

# terratest

**Geotechnical, Environmental  
& Earth Science Consultants**

**DRAFT BASIC ASSESSMENT REPORT  
PROPOSED EXPANSION OF THE MIDMAR  
CRUSHERS (PTY) LTD DOLERITE QUARRY  
SITE, UMNGENI LOCAL MUNICIPALITY,  
KWAZULU-NATAL**

**September 2018**

*Revision 01 for public comment*

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<b>TITLE:</b> DRAFT BASIC ASSESSMENT REPORT PROPOSED EXPANSION OF THE MIDMAR CRUSHERS (PTY) LTD DOLERITE QUARRY SITE, UMNGENI LOCAL MUNICIPALITY, KWAZULU-NATAL.				
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This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2008 which has been independently certified by DEKRA Certification under certificate number 90906882.				
				
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## Executive Summary

Terratest (Pty) Ltd has been appointed by Midmar Crushers (Pty) Ltd, to undertake the environmental services required for the proposed expansion of the Midmar Crushers (Pty) Ltd Dolerite Quarry Site, uMngeni Local Municipality, KwaZulu-Natal. The proposed development requires Environmental Authorisation from the Department of Mineral Resources (DMR) prior to construction commencing.

The proposal includes for the westward expansion of the existing Midmar Crushers (Pty) Ltd dolerite quarry site. The expansion will be limited to approximately 19.4ha and will include for the construction of two new access roads, dolerite quarry, stockpiles, ablution facilities and site offices. Post construction, two operational quarries will be available for Midmar Crushers (Pty) Ltd to utilise (i.e. the existing quarry and the proposed) until the existing quarry pit is rehabilitated. However, in order to limit the cumulative impacts of operation, only one quarry will be utilised at any one time. As a result, blasting and associated quarrying activities will only occur within one quarry pit at a time and not simultaneously.

The Public Participation Process involves consultation with the relevant authorities, non-government organisations (NGO's), neighbouring landowners, community members and other identified Interested and Affected Parties (IAPs). A newspaper advertisement was published at the outset of the project to inform the public of the environmental process. The advertisement was published in English on 29 November 2017 in the Village Talk newspaper. Site notices were erected on site on 29 November 2017 in English and isiZulu. Further, notification letters were distributed by email to neighbouring landowners, the Ward Councillor, as well as identified Key Stakeholders, including the Department of Water and Sanitation, the Department of Economic Development, Tourism and Environmental Affairs (EDTEA), Ezemvelo KZN Wildlife, the Department of Agriculture, Forestry and Fisheries, the uMngeni Local Municipality, the uMgungundlovu District Municipality, the Department of Human Settlements and the DMR.

Specialist studies undertaken for the proposed development include a Heritage Impact Assessment, as well as a Watercourse and Biodiversity Assessment. The Heritage Impact Assessment identified four possible human grave sites within the proposed expansion area. In this regard, an alternative layout plan has been proposed which will avoid any potential grave sites. The Watercourse and Biodiversity Assessment found no fatal flaws to development. Access bridge alternatives for the crossing of the Nguklu River have also been assessed.

The Draft Basic Assessment (BA) Report and Environmental Management Programme (EMPr) are currently being circulated for comment for a period of 30 days as per Sub-regulation 3(8) of the EIA Regulations (2014, as amended). All State Departments, inclusive of the DMR, are reminded that failure to submit comments within 30 days will, in terms of Sub-regulation 3(4) of the EIA Regulations (2014, as amended), be regarded as having no comment to offer. All comments received will be consolidated into the Final BA Report, to be submitted to the DMR for a decision on Environmental Authorisation.

This BA Report has been drafted in accordance with the EIA Regulations (2014, as amended) and adheres to the requirements contained in Appendix 1 of GNR 982, as noted in Table 1-1.

**TABLE 1-1:** Content of a BA Report (2014 EIA Regulations, as amended)

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
Appendix 1, Section 3 (a)	Details of – (i) The EAP who prepared the report; and the expertise of the EAP; and (ii) The expertise of the EAP, including a curriculum vitae.	Section 2, Appendix 1
Appendix 1, Section 3 (b)	The location of the activity, including – (i) The 21 digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name;	Section 3

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
	(iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 3
Appendix 1, Section 3 (d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered; (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Section 4
Appendix 1, Section 3 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Section 5
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 6
Appendix 1, Section 3 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including- (i) Details of all alternatives considered; (ii) Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated. (vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects; (viii) The possible mitigation measures that could be applied and level of residual risk; (ix) The outcome of the site selection matrix; (x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and; (xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 7 Section 8 Section 8 Section 9 Section 11 Section 11 Section 11 Section 11 Section 12 Section 7 Section 12
Appendix 1, Section 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Section 11
Appendix 1, Section 3 (j)	An assessment of each identified potentially significant impact and risk, including- (i) Cumulative impacts; (ii) The nature, significance and consequences of the impact and risk; (iii) The extent and duration of the impact and risk; (iv) The probability of the impact and risk occurring; (v) The degree to which the impact and risk can be reversed;	Section 12

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
	(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) The degree to which the impact and risk can be avoided, managed or mitigated.	
Appendix 1, Section 3 (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.	Section 10
Appendix 1, Section 3 (l)	An environmental impact statement which contains- (i) A summary of the key findings of the environmental impact assessment; (ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Section 13, Section 14
Appendix 1, Section 3 (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.	Section 13
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 14
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	-
Appendix 1, Section 3 (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 14
Appendix 1, Section 3 (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	-
Appendix 1, Section 3 (r)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Section 17
Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	-
Appendix 1, Section 3 (t)	Where applicable, any specific information required by the Competent Authority.	-
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	-

