January 2017

DRAFT ENVIRONMENTAL IMPACT REPORT
Carisbrooke Quarry on Portion 3 of Lot 9 Incalu 5000
uBuhlebezwe Local Municipality
Matzogystix (Pty) Ltd
KZN 30/5/1/1/2/10463MP

Prepared by

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This report was prepared by EnviroPro Environmental Consulting in terms of Appendix 1 to GNR 982

2 (1) (a) details of (i) the EAP who prepared the report; and (ii) the expertise of the EAP. Please see Appendix A for EAP Declaration and full Curriculum Vitae;

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Tertiary Education:	BSc (Hons)	Zoology
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Work Experience:	2001 – 2002	MSc formed part of EIA for National Ports Authority
	2003 – 2010	Senior Manager for KSEMS cc.
	2010 – Present	Managing Member of EnviroPro Environmental Consulting

Iain Jourdan Bsc (Hons)

Tertiary Education:	BSc (Hons)	Geographical Science
Work Experience:	2006 – 2007	Environmental Manager service for Inhlanhla Civils (Pty) Ltd
	2007 – 2010	Senior Manager for KSEMS cc
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Stephanie Williams Bsc (Hons) MPhil

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Work Experience:	2012	Environmental Control Officer for EIMS on the Transnet NMPP
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Executive Summary

Matzogystix (Pty) Ltd have applied for a Mining Permit to mine stone from a community owned property within the uBuhlebezwe Municipality, Harry Gwala 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, originally considered, on another section 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. An Environmental Impact Assessment is therefore underway 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 Carisbrooke 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. This is an ongoing impact which is to be continuously managed by the resident mine operator.
- **Impacts associated with blasting (flyrock, noise, dust, visual):** It is unlikely that the timber plantations to the north and south as well as the Inyezi Community on the opposite side of the hill will be significantly affected by the noise and dust due to the distance and topography. Residents at the Carisbrooke Farm (780m away) have raised concerns about the noise and dust. A dust sampling site will be set up at the south-west corner of the property to monitor dust outfall near the Carisbrooke Farm. Trees and the topography assist in some way to reduce this impact however it cannot be fully mitigated. A Blast Plan has been attached in Appendix C. The applicant is aware of the existing nearby services (R56, railway line and powerline) and will be required to contact the authorities (Eskom, DoT & Transnet) prior to any blasting taking place.
- **Increase in heavy truck traffic in the area:** The nature of the activity will result in a localised increase in haulage truck traffic. Having direct access onto the R56, prevents trucks from travelling on any additional private / residential roads.
- **Loss of Blue Swallow breeding site and foraging habitat:** During the site inspection, carried out by the avifaunal specialists during peak breeding season, no Blue Swallows were observed nesting or foraging on or near the Carisbrooke hill, where the quarry is located. Rehabilitation measures include the re-digging of existing old Aardvark holes has been included in the Final Rehabilitation and Closure Plan, so that the potential for the Blue Swallows to use the hill in the future, once mining operations have ceased, is not lost.
- **Loss of vegetation within the Midlands Mistbelt Grassland ecosystem:** This impact cannot be avoided as the entire permitted mine area will ultimately be cleared of vegetation (4.99 hectares). Provincially protected species will need to be relocated to another portion of the property by a suitably qualified botanist prior to mining operations commencing.
- **Impact on the intangible heritage value of Ndlovini Hill:** The rocky outcrops associated with the eastern side of the hill have been identified as an “Area of the Gods”, 230m from the quarry. This was after the heritage specialist consulted a local school principal of the Hindu faith. On consultation with the local Inyezi Community, no concerns were raised about the cultural / living heritage value of the hill since the rock outcrops are located on the other side of the hill. The EAP is in the process of obtaining further confirmation regarding the intangible heritage value associated with the hill.
- **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. The wetland specialist rated potential impacts on the water resources as “negligible to minor”.

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 Environmental Impact Assessment (EIA) process however the holder of the Mining Permit is to adhere to a number of mitigation measures outlined in the EMPr to minimise the impacts identified in section 7 of the EIR. In order to ensure effective functioning of the EMPr, the EAP recommends monthly auditing by an independent ECO for the first year of operation and quarterly audits thereafter.

Contents

Appendices

Section 1: Scope of Work and Location of Activity

1.1 Project Title

Carisbrooke Quarry located within the uBuhlebezwe Local Municipality.

1.2 Aim of the Environmental Impact Report

As per Appendix 3 of the Environmental Impact Assessment Regulations[1], 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) as well as 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 DMR[2]. 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	Matzogystix (Pty) Ltd / Tristan Mackenzie
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Fax no.	086 549 6900
E-mail address	tristmac@futurenet.co.za / tristmac1@icloud.com
Postal address	PO Box 317, Highflats, 3306

ITEM	CONSULTANT CONTACT DETAILS
Name	EnviroPro Stephanie Denison / Josette Oberholzer
Tel no	031 765 2942
Fax no:	086 549 0342

[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.

Cellular no	083 929 4662
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)

Matzogystix (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 dolerite on a community owned portion of land in Ward 2 of the uBuhlebezwe Local Municipality, Harry Gwala District. The Inyezi Communal Property Association own Portion 3 of Lot 9 Incalu 5000, where the mining will take place (proof of landowner is provided in Appendix D). The applicant is currently discussing the conditions of a lease agreement with the community regarding the surface rights to access the property / quarry area. It is anticipated that the lease agreement will be ready for inclusion in the Final EIR for submission to DMR. Interactions with the community to date, seem to indicate support for the mining proposal.

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 214.66 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 screening plant and crusher in demarcated areas. A weigh bridge will also be established near the entrance to the quarry. Chemical toilets will initially be used but it is anticipated that a septic tank will be installed as a more practical long-term solution. The authorised mining footprint will be demarcated on the ground to ensure the permitted mine area (as per Figure 1) is not exceeded during operations.

Access

Access to the quarry will be through the use of an existing dirt road, which runs through the adjacent farm (Remainder Portion of Woodburn Valley No. 15322) onto the R56. The road is shown in white in Figure 2. Access to the mine area will be restricted and controlled during operation. Representatives of the landowners, the Bo Woodburn Family Trust, objected to the Mining Permit during the Scoping Phase of the EIA. A meeting between the applicant, community and adjacent landowner was held on the 27th July 2016 to discuss the access. A consent letter was signed by Peter Woodburn during the meeting however after the meeting Mr Woodburn stated that he is one of several shareholders and that he could not authorise access without consent from all shareholders of the Trust and the signed letter is therefore not valid. He has since indicated a willingness to have a legal document drawn up for the applicant to sign to ensure that both parties are protected. It is EnviroPro's understanding that this process is underway and will be resolved prior to access being used through the adjacent property.

The existing access is the preferred access alternative as there are no other existing roads or tracks leading up the side of the hill to the mine area. The gradient is gentler on the southern portion of the hill, where the access is. The construction of an additional road to the quarry would create more disturbance to the hillside and the engineering feasibility is unknown, due to the steep topography. Access through the neighbouring farm is therefore considered the only feasible alternative.

Operation

The applicant will commence with clearing and grubbing the site, on approval of this application. A Mine Works Programme, describing the mining methodology, has been prepared and is attached under Appendix C of the EIR. 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).

As per the Mine Works Programme, bulldozers will clear and grub the portion of the site to be mined. Excavators will be used to create the topsoil stockpiles and remove overburden, which will be used to create berms around the mining area. This will divert clean water from the surrounding environment around the mining area during a rainfall event. Controlled blasting will be carried out to loosen material and create benches (Blast Report attached under Appendix C). Excavators will shape the benches to the desired angle. Material will be loaded onto trucks and transported to the two crushing plants and screening plant. Once crushed into the desired size, the aggregate will be stockpiled in the designated stockpile area and removed offsite once sold. For more details on the mining methods, please refer to the Mine Works Programme in Appendix C.

The mining operation can be summarised as follows:

- A suitably qualified botanist is to identify and remove the provincially protected species prior to any section of the permitted mine area being cleared (see section 3.4 for more details).
- Only portions of the 4.99 hectare mine area will be cleared and excavated over time to prevent unnecessary disturbance to the slope.
- Bulldozers will be brought to site to do the initial clearing and grubbing. The average depth of the topsoil to be removed will be confirmed (approximately 200-300mm) as well as the area which will be cleared (i.e. phased clearing as the mine operation expands).
- Topsoil will be cleared from north to south. Vegetation will be removed and retained in the topsoil stockpiles. Topsoil stockpiles to be located in a corner of the mine area and used for rehabilitation purposes.
- The remaining overburden will be cleared and used to create a berm around the area which will be mined.
- Dump trucks and excavators may be required to assist in the clearance of the remainder of site.
- Controlled blasting will cut benches into the mine area (ongoing).
- Excavators will be used to shape the benches to the required angle.
- There will be three 30 ton excavators used on site.
- Once blasted material, one excavator will be used to load material onto a dump truck, which will transport material to one of two crushing plants.
- There will be one excavator associated with each of the crushing plants to load material from the dump trucks into the crushing plants.
- The crushing plant for aggregate will have a primary jaw crusher and a secondary cone crusher with a screen. This will produce 6.7mm dust, 9.5mm stone, 13.2mm stone and 19mm stone.
- The excavator will be used to create the different stockpiles after the material has been crushed and screened. There will be one stockpile per product (i.e. 4 stockpiles).
- It is anticipated that 1500 tonnes / day of the various aggregate sizes will be produced.
- As the material is sold, it will be loaded from the stockpiles into the trucks and removed offsite.
- A second crushing plant will be for manufacturing sub-base for roads. It will have a primary jaw crusher, secondary jaw crusher and a Vertical Stationary Impactor (VSI). This will produce G1, G2, G5, G6 & G7. Only one of these products will be produced at any one time, depending on demand.
- There will be one stockpile per product (i.e. 5 stockpiles).
- There will also be an additional stockpile for river sand (brought in from offsite). There will therefore be a total of 10 stockpiles at the site.
- Infrastructure for the mining operations will include a weigh bridge, offices and ablution facilities. Chemical toilets will be used at the beginning of the operation however it is likely that septic tanks will be installed in the long-term.

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 3.0 of the EMPr attached under Appendix E.

On decommissioning, the processing equipment and offices will need to be removed, the access road on the property 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.
- The avifaunal specialist stated that the hill does show good potential for Blue Swallows to breed on the site in the future, particularly with some minor human intervention to maintain and re-dig Aardvark holes. Rehabilitation of the site therefore must include the re-digging of Aardvark holes across the site to increasing the nesting potential of the site after the quarry is closed.

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

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

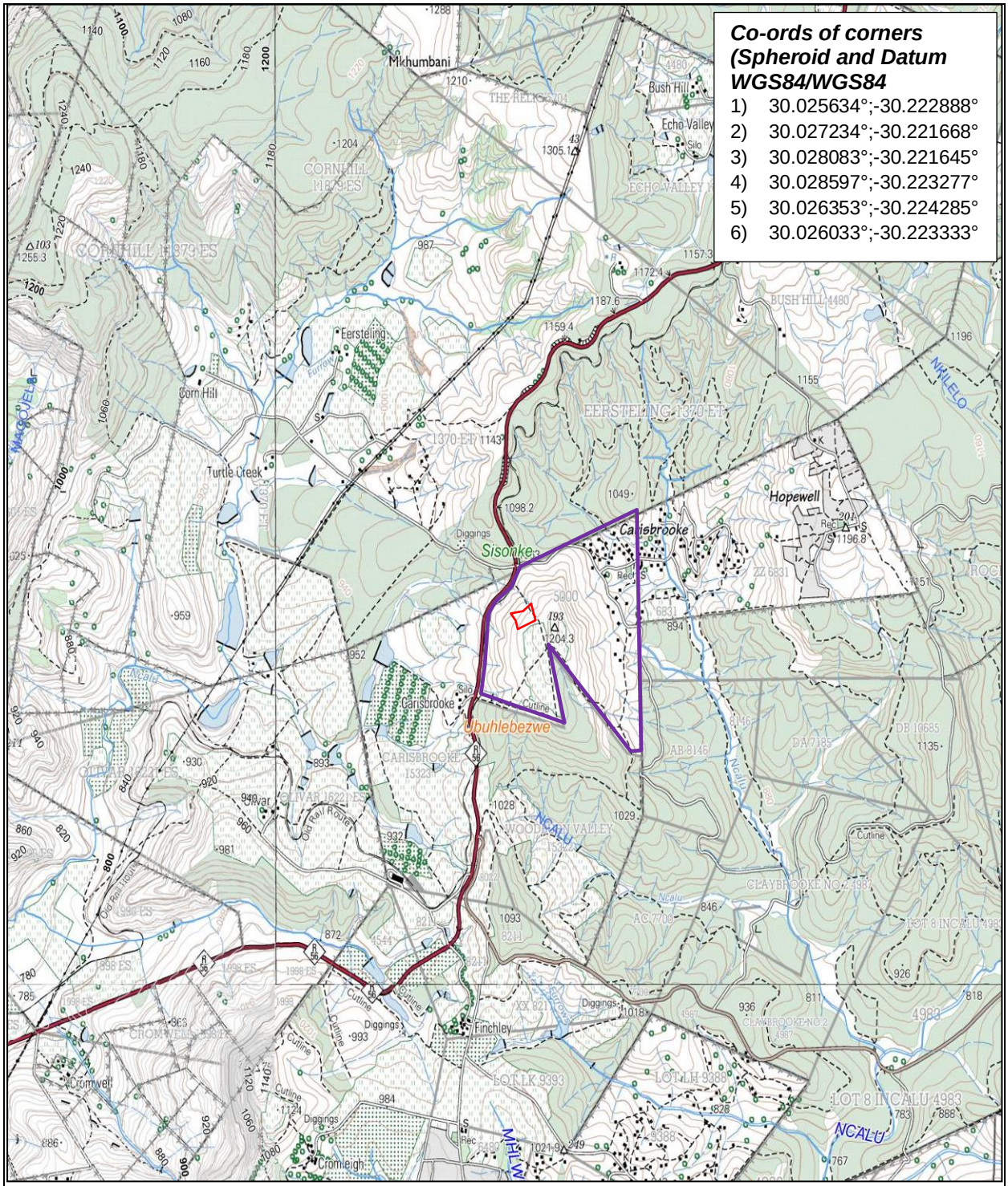
GNR	Activity Number	Activity as per the legislation	Activity as it applies to the proposal
GNR 983 Listing Notice 1; 04th December 2014	21	*Any activity including the operation of that activity which requires a mining permit in terms of s27 of the Mineral and Petroleum Resources Development Act, 2002 (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).*	A Mining Permit application was submitted to the Department of Mineral Resources and acceptance was received on the 17th March 2016.

GNR 983 Listing Notice 1; 04th December 2014	27	T*he 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.*	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; 04th December 2014	21	*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.*	Blasting, crushing and screening of rock material will take place on site. These activities are considered "primary processing of the raw material".

1.6 Location Of Activity As Per Section 3 (b)(i)-(iii)

District Municipality	Harry Gwala District Municipality.	
Local Municipality	uBuhlebezwe Local Municipality.	
Ward	2	
Area / Town / Village	Ixopo	
Co-ordinates:	**Latitude**	**Longitude**
Quarry Edge 1	30°13' 22.38"S	30° 01' 32.24"E
Quarry Edge 2	30°13' 17.96"S	30° 01' 38.03"E
Quarry Edge 3	30°13' 17.90"S	30° 01' 41.10"E
Quarry Edge 4	30°13' 23.80"S	30° 01' 42.96"E
Quarry Edge 5	30°13' 27.43"S	30° 01' 34.87"E
Quarry Edge 6	30°13' 24.02"S	30° 01' 33.73"E
Property Description:	**Parent Farm:**	**Farm Portion:**
	Lot 9 Incalu 5000	Portion 3
21 Digit Surveyor General's numbers:	N0ET00000000500000003	

Figure 1: 1 in 50 000 Locality Map Showing Proposed Quarry on Portion 3 of Lot 9 Incalu 5000 In The Ubuhlebezwe Local Municipality; Harry Gwala District Municipality; KwaZulu Natal. Applicant: Matzogystix (Pty) Ltd. Property boundary in purple; Proposed Mining Area Shown in Red Measuring 4.99ha.



