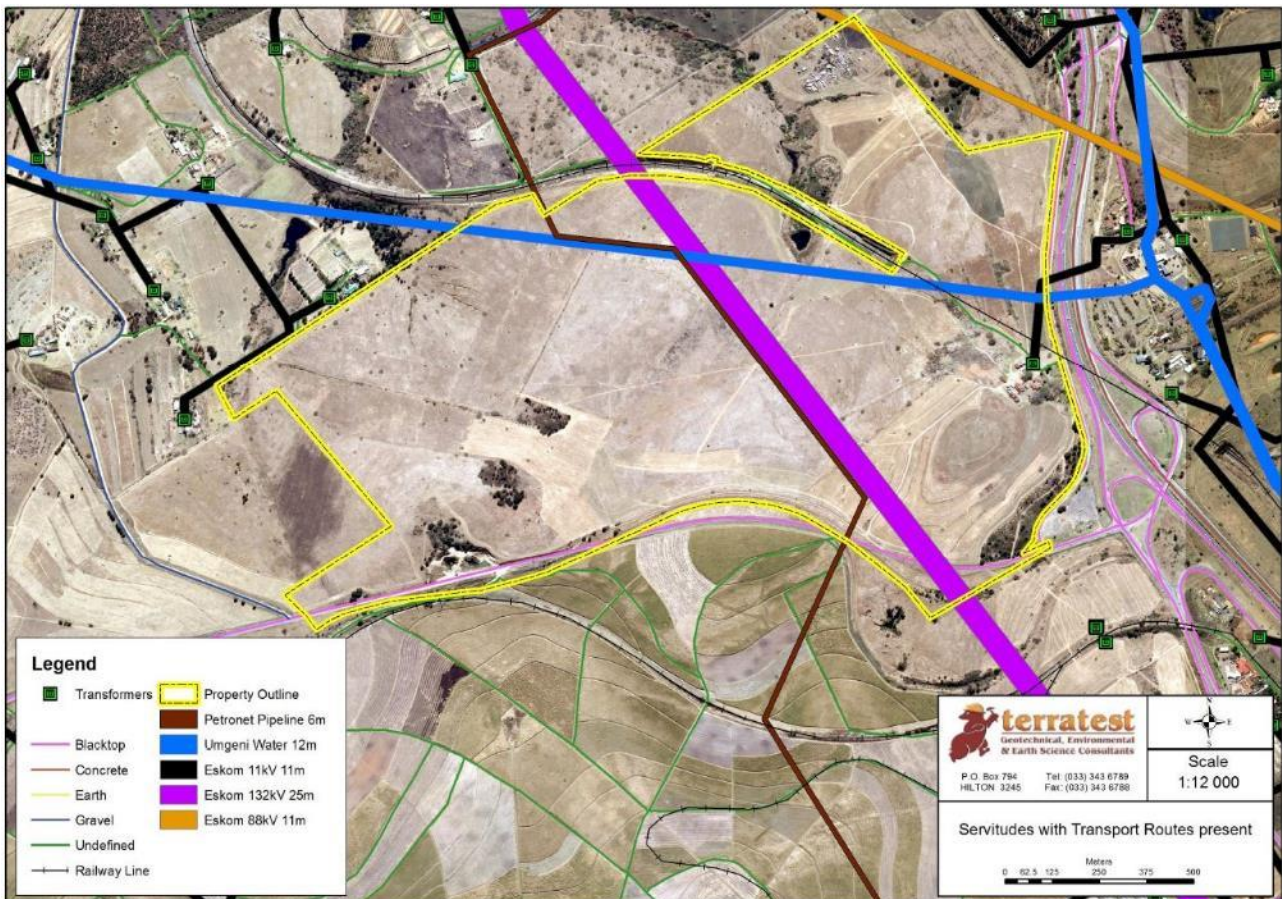


Figure 5: Photographs of mine Layout Alternative 1, outlined in black (a) Photograph taken in a southerly direction showing the view from the farm houses looking onto the proposed mine area; (b) Photograph taken in a northerly direction looking down the hill towards the households and (c) red line indicating the existing access to the alternative layout, which passes close to farm houses.



Alternative 2 (Preferred Alternative)

The preferred mine area has been relocated further south on Portion 405 of Vaalkop and Dadelfontein 885. The south facing slope will therefore be mined. The preferred mine area will be less visible to surrounding residential / farm properties located to the north of the site (Figure 6c). To further shield the quarry from the farms to the north, trees will be planted along the northern boundary of the quarry to act as a natural screen.

The mine area is located well away from the various servitudes ensuring that there will be no impact on the infrastructure during blasting operations. This has been confirmed in the Blasting Impact Report attached under Appendix C. The vibrations on the main road (P338) is well below the applied limit of 150mm/s generally applied to this type of blast receptor. The blast vibration at 500m, where the Umgeni Water Pipeline and Transnet NMPP Pipeline are located, is only 2 mm/s, which is very low and will not impact the services.

The area directly south of the mine area has been previously mined and it is likely that the material was used to upgrade / maintain the local roads (Figure 6a). The vegetation associated with this previously disturbed area as well as another patch of alien vegetation falls within the preferred mining footprint. There is however areas within the preferred site which contain primary and secondary grassland (vegetation is further discussed in section 3.4 below).

There are three access alternatives considered (Figure 7 provides an overview of the various options). Access alternatives 1 and 2 are existing tracks to the east of the quarry site, with direct access onto the P338. The third alternative, is for a new track to be created, to the west of the quarry, linking the quarry access to the D354. A Traffic Impact Statement, attached under Appendix C, has been submitted to DoT, who are in the process of confirming which access option is preferred. Currently, the preferred access is Option 2. Option 2 is the shortest route available (320m), restricting vehicles passing through grassland areas on other sections of the property. The traffic engineer concluded that Option 2 and 3 would be best from a road safety and intersection spacing criteria. If DoT confirm that Option 3 is preferred, then this will be the access point for the quarry.

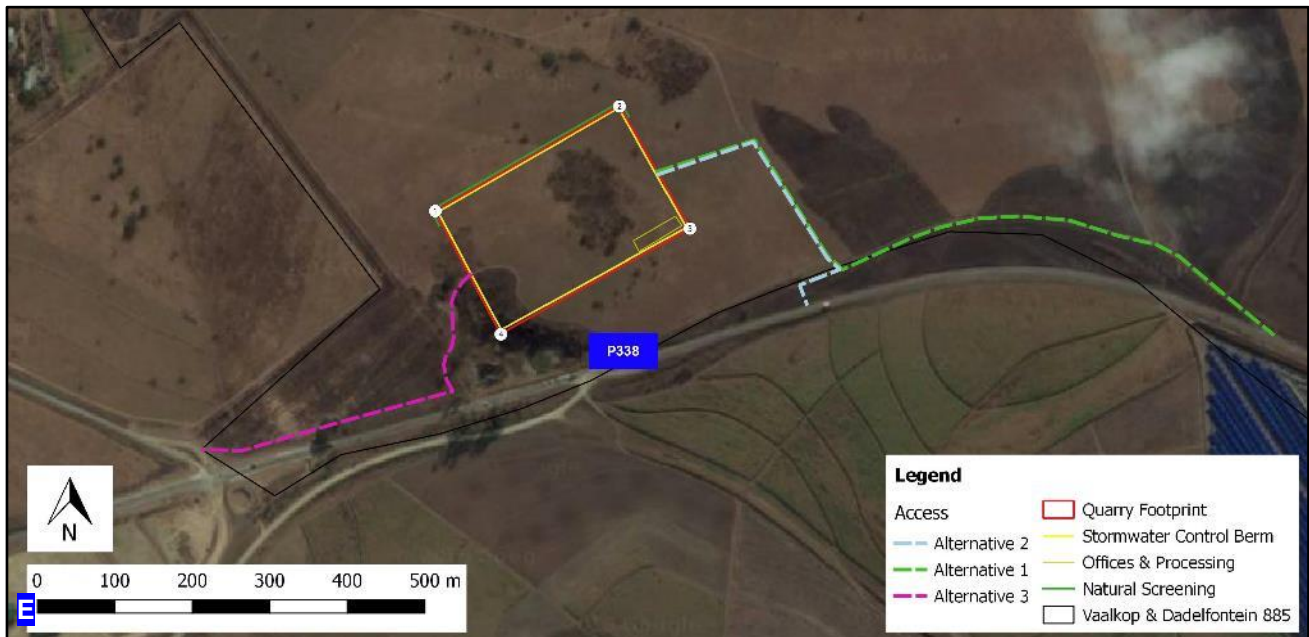
If access is taken via Option 2 or 3, the access point onto the P338 is to be upgraded to a B2 type configuration. This is to accommodate the combination of an increase in truck traffic turning into these minor roads and the existing speed limit on the P338.

The specialist studies carried out and summarised in the following section, assessed the entire property to gain insight into the condition and biodiversity hotspots across the 178 hectare property. The specialists also concentrated on assessing this preferred quarry site in the context of the entire property.

Figure 6: Photographs of the preferred mine Layout Alternative showing the previously mined area associated with the southern corner of the mine area (a) Photographer facing north, towards the proposed mine area, (b) Photograph taken in a southerly direction towards the P338, (c) Photograph taken in a south-easterly direction showing the view from the farm houses looking onto the proposed mine area and (d) Existing dirt track through the farm looking towards the quarry.



Figure 7: Aerial photograph showing the three access options associated with the preferred quarry site (source: QGIS).



Technology Alternatives

In terms of the mining method proposed, overburden will be cleared using an excavator and soft material will be cut back. Work benches (minimum of 30m wide and ideal bench height of 10-12m) will be cut into the mining area and material will be removed using controlled blasts (see Mine Works Plan in Appendix C). The loosened material will be removed using excavators and transported to the crushing and screening plant area. This is the standard methodology used to mine hard stone material and is therefore the only feasible technology alternative considered throughout the EIA process.

An alternative method would be to crush and screen the material at an offsite location. The applicant would need to provide and retain proof at the Anniedale Quarry that the site processing the material further is permitted to do so. It therefore does not make logistical sense to transport truckloads of material to be screened and then crushed at an alternative site. The Works Manager will have more control over the processing process, which will be located in the south-east corner of the preferred quarry site. There is therefore an opportunity to ensure that best practice measures are carried out during the processing (as per the Environmental Management Programme, to be attached to the EIR).

The No Go Alternative

No mine will be established on the property and the land will remain as it is. No impacts associated with mining will occur. There will, however, be no positive economic benefits associated with employment or the establishment of a locally available source of material for construction and development.

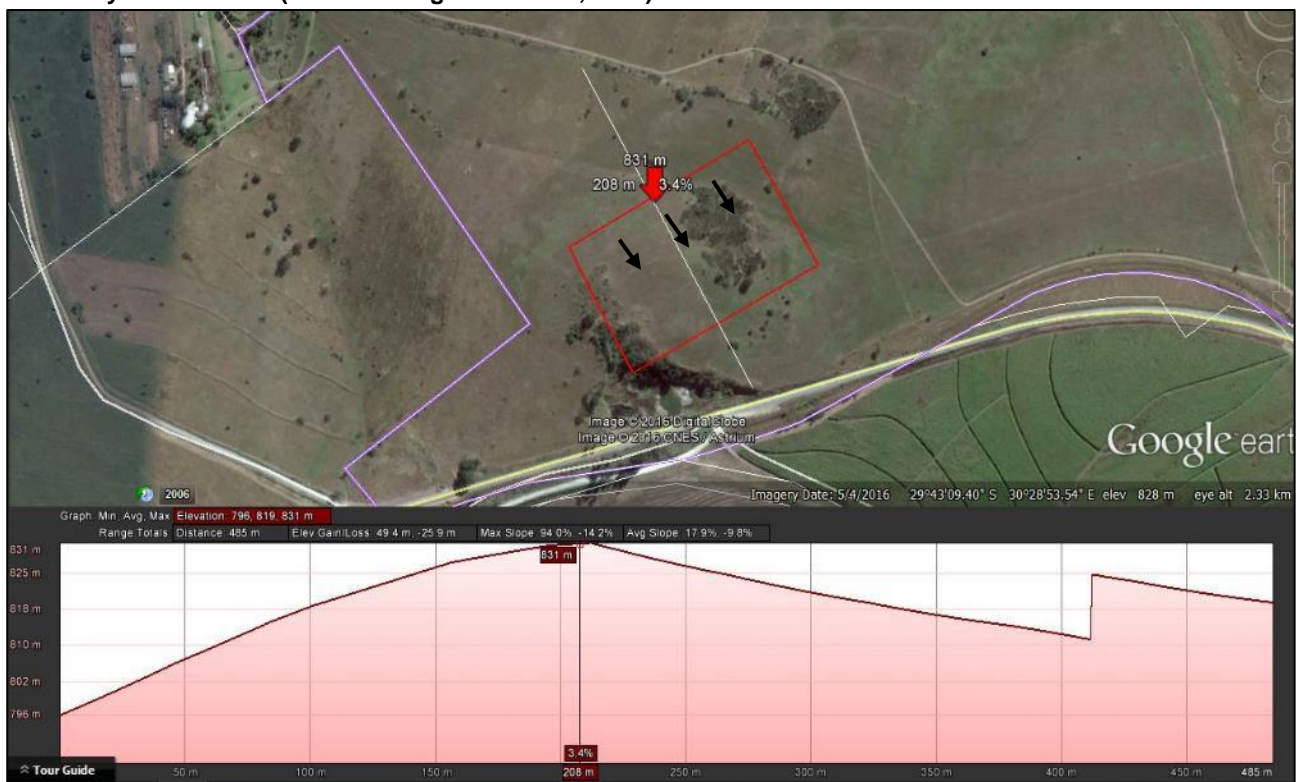
Section 3: Site Description and Surrounding Land Use as per Section 3 (h) (iv)

A summary of the findings of the various specialist reports is included under this section as per section 3 (k) of the NEMA EIA Regulations³. Impacts identified by the specialists as well as recommended mitigation measures are provided in section 6 of the EIR. Copies of all specialist reports are attached under Appendix C of the EIR.

3.1 Geographical, Physical Characteristics of the Site and Surrounding Land Uses

The property has an elevation range of 745 – 829m above mean sea level (Geohydrological Investigation, Appendix C). The proposed quarry site is only a locally elevated ridge line of a catchment divide. The site grades gently at 1:14 in a north north easterly direction with the northern portion dipping north west and the southern portion dipping north east. An elevation profile of the hill, which is to be mined, is provided in Figure 8. The south facing side of the hill will be mined.

Figure 8: Elevation profile of the hill where the proposed Anniedale Quarry is to be located. Mining direction is shown by black arrows (source: Google Earth Pro, 2016).



Section 5 of the Geohydrological Investigation describes the regional geology, which is comprised of dark grey shale and siltstone of the Pietermaritzburg Formation. The formation has been intruded by a localised dolerite sill beneath the site (rock source for quarrying). The Pietermaritzburg Formation is underlain by tillite of the Dwyka Formation, which outcrops to the north, east and south. The Dwyka Tillite (diamictite) lithology in the area under review, is in excess of 100 meters in thickness (Mine Works Plan attached under Appendix C). The Dwyka Tillite is composed of an assortment of rock types deposited from the bed load of an advancing ice sheet. These pebbles, cobbles and boulders randomly occur in a fine grained greenish grey matrix. The regional geology and mapped geological structures are presented in Figure 9.

The Geological Review Report, prepared by Drennan Maud (Pty) Ltd and attached under Appendix C, concludes that over an area of 5 hectares and to a depth of 40m, an estimate of 1 million tight cubes of overburden and hard road are likely to be available at the Anniedale Quarry site. The material is suitable as aggregate for concrete and aggregate for asphalt (section 6.1 of 6.2 of the Geotechnical Review).

There is a man-made depression in the southern corner of the study site where mining activities have previously been carried out (prior to 2005). Rain water has collected in the depressions left by mining and riparian vegetation has also grown around these depressions. Photographs taken of the proposed Anniedale

³ Environmental Impact Assessment Regulations (2014) published under sections 24(5) and 44 of the National Environmental Management Act, 1998, in Government Gazette No. 38282 GN R982 of 04th December 2014.

Quarry showing the surrounding topography are included in Figure 10. The N3 Highway is located to the east of the property (1.3km from the mine area) with farming activities taking place to the north, south and west. Surrounding land uses have been illustrated in Figure 11. Existing services and servitudes associated with the property are shown in Figure 4.

Figure 9: Regional geology and structures associated with the Anniedale Quarry site (source: Geohydrological Assessment, 2016).