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## ACRONYMS

BA	-	Basic Assessment
CBD	-	Central Business District
CLO	-	Community Liaison Officer
CV	-	Curriculum Vitae
EA	-	Environmental Authorisation
EAP	-	Environmental Assessment Practitioner
EDTEA	-	Economic Development, Tourism and Environmental Affairs
EIA	-	Environmental Impact Assessment
EKZNW	-	Ezemvelo KZN Wildlife
EMPr	-	Environmental Management Programme
DMR	-	Department of Mineral Resources
DWS	-	Department of Water and Sanitation
HIA	-	Heritage Impact Assessment
IAP	-	Interested and Affected Party
IUCN	-	International Union for Conservation of Nature
mamsl	-	Metres above mean sea level
MPRDA	-	Mineral and Petroleum Resources Development Act (Act 28 of 2002)
NEMA	-	National Environmental Management Act (Act 107 of 1998)
NFEPA	-	National Freshwater Ecosystem Priority Area
NGO	-	Non-Government Organisation
NWA	-	National Water Act (Act 36 of 1998)
PES	-	Present Ecological State
PIA	-	Palaeontological Impact Assessment
SAHRIS	-	South African Heritage Resources Information System
SG	-	Survey General
WMA	-	Water Management Area
WULA	-	Water Use Licence Application

# PROPOSED EXPANSION OF THE MIDMAR CRUSHERS (PTY) LTD DOLERITE QUARRY SITE, UMNGENI LOCAL MUNICIPALITY, KWAZULU-NATAL

## 1 INTRODUCTION

Terratest (Pty) Ltd has been appointed by Midmar Crushers (Pty) Ltd, to undertake the environmental services required for the proposed expansion of the Midmar Crushers (Pty) Ltd Dolerite Quarry Site, uMngeni Local Municipality, KwaZulu-Natal. The proposed development requires Environmental Authorisation from the Department of Mineral Resources (DMR) prior to construction commencing.

The proposal includes for the westward expansion of the existing Midmar Crushers (Pty) Ltd dolerite quarry site. The expansion will be limited to approximately 19.4ha and will include for the construction of two new access roads, dolerite quarry, stockpiles, ablution facilities and site offices. Post construction, two operational quarries will be available for Midmar Crushers (Pty) Ltd to utilise (i.e. the existing quarry and the proposed) until the existing quarry pit is rehabilitated. However, in order to limit the cumulative impacts of operation, only one quarry will be utilised at any one time. As a result, blasting and associated quarrying activities will only occur within one quarry pit at a time and not simultaneously.

Upon appointment, Midmar Crushers (Pty) Ltd provided Terratest (Pty) Ltd with a proposed layout for expansion. This layout included for a 19.4ha area of expansion on which to develop the proposed new quarry. This layout is referred to as **Layout Alternative 1**. During the Basic Assessment Process, various Specialist Studies were commissioned, including a Heritage Impact Assessment. The findings thereof identified four possible human grave sites within the Layout Alternative 1 expansion area. As a result, the layout has been amended to avoid any possible contact with the four potential grave sites. The amended application area is referred to as **Layout Alternative 2 (Preferred Alternative)** and still allows for an expansion area of approximately 19.4ha.

As per GNR 326 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended) a Basic Assessment (BA) Process must be undertaken in such a manner that the environmental outcomes, impacts and residual risks of the proposed Listed Activities being applied for are noted in the BA Report and assessed accordingly by the Environmental Assessment Practitioner (EAP). In this regard, the requirements of the BA Process are noted in the EIA Regulations (2014, as amended)), Listing Notice 1, Appendix 1 of GNR 326 and are consequently adhered to in this report (please refer to Table 1-1 of the Executive Summary).

Ultimately, the outcome of the BA Process is to provide the Competent Authority, the Department of Mineral Resources (DMR), with sufficient information to provide a decision on the Application in terms of Environmental Authorisation (EA), in order to avoid or mitigate any detrimental impacts that the activity may impose on the receiving environment.

## 2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Terratest (Pty) Ltd has been appointed by Midmar Crushers (Pty) Ltd to undertake the environmental services required for the westward expansion of the Midmar Crushers (Pty) Ltd site, uMngeni Local Municipality, KwaZulu-Natal. Details of the qualified EAPs involved in undertaking the BA Process are noted in Table 2-1 and the Curriculum Vitae (CV) of the relevant EAPs attached as Appendix 1.

**TABLE 2-1:** Details of the EAP

<b>COMPANY: TERRATEST (PTY) LTD</b>			
<b>EAP</b>	<b>Qualifications &amp; professional affiliations</b>	<b>Experience</b>	<b>Contact details</b>
<b>Mr M. van Rooyen</b> Executive Associate	BSc, BSc Hons, MPhil. (Environmental Management), Pr. Sci. Nat, IAIAsa	14 years	Tel: (033) 343 6789 Email: vanrooyenm@terratest.co.za
<b>Ms L. Dralle</b> Environmental Scientist	BSc. Hons Environmental Management, IAIAsa	11 years	Tel: (033) 343 6789 Email: drallel@terratest.co.za

### 2.1 SUMMARY OF EAPS EXPERIENCE

**Mr Magnus van Rooyen:** Mr van Rooyen is currently an Executive Associate and the Regional Head of the Environmental Division of Terratest (Pty) Ltd. He is located in Pietermaritzburg, KwaZulu-Natal.

In addition to holding a Masters degree in Environmental Management, Mr van Rooyen also holds a BSc degree in Botany and Zoology, an Honours Degree in Botany and a Post Graduate Certificate in Education. He has 13 years' experience in projects involving Environmental Impact Assessments in various developmental sectors (Mining and Agricultural Sector, National Roads, Pipelines, Dams, and Residential Developments), conducting Specialist Biodiversity Assessments associated with Environmental Impact Assessments and Project Feasibility Studies. He has experience in the compilation of Resettlement Policy Framework Plans associated with infrastructure development projects. Mr van Rooyen has experience in working on various private and public sectors, as well as rural and urban environments in various countries.