Title	Carisbrooke Quarry	**Legend**	
Co-ordinates	30°13'22.81"S; 30° 1'37.83"E		Watercourses
Scale	1:50 000		Property
Topographical Sheet No.	3030AA		Quarry site
Drawing No.	Carisbrooke Quarry #01		20m Contour
Date Prepared	29th March 2016		Forest Plantations
Prepared By	Stephanie Williams		Urban Areas

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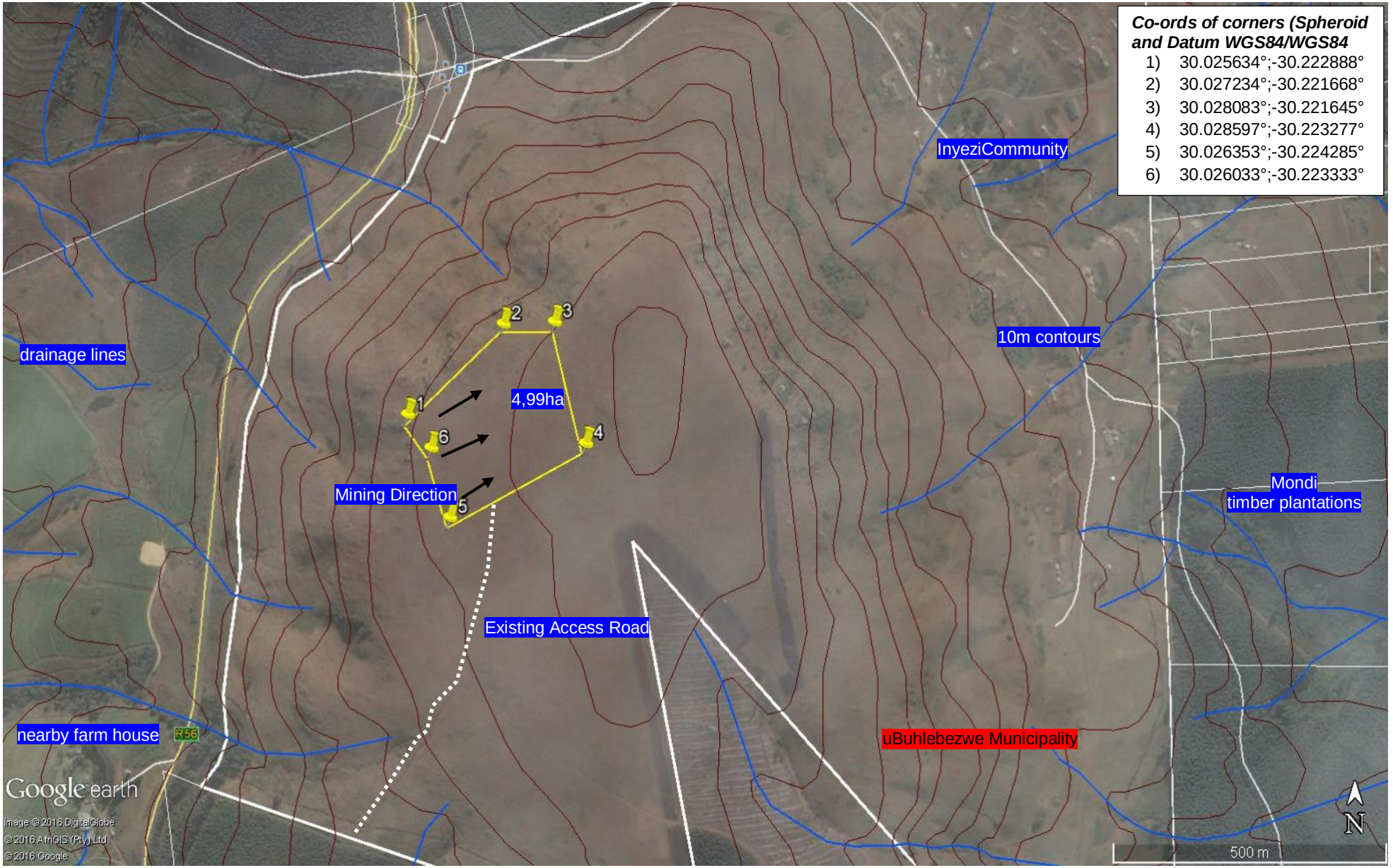
Figure 2: Aerial Photograph Showing Proposed Quarry on Portion 3 of Lot 9 Incalu 5000 in the Ubuhlebezwe Local Municipality; Harry Gwala District Municipality; KwaZulu Natal. Applicant: Matzogystix (Pty) Ltd. Property boundary in white; Proposed Mining Area Shown in Yellow Measuring 4.99ha. The 10m contour lines are shown in brown (source: Google Earth Pro, 2016).



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

Matzogystix (Pty) Ltd will be entering into a Lease Agreement with the Inyezi Communal Property Association, who own the property. The proposal is ultimately to mine a portion of land not exceeding 5 hectares. 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). There are therefore no feasible site alternatives.

It is to be noted that, although alternative layouts were considered at the beginning of the EIA process (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.

Various layout alternatives were considered across the property with the preferred quarry site being restricted by surrounding infrastructure and other sensitive environmental features across the property (discussed further in section 3.0 of the EIR). The layout alternatives considered and discussed in the Scoping Report are summarised below.

Layout Alternatives

The proposed mining area was discussed between the EAP and the applicant prior to the submission of the proposed quarry site to DMR and the commencement of the EIA process. The proposed quarry site needed to be near the crest of the hill to reduce the amount of overburden requiring clearing during operation. The alternative mine sites were therefore shifted around the current layout. The location of the preferred quarry site takes into account the following:

- Regulations listed under Government Notice 704, which states that no mining activities / infrastructure is to be placed within a horizontal distance of 100m from a watercourse[3]. The nearest drainage line is therefore located 100m to the north of the proposed quarry.
- The steep gradient associated with the eastern side of the property (see close contours in Figure above);
- Existing access to the south of the property; and
- Restrictions associated with the various serves and servitudes running along the north and western boundaries of the property. The location of the quarry therefore needed to take into account infrastructure within 500m of the site to comply with the relevant health and safety restrictions when blasting in close proximity to this infrastructure.

The different variations to the quarry site that were considered are shown in black in Figure 3 below. The vegetation does not differ greatly between the alternatives as all alternatives fall within the Midlands Mistbelt Grassland ecosystem. The property is currently used for grazing by the surrounding community. Vegetation is discussed further in section 3.0 of the EIR. Similar to the vegetation, potential fauna species associated with the mine area is unlikely to differ significantly between the layout alternatives due to their close proximity. Since the layout variations do not significantly differ from the proposed preferred layout (red in Figure 3), apart from the distance to the drainage lines, no feasible alternative layout have been discussed. Photographs of the preferred Carisbrooke Quarry site are provided in Figure 4.

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 214.66 hectare property. The specialists also concentrated on assessing the preferred quarry site in the context of the entire property.

[3] Regulation 4(a) of Government Notice 704 published in government Gazette No. 20119 on the 04th June 1999.

Figure 3: Proposed Layout Alternatives for the Carisbrooke Quarry on Portion 3 of Lot 9 Incalu 5000. Layout Alternatives considered are outlined in black with the preferred Layout Alternative outlined in red. Drainage lines are drawn in blue (source: Google Earth Pro with DWS GIS overlay).

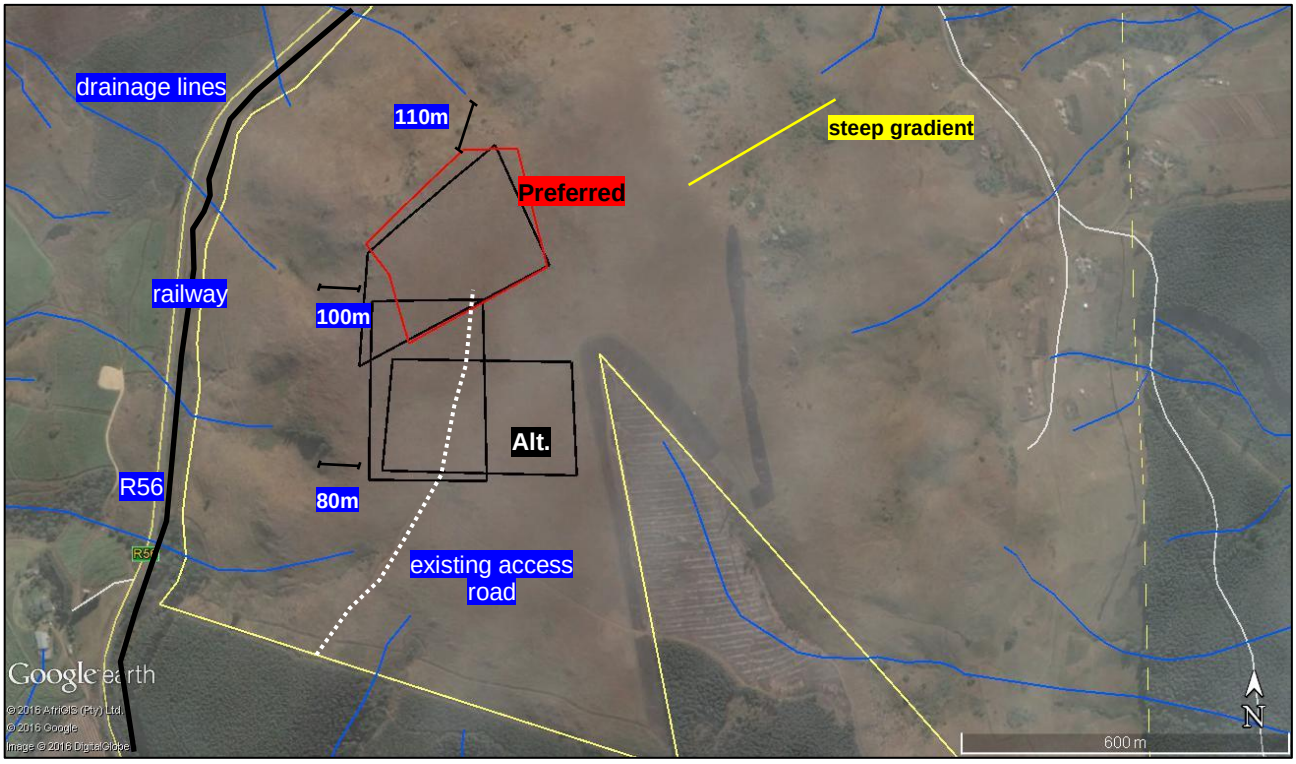


Figure 4: Photographs of the proposed Carisbrooke Quarry area, outlined in black (a) Photograph taken in a southerly direction towards the mine area; (b) Photograph showing crest of hill and steep gradient associated with the northern portion of the property looking down towards the R56; (c) View from the Inyezi Community looking up the steep easterly bank; and (d) Photograph showing the general condition of the grassland associated with the proposed quarry area.

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 will be blasted and cut into the hillside (see Mine Works Plan in Appendix C). The loosened material will be removed using excavators and transported to the crushing and screening plant area. Processed aggregate will be stored in various stockpiles until collected by truck and used offsite. 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 Carisbrooke 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 near the entrance to the quarry. There is therefore an opportunity to ensure that best practice measures are carried out during the processing.

The No Go Alternative
No mine will be established on the property and the land will remain as it. No impacts associated with mining will occur and the landowners will continue to use the hill for grazing cattle. The mining operations have the potential to positively benefit the Inyezi community in terms of economic benefits associated with employment and monetary contributions. The quarry also has the potential to legally supply good quality material to the local and provincial market.

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 Regulations[4]. 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 situated at an elevation of 1140 – 1190m above mean sea level (Geohydrological Investigation, Appendix C). The proposed quarry site is on moderately to steeply sloping land whilst the surrounding area could be described as moderately to steeply undulating. The gradient drops off steeply to the north, east and west of the property. The most logical access point to the quarry is therefore from the south, where the gradient is gentler. An elevation profile of the hill, which is to be mined, is provided in Figure 5. The west facing side of the hill will be mined.

Section 5 of the Geohydrological Investigation describes the regional geology, which is comprised of Jurassic age dolerite whilst its surrounds are underlain by Pietermaritzburg Formation shales of the Ecca Group of the Karoo Supergroup. The Pietermaritzburg Formation comprises dark silty mudrock, which coarsens upwards, with deformed sandy and silty beds appearing near the top of this unit. These units have been subjected to faulting and fracturing associated with the breakup of the ancient Gondwana super-continent and, as a result of this tectonic activity, these older sedimentary formations have been intruded by the much younger Jurassic-age, sub-horizontal dolerite sills and sub-vertical dolerite dykes, as seen underlying the proposed Carisbrooke Quarry site. The regional geology and mapped geological structures are presented in Figure 6.

Photographs taken of the proposed Carisbrooke Quarry showing the surrounding topography and dolerite outcroppings are included in Figure 7. The R56 is located to the west of the property with timber farming being a typical land use surrounding the site. The Inyezi Community is located to the north-east. Surrounding land uses are illustrated in Figure 8 below.

[4] 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.

Figure 5: Elevation profile of the hill where the proposed Carisbrooke Quarry is to be located. Mining direction is shown by black arrows (source: Google Earth Pro, 2017).

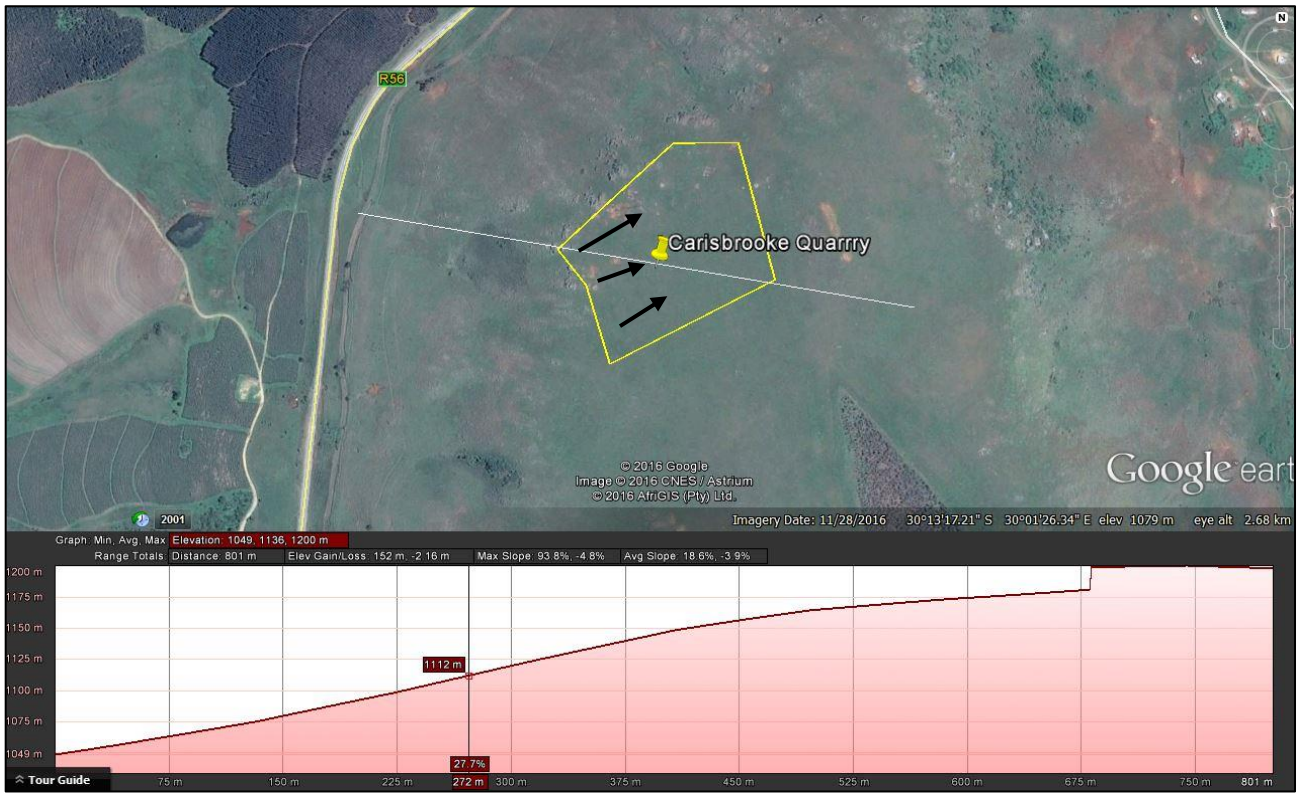


Figure 6: Regional geology and structures associated with the Carisbrooke Quarry site (source: Geohydrological Investigation, 2015).