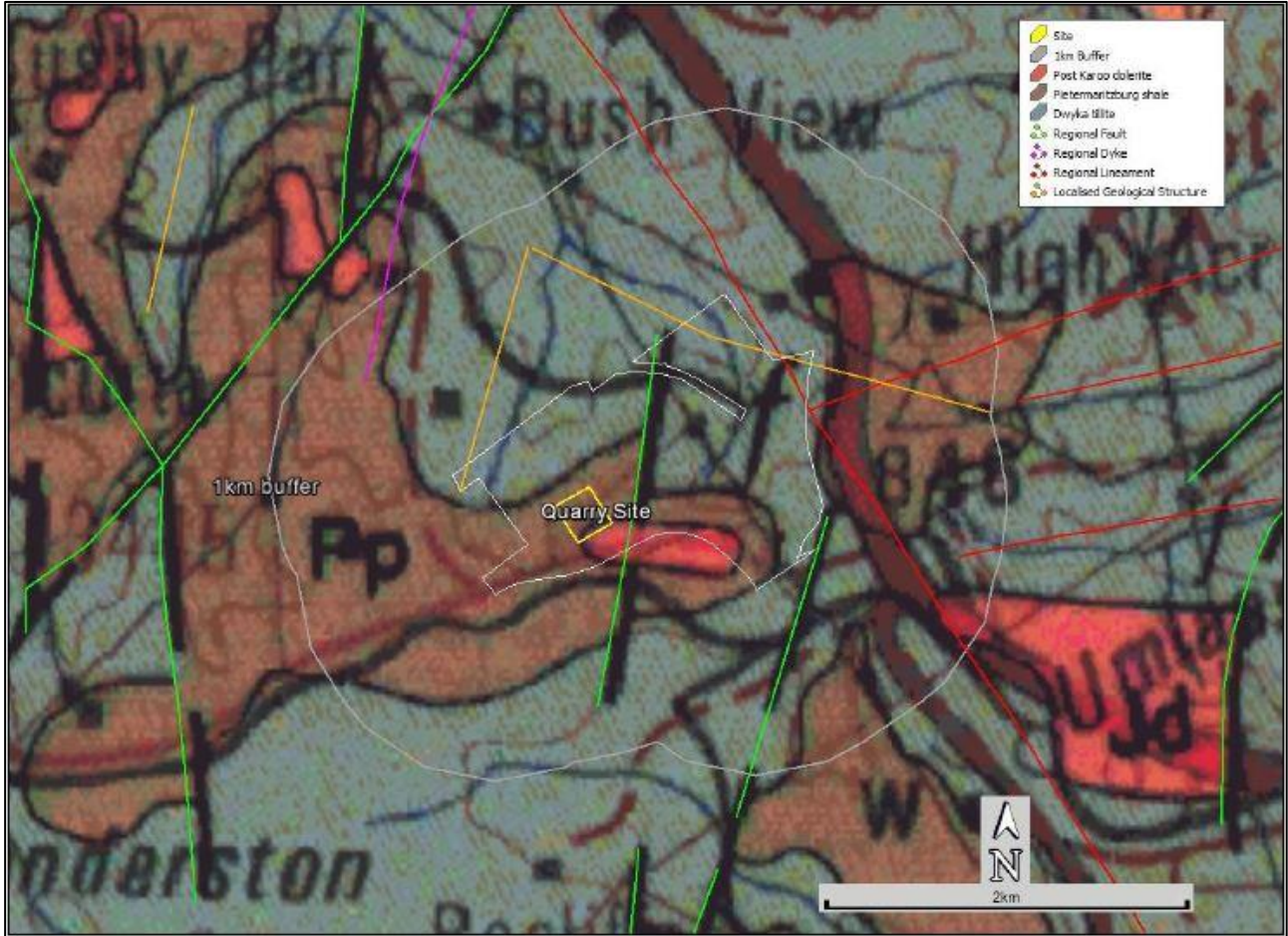
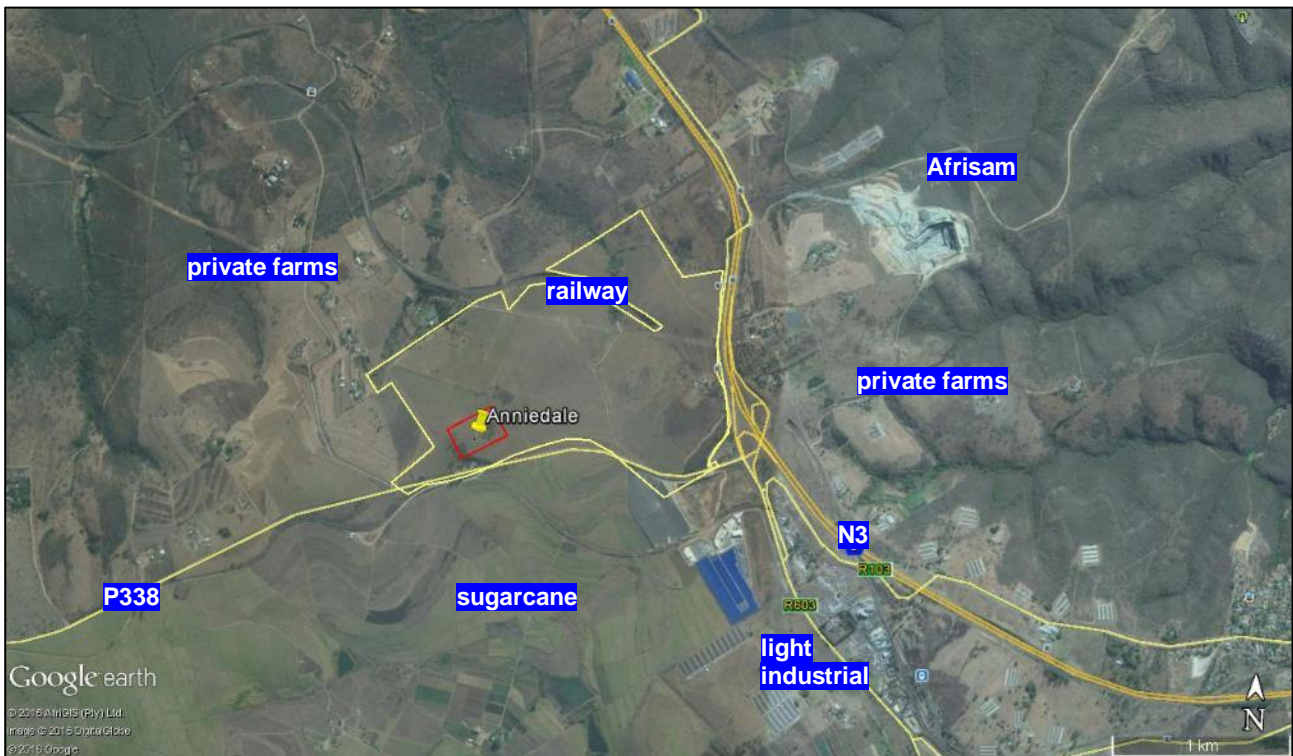


Figure 10: Photographs showing the topography and characteristics of the Anniedale Quarry site (a) Photograph taken facing east with the proposed cut into the hill shown in red, and (b) Photograph taken from the centre of the site facing west showing the crest of the hill as it drops down towards the previously mined face.



Figure 11: Aerial photograph showing the location of the Anniedale Quarry in the surrounding landscape (source: Google Earth Pro, 2016).



3.2 Surface Water

The Biodiversity Company carried out an Aquatic and Wetland Assessment on the site to determine the current state of the aquatic systems surrounding the proposed quarry site and identify the risks associated with the quarry on the watercourses. The study area is located in the Mvoti to Umzimkhulu Water Management Area (WMA 11) and Quaternary Drainage Regions U20J. The region has a mean annual precipitation rate of 800 to 1 500 mm and is considered humid.

It is important to note that the Aquatic and Wetland Assessments provide a holistic study of the entire property with mitigation measures and management plans provided if the entire property were to be developed (i.e. water management across the property and wetland monitoring during operation). The information and mitigation measures provided in the report that are specific to the proposed quarry, have been included in the impacts section and EMPr attached under Appendix E.

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 location of the drainage lines are indicated in Figure 12. The aquatic report concludes that the system is in a largely natural state due to the riparian and instream habitat and biotic integrity. The drainage lines are preferential flow paths that direct water flows to the wetland areas and therefore displayed wetland indicators (section 8 of the Wetland Assessment).

The National Freshwater Ecosystem Priority Areas (NFEPA) database forms part of a comprehensive approach to the sustainable and equitable development of South Africa's scarce water resources. This database provides guidance on how many rivers, wetlands and estuaries, and which ones, should remain in a natural or near-natural condition to support the water resource protection goals of the National Water Act (Act 36 of 1998). The database shows three wetland systems associated with the property (shaded in green in the Figure below). The area immediately south of the proposed quarry footprint was included in the NFEPA database however was not classified as a wetland by the wetland specialist (i.e. only two hydrogeomorphic units were classified). The wet area is the result of previous mining activities where excavated pits have collected water over time (Figure 13a).

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 (see section 9.1 of the Wetland Assessment attached under Appendix C). There may be indirect impacts if vehicles travel near the wetlands or erosion is uncontrolled however all impacts were rated as minor to negligible after mitigation measures (see Table 5 in the Wetland

Assessment). In light of the findings, the specialist is of the opinion that the project be favourably considered (section 11 of the Wetland Assessment).

From Figure 12 below, it is evident that the alternative quarry site, falls in close proximity to the source of the drainage lines which flow into the tributary of the Malkop Spruit. There were extensive erosion gullies noted in this area during the site visit. The alternative site is located on the north-facing slope, which drains towards the Malkop Spruit. Since the buffers associated with these drainage lines is greatly reduced, compared to the preferred site, any stormwater and sediment runoff during operation of the quarry would need to be tightly controlled to ensure that it does not enter the watercourses during high rainfall events.

A hydrocensus was carried out by Terratest which shows that there were 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 (section 5.5 of the Geohydrological Assessment in Appendix C).

All clean surface water runoff from surrounding slopes will be diverted away from the mining area using berms. Potentially contaminated run off from the mine area itself will be diverted into the onsite sumps and will not be permitted to discharge to the surrounding environment or any watercourses. Water collected in the sumps will be treated as potentially contaminated and will only be used for dust suppression within the mine area. A Drainage Analysis has been included in Appendix C of the EIR. This document as well as a site specific stormwater management plan will also be submitted to the DWS as part of the Water Use Authorisation application.

Figure 12: Aerial image showing the aquatic environments associated with Portion 405 of Vaalkop and Dadelfontein 885 (source: QGIS with NFEPA database overlay)



Figure 13: Aquatic environments associated with Portion 405 of Farm Vaalkop and Dadelfontein 885 (a) Excavated pit from previous mining activities having collected water over time, located directly south of the proposed quarry; (b) Wetland HGM 1 located in the north-east portion of the property; and (c) Wetland HGM 2 located in the north-east portion of the property (source: The Biodiversity Company, 2016).



3.3 Groundwater

A “Geohydrological Desktop Assessment for the Proposed Anniedale Quarry Site” was carried out by Terratest to characterize the geohydrological setting and determine potential risk of potential impacts by the quarry on the receiving environment (Appendix C). In section 5.2 of the Assessment the regional geohydrology of the area is broadly described as predominantly argillaceous rocks comprising shale, mudstone and siltstone, which are surrounded to the north, east and south with predominantly diamictite rocks, comprising tillite. The principal groundwater occurrence is from an intergranular and fractured aquifer type, with median borehole yields in the range 0.5 to 2.0l/s. The aquifer is characterised as a low to medium yielding Minor aquifer in terms of the South African Aquifer Classification System.

On a regional scale, dolerite/shale contacts are considered the primary groundwater target in the project area, however, it is anticipated that the dolerite sill overlying the shale on site is relatively thin and does not extend to a significant water bearing depth. Thus the contact between dolerite and shale is not considered a suitable target.

The underlying tillite is typically low yielding and commonly offers poor success rates with borehole drilling. Major fault zones in tillite can produce high yielding boreholes but their occurrence is low. 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 (section 6.3 of the Geohydrological Assessment). 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 anticipated area weighted recharge for the inferred local catchment area of 4.85km² is 0.28Mm³/annum. The National Groundwater Archive and KwaZulu-Natal Groundwater Resource Information Project datasets of DWS were interrogated by the specialist to establish the existence of any groundwater resources and groundwater use near the project area. 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.

Terratest concluded that the site is characterised as low risk with conservative buffers around confirmed boreholes, geological structures and surface water resources (Risk Assessment summarised in section 6.5 of the Geohydrological Assessment).

3.4 Flora

According to SANBI's Geographical Information System (GIS) overlay, the entire property falls within the Ngongoni Veld Ecosystem, which is described as "vulnerable". The GIS overlay is largely based on a desktop assessment (i.e. coarse scale). In order to accurately plot the various vegetation types across the property and identify protected / red listed species, on a fine scale David Styles prepared a Report on Vegetation for the property. The report is attached under Appendix C and summarised below. A species list is provided in Appendix 4 of the Vegetation Assessment. Photographs showing the current condition of the vegetation on the property are provided in Figure 16.

The provincial map, developed by Ezemvelo KZN Wildlife, shows four vegetation types occurring on the property (see Appendix 2.2 in the Vegetation Report attached under Appendix C). The map confirms that the property falls in the Ngongoni Veld vegetation type (Dry Coast Hinterland Grassland in the south and Moist Coast Hinterland Grassland in the north). There are a few patches of KZN Hinterland Thornveld as well as Alluvial Vegetation scattered across the property but do not fall within the proposed quarry site.

The grassland area associated with the preferred quarry site is discussed in section 5.1 of the Vegetation Report. 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 vegetation specialist has therefore mapped different areas of grassland across the property in terms of quality. Primary grassland consists of modest to good herbaceous diversity, not limited to common pioneers, ruderal or weeds (dark green in Figure 14). An important, "core area" of primary grassland is situated at the centre of the property, parts of which are characterized by notable forb abundance (light green in Figure 14). Transitional primary grassland is intermediate in quality between primary and parts that have suffered more severe disturbance (shaded yellow in Figure 14). *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.

Secondary and near-secondary grassland is hatched in black in Figure 14. The alternative site consists completely of secondary grassland. The specialist describes this grassland as areas which appear to have been transformed both historically and more recently by cultivation, erosion, earth-moving, abandoned settlement or construction of infrastructure. *Aristida junciformis* is replaced in many parts by the weedy grasses *Digitaria eriantha* and more particularly *Sporobolus africanus* and *S. pyramidalis*. Many herbaceous ruderals are present, including alien herbs. It is possible that over time there can be a percolation back of species from adjacent areas of better grassland.

The vegetation specialist confirms that the "Wetland Feature" shaded in blue, to the south of the quarry site is not a natural feature but comprised of quarry pits that have filled with water. Vegetation around these pits is highly degraded and is either alien or secondary (section 5.4 of the Vegetation Assessment). There is very little wetland vegetation, with this comprised of a small presence of *Typha capensis*, *Ludwigia octovalvis* and *Persicaria senegalensis*.

There are two patches of alien vegetation, hatched in orange in Figure 15, occurring in the preferred quarry area. *Acacia mearnsii* (Black Wattle) is the most abundant alien tree on the property with other alien trees being *Melia azedarach* (Syringa), *Pinus elliottii* (Slash Pine) and *Solanum mauritianum* (Bugweed). A line of eucalypts also occurs on the edge of the old quarry area. *Lantana camara* is the most common alien shrubby plant forming undergrowth under alien trees and skirts around freestanding and aggregated indigenous trees.

A number of Red Listed species were identified on the property with three species being identified within the preferred quarry area. Three species protected under the KZN Provincial Conservation Ordinance, were identified in or directly adjacent to the quarry area. The location of these species is provided in Figure 15. These protected species may not be lawfully destroyed, damaged or relocated without permit authorisation from Ezemvelo KZN Wildlife. Due to time constraints, the specialist did not map all Red Listed / Protected species across the site (i.e. in the alternative quarry site), however there is a high potential for some of the species to be found in this area as well.

The site is currently zoned as "agriculture" with the Msunduzi Environmental Management Framework showing the property to have a high agricultural potential (discussed further in section 4.0 of the EIR). The town planner has applied for the property to be released from the Department of Agriculture. This process is in progress with the town planning application pending feedback from the Department of Agriculture. Although there will

be 5 hectares of potentially viable agricultural land lost, the entire property is 178 hectares, which currently remains undeveloped.

The operation of the proposed Anniedale Quarry will result in the cumulative clearance of approximately 0.9 hectares of primary grassland (high priority), 2.67 hectares of primary transitional grassland (medium priority) and 1.4 hectares of alien vegetation (low priority) at the preferred site. Although the proposed quarry is not located within an endangered or critically endangered ecosystem in terms of section 52 of the National Environmental Management: Biodiversity Act (2004), more than 1 hectare of indigenous vegetation will be progressively cleared during mining.

Figure 14: Map showing the vegetation observed across the property (source: Vegetation Assessment, 2016).

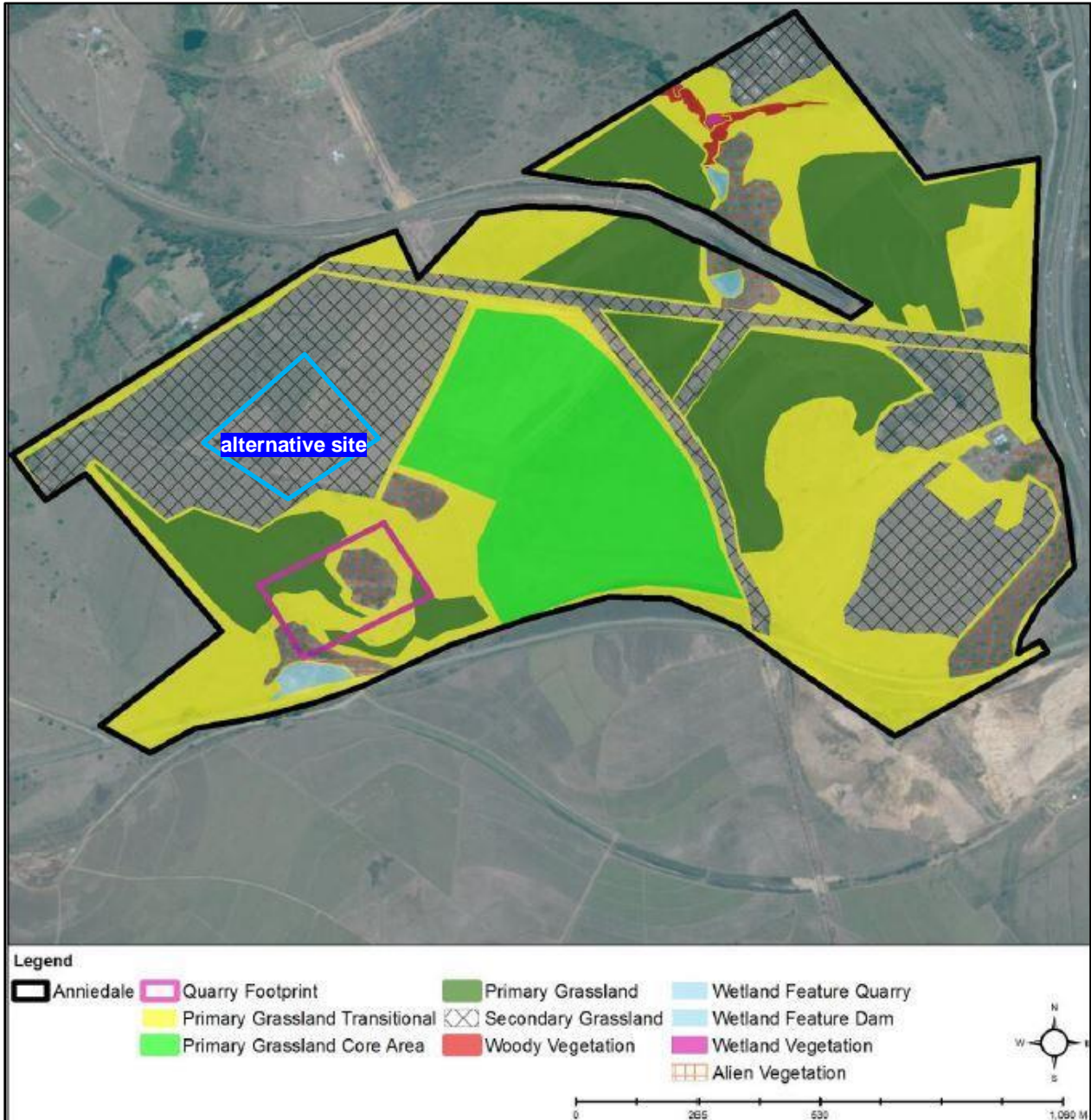


Figure 15: Location of Red Listed and Protected flora species associated with the preferred Anniedale Quarry site (source: Vegetation Assessment, 2016).