Mr van Rooyen's expertise lies within the mining sector where he has gained extensive exposure to all the aspects of mining projects from the pre-feasibility, prospecting, Environmental Impact Assessment and implementation and monitoring stages. In addition, he has conducted Due Diligence Assessments, as well as Environmental Compliance Monitoring and Management of a variety of mining sites.

**Ms Liz Dralle:** Ms Dralle is a Senior Environmental Scientist with Terratest (Pty) Ltd and has been practising as an Environmental Assessment Practitioner (EAP) for the past 11 years. She holds an Honours Degree in Environmental Management and her experience includes undertaking Environmental Impacts Assessments, Mining Right and Mining Permit Applications, Waste Management Licences, Water Use Licence Applications, Environmental Screening Assessments, Environmental Compliance Auditing and Environmental Management Programmes. Ms Dralle prescribes to the International Association for Impact Assessment South Africa (IAIAsa) code of conduct and has been a member since 2007.

## 3 LOCATION OF THE ACTIVITY

The site proposed for development is the Remainder of the Farm Lot 51 No. 1794. The site is located within Ward 9 of the uMngeni Local Municipality, located approximately 1km south of Mpophomeni and approximately 17km southwest of Howick. Midmar Crushers (Pty) Ltd currently operate an existing dolerite quarry adjacent to the proposed expansion site on Lot 50 of the Farm Rietvallei No. 1043, under Mining Right KZN30/5/1/2/2/188 MR (see Figure 3-1 and Figure 3-2).