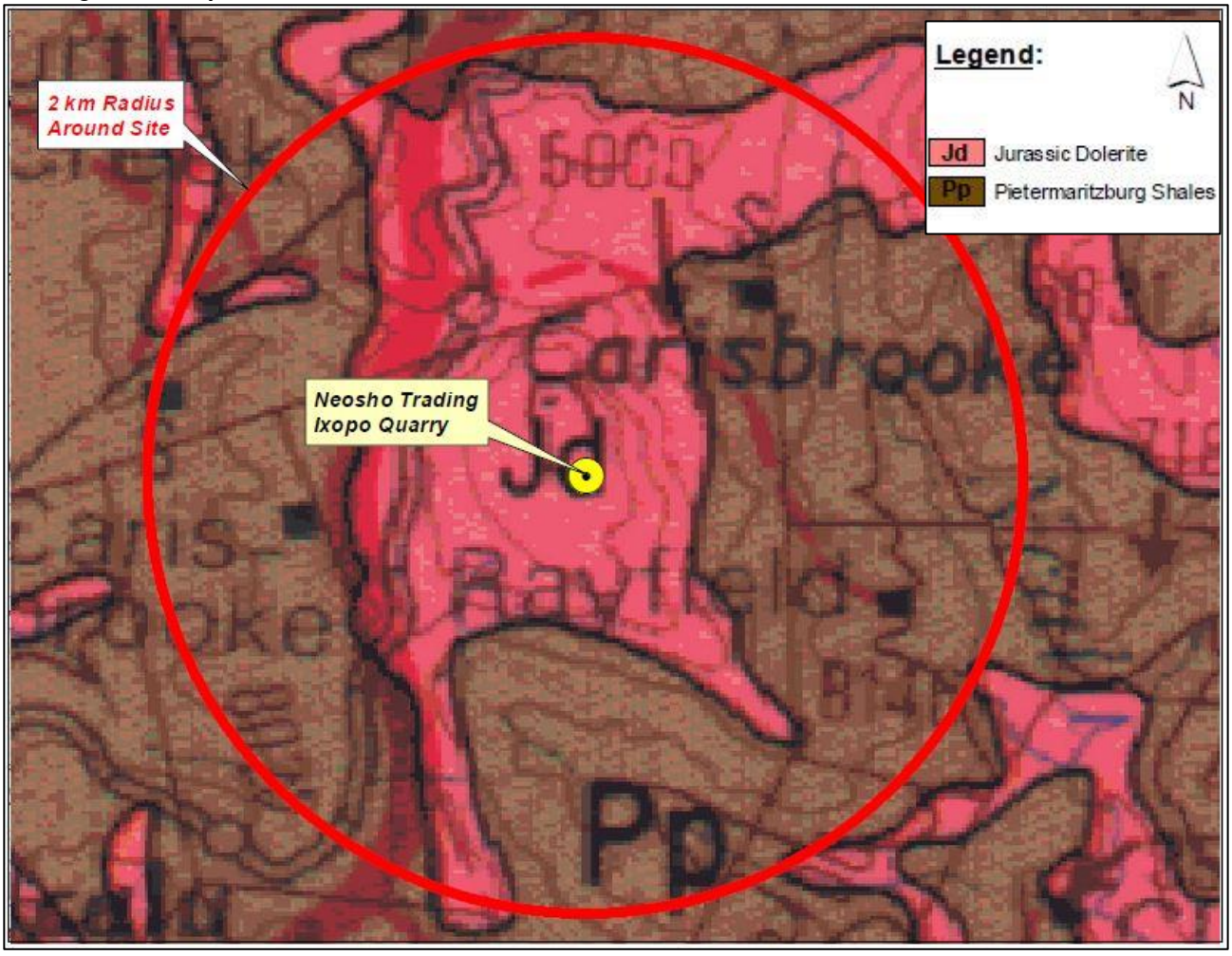


Figure 7: Photographs showing the topography and characteristics of the Carisbrooke Quarry site (a) Photograph taken facing south showing the existing dirt access road onto the property, (b) Photograph taken facing north over the proposed mining area, indicated in red; and (c) Exposed dolerite outcroppings in the northern section of the property.

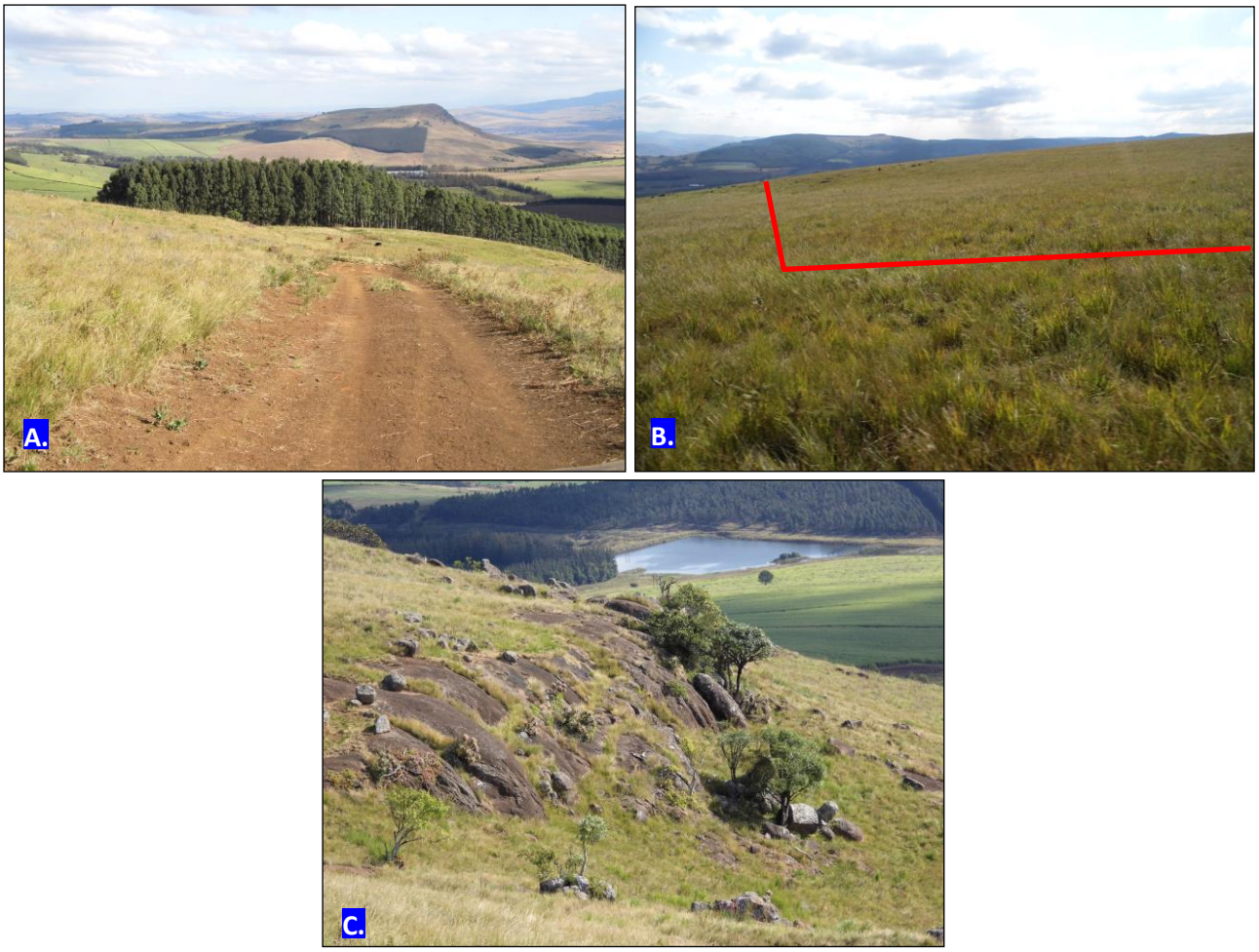
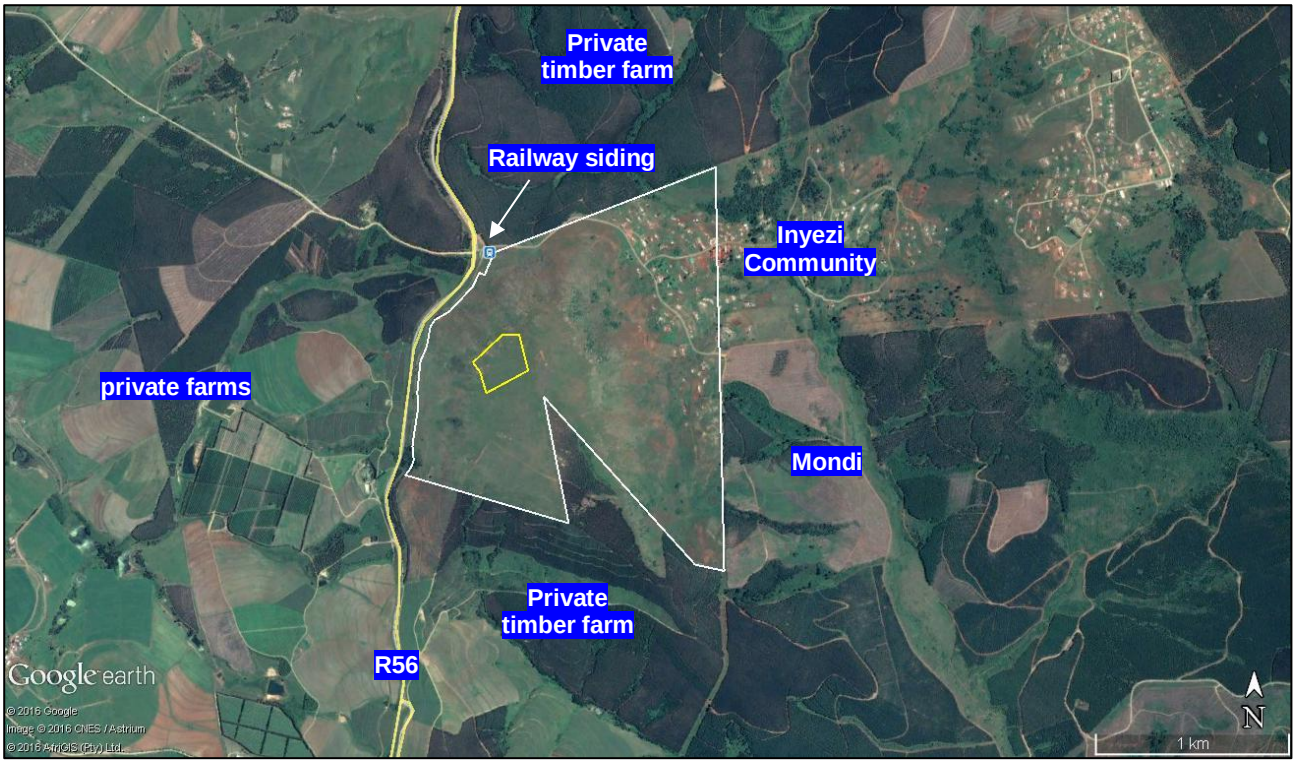


Figure 8: Aerial photograph showing the location of the Carisbrooke Quarry in the surrounding landscape (source: Google Earth Pro, 2017).



3.2 Surface Water

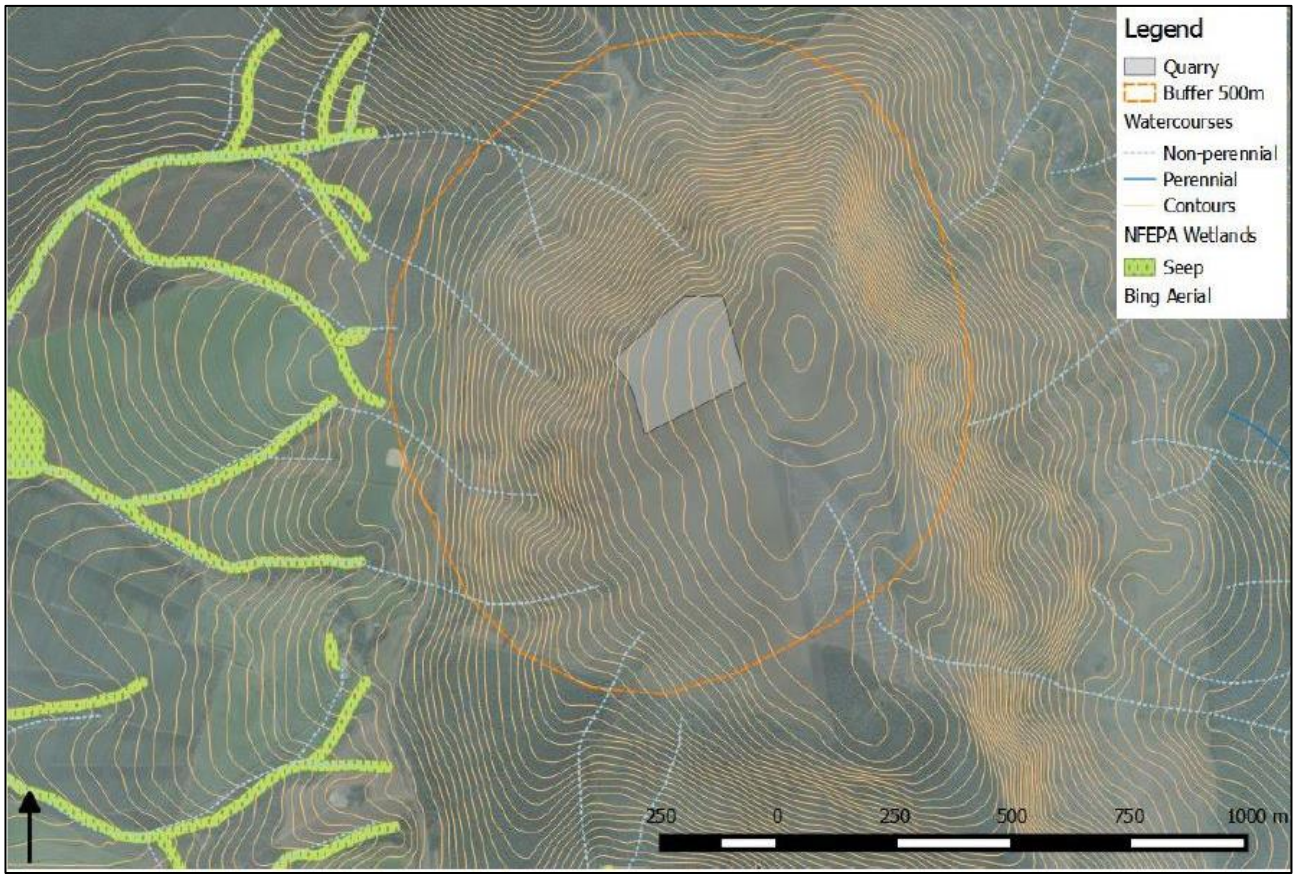
The Biodiversity Company carried out a Wetland Assessment on the site to determine the current state of the aquatic systems surrounding the proposed quarry site and identify the risks associated with the quarry on the watercourses. The study area is located in the Mvoti to Umzimkhulu Water Management Area (WMA 11) and Quaternary Drainage Regions T52D. The region has a mean annual precipitation rate of 800 to 1 500 mm and is considered humid.

A desktop assessment of the project area was carried out and verified by the specialists during the site inspections. Local wetland and riparian systems were delineated and a risk assessment included based on potential impacts to the systems.

There are no major rivers on the property with non-perennial drainage lines delineated for the project area by the specialist. The drainage lines likely contain run-off for short periods of time and form part of a first order and sometime second order streams or rivers. These drainage lines are almost never (or very seldom) in connection with a zone of saturation and they consequently never have base flows. All drainage lines associated with the site eventually form part of the Ncalu River system, >2km to the west, south-west and south of the site. The location of these drainage lines are indicated in Figure 9.

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 seepage wetlands in excess of 500m of the project (shaded in green in Figure 9).

Figure 9: Aerial image showing the aquatic environments associated with Portion 3 of Lot 9 Incalu 5000 (source: The Biodiversity Assessment, 2016).



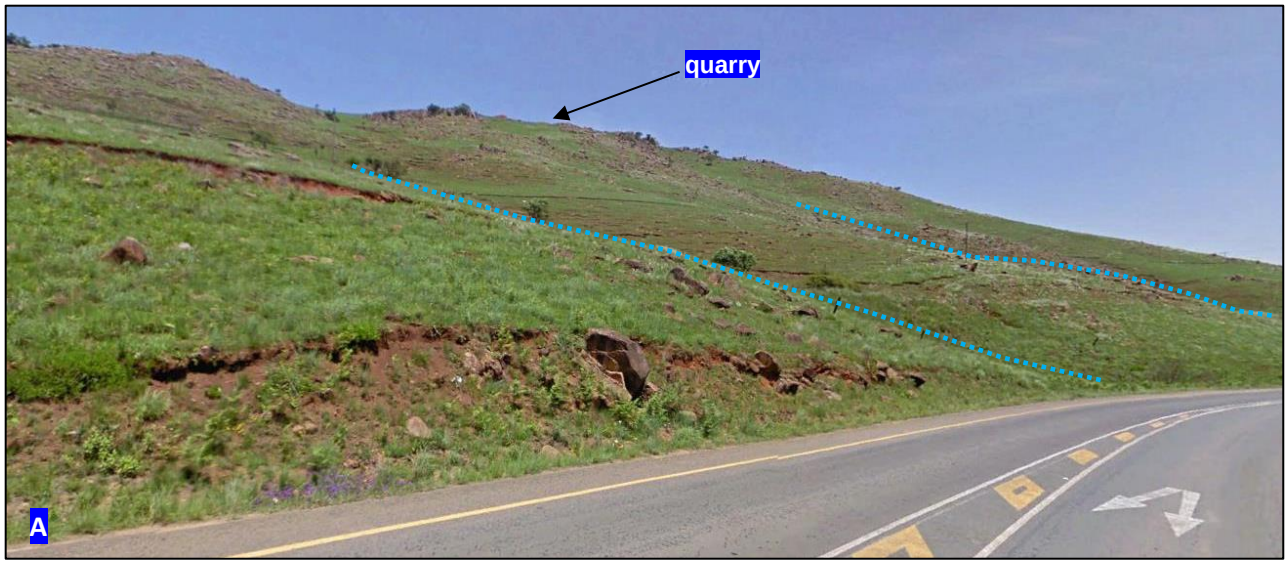
Taking into account the location of the preferred quarry site, the specialist stated that the quarry will not pose a risk to the wetland areas however, best practice and mitigation measures must be implemented to prevent waste, contaminated water and toxicants from being washed into the drainage lines to the receiving wetlands (see section 6.2 of the Wetland Assessment attached under Appendix C). There may be indirect impacts if vehicles travel near the drainage lines or erosion is uncontrolled however all impacts were rated as minor to negligible after mitigation measures (see Table 4 in the Wetland Assessment).