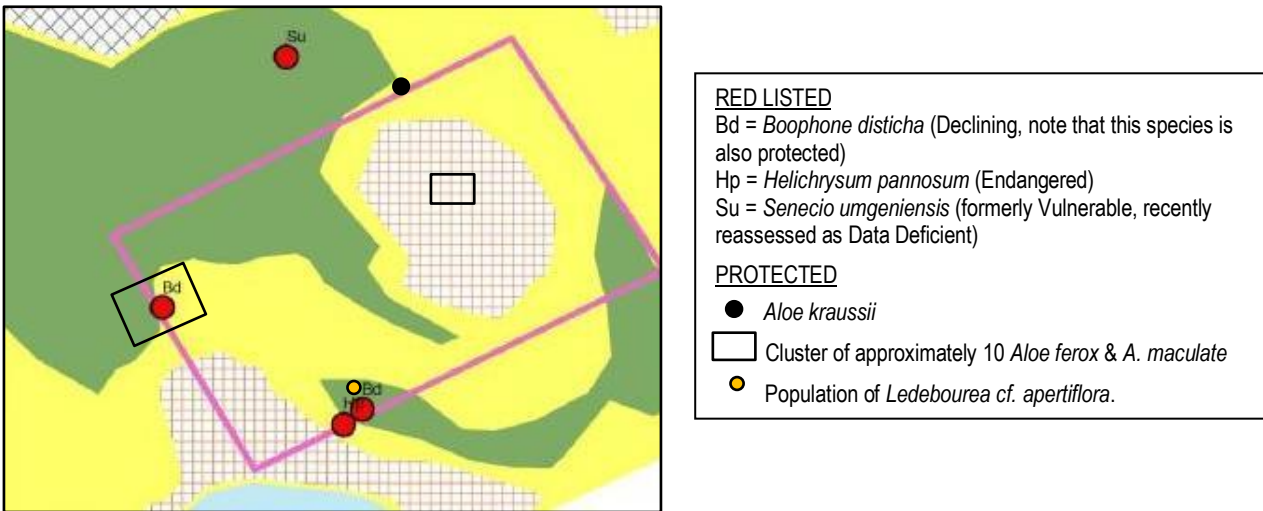
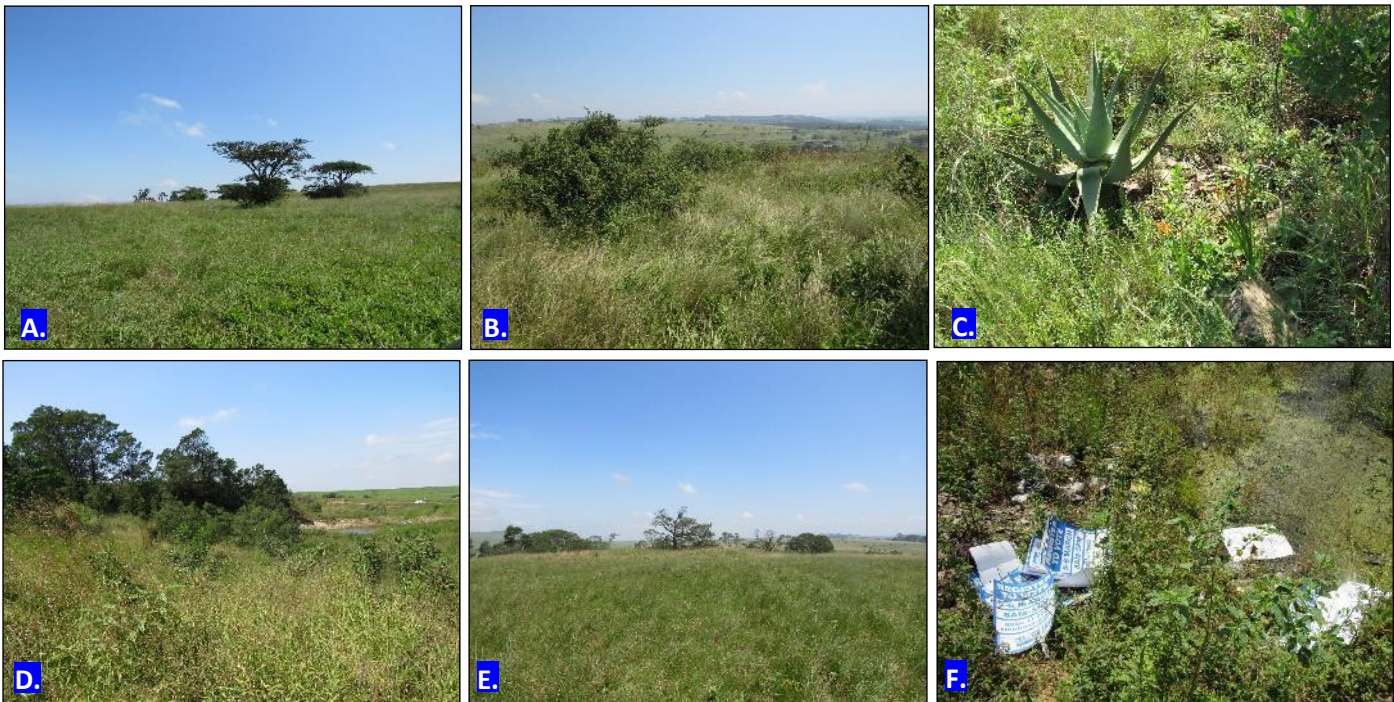


Figure 16: Photographs showing the general condition of the vegetation on the preferred Anniedale Quarry site (a) Photograph of the centre of the proposed preferred mining area facing east; (b) Photo of the crest of the hill facing south towards the P338; (c) Aloe species in the south-west corner of the quarry footprint; (d) Photograph taken of the south corner of the mine area near the exposed face; (e) Top of the hill facing east towards the outcrop of alien vegetation; and (f) Waste accumulating in the previously mined area where pits have been left open.



3.5 Fauna

Enviro-Insight cc performed an Ecological and Fauna Assessment for the entire property, including the proposed quarry footprint. The assessment constitutes a Faunal Biodiversity Study in line with the provincial and national legislation. The full Ecological and Faunal Assessment is attached under Appendix C and summarised below. It is important to note that the assessment provides a holistic study of the entire property with mitigation measures and recommendations provided if the entire property were to be developed (i.e. a spatial development plan compiled to accommodate the potential foraging requirements of the crane species present, referring to open grassland areas not designated for development).

Six basic faunal habitat types were identified by the specialist across the entire property:

- Human development areas (non-sensitive and no Red-Listed species),
- Alien vegetation,
- Drainage,

- Grassland (core foraging habitat for small mammals, small birds, raptors, reptiles, large red-listed avifauna species such as cranes & secretary birds and endemic millipede habitat),
- Woody vegetation (provides significant refugia to generalist fauna and avifauna species), and
- Wetland/farm dams (crucial for water associated avifauna, reptiles and amphibians. Core foraging habitat for small mammals, small birds, raptors, reptiles, large red-listed avifauna species, amphibians and waterfowl).

A number of faunal species of conservation concern associated with the property were identified by the specialist (section 3.5 of the Ecological and Faunal Assessment).

- There is a moderate to high probability that a *Southern African Python* (Nationally Protected) occurs in the rocky ridge / water body directly south of the proposed quarry footprint. It is unlikely that further disturbance will significantly affect either the localised or regional python population.
- Core distribution area for the nocturnal *Striped Weasel*. It thrives in grassland and avoids high human disturbance levels.
- Grassland has the potential to provide habitat for *Serval* (Near Threatened).
- Grassland / shrubland areas potentially providing habitat for the *White-tailed Mouse* (Endangered). They have a specific requirement for black loam areas that consist of good vegetation cover. Localise colonies may be susceptible to large-scale excavations.
- Woody and grassland habitats suitable for the *Southern African Hedgehog* who require a burrowing habitat. Hedgehogs have previously been recorded within the quarter degree square applicable to the study area. Large-scale excavations may have severe impacts on any local populations.
- The *Lesser Kestrel* has previously been recorded on the property, where it forages in the grassland areas and waterbodies. This is a migratory bird which breeds in the Northern Hemisphere returning south to forage.
- Wetland and riparian habitat may host the *Giant Bullfrog* (Near Threatened) and *Water Rat*.
- High reporting rates of *Grey Crowned Crane* (Endangered), *Blue Crane* (Near Threatened) and *Secretary Bird* (Vulnerable). All three bird species have similar lifestyles and are susceptible to similar impacts. Open primary grassland and wetland areas with limited anthropogenic disturbance provide suitable foraging habitat.
- The property provides optimal foraging (not breeding) habitat for the Southern Bald Ibis (Vulnerable).

Table 1 illustrates the probability of occurrence for Red-Listed avifaunal species associated with the property. None of the avifauna taxa are breeding residents but many of the species are foraging residents.

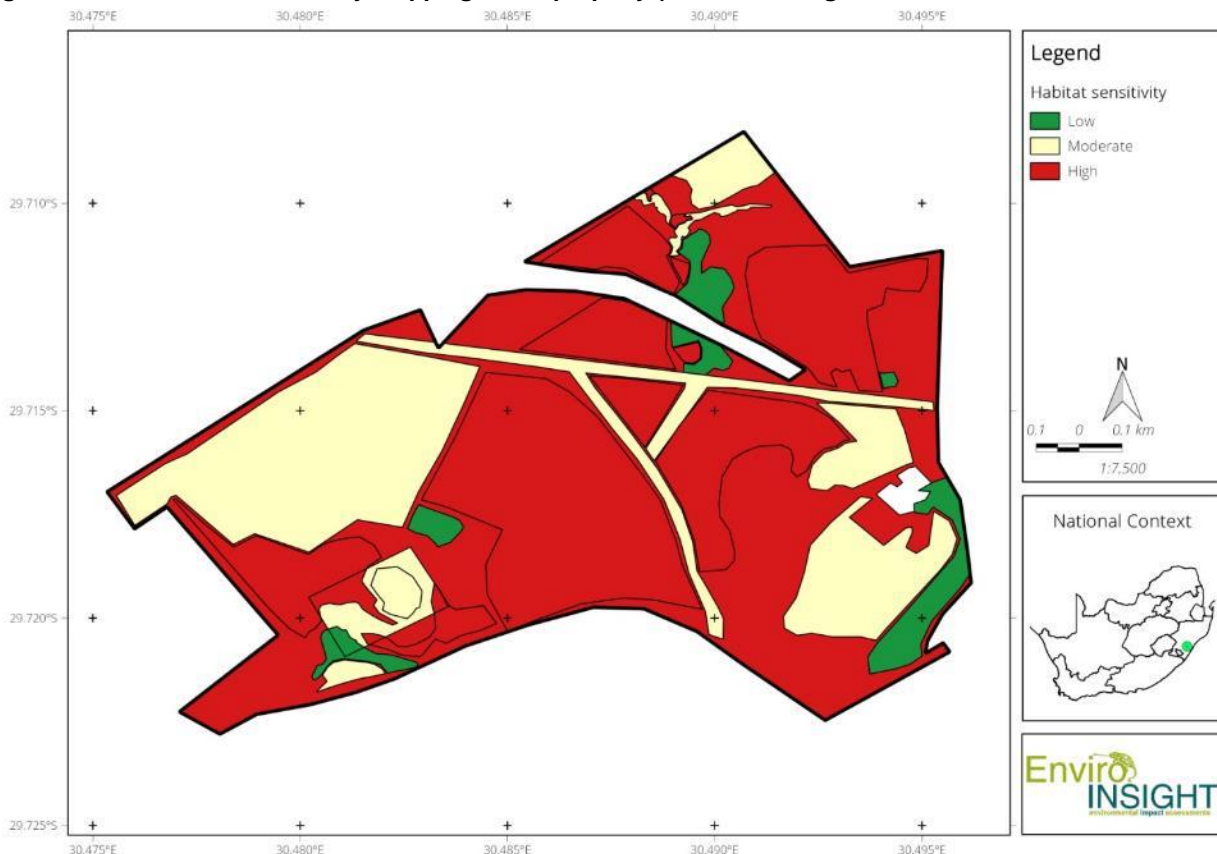
Table 1: Probability of occurrence of avifaunal species within known distribution (source: Ecological and Fauna Assessment, 2016)

	Probability of occurrence on site	Notes
<i>Anthropoides paradiseus</i> (Blue Crane)	Moderate	Possible foraging species
<i>Balearica regulorum</i> (Grey Crowned Crane)	Confirmed	Periodic foraging species with a permanent local population
<i>Bugeranus carunculatus</i> (Wattled Crane)	Low	Outside of core distribution and excessive human disturbance
<i>Ciconia abdimii</i> (Abdim's Stork)	Moderate	Possible foraging species
<i>Ciconia nigra</i> (Black Stork)	High	Possible foraging species
<i>Circus ranivorus</i> (African Marsh Harrier)	High	Likely foraging species
<i>Falco biarmicus</i> (Lanner Falcon)	High	Potential foraging species
<i>Geronticus calvus</i> (Southern Bald Ibis)	Moderate	Possible foraging species
<i>Oxyura maccoa</i> (Maccoa Duck)	Moderate	Potential foraging species

<i>Polemaetus bellicosus</i> (Martial Eagle)	Moderate	Potential foraging species
<i>Sagittarius serpentarius</i> (Secretarybird)	Confirmed	Foraging species
Total (all)		10
Total (High-Confirmed)		5

The “habitat sensitivity” of the property was rated by the faunal specialist with the result shown in Figure 17 (see section 4 of the Ecological and Fauna Assessment). The quarry area has a moderate to high habitat sensitivity 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. There was also Red-Listed (including Endangered) avifauna species noted on the property, increasing the sensitivity to “high” status.

Figure 17: Final habitat sensitivity mapping of the property (source: Ecological and Fauna Assessment, 2016)



According to the Ezemvelo KZN Wildlife Minset Map there is the potential for 8 threatened species of Millipede and 2 threatened Molluscs species to found in the study area:

- *Spinotarsus maritzburgensis* (Millipede)
- *Spinotarsus destructus* (Millipede)
- *Gnomeskelus tuberosus urbanus* (Millipede)
- *Spinotarsus glomeratus* (Millipede)
- *Doratongonus cristulatus* (Millipede)
- *Patinatius bidentatus simulator* (Millipede)
- *Camaricoproctus planidens* (Millipede)
- *Gnomeskelus spectabilis* (Millipede)
- *Gulella euthymia* (Mollusca)
- *Gulella separata* (Mollusca)

A report regarding the presence of millipedes within the study area was carried out by Hamer (2010) on an adjacent property. The findings of this report directly relate to the critical habitat classifications by the C-Plan for the study area. It has been stated that “green buffer zones” are crucial to the migration of potentially critical millipedes and, should the remainder of the property be developed, these buffer areas must be determined by the specialist.

A concern was raised by an I & AP during the Scoping Phase of the project, that the Thornville Earthworm (*Proandricus thornvillensis*) may be present in the quarry site and impacted by quarry operations. According to the Msunduzi Municipality: MOSS Report⁴, the habitat preference for the Thornville Earthworm is “indigenous grasslands, bushes on river banks, in moist or wet sites and well soaked soils”. Maintenance of suitable riparian corridors, as opposed to terrestrial corridors, was therefore recommended to ensure the persistence of the species. Since the earthworm prefers moist, riparian habitats, it is likely that the earthworm, if present, would be found in the northern corner of the property where the wetland and drainage lines originate and directly south of the quarry (wet area associated with previous mining activities).

3.6 Mpushini Protected Area

Portion 405 of Farm Vaalkop and Dadelfontein 885 is located within the Mpushini Valley, located on either side of the Ashburton interchange on the N3 between Durban and Pietermaritzburg. As a result of the high biodiversity in the Mpushini and surrounding river catchments, various landowners in the Mpushini Valley have been actively involved in conserving this area. The Mpushini Valley has been divided into the Lower and Upper Mpushini Conservancy (outlined in green and blue respectively in Figure 18), which have been registered with Ezemvelo KZN Wildlife as a conservancy area⁵. Private landowners have applied and certain properties have been proclaimed as “Protected Environments” in terms of the National Environmental Management: Protected Areas Act (No 57 of 2003; NEMPAA). The areas shaded in green in Figure 18 show these formally protected areas.