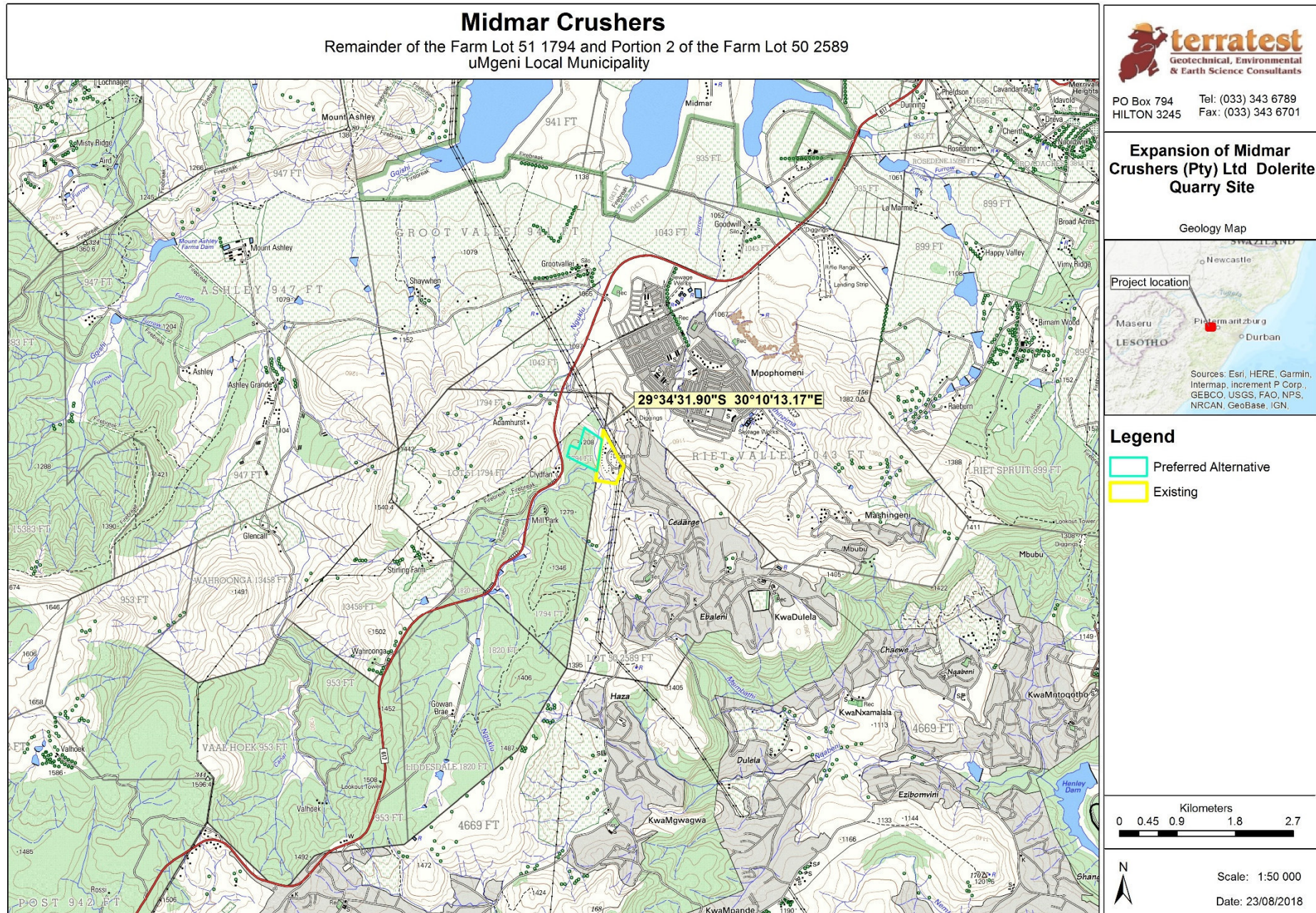


FIGURE 3-1: Locality Map

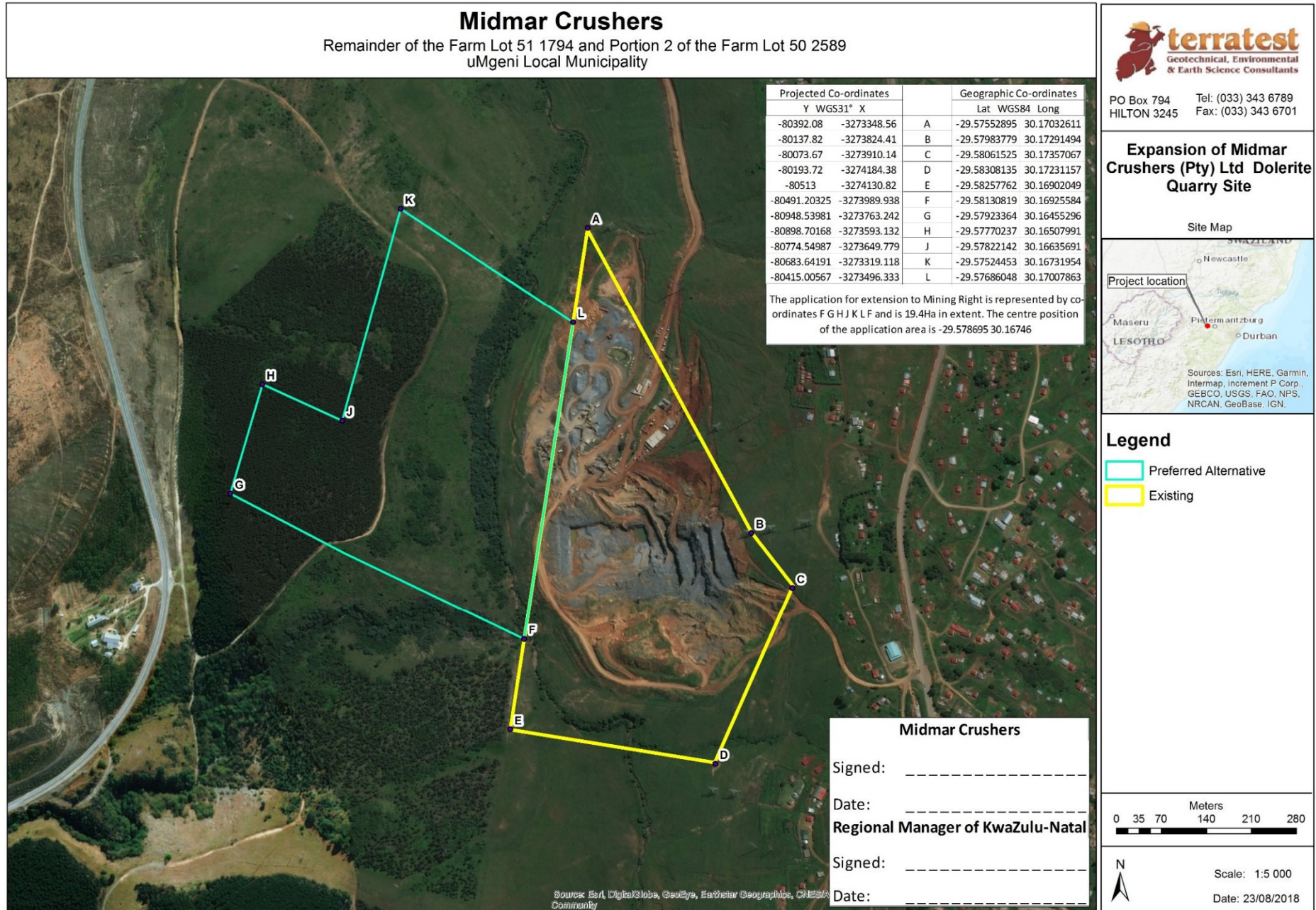


FIGURE 3-2: Layout Map

The 21-digit Surveyor General (SG) code for the site, as well as site coordinates and the relevant municipal districts are provided in Table 3-1.

**TABLE 3-1:** Site details

<b>Farm Name</b>	Remainder of the Farm Lot 51 No. 1794
<b>Landowner</b>	Midmar Crushers (Pty) Ltd
<b>Application area (Ha)</b>	19.4ha
<b>Magisterial district</b>	Lions River
<b>21-digit Surveyor General Code</b>	N0FT00000000179400000
<b>Centre coordinates</b>	29°34'42.97"S; 30°10'04.55"E

## 4 ACTIVITY DESCRIPTION

### 4.1 APPLICABLE LISTED ACTIVITIES

In terms of the Environmental Impact Assessment (EIA) Regulations (2014, as amended), promulgated in terms of the National Environmental Management Act, 1998 (NEMA), certain Listed Activities are specified for which either a Basic Assessment (GNR 327 and GNR 324) or a full Scoping and EIA (GNR 325) is required.

The following Listed Activities in Government Notice (GNR 327 (Listing Notice 1) and GNR 324 (Listing Notice 3) requiring a Basic Assessment (BA) Process are applicable to the proposed expansion:

- **GNR 327, Activity 12:** “The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs a) within a watercourse b) in front of the development setback; or c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of the watercourse, excluding (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves.”
  - *The proposed expansion will necessitate the construction of two access roads and associated bridges over the Nguklu River. This will therefore require construction within a watercourse, thereby triggering this Listed Activity.*
- **GNR 327, Activity 19:** “The infilling or depositing of any material of more than 10 cubic metres into, or dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 10 cubic metres from (i) a watercourse.”
  - *The construction of two access roads and associated bridges over the Nguklu River will result in the deposition and / or removal of more than 10m<sup>3</sup> from the watercourse, thereby triggering this Listed Activity.*
- **GNR 327, Activity 27:** “The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation”.
  - *Construction activities will require the clearance of more than 1 hectare of indigenous vegetation on site, but less than 20 hectares. Therefore, this Listed Activity is triggered.*
- **GNR 324, Activity 4:** “The development of a road wider than 4 metres with a reserve less than 13,5 metres in (d) KwaZulu-Natal (xii) outside urban areas (aa) areas within 10 kilometres from national

parcs or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve”.