The preferred quarry site takes into account the regulations listed under Government Notice 704, which states that no mining activities / infrastructure is to be placed within a horizontal distance of 100m from a watercourse[5]. The nearest drainage line is therefore located 100m to the north of the proposed quarry. The spring is described in section 6.2 of the Geohydrological Investigation. Water from the spring is piped and carries water down-slope towards a catchment which appears to be used for watering cattle.

The natural drainage off the site is in a westerly direction towards the R56 (visible from Figure 3 showing the elevation profile and confirmed in section 5 of the Geohydrological Investigation). The natural drainage is towards a number of small farm dams on Carisbrooke Farm, to the west of the site. The landowner confirmed that the dams receive fresh water from the springs on Portion 3 of Lot 9 Incalu 5000 and the potential for the quarry operations to pollute this water was therefore raised as a concern by the landowner. Provided that the mitigation measures provided in the attached EMPr are adhered to, there is unlikely to be any impact on the surface water flowing in the drainage line into the dam. A conceptual model of the groundwater and possible impacts on the groundwater has been provided by the Geomeasure Group and are discussed in the following section. The impact of the quarry on the Carisbrooke Farm dam is therefore discussed further below.

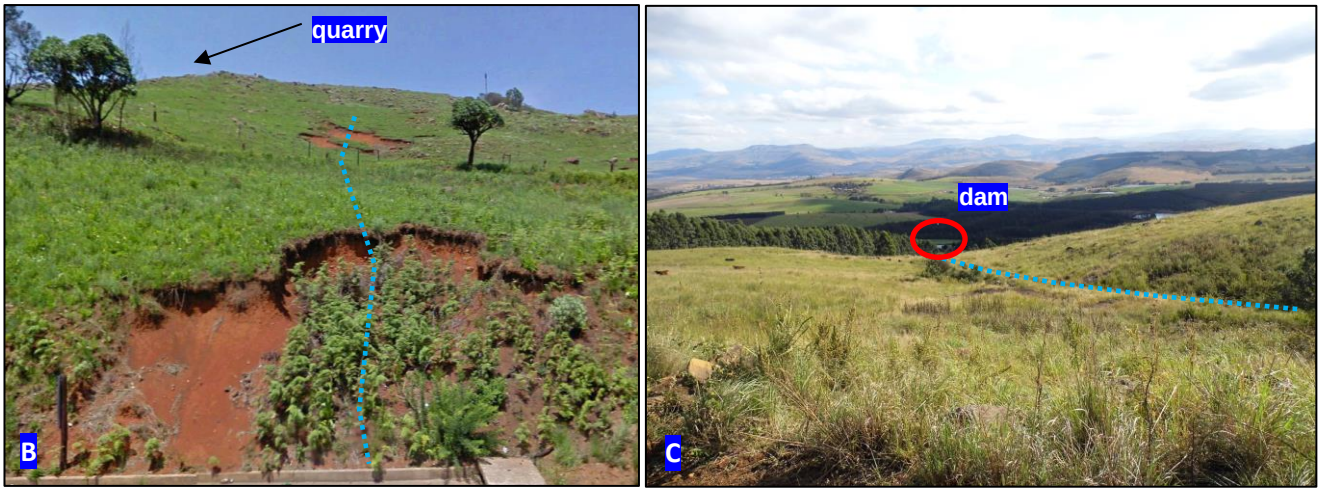
All clean surface water runoff from surrounding slopes will be diverted away from the mining area using berms. This "clean" stormwater will naturally flow into the existing drainage lines, as per the pre-mining drainage pattern. Potentially contaminated runoff from the mine area itself will be diverted into the onsite sumps and will not be permitted to discharge to the surrounding environment or any drainage lines. Water collected in the sumps will be treated as potentially contaminated and will only be used for dust suppression within the mine area. This document as well as a site specific Stormwater Management Plan will also be submitted to the Department of Water & Sanitation (DWS) as part of the Water Use Authorisation application.

Figure 10: (a) Aquatic environments associated with Portion 3 of Lot 9 Incalu 5000 (a) Photograph taken from the R56 showing the drainage lines off the hill.



[5] Regulation 4(a) of Government Notice 704 published in government Gazette No. 20119 on the 04th June 1999.

Figure 10 (continued): (b) Looking up towards the quarry from the R56 showing the existing erosion; and (c) Southern boundary of the property looking down a drainage line towards the Carisbrooke Farm dam, circled in red.



3.3 Groundwater

A Geohydrological Investigation was carried out for the proposed Carisbrooke Quarry by the Geomeasure Group 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 the geohydrology of the area is described with Jurassic age dolerites and sedimentary rocks of the Karoo Supergroup being secondary or fractured / weathered rock aquifers with negligible primary storage and permeability. Groundwater storage and movement is generally confined to fractures, joints and bedding planes within the rock mass.

Typical borehole yields are considered poor to moderate, in the range of 0.1 - 3.0 litres per second. The Jurassic dolerites and the sedimentary rocks of the Pietermaritzburg formation, reportedly form a poor to moderate potential aquifer with water quality typically suitable for potable water supply with only basic treatment (section 8 of the Geohydrological Investigation). A detailed hydrocensus was carried out by the Geomeasure Group within a 2km radius of the site to identify springs and existing boreholes. Six boreholes / groundwater sources occur within a 2km radius (Figure 11). All boreholes / springs are located to the north / north-east of the site.

A basic conceptual site model of the geohydrology associated with the hill was prepared by the Geomeasure Group and presented in Figure 12. The model shows the farm dam to the west of the quarry and borehole to the east (main receptors). After contour analysis, the groundwater beneath the quarry is likely to flow towards the west. If the mining operations are not managed correctly or if there are any uncontrolled spills of hydrocarbons / leaking vehicles etc. operating on site, this has the potential to impact the groundwater and, in turn, the downstream farm dam. Mitigation measures to ensure the correct storage of hydrocarbons and management of mining structures/vehicles have been included in the EMPr. Further to these measures, the geohydrologist recommends that the spring to the north of the quarry, borehole to the east and the farm dam to the west be sampled twice a year to ensure there is no change in the current water quality (Appendix C of the Geohydrological Investigation). Alternatively, monitoring wells up- and down-gradient of the quarry are to be installed to allow for long-term sampling of the groundwater. Water quality tests attached to the Geohydrological Investigation are to be used as the baseline quality, to compare future samples against. The potential for the quarry operations to impact the groundwater quality has been included in Table 3 under section 7.0 of the EIR.

Figure 11: Results from the hydrocensus carried out by the Geomeasure Group for the Carisbrooke Quarry (source: Geohydrological Investigation, 2015).

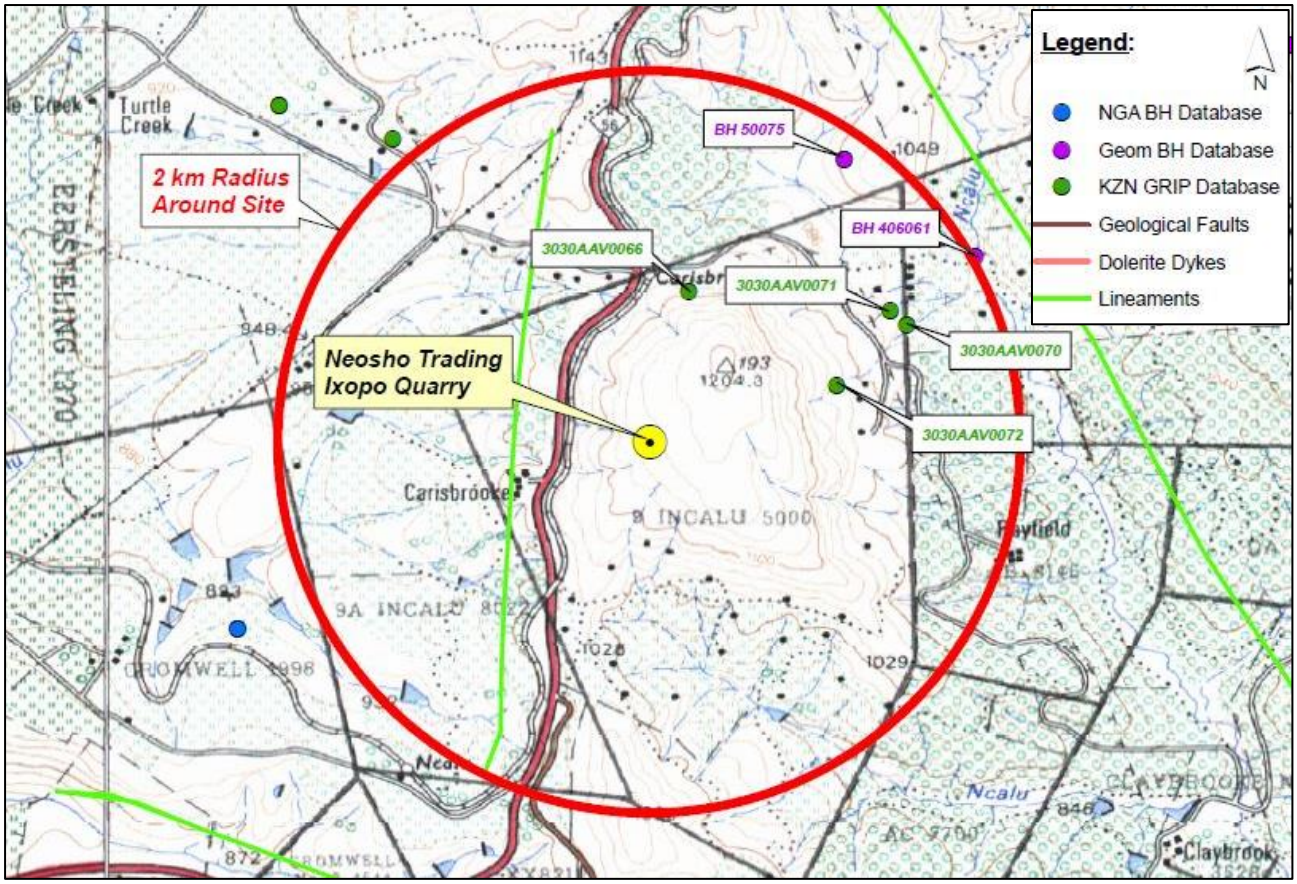
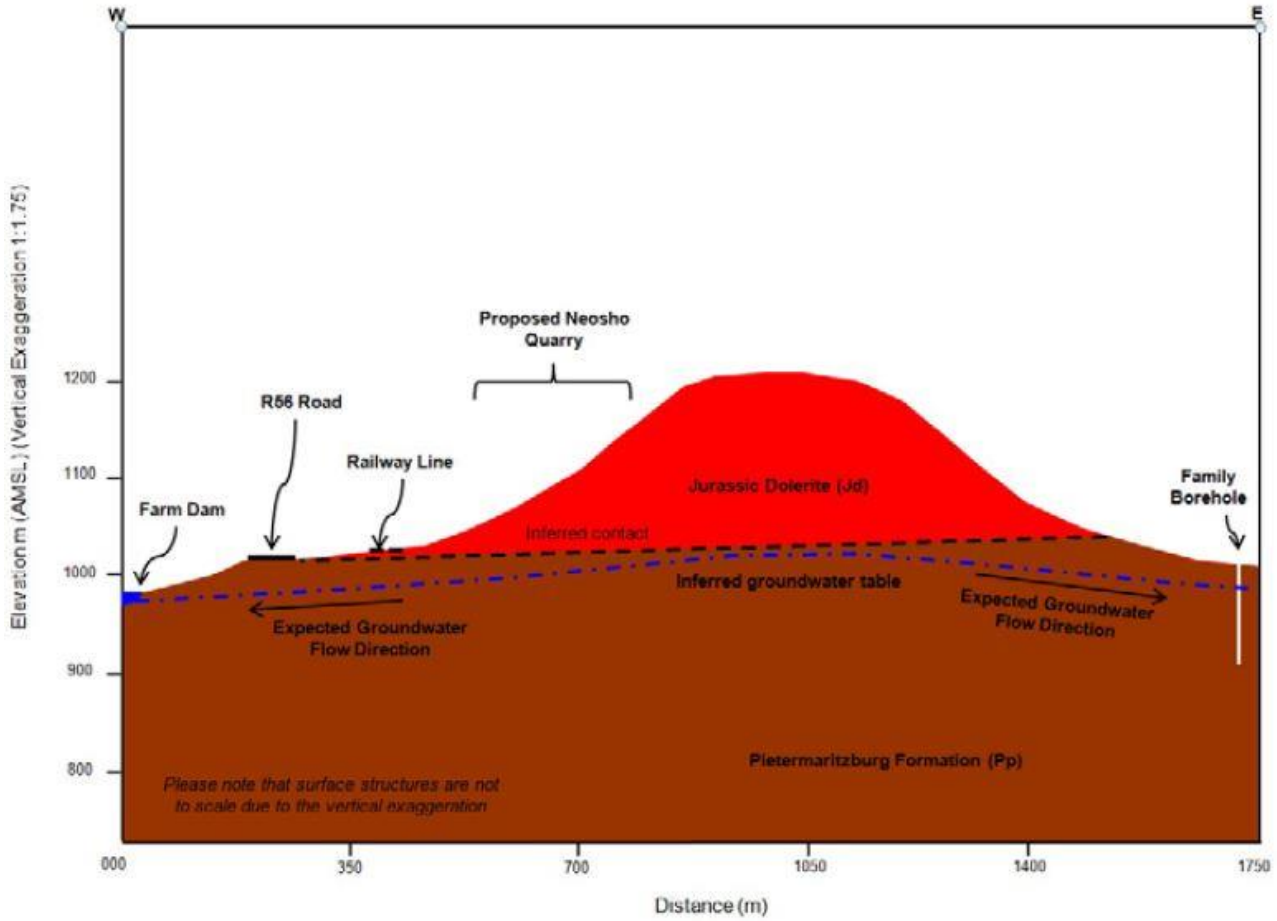


Figure 12: Conceptual site model (source: Geohydrological Investigation, 2015).



3.4 Flora

According to the South African National Biodiversity Institute (SANBI) Geographical Information System (GIS) overlay, the quarry falls within the Midlands Mistbelt Grassland ecosystem. This ecosystem is listed in the national list of ecosystems that are threatened and in need of protection under the "vulnerable" category[6]. Mucina & Rutherford consider the ecosystem to be "endangered" and "one of the most threatened vegetation types in KZN"[7].

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. Since the first site visit took place in winter, a second site visit and report was prepared in February 2016. The reports are attached under Appendix C and summarised below. A species list is provided in Appendix 2 of the Follow-Up Vegetation Report. Photographs showing the current condition of the vegetation on the property are provided in Figure 13.

The grassland area associated with the preferred quarry site is discussed in section 2.0 of the Vegetation Report. Although the vegetation associated with the preferred quarry site is more degraded than other areas on the hill, the grassland has not been entirely depleted of plant diversity, nor is it comprised mainly of weeds of disturbance or ruderals and therefore cannot be designated as "secondary". While most grasses are wiry-leaved sourveld species including *Aristida junciformis* that become more common under grazing, there is still some sparse occurrence of *Themeda triandra*. *Themeda triandra* is an indicator of good veld condition, or at least that the grassland is not currently heavily grazed.

The vegetation specialist identified six plant species within the preferred quarry footprint that are protected under the KZN Provincial Conservation Ordinance (*Agapanthus campanulatus, Dierama reynoldsii, Gladiolus ecklonii & Tritonia lineata, Kniphofia littoralis, Merwilla plumbea* and *Zantedeschia albomaculata*). The specialist also noted a small population of *Merwilla plumbea* plants beyond the northernmost edge of the quarry boundary. The location of these protected species is provided in Figure 14 however the scattered occurrences of the protected species makes it difficult to exactly map the location and therefore the figure does not show the location of all the species (e.g. there are several hundred *Dierama reynoldsii* species within the quarry footprint). These protected species may not be lawfully destroyed, damaged or relocated without permit authorisation from Ezemvelo KZN Wildlife.

The relocation of the protected species is feasible (section 3 of the Follow-Up Vegetation report), however will require another thorough site investigation to map the exact location of all the species and a permit application procedure for relocation of the species. Prior to clearing of the site, input from Ezemvelo KZN Wildlife will be obtained during the relocation procedure. The vegetation specialist concluded that most of the protected plants have bulbs/corms and will therefore have a high success rate for relocation however there will still be some mortality.