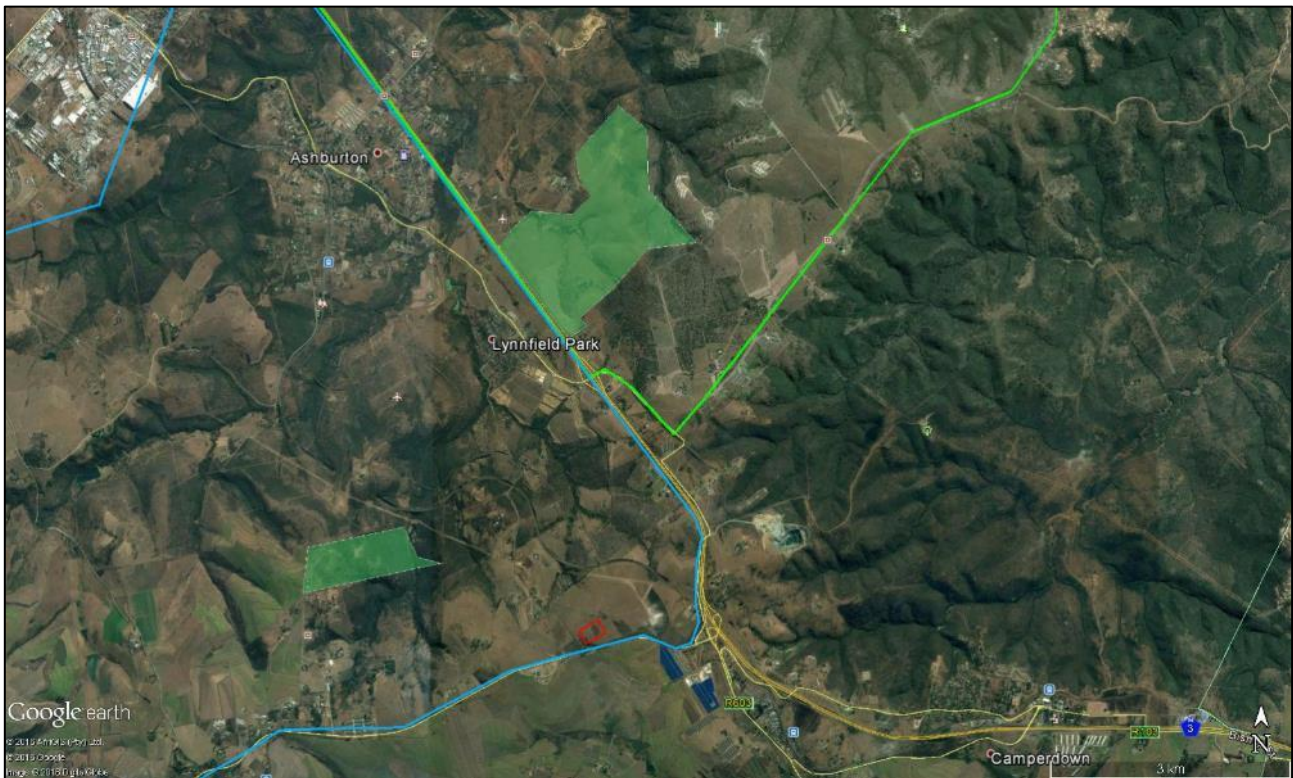
The Preservation of the Mkhondeni Mpushini Biodiversity Trust (PMMBT) in conjunction with the Lower Mpushini Valley Biosphere Conservation Association and Upper Mpushini Conservancy Association currently manage and rehabilitate the conservancy areas in the Mkhondeni and Mpushini Valleys. During the Scoping Phase of this project, it was communicated to the EAP that 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. Since the current application is for a 5 hectare portion of the property, it is beyond the scope of this application to formulate conservation corridors and links on other portion of the property. Future plans for development of the site in the long-term are currently not available to the EAP however further engagement between the applicant and the PMMBT will take place at a later stage once a clearer vision for the remainder of the property has been formulated.

⁴ SRK Consulting “Msunduzi Municipality Final Draft Environmental Services Plan” May 2010.

⁵ Mpushini Wildlife Website (<http://www.mpushini-fauna.com/>)

Figure 18: Map showing the location of the Lower (green) and Upper (blue) Mpushini Conservancy in relation to the proposed quarry footprint (red). Shaded green areas indicate the location of formally protected areas within the MPE (source: Google Earth Pro & PMMBT overlay).



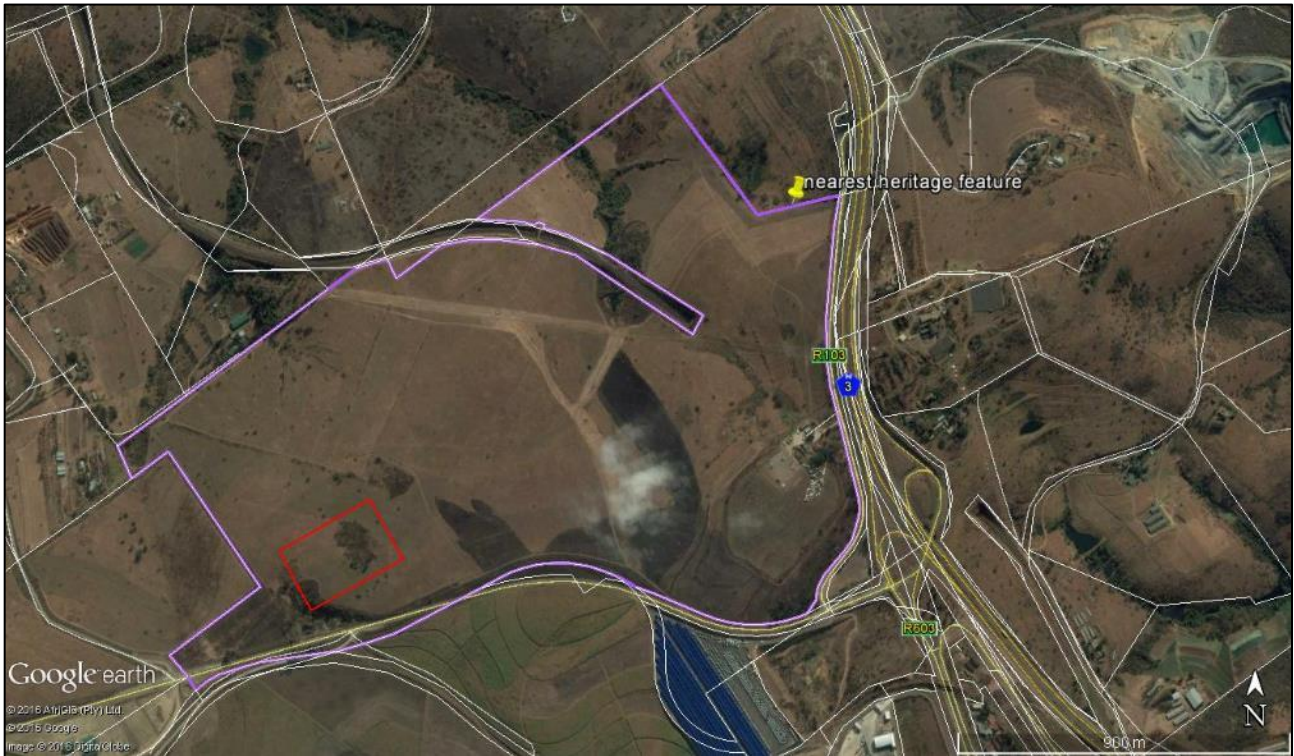
3.7 Heritage and Cultural Aspects

A Heritage Impact Assessment (HIA) was carried out by Active Heritage in April 2016 to determine the impact of the mine on the site and surrounding outlook. The findings of the HIA are summarised below with the report attached under Appendix C. The Msunduzi Environmental Management Framework (EMF) shows the preferred quarry site to have a “low cultural heritage” conservation significance.

Large areas adjacent to the Umlaas Road have been surveyed by Heritage Consultants in the last 4 years. The available evidence indicates that the area contains mostly Early Stone Age material. A large number of Early Iron Age sites have been located in the adjacent Mngeni Valley. Various buildings and farmsteads belonging to the Victorian and Edwardian periods occur in the area. Stone Age sites of all the main periods and cultural traditions occur within the greater Umlaas Road area. Most of these occur in open air contexts as exposed by donga and sheet erosion.

Although the area is potentially rich in Iron Age and Stone Age sites no heritage sites or features were observed on the actual footprint. One Early Stone Age occurrence is located approximately 1.4km to the north east of the proposed Quarry Site however, this site is not threatened by the proposed development and merits no further discussion. Special care was also taken to survey the area for graves of farm labourers and occupants. However, no grave sites were identified in the immediate environs of the proposed development. An old quarry site, including the ruins of associated concrete structures, occur directly adjacent to the proposed development site however, the concrete structures are younger than 60 years old and therefore have no heritage value. The project area is also not part of any known cultural landscape. Figure 19 show the heritage features in proximity to the proposed quarry site.

Figure 19: Google aerial photograph showing the location of the proposed quarry site, outlined in red, and the nearest Early Stone Age site indicated with the yellow pin (source: Cultural Heritage Impact Assessment, 2016).



3.8 Socio-Economic Environment

The area is rural in nature. It is located adjacent to the N3 / R603 interchange and is surrounded by agricultural activities such as grazing and sugarcane. There are scattered farm houses located to the north ($\pm 510\text{m}$) and west ($\pm 1.8\text{km}$) 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. Please refer to Figures 11 and 19 above showing surrounding land-uses.

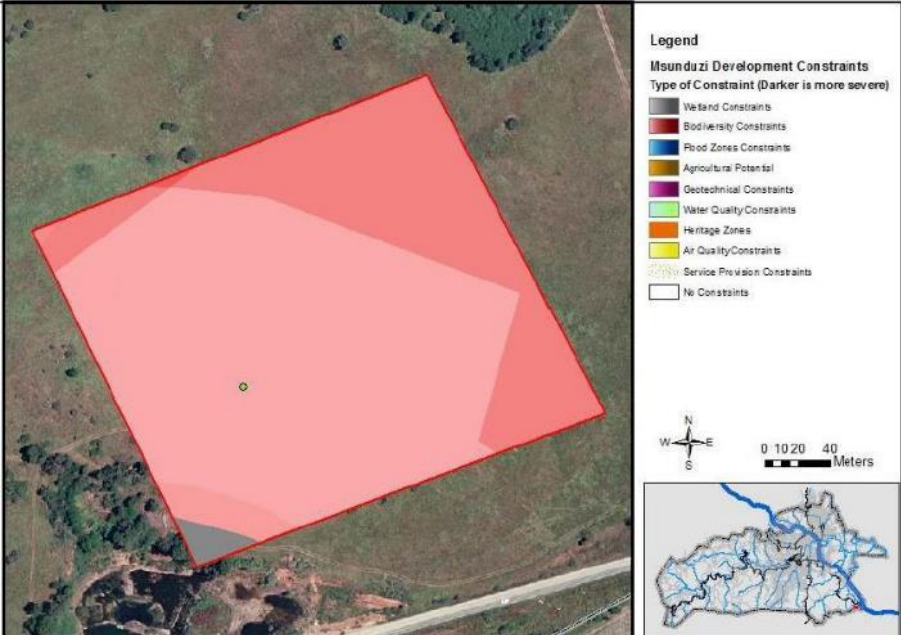
According to the Msunduzi Environmental Management Framework (EMF), Pietermaritzburg has been identified as a focal area for development and economic growth. The N3 route has been identified as a provincial priority corridor creating urbanization and economic development pressures on Msunduzi. Based on these trends, it is anticipated that the pressure on land available for development and the demand for employment opportunities and social facilities will increase⁶.

⁶ SRK Consulting "Msunduzi Final Draft Environmental Management Framework" Report No. 376998/FDEMF (May 2010).

Section 4: Policy and Legislative Context

4.1 Description of the Policy and Legislative Context and Compliance of Proposed Activity to the Legislation and Policy as Per Section 3 I

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 minimisation, 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	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.
Mineral and Petroleum Resource Development Act 28 of 2002	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).
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> <p>s21 (a) – abstraction of water from the sump for dust suppression; s21 (g) – stockpile areas, sump and dust suppression.</p>
National Waste Management Act 2008	<p>Reforms the law regulating waste management to prevent pollution and ecological degradation.</p> <p>Section 19 allows the Minister to publish a list of activities, which require a Waste Management License. The most recent list is published in Government Gazette 37083 Notice No. 921 dated 29 November 2013.</p> <p>The proposal will not trigger a Waste Management Activity.</p>
National Environmental Management Biodiversity Act 2004	<p>To provide the framework, norms, and standards for the conservation, sustainable use and equitable benefit-sharing of South Africa's biological resources. Section 52 allows for the publication of a list of threatened ecosystems in need of protection. The list was published in Government Gazette No. 34809 Notice No. 1002 dated 9 December 2011.</p> <p>This site is not located within an endangered ecosystem type and therefore does not require environmental authorisation for this aspect.</p>
National Heritage Resources Act 25 of 1999	<p>For the protection of South African Heritage to nurture and conserve communities legacy.</p> <p>The Heritage Impact Assessment did not identify any features of cultural or architectural significance associated with the quarry site.</p>
Provincial Legislation	Compliance of Activity
KwaZulu-Natal Nature Conservation Ordinance No. 15 of 1974	The Ordinance provides measures for the management of nature conservation, not only within KZN but also within protected areas in the Province. The Amendment Act schedules specially protected indigenous

	<p>animals and plants and provides certain legal protections for the scheduled species. It also sets out a system of permitting for certain activities. There are species on the property, identified by the vegetation specialist, that are protected by the provincial conservation ordinance. Plants protected by the provincial conservation ordinance may not be lawfully destroyed, damaged or relocated without permit authorisation from Ezemvelo KwaZulu-Natal Wildlife.</p>
<p>Municipal Planning Framework</p>	<p>Compliance of Activity</p>
<p>Umgungundlovu Municipality Integrated Development Plan 2015/2016</p>	<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>
<p>Msunduzi Environmental Management Framework (EMF)</p>	<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 are shown in Figure 20 below and identifies the site to contain the following constraints:</p> <ul style="list-style-type: none"> • High Wetland Development Constraint • High Agricultural Potential • High Biodiversity Constraint • Moderate Slope (10-18 degrees) • Low Flood Potential • Low Air Quality Constraints • Low Cultural Heritage Significance • Low Service Provision <p>Figure 20: Msunduzi Environmental Management Framework for the proposed Anniedale Quarry.</p> 

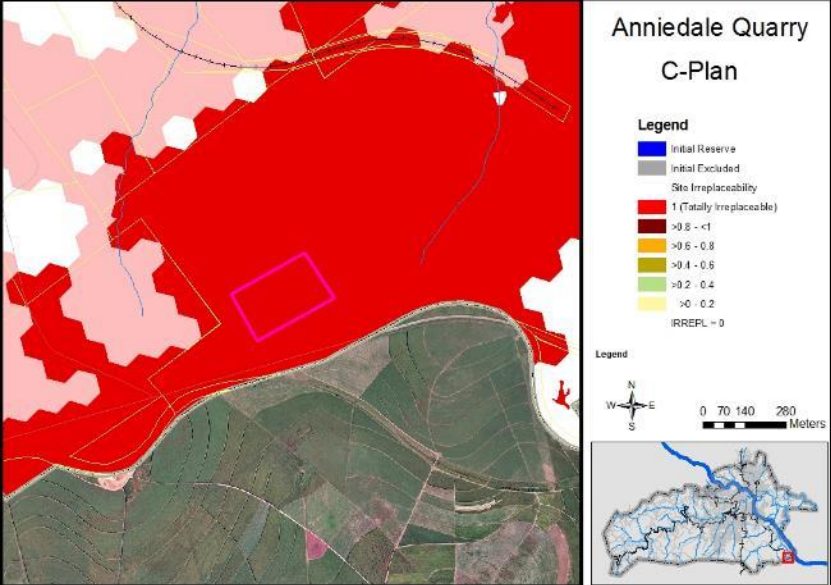
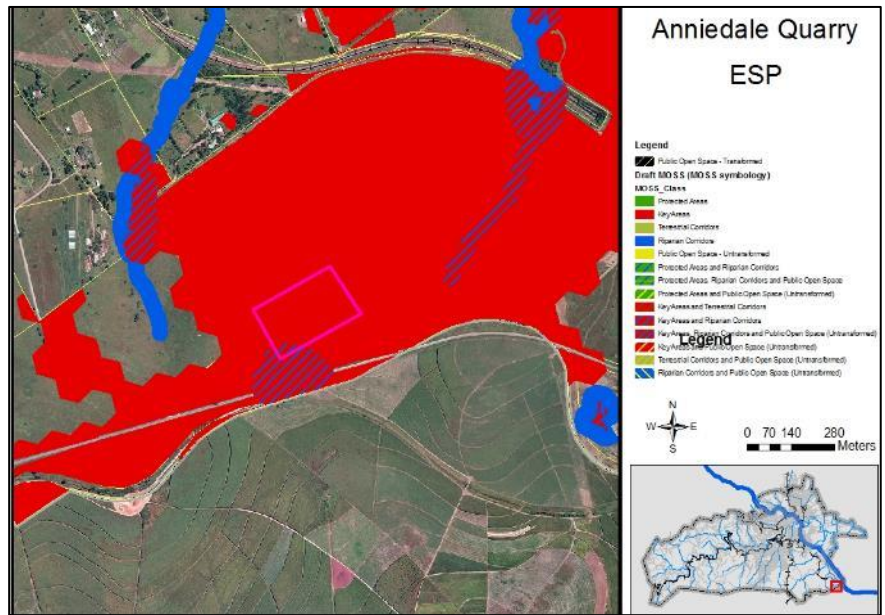
	<p>The Wetland Assessment has confirmed that there will be no net loss of wetland area. The wet area to the south of the quarry site is not a natural feature but comprised of quarry pits that have filled with water.</p> <p>The high agriculture potential of the site extends across the remainder of the 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 foresees that, as a result of the “development corridor associated with the N3, land along the N3 interface will be released for economic activity. 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 Conservation Plan (C-Plan)</p>	<p>Areas of high biodiversity value occurring within the municipality were identified and mapped in the Conservation Plan also referred to as C-Plan to ensure their protection and continuity. The Msunduzi C-Plan for the area is provided below and has identified totally irreplaceable biodiversity areas on the entire application site.</p> <p>The irreplaceability index of the C-Plan falls in line with the Biodiversity Constraints identified in the EMF and addressed in the row above.</p> <p>Figure 21: Msunduzi Conservation Plan for the proposed Anniedale Quarry site.</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, is provided in the figure below and identifies the entire application area as a key biodiversity area.</p> <p>The ESP falls in line with the Biodiversity Constraints identified in the EMF, which have been addressed in the rows above.</p>

Figure 22: Msunduzi Ecosystem Services Plan for the proposed Anniedale Quarry site.



Msunduzi Integrated Environmental Management Policy (IEMP)

Msunduzi’s IEMP, approved by Msunduzi’s Executive Committee on 07 May 2007, included an environmental vision for the municipality. One of the points in the vision is to “have environmentally responsible citizens that are well informed in regard to the environmental issues and who will be part of an innovative team that contributes to a sustainable living environment”. The Msunduzi IEMP was developed to assist / guide the municipality towards achieving sustainable development. The document include numerous key aspects, action plans, strategies and “approaches” which have been identified for long term implementation, to promote and encourage sustainability and ensure the conservation / preservation of natural resources. The location on the property is considered one of the more disturbed areas, away from water resources with easy access onto the main road (not having to create additional roads through grassland areas etc.). The 5 hectare footprint of the Anniedale Quarry will not significantly impact the natural resources associated with the property however any future development of the property, will need to take into account conservation corridors.