- *The site falls within 5km of the Midmar Nature Reserve and construction of the proposed access roads will be wider than 4 metres. This Listed Activity is therefore triggered.*
- **GNR 324, Activity 14:** “The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more in (d) KwaZulu-Natal (x) Outside urban areas (aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.”
  - *The construction of two access roads and associated bridges across the Nguklu River will have a physical footprint larger than 10m<sup>2</sup>, within 5km of the Midmar Nature Reserve. Therefore, this Listed Activity is triggered.*

Based on the above proposed activities, a BA Process is required. An organogram of the BA Process is provided in Figure 4-1 for reference purposes.

#### 4.2 NATIONAL WATER ACT (ACT NO 36 OF 1998)

As per the National Water Act (Act No. 36 of 1998), should an identified activity trigger a Water Use, as defined in Section 21 of the Act, a Water Use Licence or a General Authorisation registration will be required prior to the activity being undertaken. The Competent Authority in this regard is the Department of Water and Sanitation. Water Uses, in terms of Section 21 of the National Water Act (Act No. 36 of 1998) include:

- a) Taking water from a water resource;
- b) Storing water;
- c) Impeding or diverting the flow of water in a watercourse;
- d) Engaging in a stream flow reduction activity contemplated in Section 36;
- e) Engaging in a controlled activity identified as such in Section 37(1) or declared under Section 38(1);
- f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- g) Disposing of waste in a manner which may detrimentally impact on a water resource;
- h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- i) Altering the bed, banks, course or characteristics of a watercourse;
- j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- k) Using water for recreational purposes.

A Pre-Application Meeting will be held with the Department of Water and Sanitation to ascertain their requirements and to confirm the Water Uses to be applied for. The necessary Water Use Licencing process will be conducted as per the National Water Act (Act No. 36 of 1998) and does not fall within the mandate of the DMR or NEMA. As such, this aspect of the project will not be considered further in this Application for Environmental Authorisation.



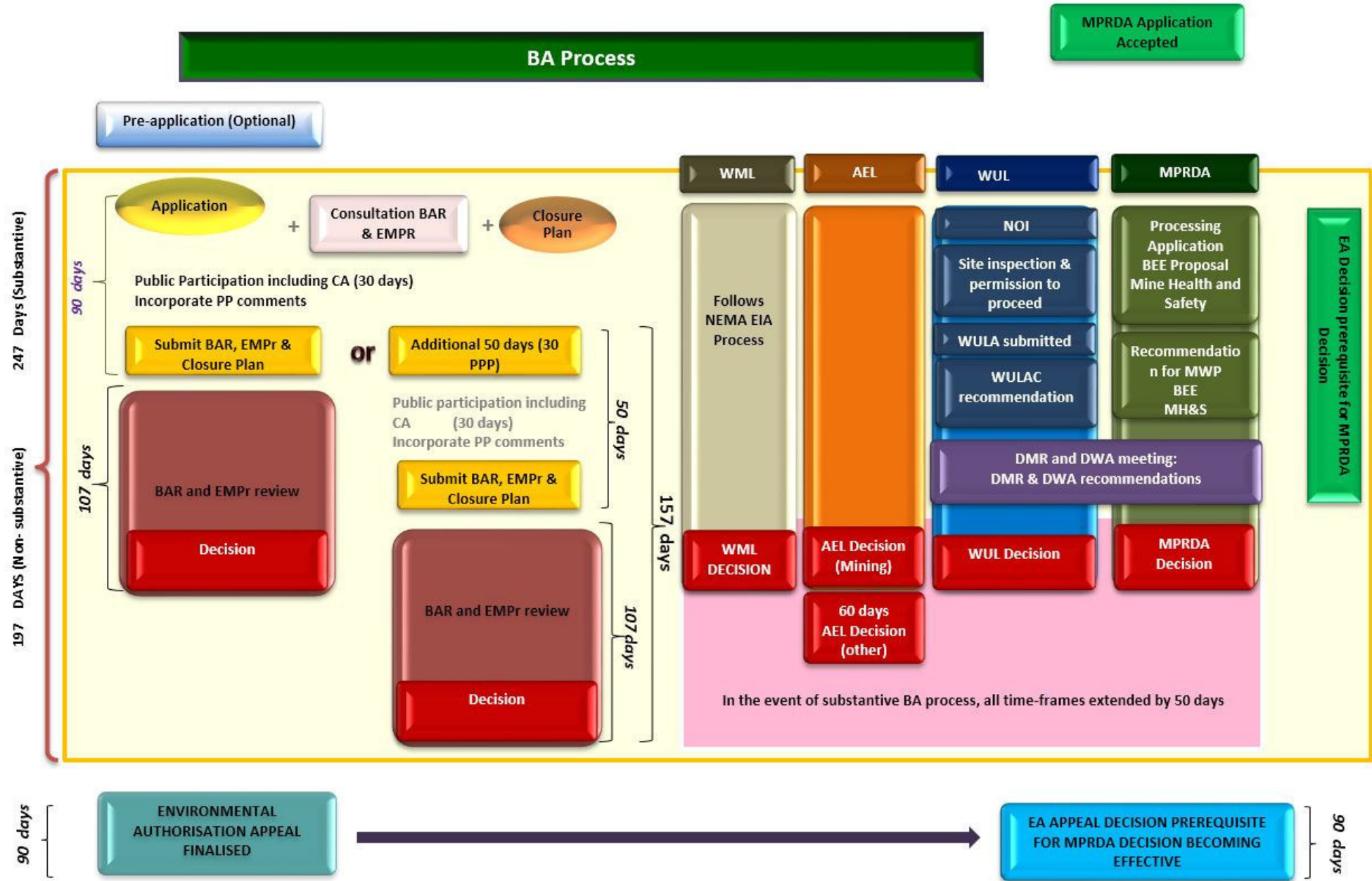


FIGURE 4-1: Basic Assessment Process Organogram

## 4.3 DESCRIPTION OF THE ACTIVITY

### 4.3.1 Project Overview

Terratest (Pty) Ltd has been appointed by Midmar Crushers (Pty) Ltd to undertake the environmental services required for the proposed expansion of the Midmar Crushers (Pty) Ltd dolerite quarry site, uMngeni Local Municipality, KwaZulu-Natal.