The operation of the proposed Carisbrooke Quarry will result in the cumulative clearance of approximately 4.99 hectares of vegetation from within the Midlands Mistbelt Grassland ecosystem. 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), the ecosystem is classified as "endangered" by Mucina & Rutherford (2011). Rehabilitation of the excavated / disturbed area will therefore concentrate on effectively re-vegetating the quarry without allowing weeds to establish and encroach into the surrounding indigenous grassland (see Rehabilitation Plan in Appendix E).

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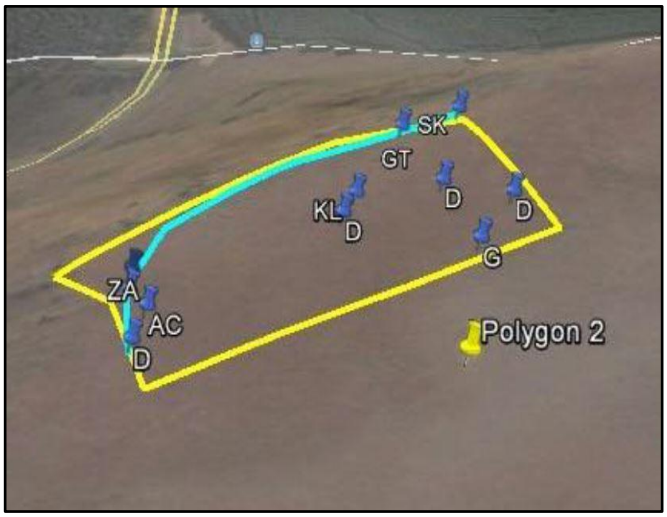
[6] Government Notice No. 1002 published in government Gazette No. 34809 on the 09th December 2011 "*National Environmental Management: Biodiversity Act (10/2004): National list of ecosystems that are threatened and in need of protection*".

[7] Mucina, L. & Rutherford, M.C. (eds). Reprint 2011. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

Figure 13: Location of Red Listed and Protected flora species associated with the preferred Carisbrooke Quarry site (source: Vegetation Assessment, 2016).



PROTECTED SPP
AC – *Agapanthus campanulatus*
D – *Dierama reynoldsii*
GT – *Gladiolus ecklonii & Tritonia lineata*
KL – *Kniphofia littoralis*
SK – *Merwilla plumbea*
ZA – *Zantedeschia albomaculata*

Figure 14: Photographs showing the general condition of the vegetation on the preferred Carisbrooke Quarry site (a) Photograph of the centre of the proposed preferred mining area facing west; (b) Grassland with dolerite outcrop near the northern boundary; and (c) Cattle grazing in the grassland near the preferred quarry site.

3.5 Fauna

According to the Ezemvelo KZN Wildlife Minset Map, there is the potential for 3 threatened species of Millipede and 1 threatened Mollusc and amphibian species and 4 threatened grasshopper species to found in the study area. The species are include:

- *Spinotarsus glomeratus* (Millipede)
- *Centrobolus tricolor* (Millipede)
- *Doratogonus montanus* (Millipede)
- *Euonyma lymneaeformis* (Mollusca)
- *Whitea alticeps* (Insect)
- *Whitea coniceps* (Insect)
- *Pagopedilum martini* (Insect)
- *Eremidium erectus* (Insect)
- *Arthroleptella ngongoniensis (*Amphibian)

During the Scoping phase of the EIA, concerns were raised regarding the proposed quarry site being used as a feeding ground and/or nesting area for the critically endangered Blue Swallow (*Hirundo atrocaerulea*). The Blue Swallow is an African endemic and sub-Saharan migrant (section 1.6.1 of the Blue Swallow assessment attached under Appendix C). The global population is estimated as 1 006 breeding pairs spread across ten countries. KZN holds approximately 33 breeding pairs, mostly in the Ixopo area (section 1.6.2 of the Blue Swallows Assessment). The global population and the southern African population of this species is in decline. Presence of the Blue Swallows at the proposed quarry site would be considered a "red flag"[8] for the project. Ezemvelo KZN Wildlife's Biodiversity Research division was therefore contacted to determine the likelihood of Blue Swallows utilising the hill.

[8] A "red flag" in the EIA process is an area of significant concern which may result in an unsuccessful application.

Ezemvelo KZN Wildlife's Biodiversity Research division visited the site on the 03rd June 2016 and concluded that the Blue Swallows *may* utilise the site and that a number of *potential* nesting holes were located. No evidence of any were recorded but it was recommended that further investigations would need to be carried out during the summer months. A copy of the full findings of the site visit are attached under Appendix B of the EIR (Comments & Responses). A number of avifaunal specialists were therefore consulted and Inkululeko Wildlife Services in partnership with Wild Skies Ecological Services commissioned to:

- Confirm whether or not Blue Swallow utilise the hill for nesting / foraging;
- Discuss the impact of the quarry on the Blue Swallow; and
- Rate the significance of the impacts on Blue Swallow to determine whether the quarry is feasible or not.

The specialists stated that, in order to achieve a high level of accuracy, the Blue Swallow survey needed to be conducted at the optimal time with respect to the species' ecology and migration patterns. The Blue Swallows arrive in South Africa in September - October with egg laying peaking in December – January (dates influenced by environmental factors). DMR therefore granted an extension allowing the EAP to submit the EIR after the Blue Swallow survey was complete, to ensure accurate findings. The site and surrounds were surveyed in the period 28-30 November 2016 based on news that Blue Swallows were present and breeding at other known breeding sites in the Ixopo area. The Blue Swallows Assessment is attached under Appendix C and summarised below.

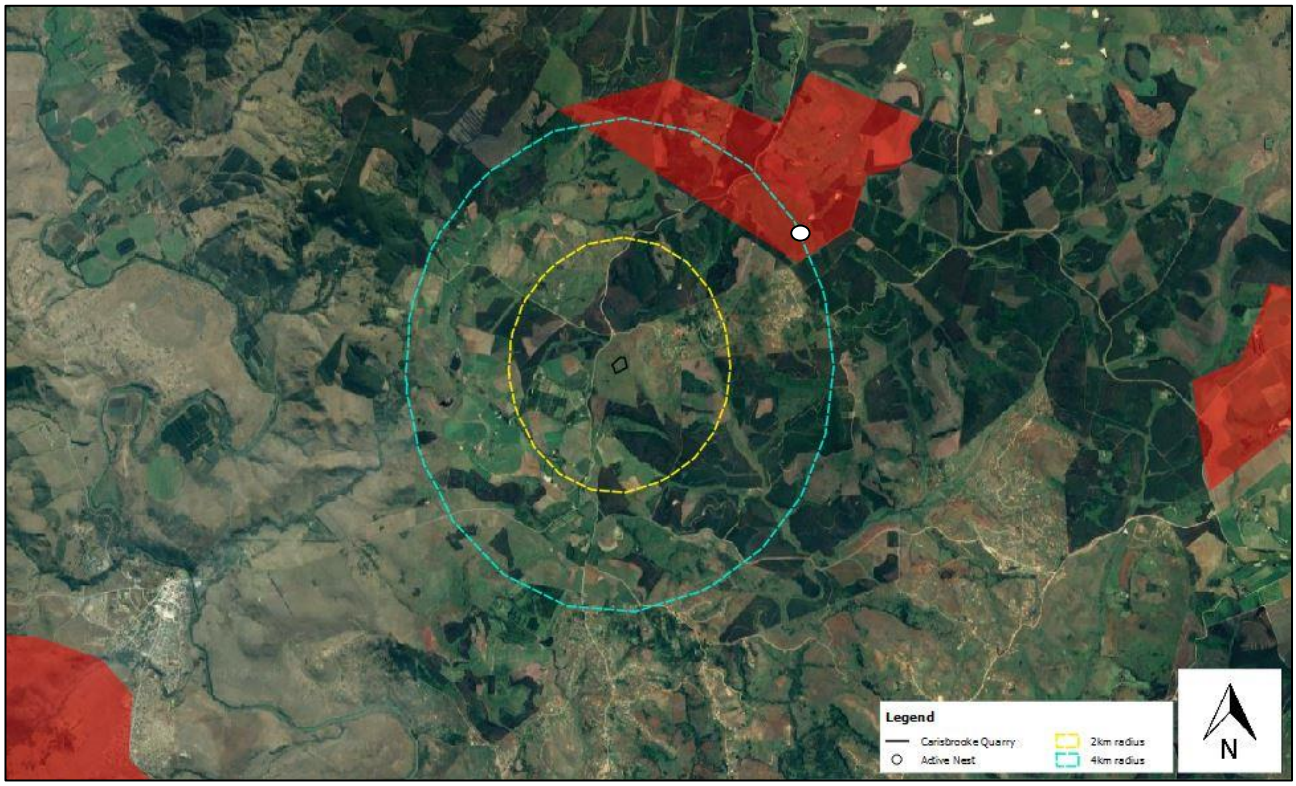
As per the specialist report attached under Appendix C, Blue Swallow nests are found in high altitude, high rainfall grasslands (mostly Mistbelt Grassland). Nests are built in sinkholes, Aardvark holes, potholes, river banks, dongas or mine shafts sometimes up to 5 metres below ground surface. Foraging generally takes place over both grassland and wetland and along the ecotone between the two. Pairs need enough suitable foraging habitat within a 1.5km radius from the nest. Some specialists recommend a 2km protected buffer (yellow in Figure 15), while others recommend a 4km buffer (blue in Figure 15), where no habitat transformation should take place. The closest known and active nest site is at Stainton farm, approximately 3.9km north-east of the proposed quarry site (white circle in Figure 15).

A Blue Swallow habitat model has been developed by Ezemvelo KZN Wildlife in 2010 to determine potential habitat for the species outside of the known breeding area. The Carisbrooke Quarry site falls in an area of 60% likelihood of being used by the swallows however this statistic has not yet been ground-truthed by Ezemvelo KZN Wildlife. The impacts identified by the specialist are included under Table 3 under section 7.0. The site survey conclusions were as follows:

- Although a number of Aardvark holes were found on the hilltop, most have not been used recently and the specialists concluded that Aardvark have not been active on the site for some time. The Aardvark holes are therefore not suitable for breeding Blue Swallows (collapsed / over grown). The holes that were suitable, are not currently being used.
- The *site is not used for breeding by Blue Swallows* (high confidence).
- *No Blue Swallows were recorded foraging on or near the site*.
- It is approximately 3.9km to the nearest active breeding site, which is further than the typical foraging range. Sufficient foraging habitat exists closer to the breeding site.
- The specialist believes that there is good potential for Blue Swallows to breed on the site in the future, particularly with some minor human intervention to maintain and re-dig Aardvark holes.
- Rehabilitation of the site therefore includes the re-digging of Aardvark holes across the site to increasing the nesting potential of the site after the quarry is closed.
- The high potential of the site for Blue Swallows, and the position of the site marginally inside the 4km radius of an existing nest identified for protection, warrants the classification of this impact as high significance.

The site survey, carried out during peak breeding season of the Blue Swallows, confirmed that there are currently no Blue Swallows nesting or foraging on the hill. Although there are good indicators for Blue Swallow habitat, there are no Blue Swallows utilizing the property.

Figure 15: Aerial image showing the proximity of the Important Bird Areas shaded in red, a 2km radius from the quarry as well as the 4km radius around the quarry. The known bird site is visible with the white dot (source: QGIS, 2017).



3.6 Heritage and Cultural Aspects

During the initial site visit, no archaeologically/ cultural significant resources or evidence of graves were identified in the proposed mine area. The provincial heritage authority, AMAFA, commented on the Scoping Report and based on their knowledge of the area, stated that the mining operations may impact on significant tangible and intangible aspects of heritage. A link was also sent to EnviroPro by an I & AP drawing attention to a rocky outcrop on the Carisbrooke hill which resembles the image of Ganesha (discussed further below). A Heritage Impact Assessment (HIA) was therefore carried out by Active Heritage to determine the impact of the quarry on the natural and cultural landscape (see HIA under Appendix C).

The desktop survey identified no archaeological sites within 2km of the proposed quarry. The Carisbrooke Railway Station was identified as a historical site 450m north-west of the quarry (older than 60 years; Figure 16). The station is mentioned in Alan Paton's book "Cry the Beloved Country" with one of the books central themes being the social protest against the structures of the society which gave rise to apartheid. The station therefore falls within the genre of "struggle-era literature and politics" and is rated as locally significant. Due to the distance from the quarry, the heritage specialist concluded that there will be no direct impact on this historical site.

The specialist interviewed a local school principal who has been visiting the hill since the mid-1990's. According to the principal, the hill is considered sacred and has been given the name of "Ndlovini Hill". There were a number of intangible heritage aspects associated with Ndlovini Hill that were raised by the principal and listed under section 5.2.2 of the HIA, including the reference to Alan Paton's book. Paton wrote about a local priest whose son was going to be put to death by hanging during the early apartheid years. The night before this could happen, the priest climbed to the top of the hill and prayed at a shelter. In this way the hill is also significant as a feature relating to the Apartheid and struggle-era history of South Africa. Rocky outcrops along the eastern side of the hill assume various shapes. For example an elephant shaped rock is said to be an image of the Hindu God Lord Ganesha (Figure 16a & b). The "Area of the Gods" is shaded in red in Figure 16. Members of the local Hindu community have been to Ndlovini Hill but not all are convinced that the rock outcrops represent Hindu deities. These perceptions are all known as "intangible" / living heritage, which is an important heritage category in the National Heritage Resources Act.

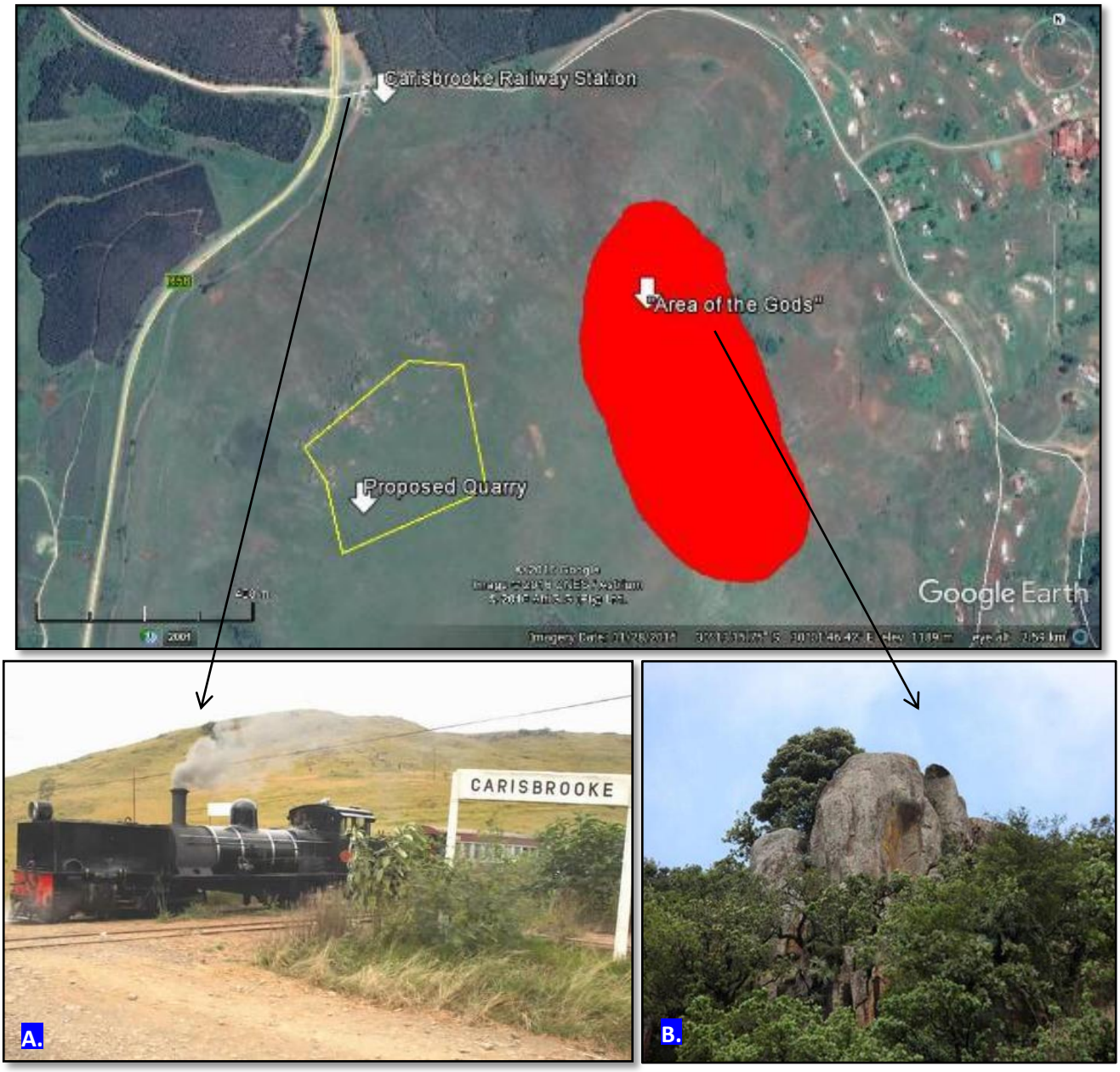
The heritage specialist concluded that it was difficult to give an objective evaluation of the local perceptions relating to the intangible heritage of Ndlovini Hill and therefore a Phase 2 HIA was recommended. Local community members would need to be interviewed to determine the significance to establish if the entire

Ndlovini Hill should be left untouched or if sections, such as the footprint with no apparent tangible heritage features, may be developed.