Msunduzi Integrated Development Plan (IDP) 2015/16 – 2016/17

The IDP and SDF is the Municipality’s response to planning for future growth and change. It is intended to enable the Council, communities, development industry, service providers, and government agencies to plan, budget and develop with confidence to meet the expectations of the Municipality’s development. Section C4 of the IDP analyses service delivery and infrastructure within the municipality. Material mined from the quarry will be high quality construction material used for concrete, fill and road material. Table 28 of the IDP summarizes the Municipal sector plans (bulk water master plan, bulk sanitation master plan, major roads plan etc.). Plans to construct new and upgrade existing services, will require permitted, locally sourced material. Provided that the quarry operations are in line with the management measures listed in the EMP, the quarry has the potential to assist the municipality reach its development expectations without compromising the natural resources identified through specialist studies on Portion 405 of Vaalkop and Dadelfontein 885.

Msunduzi Spatial Development Framework (SDF)

The SDF is an integral part of a Municipality’s IDP. It represents the spatial expression of the Council’s development vision, and should therefore be reviewed regularly to take into account changing circumstances. As above, the SDP takes into cognizance of the foresight of those past and presently involved in building the city as well as the challenges faced with integrating the activities of the population cores of the greater municipality within a sustainable social, economic, and bio-physical context.

	<p>The property falls in the Area Based Management Plan (ABM) for the CBD, Ashburton and Eastern Areas. This area was identified in the SDF as a significant location in terms of the residential, industrial and mixed use growth and expansion of Msunduzi. It also identifies the importance of conserving critical environmental resources in the area. Catchment management to protect downstream environmental assets was highlighted as a factor to take into account during future development.</p> <p>The Anniedale Quarry has the potential to supply construction material to the South Eastern District of this ABM, identified by the SDF for future expansion and development. The close proximity of the N3 highway and P338 provide an ideal access network to surrounding areas and the anticipated “development corridor” associated with the N3 should further see an increase in the construction of light industry / mixed-use developments in the immediate area.</p> <p>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. Further development of the property is likely to be carried out once the mining is complete.</p>
Msunduzi Climate Change Policy (2014)	<p>The Climate Change Policy seeks to unpack core issues (impacts on biodiversity, water resources and human health) and suggests adaptation and mitigation measures in greater detail, to be implemented (i.e. each adaptation and mitigation option would be case / site specific) which would contribute to the reduction of climate change related impacts on each of the sectors mentioned above.</p> <p>The Climate Change Policy is aimed at ensuring Municipal Business Units are compelled to take environmental impacts of their activities / plans into consideration and ensure that there are suitable strategies in places which enable cooperative and coordinated environmental management throughout Municipal structures and activities.</p> <p>The main goal of this policy is to ensure that Msunduzi’s Carbon footprint is reduced and the city is able to adapt to climate change related impacts and ensure there are options available when decisions need to be made regarding adaptation and mitigation. Climate change mitigation focuses on reducing the amount of GHG’s that are emitted into the atmosphere (section 7.2 of the Climate Change Policy).</p> <p>The relevant sections in the Climate Change Policy are the following:</p> <ul style="list-style-type: none"> • Biodiversity (section 10.1) • Water Resources (section 10.2) • Food Security and Agriculture (section 10.3) • Stormwater Control (section 10.5) <p>With specialist input, the impacts on these aspects of the quarry have been identified and mitigation measures recommended for inclusion in the EMPr. The impact of the quarry on biodiversity, water resources and agricultural potential in Msunduzi, has been addressed in the above row on the EMF. The Drainage Analysis is included in Appendix C. The potential impact of stormwater on surrounding water resources has been addressed in more detail in section 6.</p>

Section 5: Motivation, Need and Desirability

5.1 Need and Desirability as Per Section 3 (f)

Following the World Summit on Sustainable Development in 2002, the Department of Minerals Resources initiated a programme to guide the mining and minerals sector to achieve “sustainable development”⁷. The Sustainable Development through Mining Programme (SDM) was therefore developed by the DMR. This EIA process aims to implement this Programme by ensuring that the planning and operational phases of the Anniedale Quarry fall in line with sustainable development principles listed in Chapter 1 of NEMA. The EIA process guides the applicant in contributing to sustainable development thereby achieving one of the goals of the SDM Programme.

As discussed in section 4 above, the Msunduzi SDF, prepared by IYER Urban Design Studio, states that there is limited land available for development throughout the municipality with development constraints specifically in the western parts of the municipality. The area where the proposed Anniedale Quarry, in the South Eastern District of the CBD, Ashburton and Eastern Areas ABM, has been earmarked as a significantly underdeveloped area which has strategic importance to the long term development of Msunduzi. The Anniedale Quarry therefore 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.

More specifically, the tillite that will be mined at the Anniedale Quarry 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. The Msunduzi EMF identifies the lack of basic services, with the increase of the Msunduzi Municipal area of jurisdiction. Apart from supplying good quality material to the construction market, the mine will create job opportunities (skilled and unskilled) benefiting the local economy.

5.2 Motivation for Preferred Site, Activity and Technology Alternative as Per Section 3 (g)

The western portion of the property was selected for the application of a Mining Permit on inspection of the underlying geology of the property and therefore there are no other site alternatives. Layout Alternative 1, discussed during the environmental feasibility stage (pre-submission of the Mining Permit application to DMR), was considered as an alternative quarry site (described in section 2 above). Layout Alternative 2 is considered the preferred layout due to the following aspects:

- Existing dirt tracks available providing vehicles with direct access onto the P338. This limits travelling time through areas of primary grasslands (access Option 2 & 3), reducing indirect impacts such as dust settling over sensitive vegetation and disturbance to endangered fauna utilising the grassland area.
- Decreased visual impact on surrounding farms to the north of the property.
- Increased distance away from services crossing the property during Blasting (Umgeni water pipeline and Transnet NMPP)
- Increased distance away from the delineated aquatic environments, in the north-east and north-western corners of the property. The preferred quarry site is located on the south facing slope, with drainage flowing towards the P338 and not the Mpushini Valley.

Due to the nature of the material available at the Anniedale Quarry, there are no feasible technology alternatives. The technology / mining methodology is considered preferable as there is no excessive water use associated with the process. The only water used for the mining process will be that needed for dust suppression and water used by staff for drinking etc. Run off from the mined area will be collected in the sump and will be re-used in the mine area for dust suppression. Additional water may be needed for dust suppression and this will either be obtained from a municipal source or trucked in.

⁷ Sustainable development can be defined as “development that meets the needs of the present generation without compromising the ability of future generations to meet their needs”.

Section 6: Public Participation as per Section 3 (h) (ii) & (iii) and 2 (i) (vi) & (vii)

As per Section 2 (h) (ii) and (iii), below is the details of the public participation process followed to date and a summary of the issues raised by interested and affected parties. Copies of supporting documents and inputs have been included in Appendices B – F.

6.1. Notification of Interested and Affected Parties

- 1) *fixing a noticeboard at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of-*
 - i. *the site where the activity to which the application or proposed application relates is or is to be undertaken; and*
 - ii. *any alternative site;*

A noticeboard was placed on the proposed Anniedale Quarry mine site, near the existing exposed rock (English noticeboard) adjacent to and facing the road. An additional noticeboard was placed opposite the old quarry site (isiZulu noticeboard) also adjacent to and facing the road. Noticeboards were erected on the 24th March 2016. The noticeboard detailed the applicant's proposed plan to mine 4.99 hectare of the site, subject to a Scoping/EIA process. See Appendix B for proof of placement of the noticeboards.

- 2) *giving written notice, in any of the manners provided for in section 47D of the Act, to-*
 - i. *the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;*
 - ii. *the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;*
 - iii. *the municipality which has jurisdiction in the area;*
 - iv. *any organ of state having jurisdiction in respect of any aspect of the activity, and;*
 - v. *any other party as required by the competent authority;*

The landowner, Nikkel Trading 535 (Pty) Ltd, is currently using a small portion of the eastern corner of the property for truck parking. The landowner is aware of the mining permit application and is supportive of the application (see Appendix B). The municipal councillor for Ward 37, Ms Sandra Lyne, was contacted via telephone on the 22nd March 2016 to discuss the project. An official email of notification was sent to the ward councillor shortly after (see Appendix B for proof of notification). The ward councillor confirmed that she would assist in distributing the information to the relevant people in the area who will register as an Interested and Affected Parties should they wish. Representatives from the Msunduzi Municipality and Umgungundlovu District Municipality were notified by email. A number of stakeholders and authorities were also tracked down electronically and information has been provided to them via email on the 22nd March 2016 (see Appendix B for proof).

All relevant authorities have therefore been notified of the application and were provided with copies of the Draft Scoping Report (SR). The Draft SR was circulated for a legislated 30 day comment period (04th April 2016 – 09th May 2016). All comments received within the comment period have been included in Appendix B of the Draft EIR. The Draft EIR has been made available to all registered I & APs for the legislated 30 day comment period (11th October 2016 – 10th November 2016). The Final EIR will then be submitted to DMR for assessment.

- i. *owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;*

A map showing the properties directly adjacent to Portion 405 of Vaalkop and Dadelfontein 885 has been provided in Appendix B "Adjacent LO Notification". Notification emails were sent on the 22nd, 24th and 29th March 2016. Please see Appendix B for proof of notification.

- 3) *placing an advertisement in-*
 - i. *one local newspaper; or*
 - ii. *any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;*
- 4) *placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph 1(ii);and*

After discussions with the ward councillor it was agreed that the project be advertised in the Pietermaritzburg Fever (English) and Eyethu (isiZulu). The adverts were published on the 30th and 31st March 2016 respectively. The adverts detail the proposed Anniedale Quarry, Scoping/EIA process and provide contact details for EnviroPro should anyone wish to register as I & AP. Proof of adverts is provided in Appendix B.

6.2. Registered Interested and Affected Parties

42. *A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of-*
- (a) all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;*
 - (b) all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and*
 - (c) all organs of state which have jurisdiction in respect of the activity to which the application relates.*

The contact details of all I & A Ps that have registered have been provided in the Registered I & AP list in Appendix B.

6.3. Comments

Comments of interested and affected parties to be recorded in reports and plans.

- 1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.*
- 2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to-*
 - i. a lack of skills to read or write;*
 - ii. disability; or*
 - iii. any other disadvantage;*
 - iv. reasonable alternative methods of recording comments must be provided for.*

All comments received from I & APs to date have been recorded in the Comments and Response Table in Appendix B. The original comments provided have been provided together with a response to all comments provided in the table.

On receipt of the Scoping Report, a Trust run by a group of residents in the immediate area has objected to the Mining Permit application on the 03rd May 2016. The Trust is the PMMBT. The objection is included in the Comments and Response Table and refers to the quarry site being in close proximity to the headlands of a sensitive catchment (Malkopspruit / Mpushini River Catchment). PMMBT notes that the catchment is already seriously impacted by land-use activities, impoundments and alien invasive species. Section 3.2 summarises the aquatic specialist's findings with section 3.6 of the EIR addressing the Mpushini Protected Area specifically. Potential impacts on the Mpushini Protected Area has been discussed further in the impacts table below.

Gail McKenzie, on behalf of the farmers and residents in the Umlaas Road area, neighbouring properties and D354 residents, objected to the quarry on the 05th May 2016. Adjacent landowners, Bradley and David Hutton, objected to the quarry on the 09th May 2016. The full objections are included in the Comments and Response table in Appendix B with specific concerns addressed in the impacts table below.

Sandy Lyne (Ward Committee Chairperson) objected to the quarry on the 08th May 2016. Concerns were raised around the location of the quarry fitting in with the Msunduzi SDF and Town Planning schemes. A rezoning application is underway. The first step, to apply for the land to be released from the Department of Agriculture, has been carried out and a response from the Department is pending. Section 4 above discusses the policy and legislative context and the compliance of the project. The maximum lifespan of the quarry is 5 years, after which the area is to be rehabilitated in order to be re-used in the future development of the site (rehabilitation of the quarry is detailed in section 3 of the attached EMPPr). Although plans for the future development of the site are not yet available, the development is to be in line with the SDF and Local Area Plans to ensure that a sustainable development is achieved for the future of the 178 hectare property.

Section 7: Impact Assessment as Per Section 3 (h) (v) – (viii)

7.1 Methodology to Determine and Rank Nature, Significance and Consequences of Impacts Associated With all Alternative as Per Section 3 (h) (vi), (i) and (j)

Impacts are assessed qualitatively and quantitatively, looking at the duration / frequency of the activity and likely impacts associated with that activity during construction, operation and 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 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 construction and operational 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 full impact scoring tables detailing how the significance rating was calculated can be found in Appendix G, as per section 2 (h) (ix).

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.

7.2 Preferred Site and Layout Alternative

See Appendix D for the full impacts scoring matrix, which assesses the impacts based on the above scoring system. The below impacts relates to the preferred layout, which has been registered with DMR (i.e. Layout Alternative 2 on the south-facing slope).

Table 3: Impacts and mitigation measures associated with the preferred layout.

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
Construction			
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) and therefore there are fewer impacts associated with this phase compared to the operation phase.			
<p>1. Site camp establishment. Fuel, lubricants and chemicals brought onto site as well as the setting up of ablution facilities for staff. This could lead to spills and contamination of soil / groundwater.</p>	<p>5 (low)</p>	<p>The location of the site camp is indicated in the Mine Works Plan attached under Appendix C and is located in the south-east corner of the mine area. All mining equipment is to be retained in the site camp. It is unlikely that there will be any hazardous materials brought to site however these are to be stored in a designated area which is hard surfaced, bunded and covered. Adequate spill kits and containers for spilled and contaminated material to be on standby on site. If a spill occurs, stop the source, contain it, clean up in accordance with MSDSs and notify relevant authorities (procedure outlined in section 2.9 of the EMP). The stormwater management system is to be established prior to any excavation taking place to ensure the separation of clean and “dirty” water. The construction of the berm around the mine area is to be established and the location of the sumps determined. The berm will divert water away from the mine area, as shown in the Drainage Analysis drawing attached under Appendix C, as well as contain water inside the quarry. During site camp establishment, 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. The location of the screen is also provided in the Mine Works Plan attached under Appendix C. This impact can be managed.</p>	<p>1 (low)</p>
<p>2. Disturbance of vegetation during the upgrading of the intersection to a B2 type intersection (Access Options 2 and 3). This would lead to clearance of indigenous vegetation and incursion of alien vegetation.</p>	<p>8 (med)</p>	<p>As a result of the increase in truck traffic turning into the minor access roads off the P338 as well as the existing speed limit of the provincial road, the intersections are to be upgraded, as per the traffic specialist’s recommendations (section 5 of the Traffic Impact Statement in Appendix C). Clearance of vegetation will only take place in the intersection footprint (i.e. no</p>	<p>5 (low)</p>

⁸ See Appendix H for more details.

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		excessive clearance of vegetation). There is to be no dumping of waste or spoil material in the area once the intersection has been formalised. Should DoT confirm access Option 3 as the preferred, vehicles are to form an access track 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. This impact can be minimised.	
Operation			
3. There is a risk of collapse of the mining face if the angle of removal is not correctly planned and managed. This could lead to slippage and collapse of the slope causing damage to the adjacent road as well as posing a risk to onsite workers.	9 (med)	If the appropriate mining technique is not used and slippage occurs, it could potentially have a significant impact in terms of risk to the workers on site, on-going instability issues and on-going erosion. The risk of this impact occurring is relatively low, provided proper mining techniques are used and the angle of removal is appropriately planned, implemented and monitored. Measures prescribed in the Mine Works Programme to prevent collapse of mine face: <ul style="list-style-type: none"> • 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. • A safety berm will be erected around 3m from the crest. • Benches to be spaced vertically at 8-14m with the ideal bench height being between 10-12m. • The slope face must not be heavily undercut as this could lead to collapse of the slope. • Undercutting of the slope and creation of over-steep slopes must not be permitted. After a blast these soft areas, which are prone to back break, are excavated to a point where competent material is reached. No loose material is left in the face. • Soft material will be cut back at a batter no steeper than 1:1.5 reducing the height of the suspended material. • No artificial support is envisaged for the quarry face. • Final pit wall slopes will vary between 45° - 65° depending on the local rock mass classification. • 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. 	4 (low)

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<ul style="list-style-type: none"> 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. The maintenance of proper drainage away from the working area. <p>This impact can be prevented and managed.</p>	
<p>4. Generation of flyrock as a result of blasting causing damage or injuries to neighbouring property and people.</p>	<p>9 (med)</p>	<p>Mitigation is generally applied when mining comes to within 100m of any structure and whenever the ground vibration is likely to cause damage to the structure. A Blasting Impact Report was prepared and is attached to Appendix C. The Blasting Report calculated the Peak Particle Velocities (PPV) at varying distance intervals from the quarry so that potential impacts on nearby structures could be determined. The predicted blast vibrations for the nearest blast receptors are as follows:</p> <p>P338 tar road (83m) - 22.2 mm/s Homestead A (530m) - 1.8 mm/s Homestead B (532m) - 1.8 mm/s Construction Camp C (622m) - 1.5 mm/s</p> <p>Receptors A, B & C listed above are well below the USBM recommended limit of 25 mm/s and are also outside the legislated 500m blast radius. The P338 is well below the applied limit of 150mm/s generally applied to this type of blast receptor. In light of the above calculations no mitigation measures need to be applied. The blast predictions are calculated on single hole firing with an inter-hole delay of 8 milliseconds or more.</p> <p>Blasting generates short duration events that are noticeable only by communities and individuals living in the immediate environment. The blasting is to be carried out by a suitably qualified Contractor. Typically this will comprise 115mm diameter blast holes in a 3.5 x 4.0 m staggered drill hole pattern, drilled vertically, with a 1m sub-drill and 2.5m stemming. Blasting is by means of Nonel initiation and Anfo explosives. Blast sizes vary dependent on requirements, but can be up to 40 000 tonnes.</p> <p>An assessment of ground conditions and desired fragmentation is to be done on each blast and blasting strategies and techniques are tailored to deliver the desired outcomes. For example:</p>	<p>5 (low)</p>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<ul style="list-style-type: none"> • The use of “shake up” blasts in the soft areas. The blasts have a wider drill pattern and are undercharged. • The use of bottom and mid hole boosters on high benches >15m. • The weathered zones and solution channels often have to be blasted using packaged explosive emulsion due to the clay and sometimes wet conditions. <p>Ground vibration from blasting operations will be monitored after each blast by means of a PPV (Peak Particle Velocity) meter. Recordings will be kept of each blast in the Blast Analysis Sheet and filed in the Site Supervisor’s office. Due to the isolated nature of the quarry as well as the distance from the receptors, flyrock is not anticipated to impact any neighbouring properties or structures however neighbouring farmers are to be notified prior to blasting commencing. This impact can be prevented and mitigated.</p>	
5. Generation of emissions from vehicles.	7 (med)	<p>All construction vehicles will be fitted with the appropriate silencers and exhausts. Emissions generated from these vehicles is not expected to significantly affect the workers on site or neighbouring farmers. This impact can be managed and mitigated.</p>	3 (low)
6. Dust generation during preparation of site and roads as well as during operation impacting on air quality.	9 (med)	<p>The area of impact is expected to be relatively low. Dust suppression is however to take place along the dirt access track as well as inside the quarry area itself.</p> <ul style="list-style-type: none"> • Dust will require management and the applicant must comply with the National Dust Regulations (Government Notice R827, 2013) with regards to dust levels produced on site. • Mining benches are only to be cleared of vegetation as and when required for mining. This will reduce the amount of soil exposed to high winds creating dust. • Perimeter monitoring of dust will be conducted to monitor dust levels to ensure they remain within legislated limits. • Vehicle speeds must be reduced to 40kms within the quarry area and a water cart and water truck must be in operation to ensure dust is controlled. • 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. 	5 (low)