The proposal includes for the westward expansion of the existing Midmar Crushers (Pty) Ltd dolerite quarry site. The expansion will be limited to 19.4ha and will include for two new access roads and associated bridges, dolerite quarry, stockpiles, ablution facilities and site offices.

The stages of development are detailed below:

#### A. PRE-CONSTRUCTION / PLANNING PHASE:

The Pre-construction / Planning Phase of the proposed expansion will include for the demarcation and survey of the 19.4ha area of land which will be cleared and grubbed; the surveying of the access road and two low-level bridge (causeway) crossings; the identification and cordoning off of 'no-go' areas for the construction and operational phases; and the planned layout of the operational area including for the location of stockpiles, overburden material, topsoil, designated turning area for trucks, ablution area, office area, emergency assembly point and stormwater controls. The Pre-Construction and Planning Phase will also entail the finalisation of the Mining Plan and the methodology in which to undertake the mining activities.

#### B. CONSTRUCTION PHASE:

Construction Phase activities will include the following:

##### a) Clear and grubbing

All areas required for development will be cleared of vegetation and all topsoil removed and stockpiled on site, as per the Layout Plan, for use during the rehabilitation phase. All topsoil stockpiles will be surrounded by silt traps and/or berms to prevent run-off and siltation of watercourses. Topsoil stockpiles shall be kept separate from overburden stockpiles and shall not be used for maintaining access roads.

##### b) Levelling and platforming

As the site is located on the side of a hill, a certain amount of levelling will be required prior to operation. In this regard, blasting, cut, fill and compaction activities will need to be implemented in order to create level platforms for the development of the quarry site and for the site camp. The overburden and topsoil stockpiles will be stored on the platforms and will be surrounded by silt traps and/or berms to prevent run-off and siltation of the nearby watercourse.

##### c) Access roads

Two new gravel access roads from the existing quarry site, located to the east of the Nguklu River will need to be cut to allow for the construction of the proposed low-level bridges (causeways). On the opposite side of the Nguklu River, on the southern corner of the proposed expansion site, the road will be extended up from the existing Mining Right Area to the new site camp and quarry area. The gravel road will be 6m wide or less. An additional gravel access road and low-level bridge (causeway) is proposed to be constructed approximately 400m downstream (i.e. north) of the first low-level bridge. Both bridges will accommodate one-way traffic only. The result thereof will result in a one-way traffic system through the expansion area which will eradicate the need for vehicle turning areas and will also increase road safety on the site.

**d) Low-level bridge (causeway) construction:**

Two low-level access bridges (causeways) will require construction across the Nguklu River. The low-level access bridges will be 6m wide or less. The carrying capacity of both bridges will be 50 tons each in order to allow for laden construction vehicles and operational vehicles to cross safely.

Construction will necessitate the temporary impedance of water in the river during construction as a result of cofferdam<sup>1</sup> construction. Conduits will be placed in the watercourse during construction to allow for the free flow of water through built infrastructure where necessary. The causeway will be built to Department of Transport (DoT) requirements for construction on bedrock, as detailed in Figure 4-2 and will be a box culvert design as presented in Plates 4-1 and 4-2.

Each access bridge will allow for the single passage of one heavy construction vehicle or operational vehicle at a time.



**PLATE 4-1:** Example of a typical DoT box culvert design



**PLATE 4-2:** Example of box culvert bridge crossing

Further information on the box culvert design is presented in Section 7: Alternatives.

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<sup>1</sup> A cofferdam is a structure that retains water and soil that allows the enclosed area to be pumped out and excavated dry. Cofferdams are commonly used for construction of bridge piers and other support structures built within water.