Four members of Inyezi community attended the DMR site visit on the 21st July 2016 with the EAP and the applicant, to show support of the project. The EAP raised the concerns around the rock structure representing Ganesha and its significance to the community. The community members responded by stating that the rocks were on the other side of the hill, away from the quarry and that they were not concerned about the cultural/heritage aspect. At the community meeting held on the 27th August 2016, the EAP presented the location of the quarry to members of the community. No issues or concerns were raised at the meeting regarding the heritage of the hill. One of the members of the local community is a member of Matzogystix (PTY) Ltd, the applicant and has indicated that no such concerns have been brought to his attention.

The "Area of the Gods", where the rocky outcrops occur along the eastern portion of the hill and associated shelter-like formations mentioned in section 5.2.2 of the HIA, is shaded in red in Figure 16. It is located approximately 230m east of the quarry site, which is on the opposite side of the hill. During the consultation process with the Inyezi community, no concerns have been raised around the cultural / heritage value of the hill. A lease agreement is currently being drafted by the applicant, which the community will sign, indicating their willingness for the operation to go ahead. It is anticipated that the lease agreement will be ready for inclusion in the Final EIR for submission to DMR. The EAP is currently obtaining further feedback regarding the community's view on the subject.

Figure 16: Google aerial photograph showing the location of identified heritage sites or areas in the near vicinity of the proposed quarry site. Photographs of the (a) Carisbrooke Station and (b) Elephant rock formation are included underneath the figure (source: Heritage Impact Assessment, 2017).



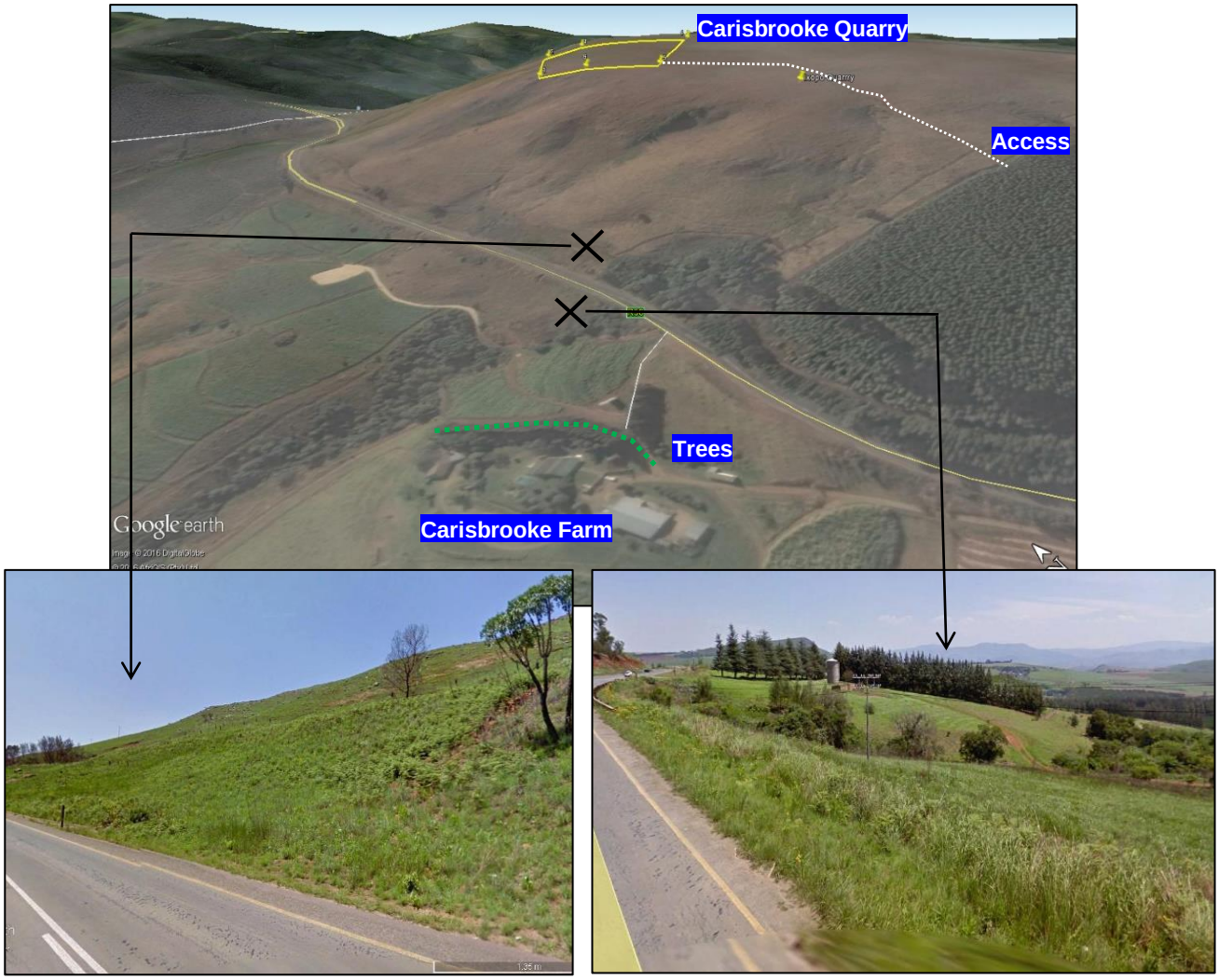
3.7 Socio-Economic Environment

The Carisbrooke hill is located adjacent to the R56, which is the main road between Ixopo and uMzimkhulu. The area is rural in nature. The property is surrounded by agricultural activities with the majority of the land being used as timber plantations. The nearest farm house is located approximately 780m south-west of the proposed quarry site. The Inyezi local community (landowners) have scattered rural housing to the north-east of the quarry. The nearest household is located approximately 700m to the east. Due to the steep topography, the quarry activities will not be visible to the community.

The mining activities will not impact the timber plantations in the area and there may be potential to use the quarry dust (produced as a by-product of the mining activities) for use as a fertilizer on the surrounding farms (see meeting minutes from 19th April 2016). This is still to be discussed with the neighbouring farmers. Please refer to Figure 2 above showing surrounding land-uses.

A concern was raised during the Scoping Phase that the quarry will be a nuisance (visual and dust) to the Carisbrooke homestead (780m south-west of the quarry). Photographs from the R56 showing the position of the quarry on the slope looking up from the R56 near Carisbrooke Farm are included in Figure 17 below. Due to the steep topography and line of trees around the homestead, the visual impact of the quarry will be reduced. As per section 2.8 of the EMPr, dust monitoring is a legal requirement of the quarry. It has been recommended that one of the dust sampling sites is installed at the south-west corner of the property to monitor the amount of dust settling near the Carisbrooke Farm. The required Dustfall Management Plan will identify any areas of high dustfall and provide management measures to address areas exceeding the legislated limits. Mitigation measures to reduce dust during operation are provided in the EMPr.

Figure 17: Elevation photograph showing the view from the south-western side of Carisbrooke hill. Photographs are included below, taken from the black crosses (source: Google Earth Pro, 2016).



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	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. 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. 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.
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	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). 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: s21 (a) – abstraction of water from the sump for dust suppression; s21 (g) – stockpile areas, sump and dust suppression.
National Waste Management Act 2008	Reforms the law regulating waste management to prevent pollution and ecological degradation. 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. The proposal will not trigger a Waste Management Activity.
National Environmental Management Biodiversity Act 2004	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. This site is not located within a SANBI identified endangered ecosystem type and therefore does not require environmental authorisation for this aspect.
National Heritage Resources Act 25 of 1999	For the protection of South African Heritage to nurture and conserve communities legacy. The Heritage Impact Assessment was carried out following the requirements of the National Heritage Resources Act and the KZN Heritage Act, 2008.
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

	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 in the proposed mining area, 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.
Municipal Planning Framework	**Compliance of Activity**
Harry Gwala Municipality Integrated Development Plan 2015/2016	The intention of the Carisbrooke Quarry is to supply material for future developments and service delivery within the Harry Gwala Municipality. The applicant has indicated that the material will be used by the DoT to upgrade roads in the Ixopo area. Poor infrastructure was identified as a threat in the SWOT analysis in the IDP. A number of development goals, which include basic service delivery

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"[9]. 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 Carisbrooke 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.

The Harry Gwala District Municipality Spatial Development Framework (SDF) identifies Ixopo as the primary node that provides services to meet the local requirements of the uBuhlebezwe Municipality as well as the greater Harry Gwala District. The Ixopo node contains a wide range of local and district level public and private sector activities. The Carisbrooke Quarry, just south of Ixopo, therefore has the potential to supply construction material to the immediate area increasing its development potential further.

The dolerite mined will be used in the construction industry, which is an important contributor to municipal and provincial development and growth. The uBuhlebezwe Municipality Integrated Development Plan 2012 – 2017 notes that the maintenance of provincial and district roads as "*a major problem owing to heavy rains and inadequate resources"*. The Carisbrooke Quarry intend to supply DoT with good quality material to improve the road network. DoT have a major depot in Ixopo, which will be in close proximity to the proposed quarry.

Apart from supplying good quality material to the construction market, the mine will create job opportunities (skilled and unskilled) benefiting the landowners and the local economy. One of the conditions listed in the Lease Agreement with the landowner will be for the applicant is to employ local community members as general labourers in the mining operations.

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

The site was selected for a mining permit on inspection of the underlying geology of the property and after a verbal agreement was reached with the landowners to operate a quarry on the hill. Since only one site can be submitted to DMR at the beginning of the process, there are no feasible site alternatives.

The location of the preferred quarry site is more than 100m from a watercourse[10], avoids the steep gradient associated with the eastern side of the property and links to an existing access road to the south of the property (i.e. reducing disturbance by creating an additional road on the hill). The vegetation does not differ significantly between any of the alternatives considered. Similarly, potential fauna species associated with the mine area is unlikely to differ significantly between the layout alternatives due to their close proximity across the hill.

[9] 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".

[10] Regulation 4(a) of Government Notice 704 published in government Gazette No. 20119 on the 04th June 1999.

Due to the nature of the material available at the Carisbrooke 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 are for dust suppression. Additional water may be needed for dust suppression and this will either be obtained from a municipal source or trucked in.

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;*

Three noticeboards were placed at various locations around the proposed Carisbrooke Quarry mine site with an additional noticeboard placed at the entrance to the site (isiZulu). An English noticeboard was placed at the Carisbrooke train station and at the exit of the R56, towards the proposed access road. An isiZulu noticeboard was placed in the Inyezi Community, east of the site. Noticeboards were erected on the 23rd March 2016. The noticeboard detailed the applicants proposed plan to mine a 4.99 hectare of hill on the property, 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;*

Rural houses forming part of the Inyezi Community currently occupy a small portion of the eastern boundary of the property. One of the conditions of the Lease Agreement with the landowner will be for the applicant to allow the community members to continue residing on the property where homesteads and sheds have already been established (lease agreement to be attached to the Final EIR). One of the signboards described above was placed in this section of the community, where houses have been established on the property. A meeting was held with members of the Inyezi Community on the 27th August 2016 where the EAP meet with the relevant community representatives to distribute relevant information through the correct channels (meeting minutes attached under Appendix B). The Chief of the Inyezi Communal Property Association (the landowners) attended the meeting held on the 29th July 2016 (see attendance register attached under Appendix B). Proof of delivery of the Scoping Report to the landowner is also attached under Appendix B. The report was received by the chairperson of the Inyezi Communal Property Association.

The municipal councilor for Ward 2, Mr Tenza, was contacted via telephone on the 22nd March 2016 to discuss the project. An official email of notification was sent to the Ward Councilor shortly after (see Appendix B for proof of notification). Representatives from the uBuhlebezwa Municipality and Harry Gwala District Municipality have been notified by email. Mr Mkhize from the local municipality attended a meeting held on the 29th July 2016 with representatives of the landowner and surrounding farmers to gain further insight into the project (see attendance register in Appendix B). The Land Restitution Commission was also included in the notification. There are currently no land claims associated with the property. A number of stakeholders and authorities were also tracked down electronically and information has been provided to them via email on the 23rd March 2016 (see Appendix B for proof).

All relevant authorities were therefore 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 and the Final

Scoping Report submitted to DMR for approval. Notification of acceptance of the Scoping Report as well as notification of the approved extension was circulated to I & APs prior to the release of the Draft EIR. The Draft EIR has been made available to all registered I & APs for the legislated 30 day comment period. All comments received within the comment periods have been and will be included in Appendix B of the Final EIR.

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 3 of Lot 9 Incalu 5000 has been provided in Appendix B. Some of the properties are not registered with the title deeds office or contact details are not available (from the deeds office or the local municipality). A meeting was held with the Inyezi Communal Property Association on the 27th August 2016 and signboards erected to the east of the property notifying adjacent landowners. Two meetings were held on the 19th April and the 29th July 2016 with some of the neighbouring farmers to discuss the access through their property. Meeting minutes as well as other proof of adjacent landowner notification is attached under Appendix B.

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 I(ii);and

The project has been advertised in the Kokstad Advertiser (English) and Ilanga (isiZulu). The adverts were published on the 31st March 2016 and 03rd April respectively. The adverts detail the proposed Carrisbroke 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 &APs 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 sub-regulation (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. During the Scoping Phase, three objections were received. Ixopo Quarries cc submitted a list of signatures of people objecting to the proposed quarry. Reasons for the objection were that the market is not considered big enough to support two quarries and that the employees at Ixopo Quarries were worried

about job security. Two of the adjacent landowners from the Bo Woodburn Family Trust have also objected to the mining operation. There are a number of concerns raised in the objections (see Appendix B), however the main concern is regarding access through Remainder Portion of Woodburn Valley No. 15322. The dust created by heavy vehicles, the security risk as well as the fire hazard when drivers are travelling through the timber plantations. It is EnviroPro's understanding that a legal agreement is in the process of being drawn up between the landowners and the applicant to address these concerns. The objections received during the Scoping Phase have been addressed as far as possible in the Draft EIR. It is recommended that a formal legal agreement be in place before the applicant uses the access road.

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 have it have a local or regional effect. Impacts are also reviewed looking at severity levels and consequences should the impact occur i.e. will the severity be low, medium or high and then probability of the impact occurring is taken into account.

Whether or not the impact can be mitigated and the extent to which it can be avoided, managed, mitigated or reversed is assessed i.e. the probability of occurrence after mitigation has been applied. This also takes into account likelihood of human error based on 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 1: Explanation of the scoring of the impacts identified in the 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 1and 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 1and 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.

Table 2: Impacts and mitigation measures associated with the *preferred* layout.

Nature and Consequences of impact	Significance rating of impacts[11]:	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.			
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.	7 (med)	The area designated for the site camp is to be clearly marked to ensure that all mining equipment is retained in this area. It is unlikely that there will be a large amount of 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 EMPr). 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 well as containing water inside the quarry. During site camp establishment, the holder of the mining permit is mark out the boundaries of the permitted mine area (see co-ordinates in Figure 2) to ensure clearing and excavation does not encroach into the surrounding grassland. This impact can be managed.	2 (low)
2. Destruction of provincially protected plant species during site camp establishment and initial clearing of the site.	10 (med)	The vegetation specialist identified six plant species within the preferred quarry footprint that are protected under the KZN Provincial Conservation Ordinance (*Agapanthus campanulatus, Dierama reynoldsii, Gladiolus ecklonii & Tritonia lineata, Kniphofia littoralis, Merwilla plumbea* and *Zantedeschia albomaculata*). The location of these protected species is provided in the EMPr as well as photographs of the plants,	7 (med)

[11] See Appendix H for more details.