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<ul style="list-style-type: none"> • If legislated dust levels are exceeded, 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 be implemented to assist in managing dust. • The material being transported off site in the back of the trucks must be covered. • Dust generation will be primarily managed through application of water from the sump area, which will be created during mining. • Water scarcity was raised as a concern during the Scoping Phase. The applicant has confirmed that water will be obtained from the municipality and bought to site by water tanker, if water in the sump runs low. <p>Dust is an impact associated with on-going operation of a quarry and even with mitigation, some dust will still be released. It is therefore important that it is monitored to ensure levels remain within the legislated parameters and that all necessary mitigation measures are implemented.</p>	
<p>7. Noise generation during operation of plant equipment (crushing, screening and blasting) and trucks which may impact on staff and neighbours.</p>	<p>9 (med)</p>	<p>The nearest household is located 530m north of the quarry (see Blasting Impact Report). Due to the distance from the site, and the topography, the noise from machinery (front end loaders, excavators, screener and crusher) and trucks will be significantly reduced compared to the alternative site location (discussed in the table below). Regardless, all vehicles will be fitted with standard silencers and will be maintained regularly to prevent undue noise. The noise from machinery, trucks and loading of stone will be on-going during operation and can't be completely mitigated against but can be minimised.</p> <p>Typically, blasting is intermittent and at maximum capacity will only occur once a week. The smaller scale once off blasts will likely register in the vicinity of 140 dBA at source. As a point of comparison, traffic noise generates about 80-90dBA, the sound of breaking glass is 151dBA. The volume of noise will dissipate as one moves away from the blast area. In terms of topography, the site is cut into a hill and the work face will continue into the hill so sound will tend to be directed into the hillside. Blasting will only occur during daylight hours.</p> <p>The primary type of sounds expected will be fairly sharp, percussive sounds during</p>	<p>7 (med)</p>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<p>operation of crusher and loading into trucks etc. which are more likely to travel longer distances. The surrounding vegetated hillsides will partially absorb this sound as it will be less likely to ricochet off these softened surfaces. As previously mentioned, the mining activity will be into the side of the hill such that some of the noise will be absorbed into the hillside though some will also ricochet back. The table below provides noise levels experienced by operators of front end loaders and excavators⁹.</p>	

Table 4: Noise levels, L_{eq}, experienced in construction jobs in the UK⁴.

Plant/equipment	Operator, L _{EX} , dBA		Trades/Tools	L _{eq} dBA
	Ave.	Range		
Dozers, Dumpers	96	89-103	Plumber	90
Front end loaders	88	85-91	Elevator installer	96
Excavators	87	86-90	Rebar worker	95
Backhoes	86.5	79-89	Carpenter	90
Scrapers	96	84-102	Concrete form finisher	93
Mobile Cranes	100	97-102	Dry wall installer	90
Compressors	79	62-92	Steel stud installer	96
Pavers	101	100-102	Labourer – road construction	86
Rollers (compactors)	90	79-93	Labourers – formwork	88
Bar Benders	95	94-96	Labourers – shovel hardcore	94
Pneumatic breakers	106	94-111	Labourers – concrete pour	97
Hydraulic breakers	95.5	90-100	Hoist operator	100
Graders, trucks, concrete pumps & mixers, generators	< 85		Labourers— drains & roughing concrete	100
Concrete batch plant operator	< 85		Tile setter	92
Poker vibrators	94.5	87-98	Pneumatic chipper/chisel	109
Saws	88.5	78-95	Compactor	108
Piledrivers (diesel & pneum.)	98	82-105	Electric drill	102
Pile drivers (gravity, bored)	82.5	62-91	Air track drill	113

<p>8. Increase in heavy truck traffic on the P338 as trucks enter and leave the site which could impact on existing traffic levels.</p>	<p>8 (med)</p>	<p>The nature of the activity will result in a localised increase in haulage truck traffic during operating hours of the quarry. Based on the COTO Manual hourly trip rates, the development is likely to generate 2 trips each during the morning and afternoon peak hour (section 5 of the Traffic Impact Statement attached under Appendix C). Trips may vary depending on the demand of the material at that time. Having direct access onto the P338, which joins the N3 less than 2km east of the quarry, prevents trucks from travelling on any private / residential roads. Access option 3 would require vehicles to turn onto the district road (D354) prior to turning onto the P338 however this will not significantly affect neighbouring farms.</p>	<p>5 (low)</p>
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⁹ Workers Compensation Board of BC, Engineering Section Report; Stuart Eaton, February 2000
<http://hearingconservation.healthandsafetycentre.org/pdfs/hearing/ConstructionNoise.pdf>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		This impact can be mitigated by constructing a B2 type intersection as recommended by the traffic specialist however is not anticipated to significantly increase traffic in the surrounding area.	
9. Leaving the Anniedale Quarry unrehabilitated.	11 (high)	<p>If the quarry is not rehabilitated upon completion of the operation, the currently proposed activity in combination with previous activities on the immediately adjacent quarried area will create an on-going safety risk (especially children and animals who may fall off the cliff edges or be hurt by unstable collapsing rock faces). It will also continue to have a visual impact on the landscape and there may be further slippage of unshaped slopes and erosion of soil above unstable slopes.</p> <p>The applicant or holder of a permit is legally bound to “make financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of mining, as contemplated in the Act and to the satisfaction of the Minister responsible for Mineral Resources”¹⁰.</p> <p>The Annual and Final Rehabilitation Plans are included in section 3 of the attached EMPr (Appendix E) and consists of two phases. Please refer to the EMPr for further details however a summary of the proposed rehabilitation measures is provided below.</p> <ul style="list-style-type: none"> • The quarry must be rehabilitated after closure to prevent these impacts from occurring. • Rehabilitation should occur as soon as practically possible on completion of work, following the cessation of the work in a specific section. • Any infrastructure erected for mining must be demolished and removed from site. • All equipment, concrete footings, fencing, etc. must be removed from site. • All waste must 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 and must be disposed at a permitted landfill. • 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. 	7 (med)

¹⁰ Regulation 4 of the “Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operatio^s” 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.

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<ul style="list-style-type: none"> • Before placing topsoil across the floor of the quarry, all visible weeds must be removed. • 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. • The stockpiled topsoil must also be spread evenly over the prepared surface on slopes of 1:3 or steeper. • 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. • The requisite for permanent drainage works and erosion protection measures should be set in place¹¹. • Ensure that other operators or opportunists do not re-visit closed areas and continue to remove material. • Re-vegetated areas should be protected until vegetation has become established. • No vehicles or equipment should access areas that have been vegetated. • 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. • The excavated quarry pit will remain in the landscape post mining operations where water will collect naturally over time. • The water quality in the sump is to be tested to ensure there is no groundwater contamination in the long-term. There is the potential for nitrates from blasting, to accumulate in water draining off the exposed slopes. • 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 	

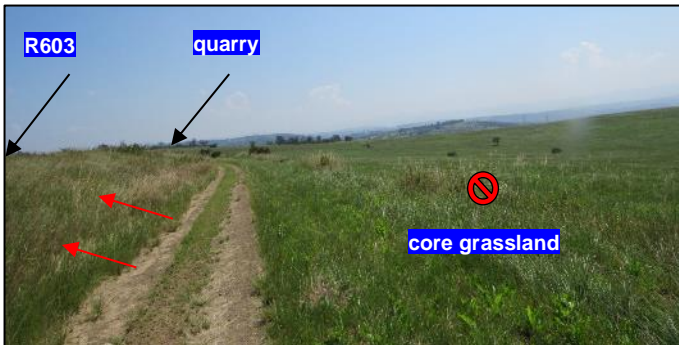

¹¹ Aggregates And Sand Produces Of South Africa; The Issue Of Borrow Pits Being Used In The Aggregate And Sand Industry.

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<p>substantially. At this stage, no more water will accumulate in the pit and the monitoring of the water quality will cease. The 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.</p> <p>Please refer to section 9 of the EIR detailing the financial provisions which are to be set aside for the rehabilitation phase. Provided these measures are implemented the quarried area can be rehabilitated and long-term impacts avoided.</p>	
<p>10. Suitability of quarry with respect to surrounding land use i.e. visual impact and impact on sense of place.</p>	<p>9 (med)</p>	<p>The portion of land ear marked for mining is currently vacant, with portions of the property being utilised for seasonal hay baling. Farmers in the area have expressed concern with the location of the quarry being in close proximity to land used for either farming / agricultural purposes. Residents have chosen to live / retire in this area because of the high agriculture potential, low disturbance levels and diverse wildlife in the area. Although this impact cannot be fully mitigated, the preferred quarry layout has taken into account the surrounding farming community, located along the northern boundary of the property.</p> <p>The preferred mine site is located on the south facing side of the hill, away from the residential households associated with the neighbouring farms. The visual impact has therefore been reduced, compared to Layout Alternative 1. A row of indigenous trees will be planted along the northern boundary of the site, which will assist in acting as a natural screen when mining commences near the crest of the hill (benches are cut from the bottom hill upwards).</p> <p>No infrastructure or services running through this property will be impacted by the mining operations. The mine is ideally located in close proximity to the N3 highway where it is anticipated that development, in particular light industry / logistics, will be increasing in the future.</p> <p>Once the site is closed, rehabilitation of the disturbed area will take place as per section 3 of the EMPr (Appendix E). The Mining Permit is valid for a maximum period of 5 years after which the quarry benches and pit will be rehabilitated taking into account the development plan for the remainder of the property.</p>	<p>6 (med)</p>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		This impact can be partially managed and mitigated.	
11. Petrochemical spills from mining operational machinery.	6 (med)	All mining equipment and vehicles are to be retained in the permitted mine area, which will be rehabilitated on closure. All spills must however be contained, placed in the hazardous waste removal containment area and removed off site to be disposed of at a licensed hazardous waste landfill site. Adequate spill kits and containers for spilled and contaminated material to be on standby on site. If a spill occurs, stop the source, contain it, clean up in accordance with MSDSs and notify relevant authorities. This impact can be avoided and managed.	2 (low)
12. Inadequate waste management on site.	5 (low)	<p>The project will see an increase in workers on site and therefore an increase in waste in the area. Waste material and refuse must not be allowed to percolate into the surrounding natural areas.</p> <ul style="list-style-type: none"> • Littering will not be permitted in the study area; • Designated waste storage areas with appropriate waste receptacles must be set up in the site camp; • Waste will be removed from site and disposed of at a registered waste disposal site. • No dumping is permitted. • Regular checks and clean ups are to be scheduled to ensure that there is no waste in the adjacent grassland. <p>This impact can be avoided and managed.</p>	1 (low)
13. Insufficient number of toilet facilities on site resulting in the contamination of the environment.	6 (med)	<p>Workers on site will require an appropriate number of toilet facilities on site.</p> <ul style="list-style-type: none"> • Appropriate and sufficient toilet facilities (1 toilet per 15 employees) must be provided by the applicant; • All toilet facilities must be checked on a daily basis; • All toilet facilities must be emptied and cleaned on a weekly basis. • A registered waste removal contractor must remove effluent waste from site or effluent waste must be disposed of at a permitted Waste Water Treatment Site. <p>As per the Msunduzi Municipality's comment on the Draft Scoping Report, the establishment and use of long-drop toilets is strictly prohibited.</p>	2 (low)
14. Cumulative impact on air quality in combination with other light industrial activities associated with the N3 highway corridor.	7 (med)	Air emissions from the quarry will be dust related and to some extent will add to the cumulative impact on air quality in the area. The nearest dust generating activity is the AfriSam plant (2.2km east). Although dust cannot be completely prevented due to the	5 (low)

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<p>nature of the activity, it will be mitigated to a large extent through a dust watering program as well as management and screening of certain equipment. Perimeter dust monitoring will be carried out as per the requirements of the legislation to ensure that levels remain within legislated limits. Water from the onsite sump will be used to suppress dust on site. A water tanker will be permanently on site to provide an alternative municipal water supply, should water from the sump run out. No water will be abstracted from nearby water resources. A complaints register has been attached to section 5 of the EMPr, which will be kept on site. Any complaints received are to be addressed in a timely fashion. A review of the complaints and close out register are to be included in environmental auditing for the quarry (discussed in section 5.3 below). This impact can be managed and mitigated.</p>	
<p>15. Construction of barriers impacting on the natural movement and foraging of species (Ecological and Fauna Assessment, 2016).</p>	<p>8 (med)</p>	<p>The majority of the fauna species identified by the faunal specialist occur in the open grassland areas and wetland / riparian vegetation. There is no wetland or riparian vegetation cleared by the mining operations. 3.6 hectares of primary / primary transitional grassland will be cleared with the remainder of the 178 hectare property remaining undeveloped for use by fauna. The location of the mine does not isolate / block off any key habitats. It is situated adjacent to the road, at the edge of the property. Once mining commences, it is unlikely that the relevant species will enter the quarry area due to the level of disturbance and activity associated with the mining. There may also be edge effects due to the activity and nature of the mining operations. The quarry is to be clearly demarcated and fenced off from the surrounding sensitive areas / open space system. Once mining is complete, rehabilitation of the area is to be carried out according to the Final Rehabilitation Plan in the EMPr (Appendix E). After mitigation, the impact was rated as "medium" by the fauna specialist (section 4.1 of the Ecological and Fauna Assessment). This impact can be avoided and managed.</p>	<p>5 (low)</p>
<p>16. Invasion of alien fauna / avifauna (Ecological and Fauna Assessment, 2016).</p>	<p>8 (med)</p>	<p>Due to the small disturbance footprint in comparison with the larger property, this impact was rated as "low" by the fauna specialist (section 4.1 of the Ecological and Fauna Assessment).</p>	<p>4 (low)</p>
<p>17. Loss of critical IUCN and National Threatened avifaunal & faunal</p>	<p>10 (med)</p>	<p>Although these species were not observed by the faunal specialist during the site visit, there is a possibility of their presence due</p>	<p>6 (med)</p>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
species populations (Ecological and Fauna Assessment, 2016).		to suitable habitat across the property. Precautionary measures have been provided: <ul style="list-style-type: none"> • If bullfrogs, hedgehogs or white-tailed rats are discovered mining should temporarily cease and an expert zoologist should be commissioned to perform an assessment. • If individual pythons are discovered on site, an expert herpetologist should be commissioned to remove the animal safely for the purposes of relocation. Photographs of the critical IUCN and national avifaunal and faunal species likely to be found on the property have been included in section 2.3 of the EMPr for reference purposes on site. The area of disturbance for this property is small when compared to the rest of the property, which means that the avifaunal species will continue to use the remainder of the site for foraging. After mitigation, the impact was rated as "medium" by the fauna specialist (section 4.1 of the Ecological and Fauna Assessment). This impact can be avoided and managed.	
18. Encroachment of alien vegetation into disturbed areas and surrounding grassland during operation of the quarry.	9 (med)	The two delineated patches of alien vegetation in the quarry footprint will be cleared during the mining process. There is however to be an alien vegetation clearance programme in place where the remainder of alien trees on the southern side of the quarry footprint are to be ring barked / removed. Eucalyptus trees outside of the authorised quarry area are to be retained as these are used by raptors (Ecological and Faunal Assessment). The vegetation specialist further recommends that the skirts of <i>Lantana camara</i> be removed. 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. The alien vegetation clearance programme is described in section of the EMPr, which is to be adhered to during operation and renewed on an annual basis. This impact can be managed.	5 (low)
19. Increase in traffic and visitation may increase the risk of collection and digging out of medicinally valuable plants (Vegetation Report, 2016).	5 (low)	Quarry workers are to undergo environmental induction and training (see section 2.2 of the EMPr). There is to be no collecting or digging out of any plants around the quarry or nearby grassland areas. This impact can be avoided.	1 (low)