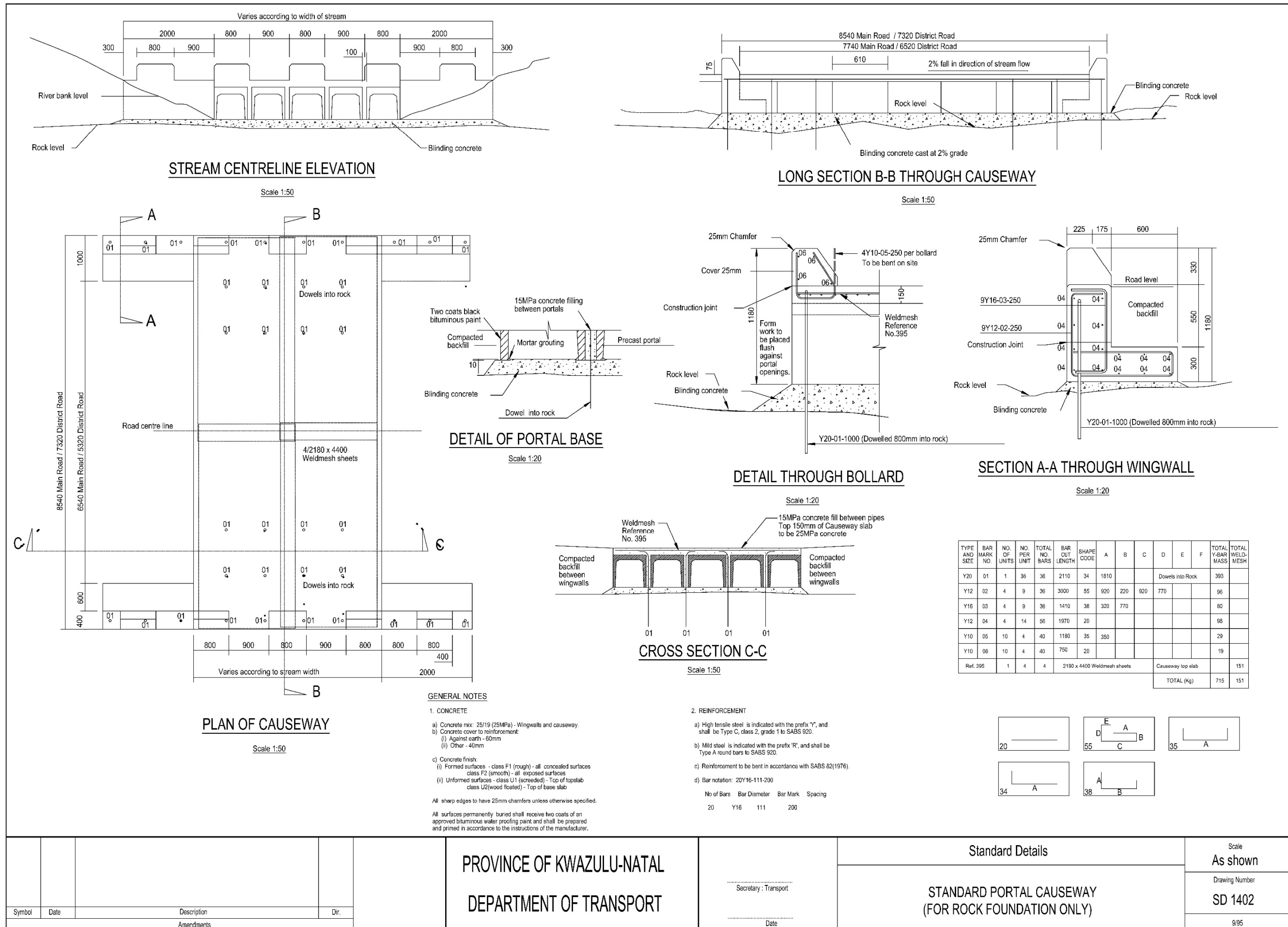


FIGURE 4-2: Low-level bridge (causeway) design

### C. OPERATIONAL PHASE

The operational phase of the quarry will involve blasting of the hard rock (dolerite) in the quarry; utilising a rock breaker pecker where necessary to break blasted rock into further fragments for sizing purposes; the loading of blasted dolerite onto tipper trucks and the transportation of loaded material along the dedicated access road to the existing operational quarry on the eastern side of the Nguklu River. There the rock will be deposited at the existing crushing plant for processing.

The operational activities are described in further detail below:

#### a) Defined quarrying area

The quarry area will be clearly demarcated by beacons at its corners and along the boundaries to ensure visibility. The beacons will be firmly erected and maintained in their correct position throughout the life of the operation. This is likely to be conducted via the placement of large white painted boulders on the periphery of the site.

#### b) Blasting

The existing Blasting Management Plan and principles utilised by Midmar Crushers (Pty) Ltd currently at the existing site will be implemented for the new expansion site, with prior approval from the DMR, Quarry Operator and Owner. The Blasting Management Plan will make allocations for the undertaking of the following pre-blasting activities:

- Informing surrounding landowners and communities that may be impacted by the blasting of the timing and procedures of any blasting event;
- Inspection and photographic recording of all structural damage to any structures (buildings, roads etc.) within a radius of 500m of the blasting site, by an independent assessor, before any blasting is to take place;
- Making allocations for the use of nitrate-free explosives where-ever possible (i.e. methods such as drilling and black powder, expanding mortar or old fashioned “plugs and feathers”); and
- The use of noise mufflers and/or soft explosives during blasting.

The Blasting Management Plan will include early warning specifications prior to blasting taking place informing surrounding residents of the intended blast. This will take the form of a siren that will sound 15 minutes before blasting that will be audible up to a radius of 1km from the site. During blasting events, if deemed necessary through an internal risk assessment, traffic signs will be utilised on the Main Road R617 advising motorists of scheduled blasting dates and times. In addition, traffic points men will be employed to temporarily stop vehicles travelling past the site.

The Blasting Management Plan will include suitably approved noise and dust prevention measures, as well as approved measures to contain and limit the occurrence of fly rock during blasting. Further, the Blasting Management Plan will include the post-blasting monitoring of all structures identified to be of risk and recorded prior to the blasting activity. Any damage resulting from vibrations caused by blasting will be recorded and corrected by suitable measures in agreement with the owners of these structures. Upon implementation of mitigation measures to the structures, a photographic record will again be taken of these structures. This assessing process and recording will be completed by an independent assessor.

Any damage caused by possible fly rock will be recorded and addressed in a manner agreed to by the owner of the damaged structures. Upon completion of these mitigation measures, the affected structures will again be recorded photographically.

**c) Benching**

Depending on the bench configurations adopted and assuming average depths of exploitation ranging between 15m and 30m, a conservative estimate would yield between 1 and 2 million m<sup>3</sup> of commercially crushable dolerite rock. A preliminary plan is provided in Section 7.

**d) Site camp and operational areas**

All areas required for operational activities will be cleared and grubbed as detailed previously. A detailed layout plan will be drafted detailing storage areas for stockpiles, laydown areas, as well as the office, ablution and eating areas.

**e) Crushing**

Blasted dolerite will be collected onsite via tipper trucks and transported back to the existing Midmar Crushers (Pty) Ltd site via the dedicated access roads and low-level bridges. All crushing activities will occur at the existing, authorised Midmar Crushers (Pty) Ltd site (ref: KZN30/5/1/2/2/188 MR).

**f) Stormwater**

All stormwater from operational areas will be channelled into the operational dolerite pit. This will be implemented via the construction and maintenance of diversions berms around the operational area. Berms will also be constructed on the downside gradient of the access road to prevent run-off from entering the Nguklu River and the resultant sedimentation thereof. The stormwater collected in the operational dolerite pit will be pumped into a bowser for use as a dust suppression mechanism on surrounding roads.