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		for ease of identification onsite (section 2.3). An additional site investigation is to be carried out by a suitably qualified botanist to further map the exact location of all the species and apply for a permit for the relocation of the species. These protected species may not be lawfully destroyed, damaged or relocated without permit authorisation from Ezemvelo KZN Wildlife. The vegetation specialist stated that most of the protected plants have bulbs/corms and will therefore have a high success rate for relocation however there will still be a significant minority which will likely experience mortality. This impact can be avoided and managed.	
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. The following mitigation measures apply: • The mine works operator is to determine the width of the working bench widths, which will only be reduced under special conditions. This will allow machines to work safely providing ample turning space. • A suitably qualified mine operator is to ensure the vertical height of the bench benches is suitable as well as the angle. • A safety berm should be erected around the working area. • 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. • No loose material must be left on the face after blasting. • 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. • 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.	4 (low)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		• The maintenance of proper drainage away from the working area. This impact can be prevented and managed.	
4. Generation of flyrock as a result of blasting causing damage or injuries to neighbouring property and people.	9 (med)	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. Blasting generates short duration events that are noticeable only by communities and individuals living in the immediate environment. A Blast Plan has been prepared by Baydrive Mining & Civils (Pty) Ltd and is attached to Appendix C. The Plan outlines the explosives to be used as well as the blast design. The following mitigation measures are provided in the blasting plan and section 2.4 of the EMPr: • No unauthorised persons shall enter blast area. • The road will be closed during the blast and +-20 min prior to blast. • A siren will sound 5 min prior to blast and then again 3 minutes before blast. • All persons shall be vacated from blast area • The blasting is to be carried out by a suitably qualified Contractor. • 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. • 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. • It is the EAP's understanding that unless blasting is within 100m of a structure, no mitigation measures are generally required. The Peak Particle Velocities (PPV) is to be measured at the time of the blast and compared to the estimated ground vibration predictions listed in Part L of the Blast Report (3.74mm/s for the powerline, 3.32mm/s of the railway line and 2.68mm/s at the R56). The predicted ground vibrations fall below the limits that are generally considered in a South African context which are: o National Roads/Tar Roads: 150 mm/s o Steel pipelines: 50 mm/s	7 (med)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		○ Electrical Lines: 75 mm/s ○ Railway: 150 mm/s ○ Concrete aged less than 3 days: 5mm/s ○ Concrete after 10 days: 200 mm/s ○ Sensitive Plant equipment: 12 or 25 mm/s depending on type – some mercury switches could trip at levels less than 25 mm/s. This impact can be prevented and mitigated.	
5. Vibrations from blasting destroying Blue Swallows nesting on the hill (Blue Swallow Assessment, 2016).	10 (med)	The vibrations caused during blasting are not compatible with the Blue Swallows who build their nests from mud on the walls of a hole in the ground (section 3.1. of the Blue Swallows Assessment). On receipt of the Blue Swallows assessment, carried out during peak Blue Swallows breeding season, the avifaunal specialist concluded, with high confidence, that there are no Blue Swallows nesting or foraging on or near the hill. The vibrations from the blasting will therefore not destroy any active nests. While the quarry is in operation (the current lifespan is a maximum of 5 years), the blasting will deter Blue Swallows coming to nest or forage on the hill during that time period. The nearest active breeding site is approximately 3.9km north-east of the quarry and therefore it is unlikely that the vibrations will impact on these active nests. Due to the lack of Blue Swallows currently using the hill, this impact is avoided. The avifaunal specialist stated that the hill does show good potential for Blue Swallows to breed on the site in the future, particularly with some minor human intervention to maintain and re-dig Aardvark holes. Rehabilitation of the site therefore includes the re-digging of Aardvark holes across the site to increasing the nesting potential of the site after the quarry is closed (section 3.3 of the EMPr).	5 (low)
6. Fragmentation of Blue Swallow habitat by upgrading and expanding the road to accommodate heavy vehicles (Blue Swallow Assessment, 2016).	8 (med)	Access to the preferred quarry location is through the use of an existing track up the southern side if the hill, where the gradient is gentler compared to the remainder of the property. Due to the number of heavy vehicles using the track, it will become more defined, reducing the area of potential habitat for the Blue Swallows (i.e. fragmentation of the hill). As stated above, there are currently no Blue Swallows nesting or foraging on or near the hill however there will still be a loss of potential habitat. Mitigation measures to ensure that the access road is not expanded into the surrounding grassland have been included	5 (low)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		in section 2.9 of the attached EMPr and include: • All vehicles to follow the existing access track to and from the quarry. • There are to be no multiple tracks formed through the adjacent grasslands. • All vehicles to remain in the parking area designated within the quarry. • No ad hoc haulage roads or turning areas may be created outside of the quarry footprint apart from the authorised access track. • The access road and any vehicle disturbance adjacent to the access road has been included in the rehabilitation plan to ensure the area is properly ripped and re-vegetated preventing future fragmentation of Blue Swallow habitat. This impact can be managed by cannot be fully mitigated during the operation of the quarry.	
7. Loss of potential future Blue Swallow nesting and foraging grounds.	11 (high)	As per the specialist report, a Blue Swallow habitat model was developed by EKZNW in 2010 to determine whether any potential habitat for the species exists outside of the known breeding areas. The Carisbrooke Quarry site falls in an area of 60% likelihood of being used by Blue Swallow however this has not been ground-truthed as yet. The avifaunal specialists believe that the site has good potential for breeding, particularly with some minor human intervention to maintain and re-dig Aardvark holes. Rehabilitation of the site therefore includes the re-digging of Aardvark holes across the site to increasing the nesting potential of the site after the quarry is closed (section 3.3 of the EMPr). If birds were to breed on site, it would then follow that they would forage on site. This impact has been avoided and can be partially mitigated.	8 (med)
8. Generation of emissions from vehicles.	6 (med)	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.	2 (low)
9. Increase in heavy truck traffic as trucks enter and leave the site which could impact on existing traffic (concern raised by I & AP during Scoping phase).	7 (med)	The nature of the activity will result in a localised increase in haulage truck traffic during the operating hours of the quarry. The preferred access through the neighbouring property will allow vehicles to have direct access onto the R56, preventing trucks from travelling on any other private / residential roads. The traffic	5 (low)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		increase should therefore not significantly affect the existing traffic experienced in the area. The quarry is located outside of the nearby towns of Ixopo and uMzimkhulu so will not add to congestion in these areas during peak traffic periods. It is understood that an agreement is being drafted between the applicant and the Bo Woodburn Family Trust stipulating conditions for access through the private timber farm. A flag man is to be present at the junction where mining vehicles turn onto the R56, especially during winter when heavy mist is common. This has been included under section 2.9 of the EMPr.	
10. Suitability of operation with respect to surrounding land use i.e. visual impact, and impact on sense of place.	11 (high)	The portion of land ear marked for mining is currently not being utilised for anything other than community cattle grazing (i.e. green field site). The preferred mine site is located on the opposite side of the hill to the Inyezi Community, reducing the visual impact to these established homesteads. Timber plantations to the north and south shield the visual impact from these directions. The only nearby residential household is located 780m south-west of the quarry. The visual impact is discussed in section 3.7 with Figure 17 showing the steep topography and trees contributing to reducing the visual impact to those residing at Carisbrooke Farm. The mine is ideally located in close proximity to the R56 and Ixopo town where it is anticipated that further development and service delivery will be increasing in the future. This impact has been reduced and avoided in the preferred quarry layout but is not fully mitigated.	9 (med)
11. Dust generation during the preparation of site and roads as well as during operation impacting on air quality and settling on surrounding grassland making it less suitable for invertebrates and therefore reducing food availability for Blue Swallows (Blue Swallow Assessment, 2016).	9 (med)	Dust suppression is to take place along the dirt access track as well as inside the quarry area itself. • 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. • It is recommended that one of the dust sampling sites is to be installed at the south-west corner of the property to	7 (med)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		monitor the amount of dust settling near the Carisbrooke Farm. The required Dustfall Management Plan will identify any areas of high dustfall and provide management measures to address areas exceeding the 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. • 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 for dust suppression along the access road will be obtained from a municipal source and bought to site by water tanker. • Vehicles are to remain on the existing access road to ensure that there is no further encroachment into the surrounding grassland. Regular dust suppression, should reduce the amount of dust settling on the adjacent grassland however this is to be monitored. 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.	
12. Noise generation during operation of plant equipment (crushing, screening and blasting) and trucks which may impact on staff and neighbours.	9 (med)	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. The nearest household is located approximately 700m east of the quarry. Due to the distance from the site, and the topography (household on the opposite side of the hill), the noise from machinery (front end loaders, excavators, screener	7 (med)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		and crusher) and trucks will be significantly reduced before it reaches the Inyezi Community. Concerns have been raised by the farmer that the quarry noise and dust will be a nuisance to the people residing at Carisbrooke Farm, located 780m south-west of the quarry, on the same side of the hill. As stated above, the noise from the quarry cannot be completely mitigated during its operating hours however the following mitigation is provided in section 2.7 of the EMPr (attached under Appendix E): 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. This noise will occur during the quarry operating hours. Typically, blasting is intermittent and at maximum capacity will only occur once a week or less. 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. The primary type of sounds expected will be fairly sharp, percussive sounds during 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 richochet back. The table below provides noise levels experienced by operators of front end loaders and excavators[12].	

[12] Workers Compensation Board of BC, Engineering Section Report; Stuart Eaton, February 2000
http://hearingconservation.healthandsafetycentre.org/pdfs/hearing/ConstructionNoise.pdf

<table>
<tr><th>Nature and Consequences of impact</th><th>Significance rating of impacts[11]:</th><th>Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:</th><th>Significance rating of impacts after mitigation:</th></tr>
<tr><td colspan="4">Table 3: Noise levels, L_{eq}, experienced in construction jobs in the UK[4].
<table>
<tr><th rowspan="2">Plant/equipment</th><th colspan="2">Operator, L_{EX}, dBA</th><th></th><th></th></tr>
<tr><th>Ave.</th><th>Range</th><th>Trades/Tools</th><th>L_{eq} dBA</th></tr>
<tr><td>Dozers, Dumpers</td><td>96</td><td>89-103</td><td>Plumber</td><td>90</td></tr>
<tr><td>Front end loaders</td><td>88</td><td>85-91</td><td>Elevator installer</td><td>96</td></tr>
<tr><td>Excavators</td><td>87</td><td>86-90</td><td>Rebar worker</td><td>95</td></tr>
<tr><td>Backhoes</td><td>86.5</td><td>79-89</td><td>Carpenter</td><td>90</td></tr>
<tr><td>Scrapers</td><td>96</td><td>84-102</td><td>Concrete form finisher</td><td>93</td></tr>
<tr><td>Mobile Cranes</td><td>100</td><td>97-102</td><td>Dry wall installer</td><td>90</td></tr>
<tr><td>Compressors</td><td>79</td><td>62-92</td><td>Steel stud installer</td><td>96</td></tr>
<tr><td>Pavers</td><td>101</td><td>100-102</td><td>Labourer – road construction</td><td>86</td></tr>
<tr><td>Rollers (compactors)</td><td>90</td><td>79-93</td><td>Labourers – formwork</td><td>88</td></tr>
<tr><td>Bar Benders</td><td>95</td><td>94-96</td><td>Labourers – shovel hardcore</td><td>94</td></tr>
<tr><td>Pneumatic breakers</td><td>106</td><td>94-111</td><td>Labourers – concrete pour</td><td>97</td></tr>
<tr><td>Hydraulic breakers</td><td>95.5</td><td>90-100</td><td>Hoist operator</td><td>100</td></tr>
<tr><td>Graders, trucks, concrete pumps & mixers, generators</td><td>< 85</td><td></td><td>Labourers-– drains & roughing concrete</td><td>100</td></tr>
<tr><td>Concrete batch plant operator</td><td>< 85</td><td></td><td>Tile setter</td><td>92</td></tr>
<tr><td>Poker vibrators</td><td>94.5</td><td>87-98</td><td>Pneumatic chipper/chisel</td><td>109</td></tr>
<tr><td>Saws</td><td>88.5</td><td>78-95</td><td>Compactor</td><td>108</td></tr>
<tr><td>Piledrivers (diesel & pneum.)</td><td>98</td><td>82-105</td><td>Electric drill</td><td>102</td></tr>
<tr><td>Pile drivers (gravity, bored)</td><td>82.5</td><td>62-91</td><td>Air track drill</td><td>113</td></tr>
</table></td></tr>
<tr><td>13. Leaving the Carisbrooke Quarry un-rehabilitated.</td><td>11 (high)</td><td>If the quarry is not rehabilitated upon completion of the operation, the mining operations 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.
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”[13].
The Annual and Final Rehabilitation Plans are included in section 3 of the attached EMPr (Appendix E). Please refer to the EMPr for further details however a summary of the proposed rehabilitation measures is provided below.
• The quarry must be rehabilitated after closure to prevent these impacts from occurring.
• Rehabilitation should occur as soon as practically possible on completion of</td><td>7 (med)</td></tr>
</table>

[13] Regulation 4 of the “Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operatios” 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[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		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. • 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 place[14]. • 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	

[14] 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[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		all erosion damage should be repaired as soon as possible. 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.	
14. Petrochemical spills from mining operational machinery.	8 (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.	4 (low)
15. Inadequate waste management on site.	7 (med)	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. • 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. This impact can be avoided and managed.	3 (low)
16. Insufficient number of toilet facilities on site resulting in the contamination of the environment.	8 (med)	Workers on site will require an appropriate number of toilet facilities on site. • 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. • The establishment and use of long-drop toilets is strictly prohibited. This impact can be avoided.	4 (low)
17. Encroachment of alien vegetation into disturbed areas and surrounding	10 (med)	There is very little alien invasive vegetation associated with the hill (section 2 of the	7 (med)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
grassland during operation of the quarry.		Follow-Up Vegetation report). Disturbance associated with the mining activities has the potential to result in aliens/weeds establishing in and adjacent to the quarry site. The mine works manager is therefore to be aware of the high potential for weeds to proliferate across the site. This will be managed to prevent encroachment into the natural grassland. 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. The perimeter of the quarry should be regularly mowed to suppress alien vegetation from encroaching into the grassland around the edge of the quarry. This impact can be managed.	
18. Loss of vegetation within the Midlands Mistbelt ecosystem. There will be clearing of up to 4.99 hectares of indigenous vegetation as the mining area is expanded over time.	10 (med)	There will be 4.99ha of vegetation cleared from the preferred site over time. This impact cannot be avoided as the entire permitted mine area, will be cleared of vegetation. Provided that the mining vehicles remain within the permitted area and on the existing access road, the remainder of the property will not be disturbed by the quarry operations. The following mitigations have been provided in the EMPr to ensure no further damage is caused to the surrounding grasslands. • A suitably qualified and experienced botanist is to carry out a site survey prior to clearing any portion of the site to identify, map and remove any provincially protected species. A permit from EKZNW is required prior to relocation. • The permitted quarry area is to be clearly demarcated to ensure that vegetation is only cleared from within the authorised Carisbrooke Quarry footprint. • 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. 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. The	9 (med)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		site is almost entirely surrounded by timber plantations. This impact can be partially managed.	
19. Poor stormwater management during operation resulting in "dirty" water from within the quarry mixing with clean water outside of the quarry.	9 (med)	Provision must be made to control stormwater runoff, especially down the slope of the mine face. 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 will be assessed as part of the WULA submitted to DWS. The following measures will be taken to manage runoff in and around the mine area: • 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. • 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. This impact can be avoided, managed and mitigated.	5 (low)
20. Poor stormwater management during operation and after closure leading to erosion of the hill side.	8 (med)	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. • 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. • During rehabilitation, the slope is to be shaped to fit in with the general topography of the hill to reduce the velocity of runoff down the slope during high rains. This has been included in	4 (low)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		the rehabilitation plan attached under Appendix E. This impact can be managed and mitigated.	
21. Risk to water quality of nearby watercourses and wetlands.	7 (med)	The Wetland Assessment attached under Appendix C concluded that there will be no direct impact on any of the wetlands in the surrounding area. The preferred quarry site has been positioned more than 100m away from any of the natural drainage lines delineated on the hill. Stormwater runoff in and around the quarry will be managed to prevent "dirty" water from leaving the mining area (see above). This impact is therefore avoided and managed during operation.	3 (low)
22. Impact on existing services within 500m of the quarry i.e. ESKOM power lines, R56 and the railway line (all located to the west of the quarry site).	10 (med)	All existing services and infrastructure on and adjacent to the property have been identified. The following services are within 500m of the quarry: - Eskom's Umzali Network Breaker 73 – 22kv powerline (260m) Eskom provided comment on the Scoping Report stating that the use of explosives within 500m of the powerlines will only take place with written permission from Eskom. The EAP has forwarded this information to the applicant who was advised to make a separate application to Eskom for permission at least 35 days before blasting (see Eskom comment attached under Appendix B). - R56 (320m) The Blast Report states that the road will be closed approximately 20 minutes prior to blasting taking place. The Department of Transport (DoT) are registered I & APs and have received all Environmental reports to date. DoT have acknowledged receipt of the Scoping report but no further comment has been provided. The applicant is to communicate with DoT to ensure that all requirements are fulfilled prior to road closure. - Transnet Railway Line (280m) Transnet are registered I & APs and have received all Environmental reports to date. No comment has yet been received. The applicant is aware of the railway line and is to obtain any further permission from Transnet prior to blasting. This impact can be avoided.	9 (med)
23. Pollution of groundwater impacting on downstream water users such as the Inyezi Community, to the east of the hill and Carisbrooke Farm, to the west of the hill (Geohydrological	9 (med)	The conceptual site model shows the groundwater table and expected groundwater flow direction (Figure 12 above). The quarry is located to the west of the watershed with any contamination flowing in a westerly direction, away from	5 (low)

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
Investigation attached under Appendix C).		the Inyezi Community family borehole and towards the Carisbrooke Dam. The risk of groundwater pollution is high if there are bulk chemicals and fuel stored on site (section 7 of the Geohydrological Investigation). The following mitigation measures are included in the EMPr: • Due to the nature of the mining, there will be no bulk storage of hazardous substances on the site with any fuel / oils stored in a bunded area, undercover within the site camp. • As recommended by the geohydrologist, no vehicles are to be washed or serviced on the site. • 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. • During the operational phase, the spring to the north of the quarry, the down-gradient farm dam and the family borehole are to be sampled on a six monthly basis by an independent consultant. The samples are to be analysed according to the abbreviated SANS 241:2011 Drinking Water Standards as well as screened for hydrocarbon impacts. Alternatively, monitoring wells up- and down-gradient of the quarry should be installed to allow for the long-term sampling of groundwater up- and down-gradient of the site. The water quality results attached to the Geohydrological Investigation are to be used as a baseline to compare against. This impact can be avoided and managed.	
24. Excavations and blasting impacting on potential heritage resources (Heritage Impact Assessment, 2016).	11 (high)	The HIA concluded that there were no archaeological sites within 2km from the project area. The Carisbrooke Railway Station is 450m north-west to the nearest quarry boundary and will therefore not be directly impacted by the mining activity. The heritage specialist concluded that it was difficult to give an objective evaluation of the impact of the mining on the intangible heritage value[15] of the hill since the entire hill has been regarded as a "living-heritage site" by a member of the local Hindu community. The "Area of the Gods", shaded in red in Figure 16 correlates to the	10 (med)

[15] "intangible heritage" encompasses all those ideas, traditions, customs and memories that are passed from generation to generation (section 5.2.2 of the HIA attached under Appendix C).