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
<p>20. Physical disturbance of the core area of primary grassland by vehicles using the access Options 1 & 2 through this “high priority” area.</p>	<p>11 (high)</p>	<p>There is an existing dirt access road to the east of the preferred quarry site which will be used to gain access onto the P338, if approved by DoT. The track passes along the edge of the delineated core primary grassland area. The mine manager is to ensure that vehicles are to remain on this track. Any necessary expansion of the track is to be carried out:</p> <ul style="list-style-type: none"> • on the southern side of the existing track (i.e. towards the main P338 road) for access Option 1 (Figure 23a); or • on the western side of the existing track (i.e. quarry side) for access Option 2 (Figure 23b). <p>This is to prevent further encroachment into the core grassland. 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.</p> <p>This impact can be managed.</p>	<p>7 (med)</p>
<p>Figure 23 (a): Photograph of the dirt track through the core grassland area that will be used to access the quarry. Vehicles are to pass other vehicles on the southern side of the track as shown by the red arrows.</p> 		<p>Figure 23 (b): 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.</p> 	
<p>21. Loss of vegetation within the Ngongoni ecosystem. There will be clearing of up to 4.99 hectares of indigenous vegetation as the mining area is expanded.</p>	<p>9 (med)</p>	<p>There will be approximately 0.9 hectares of primary grassland (high priority), 2.67 hectares of primary transitional grassland (medium priority) and 1.4 hectares of alien vegetation (low priority) cleared from the preferred site (Vegetation Assessment, 2016). This impact cannot be avoided as the entire permitted mine area, will be cleared of vegetation. The core primary area of grassland on the remainder of the property will not be disturbed by the quarry operations and there will be no riparian or wetland vegetation cleared. The following mitigations have been provided in the EMP to ensure no further damage is caused to the surrounding grasslands.</p> <ul style="list-style-type: none"> • The permitted quarry area is to be clearly demarcated to ensure that vegetation is only cleared from within 	<p>10 (med)</p>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<p>the authorised Anniedale Quarry footprint.</p> <ul style="list-style-type: none"> • There are scattered indigenous and exotic tree species (<i>Acacia</i> spp, Wattle etc.) as well as alien vegetation (Lantana, Blackjacks etc.) in the grassland (see photographs in Figure 16), which are to be cleared. • Once mining is completed, the site will be rehabilitated according to the Rehabilitation Plan in section 3 of the EMPr. • When vegetation clearing takes place, the contractor is to stockpile the topsoil separately in a designated area, where it can be used again during rehabilitation. In this regard, it is to be kept fertile and protected from erosion using various measures that are included in the EMPr. <p>It is to be noted that the vegetation type is represented in the surrounding area and its loss will not result in the isolation of any important vegetation or wetland areas. This impact can be partially managed.</p>	
<p>22. Loss of provincially protected and red listed plant species associated with the quarry (Vegetation Report, 2016).</p>	<p>9 (med)</p>	<p>Three red listed species and five species protected by the KZN Provincial Conservation Ordinance are located within the quarry footprint. All specimens are to be relocated outside of the footprint prior to mining commencing in this section. Permits from Ezemvelo KZN Wildlife are to be obtained for the protected species. Relocation is to be carried out by suitably qualified personnel taking care not to damage the roots or bulbs. The plants are to be relocated to suitable habitats on the property. Section 2.3 of the EMPr shows photographs of the plant species which are to be relocated. Mine workers are to be aware of the plant species and recognise them from the photographs provided in the EMPr. As per the vegetation specialist recommendation, if the quarry is not yet established by the early summer, or has not yet reached parts of the proposed footprint where these plants are located, it should be searched again for any more protected and red listed plants, as they will be more visible at this time. This impact can be avoided.</p>	<p>5 (low)</p>
<p>23. The loss of land which has been identified in the Msunduzi EMF as having “high agricultural potential”.</p>	<p>12 (high)</p>	<p>The high agricultural potential of the land was identified based on the soil, slopes and climate of the area which offer opportunities for cultivation and food security. The property has only been used for hay bailing and not for supply of food crops. The property is currently undergoing rezoning</p>	<p>14 (high)</p>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<p>with an application having been submitted to the Department of Agriculture for the land to be released from this zoning. The outcome of the application is pending. Although there will be 5 hectares of potentially viable agricultural land lost, the entire property is 178 hectares, which remains undeveloped. The 5 hectare area of land associated with the quarry footprint will however be lost to any future agricultural activities / grazing. This impact cannot be mitigated.</p>	
<p>24. Impact on the long-term conservation plans for the greater Mpushini Protected Area.</p>	<p>9 (med)</p>	<p>The property is located within the Upper Mpushini Conservancy Area. During the Scoping Phase, it was communicated to the EAP that one of the key long-term visions of the PMMBT is to form conservation corridors within this area of the Mpushini Protected Area.</p> <p>It is recommended that these corridors should be associated with the drainage lines, wetlands and core primary grassland areas on the property. The applicant and landowner have indicated a willingness to engage with the PMMBT regarding potential conservation corridors across the property. Since the current application is for a 5 hectare portion of the property, it is beyond the scope of this application to formulate conservation corridors and links on other portion of the property. All long-term plans for future development of the property will take into account the long-term vision towards conservation of the Mpushini Valley. Discussions between the landowner, applicant and PMMBT concerning corridors and conservation servitudes will therefore be held at a later stage once the future development idea for the property has been investigated. The corridors are to take into account the environmental constraints as well as the requirements for services and access provisions (unknown at this time). The current proposal does not threaten the future corridors as all the links across the property remain and will not be affected by the mine clearing. This impact can be avoided and managed.</p>	<p>5 (low)</p>
<p>25. Poor stormwater management during operation resulting in “dirty” water from within the quarry mixing with clean water outside of the quarry.</p>	<p>7 (med)</p>	<p>Stormwater Management during operation of the mine will be discussed in detail in the Water Use Authorisation. A Drainage Analysis has been included in Appendix C of the EIR with a site specific Stormwater Management Plan to be included in the WUA application. The following measures will be taken to management runoff in and around the mine area:</p>	<p>3 (low)</p>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<ul style="list-style-type: none"> • Strategic placement of diversion berms and ditches around the mine area to divert clean water away from the mine and prevent potentially contaminated run off from leaving the mine area (see figure in the Mine Works Programme showing the layout of the Anniedale Quarry). • The ditches and berm area must be vegetated. • A sump/s are to be created at the low point of the quarry to capture runoff from within the mine area. This water is considered “dirty” and will be stored on the site and used for dust suppression. • The sump area may need to move as the mining area changes and moves. <p>The aim of the stormwater management is to ensure that clean water running off surrounding slopes does not enter the mine area and “dirty” water from within the mine area does not leave the mine area. This impact can be avoided, managed and mitigated.</p>	
<p>26. Poor stormwater management during operation and after closure leading to erosion of the site and adjacent road.</p>	<p>8 (med)</p>	<p>Provision must be made to control stormwater runoff, especially down the slope of the exposed mine face to prevent erosion and excess sediment entering the sump and surrounding environment. Temporary stormwater protection measures must be established before operational activities commence.</p> <ul style="list-style-type: none"> • Install appropriate erosion barriers (berms or diversion ditches, sandbags) and other sediment control structures (grates or grids, geofabric) in order to prevent substances from entering exposed drains or channels. • Identify steeper areas where erosion is more likely to occur and ensure adequate protection of these slopes through planting of vegetation, placement of berms or use of hessian material. Regularly check and clean material from behind erosion barriers. <p>This impact can be managed and mitigated.</p>	<p>4 (low)</p>
<p>27. Risk to water quality on nearby watercourses and wetlands.</p>	<p>9 (med)</p>	<p>During the Scoping Phase of the EIA, concerns were raised about the proximity of the Mpushini Protected Environment and the Mpushini, which protects the Mpushini River (see Comments and Response Table in Appendix B). The preferred mine alternative is located on the south facing side of the hill, opposite to the Malkop Spruit and Mpushini River. Drainage off the mine area would therefore flow in a southerly direction towards the P338. The</p>	<p>5 (low)</p>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		<p>primary aim of the stormwater management plan is to prevent run off from leaving the quarry at all (i.e. all run off captured and stored in the sump).</p> <p>In terms of mitigation, slopes that fall towards the quarry workings will be identified and berms provided to deflect clean run off from entering quarry operations, thereby reducing the risk of contamination. Drainage from the quarry area and especially areas where blasting takes place will be directed into a sump. This water will then either be re used on site i.e. for dust suppression which means it will drain back into the sump. Only clean water will be used for dust suppression outside the mine area i.e. on the access roads. Sediment and potentially contaminated run off will not be permitted to enter the natural watercourses in the area. Risk assessments included in sections 7.0 and 9.0 of the Aquatic and Wetland Assessments respectively rate potential impacts on the water resources as negligible to minor.</p> <p>This impact can therefore be avoided.</p>	
<p>28. Impact on existing services i.e. power lines, water pipes, Transnet NMPP, etc.</p>	<p>8 (med)</p>	<p>All existing services and infrastructure on the property have been identified (see Figure 4 above). The mine area has been located as far away from these services as feasible providing a sufficient buffer for blasting operations. All relevant authorities (Umgeni Water, SANRAL, DoT, Eskom and Transnet) have received a copy of the EIA with comments included in Comments and Response Table under Appendix B. No objections or mitigation measures have been provided by these authorities.</p> <p>This impact can be avoided.</p>	<p>4 (low)</p>
<p>29. Pollution of groundwater from an increase in suspended solids and associated microbiological loading from surface water runoff which may result in localised recharge / runoff from the site (Geohydrological Assessment attached under Appendix C).</p>	<p>9 (med)</p>	<p>Potential sources of groundwater pollution for the proposed quarry were identified in section 4 of the Geohydrological Assessment and include the opencast pit, waste rock dumps, product stockpiles, sanitation facilities, workshop and fuel/chemical stores. Potential pollution pathways include movement through the vadose zone, movement through the aquifer, surface runoff, movement through mine voids or airborne migration of dusts. Stormwater water management is key. Surface ingress to the excavation pit may result in temporary and unnecessary flooding. Surface ingress to stockpile areas may result in seepage from stockpile toes, with increased turbidity and other elevated compounds being possible. A stormwater management plan needs to address</p>	<p>4 (low)</p>

Nature and Consequences of impact	Significance rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		surface water ingress and runoff in a controlled manner. Sumps will be created to contain runoff from within the quarry area minimizing high suspended solids load running off from key areas and also serve as a dust suppression water source. All stockpile facilities / stores will drain into the sump with no stormwater leaving the site. Terratest concluded that the site is characterized as low risk with conservative buffers around confirmed boreholes, geological structures and surface water resources. This impact can be avoided and managed.	
30. Excavations and blasting impacting on potential heritage resources (Heritage Impact Assessment, 2016).	7 (med)	The HIA concluded that the mining operation may proceed as no heritage sites or features are in danger of being destroyed or altered. The area is also not part of any known cultural landscape. However, it must be pointed out that the KZN Heritage Act requires operations exposing archaeological and historical residues should cease immediately pending an evaluation by the heritage authorities. This impact has been avoided.	2 (low)
31. Positive impacts for local employment opportunities.	0 (no impact)	This is a positive impact however it is to be noted that local labour must be sought, where possible, for the mining of this site.	0 (no impact)

9.3 Preferred Site and Layout Alternative

See Appendix D for the full impacts scoring matrix, which assesses the impacts based on the scoring system described in section 7.1. The below impacts relates to the alternative layout (i.e. Layout Alternative 1 on the north-facing slope).

Table 4: Impacts and mitigation measures associated with the *alternative* layout.

Nature and Consequences of impact	Significance rating of impacts ¹² :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
Construction			
As per the preferred Layout Alternative 2, 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) and therefore there are fewer impacts associated with this phase compared to the operation phase.			
1. Site camp establishment. Fuel, lubricants and chemicals brought onto site as well as the setting up of ablution facilities for staff.	5 (low)	Impact significance and mitigation measures for construction impact 1 remain the same for both layout alternatives.	1 (low)
Operation			
2. Risk of collapse of the mining face if the angle of removal is not correctly planned and managed.	9 (med)	Since the underlying geology is the same on both sides of the hill, the impact significance and mitigation measures	4 (low)

¹² See Appendix H for more details.

Nature and Consequences of impact	Significance rating of impacts ¹² :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		remain the same as the preferred layout alternative.	
3. Generation of flyrock as a result of blasting.	9 (med)	The alternative location for the quarry is located closer to the blast receptors considered for the preferred alternative. The nearest homestead is located 200m north of the alternative site and downslope from the quarry. The blasting will also take place on the same side of the hill as the residential farms, increasing the noise and vibrations from blasting. The impact of flyrock and vibrations from the blasting are therefore more significant compared to the preferred layout alternative. Mitigation measures remain the same.	7 (med)
4. Generation of emissions from vehicles.	7 (med)	Impact significance and mitigation measures remain the same as the preferred layout alternative.	3 (low)
5. Dust generation during preparation of site and roads as well as during operation impacting on air quality.	9 (med)	<p>In order to access the alternative quarry site, haulage vehicles will be required to travel on small dirt roads for approximately 1.8km (shown in red in Figure 24). Dust will need to be more tightly monitored along the access road with water carts travelling along the roads frequently to ensure dust does not become a nuisance to surrounding farms. Dust suppression will also require a greater volume of water to be used compared to the short access road used for the preferred mine site. Screening (natural or shade cloth) may be required to shield dust blowing from the quarry onto adjacent farm houses. Other mitigation measures similar to the preferred site are:</p> <ul style="list-style-type: none"> • Perimeter monitoring of dust will be conducted to monitor dust levels to ensure they remain within legislated limits. • Vehicle speeds must be reduced to 40kms within the quarry area and a water cart and water truck must be in operation to ensure dust is controlled. • 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. • If legislated dust levels are exceeded, 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 be implemented to assist in managing dust. <p>The material being transported off site in the back of the trucks must be covered.</p>	7 (med)

Nature and Consequences of impact	Significance rating of impacts ¹² :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
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Figure 24: Aerial photograph showing the proposed access route to the alternative mine area in red (source: Google Earth Pro, 2016).



<p>6. Noise generation during operation of plant equipment (crushing, screening and blasting) and trucks which may impact on staff and neighbours.</p>	<p>10 (med)</p>	<p>The nearest household is located approximately 200m north of the alternative quarry site. The quarry will be on the same side of the hill as the households and therefore noise from machinery and trucks will be clearly heard on the neighbouring farms. All vehicles will be fitted with standard silencers and will be maintained regularly to prevent undue noise however this impact is more significant for the preferred site alternative. Noise from blasting will also be heard by the neighbouring farms. Although sound will tend to be directed into the hillside, some noise will be directed back away from the mining area, in a northerly direction towards the households and farms, increasing the significance of the impact.</p>	<p>8 (med)</p>
<p>7. Increase in heavy truck traffic on the P338 as trucks enter and leave the site which could impact on existing traffic.</p>	<p>8 (med)</p>	<p>Impact significance and mitigation measures remain the same as the preferred layout alternative.</p>	<p>5 (low)</p>
<p>8. Leaving the Anniedale Quarry un-rehabilitated.</p>	<p>11 (high)</p>	<p>Impact significance and mitigation measures remain the same as the preferred layout alternative.</p>	<p>7 (med)</p>
<p>9. Suitability of quarry with respect to surrounding land use i.e. visual impact and impact on sense of place.</p>	<p>11 (high)</p>	<p>Since the alternative quarry site is located on the same side of the hill as the nearby farms, the excavations and mining activities will be clearly visible by the local residents (see Figure 5a showing a photograph of the</p>	<p>11 (high)</p>

Nature and Consequences of impact	Significance rating of impacts ¹² :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		alternative site from the nearby farms). Fauna currently observed by the farmers passing through Portion 405 of Farm Vaalkop and Dadelfontein 885, will no longer be observed with the quarry operation being in the centre of the grassland, which is core foraging habitat for small mammals, birds, reptiles and millipede species (section 3.2.2 Faunal Assessment).	
10. Operational impacts 11 – 17 listed in Table 3 above remain the same for the alternative quarry layout.	See Table 3 above.	Impact significance and mitigation measures remain the same as the preferred layout alternative.	See Table 3 above.
11. Encroachment of alien vegetation into disturbed areas and surrounding grassland during operation of the quarry.	9 (med)	The entire site falls in delineated “secondary grassland” habitat, which appears to have been transformed both historically and more recently by cultivation, erosion, earth-moving, abandoned settlement or construction of infrastructure. <i>Aristida junciformis</i> is replaced in many parts by the weedy grasses <i>Digitaria eriantha</i> and more particularly <i>Sporobolus africanus</i> and <i>S. pyramidalis</i> . Many herbaceous ruderals are present, including alien herbs. There is therefore a high risk of alien vegetation to establish in the disturbed excavated area / along the access road. Similar to the preferred layout, an alien vegetation clearance programme needs to be put in place during operation.	5 (low)
12. Increase in traffic and visitation may increase the risk of collection and digging out of medicinally valuable plants (Vegetation Report, 2016).	5 (low)	Impact significance and mitigation measures remain the same as the preferred layout alternative.	1 (low)
13. Loss of vegetation within the Ngongoni ecosystem. There will be clearing of up to 4.99 hectares of indigenous vegetation as the mining area is expanded.	9 (med)	This impact cannot be avoided as the entire permitted mine area, although phased, will be cleared of vegetation. The Vegetation Assessment attached under Appendix C shows that the alternative quarry site falls within secondary and near-secondary grassland. No patches of alien vegetation were delineated by the vegetation specialist. There will therefore be 4.99 hectares of secondary grassland cleared during the operational phase of the quarry. The area appears to have been transformed historically and more recently by cultivation and erosion (section 5.1.4 of the Vegetation Assessment). There is the possibility that over time, there can be percolation back of species from adjacent areas of better grassland. The mitigation measures prescribed for the preferred layout alternative to ensure there is no further damage to the surrounding grassland apply. Similar to the preferred layout alternative, once mining is completed, the site will be rehabilitated	10 (med)

Nature and Consequences of impact	Significance rating of impacts ¹² :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		back to its former state and the vegetation type will be re-introduced.	
14. Loss of provincially protected a red listed plant species associated with the quarry (Vegetation Report, 2016).	11 (high)	Due to time constraints, the vegetation specialist did not map all Red Listed / Protected species in the alternative quarry site, however there is a high potential for some of these species identified in the preferred layout alternative to be found in this area as well. The significance and mitigation measures for impact 22 listed for the preferred layout alternative therefore remain the same.	9 (med)
15. The loss of land which has been identified in the Msunduzi EMF as having "high agricultural potential".	12 (high)	Impact significance and mitigation measures remain the same as the preferred layout alternative.	14 (high)
16. Impact on the long-term conservation plans for the greater Mpushini Protected Area.	11 (high)	As discussed in Table 3 above for the preferred layout alternative (impact 24), one of the long-term visions of the PMMBT is to form conservation corridors within the Mpushini Protected Area. Conservation corridors should preferably be associated with drainage lines and riparian areas, all of which are located on the northern half of the property. It is therefore preferable that the mining activities take place on the southern portion of the property to ensure that there is sufficient space for corridors and buffers to be established during the future development of the property. The location of the alternative quarry site, on the north-facing slope, has the potential to have a more significant impact on the long-term conservation plan for the Mpushini Protected Area.	11 (high)
17. Poor stormwater management during operation resulting in "dirty" water from within the quarry mixing with clean water outside of the quarry.	9 (med)	There are already existing erosion gullies forming in the northern boundary of the property (indicated with a yellow arrow in the figure above) and therefore stormwater will need to be carefully managed on site during the operation and rehabilitation of the mine. The alternative mine area is located on the north facing side of the hill and therefore drainage off the site will naturally flow in a northerly direction towards the tributary of Malkop Spruit, a concern raised by I & APs during the Scoping Phase of the EIA. Provision must be made to control stormwater runoff, especially down the slope of the mine face. Similar mitigation measures described in the Table 3 for the preferred layout alternative (impact 25) will be followed to ensure clean water running off surrounding slopes is kept separate from the "dirty" water running off the mine area. Slopes that fall towards the quarry workings will be identified and berms provided to deflect run off from entering	6 (med)