Nature and Consequences of impact	Significance rating of impacts[11]:	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Significance rating of impacts after mitigation:
		rocky outcrops associated with the steep eastern side of the hill. This area is 230m from the quarry, on the other side of the hill. The heritage specialist recommends a Phase 2 HIA where community members are questioned about the significance of the hill however, during the consultation process with the Inyezi community, no concerns were raised around the cultural / heritage value of the hill. A lease agreement is currently being drafted by the applicant, which the community will sign, indicating their willingness for the operation to go ahead. The agreement will be ready for inclusion in the Final EIR for submission to DMR. The EAP is currently obtaining further feedback regarding the community's view on the subject.	
25. Positive impacts for the Inyezi Community include potential for local employment.	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. It is anticipated that the lease agreement with the Inyezi Community will be ready for inclusion in the Final EIR for submission to DMR.	0 (no impact)

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 Carisbrooke Quarry relate to those associated with the operation period itself. The key findings for the preferred Carisbrooke Quarry site, on the west 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 farms. It is unlikely that the timber plantations to the north and south as well as the Inyezi Community on the opposite side of the hill will be significantly affected by the noise. Concerns have been raised by the farmer whose residence is 780m south-west of the quarry, on the same side of the hill. The noise from the quarry cannot be completely mitigated during its operating hours however mitigation measures are included in section 2.7 of the EMPr to reduce the impact. 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.

Similar to the noise impact, ongoing dust monitoring and management is required during the operation of the Carisbrooke Quarry. A number of mitigation measures in line with the National Dust Regulations (Government Notice R827, 2013) have been included in section 2.8 of the EMPr. It is recommended that one of the required dust sampling sites be installed at the south-west corner of the property to monitor the amount of dust settling near the Carisbrooke Farm. The required Dustfall Management Plan will identify any areas of high dustfall and provide management measures to address areas exceeding the legislated limits. The impact of dust was rated as medium, after mitigation.

It is the EAP's understanding that unless blasting is within 100m of a structure, no mitigation measures are generally required. The predicted ground vibrations near the powerlines, R56 and railway line fall below the limits that are generally considered in a South African context (see Part L of the Blast Report) however the actual PPV is to be measured at the time of the blast and compared to these estimated ground vibration

predictions. The applicant is aware of these services and will be required to contact the authorities (Eskom, DoT & Transnet) prior to any blasting taking place. All authorities have received the environmental reports however permission is required from the authorities. This impact is therefore rated as medium.

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, future Blue Swallow habitat, 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.

- Blue Swallows

Concerns were raised during the Scoping Phase of the project that Blue Swallows were nesting / residing in the area and that the mining operations would impact the Blue Swallow population, which is known to be present in the Ixopo area (section 1.6.2. of the Blue Swallow Assessment). The entire hill and the nearby area was surveyed by avifaunal specialists who concluded that the hill is not used for breeding or foraging (since the nearest active nest is nearly 4km from the quarry site). The quarry operations will therefore not impact the current Blue Swallow population. The hill does show good potential for Blue Swallows to breed on the site in the future, particularly with some minor human intervention to maintain and re-dig Aardvark holes. Rehabilitation of the site therefore includes the re-digging of Aardvark holes across the site to increasing the nesting potential of the site after the quarry is closed. The impact on Blue Swallows was rated as low.

- Flora

Although the grassland in the preferred quarry site was more degraded than other sections of the hill, it is still described as "not entirely depleted of plant diversity, nor comprised mainly of weeds or disturbance or ruderals and so cannot be designated as secondary" (section 2 of the Follow-Up Vegetation Report). There are a number of provincially protected species within the mining footprint that will need to be identified by a suitably qualified botanist and a permit application procedure to be followed for relocation to another portion of the hill. Cumulatively, there will be a loss of 4.99 hectares of grassland. Measures are provided to reduce the extent of the vegetation clearing however this impact cannot be avoided. The access road is existing however there is to be no further encroachment into the surrounding grassland. Section 2.8 of the EMPr provides mitigation measures which are to be adhered to during operation. The significance of the impact after mitigation therefore remains medium.

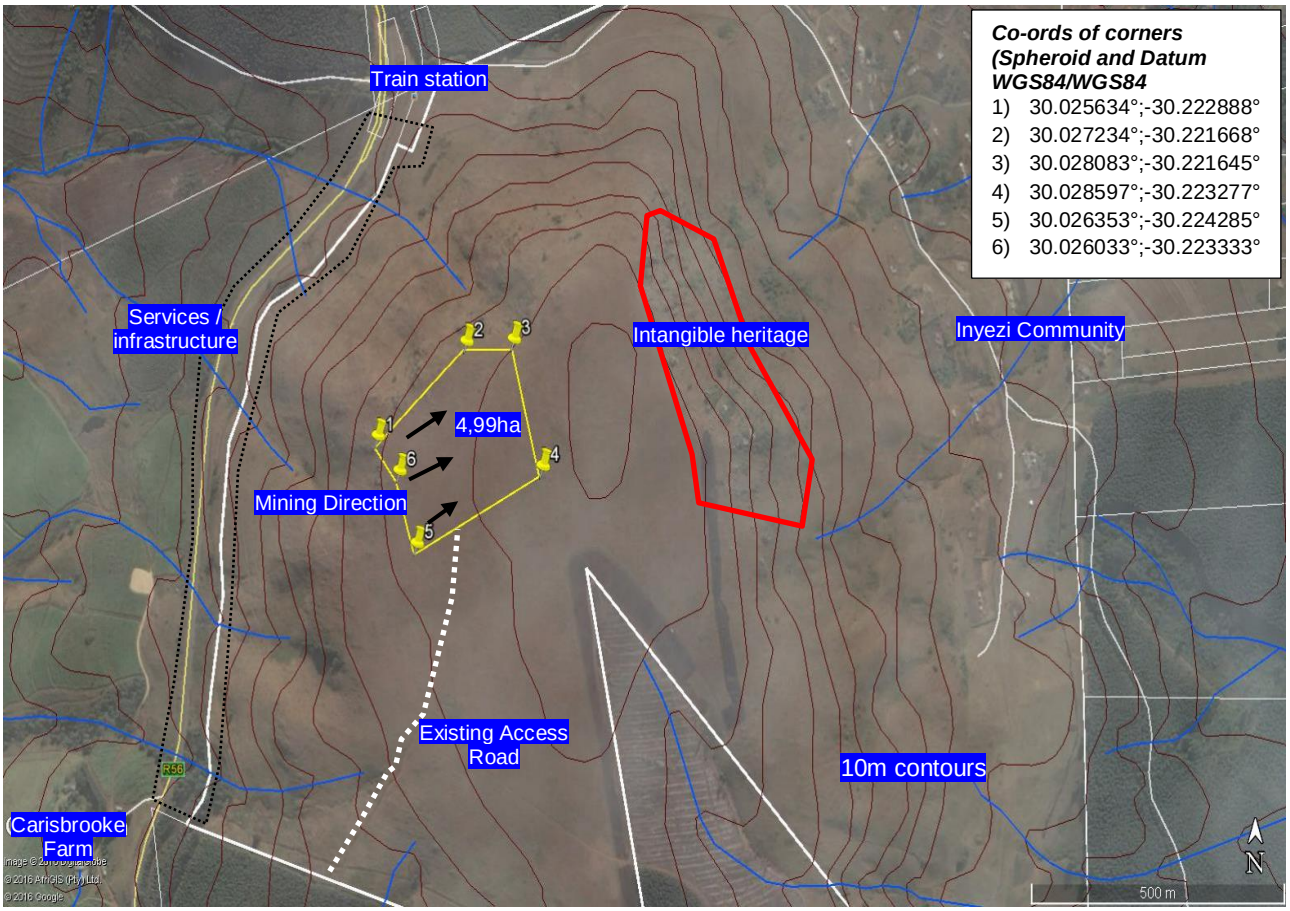
- Groundwater

The Geohydrological Investigation identified the risk to groundwater should the operation of the quarry not be well managed. A spill / leak of a hazardous substance (e.g. fuel / hydrocarbons), may reach the groundwater level and pollute the downstream dam. Due to the nature of the mining, there will be no bulk storage of hazardous substances on the site with any fuel / oils stored in a bunded area, undercover within the site camp. During the operational phase, the spring to the north of the quarry, the down-gradient farm dam and the family borehole are to be sampled on a six monthly basis by an independent consultant. Alternatively, monitoring wells up- and down-gradient of the quarry will be installed to allow for the long-term sampling of groundwater. The significance of the impact after mitigation is therefore rated as low.

- Heritage

There are no tangible heritage or archaeological sites associated with the quarry site however after communicating with a local community member, the specialist identified the entire hill as having intangible / living heritage value. The interview was conducted with a local school principal of the Hindu faith, where a number of intangible values were raised. On consultation with the local Inyezi Community, no concerns were raised about the cultural / living heritage value of the hill since the rock outcrops were located on the other side of the hill. The "Area of the Gods", highlighted in the HIA, is 230m from the quarry. One of the members of the local community is a member of Matzogystix (PTY) Ltd, the applicant and has indicated that no such concerns have been brought to his attention. The EAP is therefore currently obtaining further feedback regarding the community's view on the subject. The significance of the impact is rated as medium.

Figure 18: Map showing the preferred Carisbrooke Quarry site on Portion 3 of Lot 9 Incalu 5000 in the Ubuhlebezwe Local Municipality and the sensitive environmental characteristics surrounding the site (source: Google Earth Pro, 2017).



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

Table 4 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 4: Plan of Study for the EIA process for the Carisbrooke Quarry

Date	Description
17th March 2016	DMR Acceptance of Mining Application received
01st April 2016	Release of Draft Scoping Report to I & APs for comment
09th May 2016	End 30 day comment period
09th May 2016	Submission of Final Scoping Report to DMR. Final Scoping Report included comments received from I & APs during the Scoping Phase.
22nd June 2016	Deadline for DMR to accept or reject Scoping Report (within 43 days of receipt of Scoping Report).
05th July 2016	DMR acceptance of Final Scoping Report.
10th October 2016	EPRO requested an extension to ensure that the Blue Swallows survey could take place during the correct breeding season (Nov – Dec). The extension requested was submitted in terms of Regulation 3 (7) of NEMA[16].

[16] Regulation 3(7) of NEMA states that "In the event where the scope of work must be expanded based on the outcome of an assessment done in accordance with these Regulations, which outcome could not be anticipated prior to the undertaking of the assessment, or in the event where exceptional circumstances can be demonstrated, the competent authority may, prior to the lapsing of

	DMR accepted the extension and requested that the Final EIR be submitted on or before the 28th February 2017.
24th January 2017	Release of the Draft EIR to I & APs
23rd February 2017	End 30 day comment period.
28th February 2017	Latest date for submission of the Final EIR to DMR.
15th June 2017	Deadline for DMR to accept or reject EIR (within 107 days of receipt of the EIR).

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.
  - 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 and effectively rehabilitate the disturbed area using the financial provisions discussed in the section below.
- Outcomes:
  - To promote sustainable development i.e. to 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*[17]*".* 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 Pan, 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 report[18].

The cost for the first annual rehabilitation and remediation activities amounts to R34 120 with the financial provisions for Final Rehabilitation, Decommissioning and Closure of the quarry amounting to R249 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.

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the relevant prescribed timeframe, in writing, extend the relevant prescribed timeframe and agree with the applicant on the length of such extension".

[17] 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.

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

Section 10: Conclusion

10.1 Conclusion

Matzogystix (Pty) Ltd have applied for a Mining Permit in terms of section 27 of the MPRDA for the Carisbrooke Quarry on Portion 3 of Lot 9 Incalu 5000 (as shown in Figure 18 above). 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 however the holder of the Mining Permit is to adhered to a number of mitigation measures outlined in the EMPr to minimise the impacts identified in section 7 of the EIR. In order to ensure effective functioning of the EMPr, the EAP recommends monthly auditing for the first year operation and quarterly audits thereafter. An independent Environmental Control Officer (ECO) is to be present when the initial clearing of the area is carried out. A suitably qualified botanist is also to be present during the initial clearing to identify, map and relocate the provincially protected plant species. A permit from EKZNW is required prior to relocation. Site specific rehabilitation measures once mining is complete are also provided in the EMPr, with specific attention on re-vegetating the disturbed area and re-digging Aardvark holes to promote the site as a Blue Swallow nesting site in the future.

Due to the isolated nature of the Carisbrooke Hill amongst the timber plantations (i.e. no connectivity to other grassland ecosystems) and the willingness of the Inyezi Community to supporting the mining activities, the site is considered feasible for the mine. There were no Blue Swallows found nesting or foraging on the hill therefore there is no impact anticipated on the species. The intangible heritage associated with the rock outcrops on the eastern side of the hill, has not be raised by members of the local Inyezi Community and no mention of the heritage value of the hill has been raised at the community meeting or at the site visit with DMR in July 2016. The EAP has requested that the applicant have the Lease Agreement with the Inyezi Community ready for submission with the Final EIR. The EAP further recommends that the Surface Rights Agreement regarding access through the neighbouring property be signed before the applicant can use the access road.

Due to the various concerns shown by landowners, it is recommended that an independent ECO visit the site on a monthly basis during the first year of operation (and quarterly thereafter) to ensure compliance with the EMPr. A kick off meeting must be held by the ECO to ensure the applicant, mine works manager and any other staff working at the quarry are aware of the environmental sensitivities identified during the EIA process. A suitably qualified botanist is to visit the site during the summer months prior to clearing taking place (initially and before the next section is cleared over time), to identify and relocate protected species from the mining area. A permit from EKZNW is required prior to relocation. The plants can be relocated into the surrounding grassland, which is representative of what is being cleared. A Water Use Authorisation is also required from DWS prior to any activity commencing at the Carisbrooke Quarry, which is currently in process.

The close proximity of the R56 provides an ideal access network to surrounding areas of Ixopo and uMzimkulu, which should further see an increase in the provincial and district road maintenance (uBuhlebezwe Municipality IDP). The dolerite that will be mined at the Carisbrooke Quarry will supply the construction industry contributing to municipal and provincial growth.

Appendix A: EAP Declaration and Curriculum Vitae

Appendix B: Public Participation

- Registered Interested & Affected Parties
- Meetings
- Adverts
- Proof of Notification
- Signboards
- Comments & Responses
- Release & Acceptance of Scoping Report
- Release of Draft EIR

Appendix C: Specialists

#	Title of Report	Author / s
1	Blast Report	Baydrive Mining & Civils (Pty) Ltd
2	Mining Works Programme	Baydrive Mining & Civils (Pty) Ltd
3	Report on the Geohydrological Investigation in Support of a Water Use License Application for the Proposed Neosho Quarry – Ixopo – Sisonke District Municipality	Geomeasure Group
5	Phase One Cultural Heritage Impact Assessment of the Proposed Carisbrooke Quarry with the uBuhlebezwe local and Harry Gwala District Municipalities.	Active Heritage cc
6	Report on Vegetation on a Proposed Quarry Site Near Ixopo	David Styles
7	Follow-Up Report on Vegetation on a Proposed Quarry Site Near Ixopo	David Styles
9	Wetland Assessment Report for the Neosho Trading Ixopo Quarry	The Biodiversity Company
10	Carisbrooke Quarry: Blue Swallow *Hirundo atrocaerulea* Assessment	Inkululeko Wildlife Services & Wildskies Ecological Services.

Appendix D: Impacts Scoring Matrix

Appendix E: Environmental Management Programme