Nature and Consequences of impact	Significance rating of impacts ¹² :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		quarry operations, thereby reducing the risk of contamination. During a flood event, there is however a greater risk, compared to the preferred layout alternative, for “dirty” water to leave the confines of the quarry sump and enter the surrounding environment.	
18. Poor stormwater management during operation and after closure leading to erosion of the site and adjacent road.	9 (med)	Impact significance and mitigation measures remain the same as the preferred layout alternative.	5 (low)
19. Risk to water quality on nearby watercourses and wetlands.	10 (med)	As stated above, the alternative quarry site will be located on the northern sloping side of the hill with drainage flowing towards the Mpushini River. Drainage lines associated with the erosion gullies are located directly south of the alternative site with a NFEPA wetland delineated 270m north-west of the site (down slope from the mining operations). Although existing, the access road passes through the wetland area (see Figure 24 above). The increase in heavy vehicles utilising this road to access the quarry, would result in a higher risk of fuel/oil spills to accidentally enter the watercourse as well as sedimentation during rainfall events. The proximity of the watercourse increases the significance rating of this impact, compared to the preferred layout alternative. In terms of reducing the risk the impact, measures are similar to the preferred layout alternative (see Impact 27 in Table 3) with drainage from the quarry area and especially areas where blasting takes place will be directed into a sump where it can be tested and if necessary treated. This water will then be re used on site i.e. for dust suppression which means it will drain back into the sump. Only clean water will be used for dust suppression outside the mine area i.e. on the access roads. Sediment and potentially contaminated run off is not permitted to enter the natural watercourses to the south and south-west of the quarry site.	8 (med)
20. Impact on existing services i.e. power lines, water pipes, Transnet NMPP, etc.	9 (med)	A map showing the servitudes traversing the site is provided in Figure 4. The alternative quarry site falls closer to the Umgeni Water pipeline (226m) and NMPP pipeline (240m) compared to the preferred site alternative. The Blasting Impact Report is specific to the preferred quarry site and therefore the impact of the blasting on these services is unknown. A site specific Blasting Impact Report would therefore need to be carried out for this alternative site to determine the impact of the blasting on the services.	7 (med)

Nature and Consequences of impact	Significance rating of impacts ¹² :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
21. Pollution of groundwater from an increase in suspended solids and associated microbiological loading from surface water runoff which may result in localised recharge / runoff from the site (Geohydrological Assessment attached under Appendix C).	10 (med)	Although the potential sources of groundwater pollution are the same for the preferred and alternative layouts, the nearest borehole used as a domestic water supply, is 230m away from the alternate quarry site, compared to 580m from the preferred layout. The alternate site is also located in the same watershed as the borehole. Although mitigation measures listed in Table 3 for impact 29, would apply to both alternatives, a separate site specific Geohydrological Investigation would need to be undertaken to determine the risk and appropriate mitigation measures to reduce any potential groundwater contamination.	8 (med)
22. Operational impacts 30 and 31 listed in Table 3 above, remain the same for both layouts.	7 (med)	Impact significance and mitigation measures remain the same as the preferred layout alternative.	2 (low)

Section 8: Environmental Impact Statement as per Section 3 (l)

10.1 Summary of the Key Findings of the EIA as Per Section 3 (l) (i) – (iii) and 3 (n)

The key impacts associated with the Anniedale Quarry relate to those associated with the operation period itself. The key findings for the preferred Anniedale Quarry site, on the south facing slope of the property have been summarised below:

- General quarry operations

Noise generated during processing (screening, blasting and crushing) as well as heavy vehicles moving around site may become a nuisance to surrounding residents and businesses. It is unlikely that the light industrial and farming activities to the south and east of the proposed quarry site will be significantly affected by the noise. Some of the noise will be absorbed into the hillside however there are residential farms and houses to the north and west of the quarry site. All vehicles will be fitted with standard silencers and will be maintained regularly to prevent undue noise. The noise from machinery, trucks and loading of stone will occur during operating hours (18 hours a day Monday – Saturday). The impact of noise during operating hours was rated as medium, after mitigation.

Leaving the quarry un-rehabilitated after mining is complete, is not only a safety risk but will have an environmentally negative impact on the landscape (aesthetics, faunal movement, erosion, alien vegetation encroachment into grassland etc.). In terms of section 43 (1) of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) *“The holder of a mining permit, remains responsible for any environmental liability, pollution, ecological degradation, the pumping and treatment of extraneous water, compliance to the conditions of the environmental authorisation and the management and sustainable closure thereof, until the Minister has issued a closure certificate in terms of this Act to the holder or owner concerned.”* Procedures and requirements on mine closure will be stipulated in the environmental authorisation issued in terms of NEMA [s43 (8)]. The rehabilitation measures provided in section 3 of the EMPr are therefore to be adhered to once mining is complete. The EMPr also details the financial provisions for the rehabilitation of the site once mining is complete. The funds for the rehabilitation have to be deposited into DMR’s account before they will issue the Mining Permit, as a guarantee that rehabilitation will take place.

Farmers in the area have expressed concern with the location of the quarry being in close proximity to land used for either farming / agricultural purposes. Residents have chosen to live / retire in this area because of the low disturbance levels and diverse wildlife in the area. The preferred site alternative is located on the south facing slope away from residential households, a row of indigenous trees will be planted along the northern boundary of the site, which will assist in acting as a natural screen when mining commences near the crest of the hill. The impact can however only be partially mitigated and is therefore rated as medium after mitigation.

- Fauna

Although the quarry will directly impact 5 hectares of the 178 hectare property, there is the potential for critical IUCN and nationally threatened avifaunal and faunal species to be located within the quarry footprint. Since the grasslands are used as core foraging habitat for small mammals, birds, reptiles and millipede species (section 3.2.2 Faunal Assessment), initial disturbance (vehicles, excavations etc.) will result in species moving off the site. Photographs of the critical IUCN and national avifaunal and faunal species likely to be found on the property have been included in section 2.3 of the EMPr for reference purposes on site. The rest of the property is undeveloped and it is therefore likely that avifaunal species will continue to use the remainder of the site for foraging. After mitigation, the impact was rated as “medium” by the fauna specialist (section 4.1 of the Ecological and Fauna Assessment).

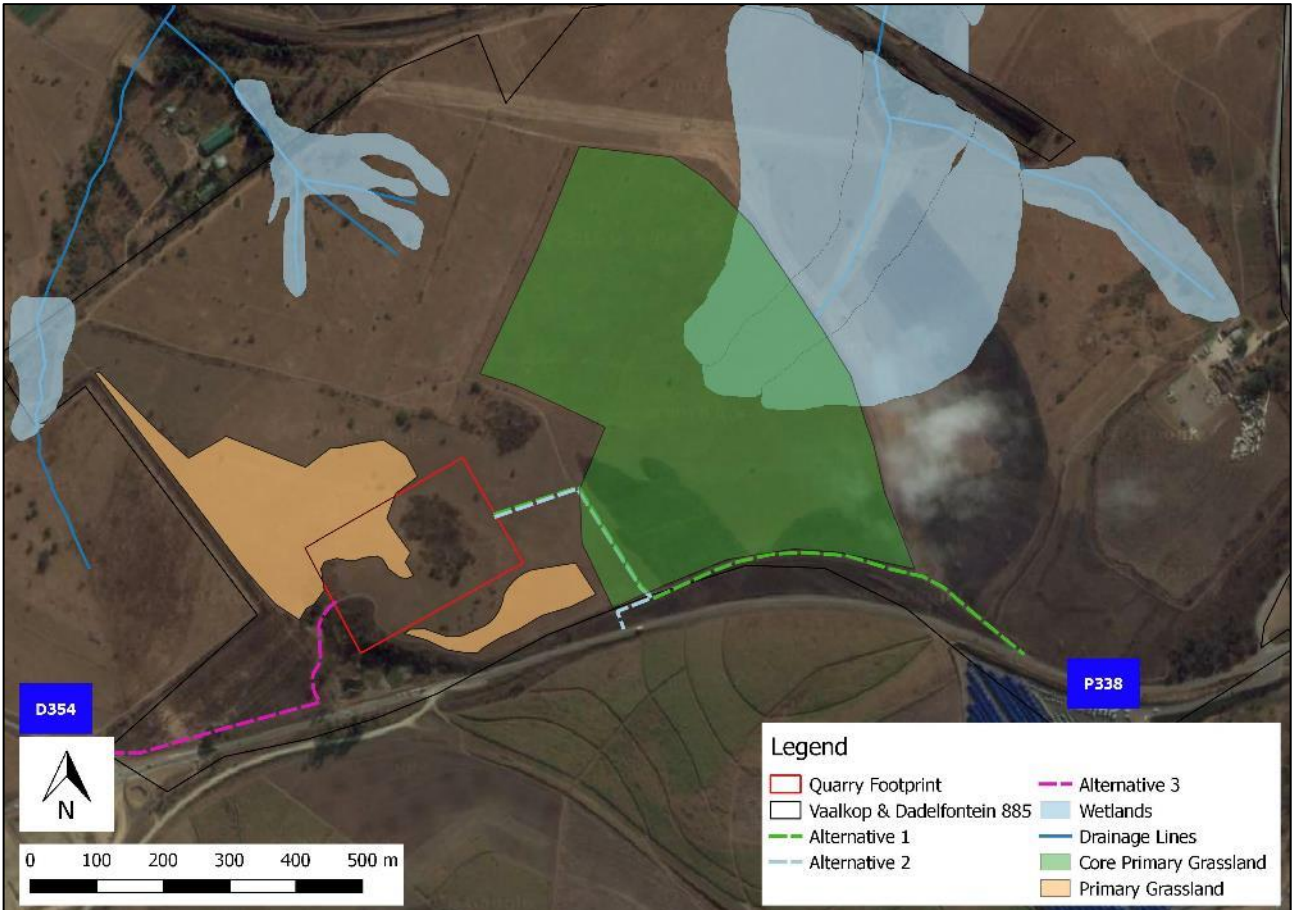
- Flora

All grassland on the property appears to have suffered some disturbance, but most has not been transformed by cultivation or other severe impacts, nor does it appear to have been much grazed (section 5.1 of the Vegetation Report). Although located outside the core primary grassland area, Access Options 1 and 2 (preferred) are located within a corner of the grassland. The access roads are existing however there is to be no further encroachment into the core grassland area. Section 2.8 of the EMPr provides mitigation measures which are to be adhered to during operation.

Cumulatively, there will be a loss of 0.9 hectares of primary grassland (high priority) and 2.67 hectares of primary transitional grassland (medium priority). Measures are provided to reduce the extent of the vegetation clearing however this impact cannot be avoided. The significance of the impact after mitigation therefore remains medium. The alien vegetation in the quarry area will be cleared, which is a positive impact.

The property is currently zoned for agricultural use with the Msunduzi Municipality identifying the property as having a “high agricultural potential”. Since the vegetation will be permanently cleared from the 5 hectare area, the loss of potentially high agricultural land was rated as “high”. 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. The outcome of the application is pending however 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”. Although there will be 5 hectares of potentially viable agricultural land lost, the entire property is 178 hectares, which remains undeveloped. The loss of 5 hectares of land with high agricultural potential is therefore not regarded as a fatal flaw.

Figure 20: Map showing the preferred Anniedale Quarry site including the environmentally sensitive areas (core primary grassland shaded in green, water resources shaded in blue; source: QGIS).



10.2 Deviations from the Approved Plan of Study in the Scoping Report as Per Section 3 (u)

Table 3 below provides the Plan of Study that was included in the Scoping Report. Deviations from the Plan of Study are shown in red. The table shows the Mining Permit application process for the remainder of the EIA according to legislated timelines provided in the Environmental Impact Assessment Regulations, 2014 published on the 04th December 2014 in Government Gazette No. 38282 Notice No. R.982.

Table 5: Plan of Study for the EIA process for the Anniedale Quarry

Date	Description
17 th March 2016	DMR Acceptance of Mining Application received
01 st April 2016	Release of Draft Scoping Report to I & APs for comment
09 th May 2016	End 30 day comment period
09 th May 2016	Submission of Final Scoping Report to DMR. Final Scoping Report included comments received from I & APs during the Scoping Phase.
22 nd June 2016	Deadline for DMR to accept or reject Scoping Report (within 43 days of receipt of Scoping Report).
05 th July 2016	DMR acceptance of Final Scoping Report.
11 th October 2016	EIR to be released for I & AP comment. EIR to include all specialist studies listed above and updated impacts table.
10 th November 2016	End 30 day comment period.
12 th December 2016	Latest date for submission of the Final EIR to DMR (within 156 days of acceptance of Final Scoping Report). In accordance with Regulation 23(1) (b), EnviroPro notified DMR on the 08 th September 2016 that the Final EIR will be submitted within 156 days of the Final Scoping Report acceptance, and not 106 days, as stated in the Scoping Report.
25 th April 2017	Deadline for DMR to accept or reject EIR (within 107 days of receipt of the EIR). Legislated exclusion period 15 th December – 05 th January 2017.

10.3 Proposed Impact Management Objectives and Outcomes for Inclusion in the EMPr and Conditions of Authorisation as per Section 3 (m) and (o)

The following objectives and outcomes must be considered for this project:

- Objectives:
 - For there to be no lasting negative impacts on the environment post-mining operations.
 - For the quarry to take into account the long-term vision for the property as well as its location within the Mpushini Protected Area.
 - To practice responsible operation, 'best practice principles' with regards to housekeeping on site during operation (outlined within the EMPr) and enforcing the polluter pays principle. The applicant / contractor must be responsible for their actions on site during operation of the site.
 - The holder of the Mining Permit is to rehabilitate the quarry effectively to ensure that there is no long-term scar left on the hillslope.
- Outcomes:
 - To promote sustainable development. Create infrastructure and an environment that is healthy and sustainable for future generations to come.

Section 9: Financial Provisions as per Section 3 (t)

The provisions have been calculated using the “*Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations*”¹³. The EMPr attached under Appendix E of the EIR provides details on the financial provisions for the rehabilitation, closure and ongoing post-decommissioning management of negative environmental impacts.

9.1 Financial Provisions

Financial provisions are required to determine the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from the mining operations throughout the lifespan of the quarry and latent or residual environmental impacts that may become known in the future. The applicant is to make financial provisions to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of the quarry (Regulation 4 of the *Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations*). Rehabilitation and remediation measures identified during the EIA process, including specialist recommendations, has been included in the section 3 of the EMPr attached under Appendix E of the EIR.

As per the Financial Provision Regulations referenced above, three plans have been included in the EMPr: an Annual Rehabilitation Plan, a Final Rehabilitation, Decommissioning & Mine Closure Plan and an Environmental Risk Assessment Report. The costs for the rehabilitation is included in the relevant sections of the EMPr. It is to be noted that the adequacy of the financial provision must be reviewed and assessed annually by an independent auditor and submitted to the Minister. Any shortfall must be remediated but increasing the financial provisions within 90 days of the submission of the auditor’s report¹⁴.

The cost for the first annual rehabilitation and remediation activities amounts to R44 620 with the financial provisions for Final Rehabilitation, Decommissioning and Closure of the quarry amounting to R229 450. Due to the nature of the stone quarry, there is unlikely to be any latent or residual impacts requiring remediation in the future. For specific rehabilitation and remediation measures including a breakdown of the cost calculations, please refer to section 3 of the EMPr.

¹³ The Regulations were 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.

¹⁴ This is regulated under Regulation 11 (4) of the Financial Provision Regulations referenced in the note above.

Section 10: Conclusion

10.1 Conclusion

Tillite Tech (Pty) Ltd have applied for a Mining Permit in terms of section 27 of the MPRDA for the Anniedale Quarry. The Final Scoping Report was accepted by DMR on the 05th July 2016. The EIR follows this acceptance and includes specialist input (section 3 of the EIR) to suitably assess the proposed activity according to the principles set out in section 2 of NEMA.

No fatal flaws have been identified during the EIA process for the preferred site of the proposed Anniedale Quarry on Portion 405 of Vaalkop and Dadelfontein 885 (as shown in Figure 25 above). During operation, the holder of the Mining Permit is to put in place the various mitigation measures outlined in the EMPr to minimise the impacts identified in section 7 of the EIR. Mitigation measures include the conservation of adjacent primary and primary core grassland, the use of existing tracks to gain direct access onto the P338 (i.e. avoid traversing grassland across other portions of the property) and the identification of important fauna species which are to be relocated outside of the proposed quarry area. The proximity of the P338 means that the use of access option 2 allows for the reduction in grassland habitat fragmentation across the property.

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 (Msunduzi SDF). The tillite that will be mined at the Anniedale Quarry will supply the construction industry contributing to municipal and provincial growth.

It is the opinion of the EAP that the Mining Permit for the Anniedale Quarry be granted, provided that the requirements of the EMPr, attached under Appendix E, are adhered to during the operation and rehabilitation of the quarry. A Water Use Authorisation is also required from DWS prior to any activity commencing at the Anniedale Quarry. Future development of the remainder of the property is to take into consideration the long-term vision of creating conservation corridors and links in the Mpushini Protected Area. Further engagement between the applicant and the PMMBT will therefore be required at a later stage once a clearer vision for the remainder of the property has been formulated.

Appendix A: EAP Declaration and Curriculum Vitae

Appendix B: Public Participation

- Registered Interested & Affected Parties
- Comments & Responses
- Meetings
- Adverts
- Proof of Notification

Appendix C: Specialists

#	Title of Report	Author / s
1	Blast Impact Report	Tillite Tech (Pty) LTd
2	Mining Works Programme	Tillite Tech (Pty) LTd
3	Traffic Impact Statement	Arup
4	Geological Review of Anniedale Farm Quarry, Umlaas Road	Drennan Maud (Pty) Ltd
5	Cultural Heritage Impact Assessment of the Proposed Anniedale Quarry Site adjacent to the R603, Camperdown.	Active Heritage cc
6	Report on Vegetation on a Property at Umlaas Road	David Styles
7	Ecological Assessment Fauna Assessment	Enviro Insight
8	Baseline Aquatic Assessment for the Proposed Anniedale Development Project	The Biodiversity Company
9	Wetland Assessment Report for the Anniedale Development Project	The Biodiversity Company
10	Geohydrological Desktop Assessment for the Proposed Anniedale Quarry Site, KZN	Terratest
11	Drainage Analysis	Tillite Tech (Pty) Ltd

Appendix D: Impacts Scoring Matrix

Appendix E: Environmental Management Programme