**g) Air quality**

Dust-buckets will be installed around the site to determine the impact of quarrying operations on air quality. All results will be recorded monthly in the Environmental File. Dust suppression mechanisms will be implemented on all access roads and all necessary areas within the pit. This will either be conducted via the spraying of water as collected in the quarry pit, or via chemical means.

**D. DECOMMISSIONING / REHABILITATION PHASE**

The decommissioning of the quarry will occur once the available resource (i.e. dolerite) has been quarried. All infrastructure will be demolished and moved off site. The overburden stockpile will be disposed of in the quarry pit and the benches sloped to allow for a gentler gradient. All compacted areas, including access roads, laydown areas and platforms, will be ripped, topsoiled and seeded. The low-level bridges (causeways) will be removed and the profile of the Nguklu River reinstated. All disturbance associated with the quarry alongside the Nguklu River and within the riverine zone, will be rehabilitated.

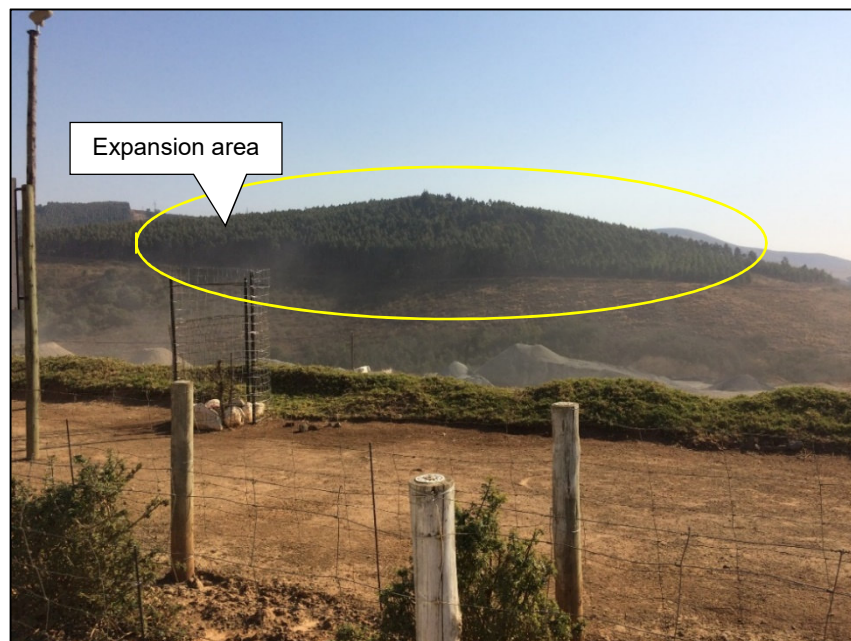
The following best practice procedures will also be followed:

- The excavated area (quarry pit) will serve as a final depositing area for the placement of overburden material;
- Rocks and coarse material removed from the excavation will be dumped into the pit simultaneously with the overburden;
- Under no circumstances will waste be permitted to be deposited in the quarry pit;
- Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the quarry area and disposed of at a recognised landfill facility;
- Waste will not be permitted to be buried or burned on the site;

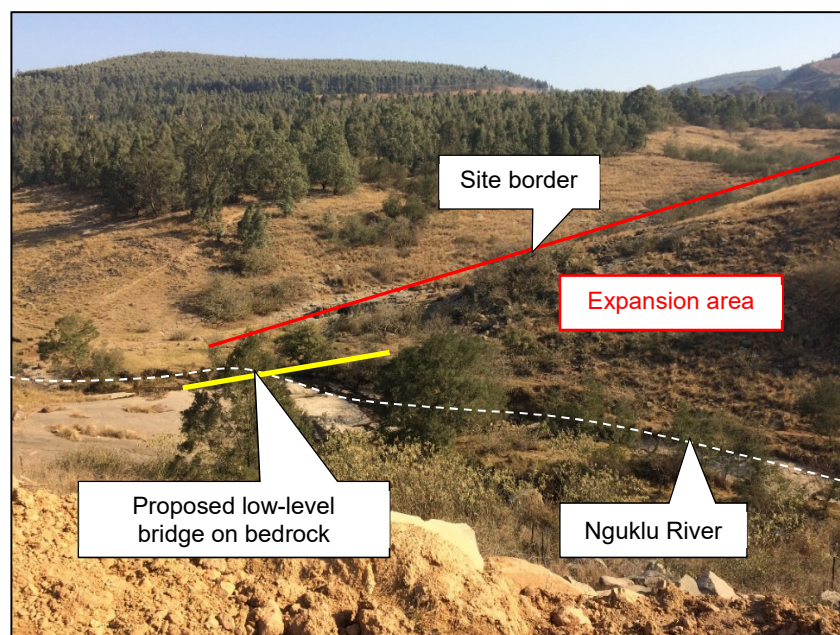
- Once excavations have been refilled with overburden, rocks and coarse natural materials and profiled with acceptable contours and erosion control measures, the topsoil previously stored, will be returned to its original depth over the area;
- The area will be fertilised, if necessary, to allow vegetation to establish rapidly;
- The site will be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora; and
- All infrastructure, equipment, plant and other items used during the quarrying period will be removed from the site.

#### 4.3.2 Site photographs

Photographs of the site are provided in Plates 4-3 to 4-8.



**PLATE 4-3:** View of the proposed expansion from the existing, operation mine (facing west)



**PLATE 4-4:** Location of proposed low-level bridge crossing – southern end of site



**PLATE 4-5:** Existing gravel access road on site



**PLATE 4-6:** Existing *Eucalyptus* plantation on site





**PLATE 4-7:** View from site facing existing dolerite quarry (facing east). Dust bucket in foreground



**PLATE 4-8:** View from site facing existing dolerite quarry (facing east)

A map showing the location of where photographs were taken is provided as Figure 4-3.

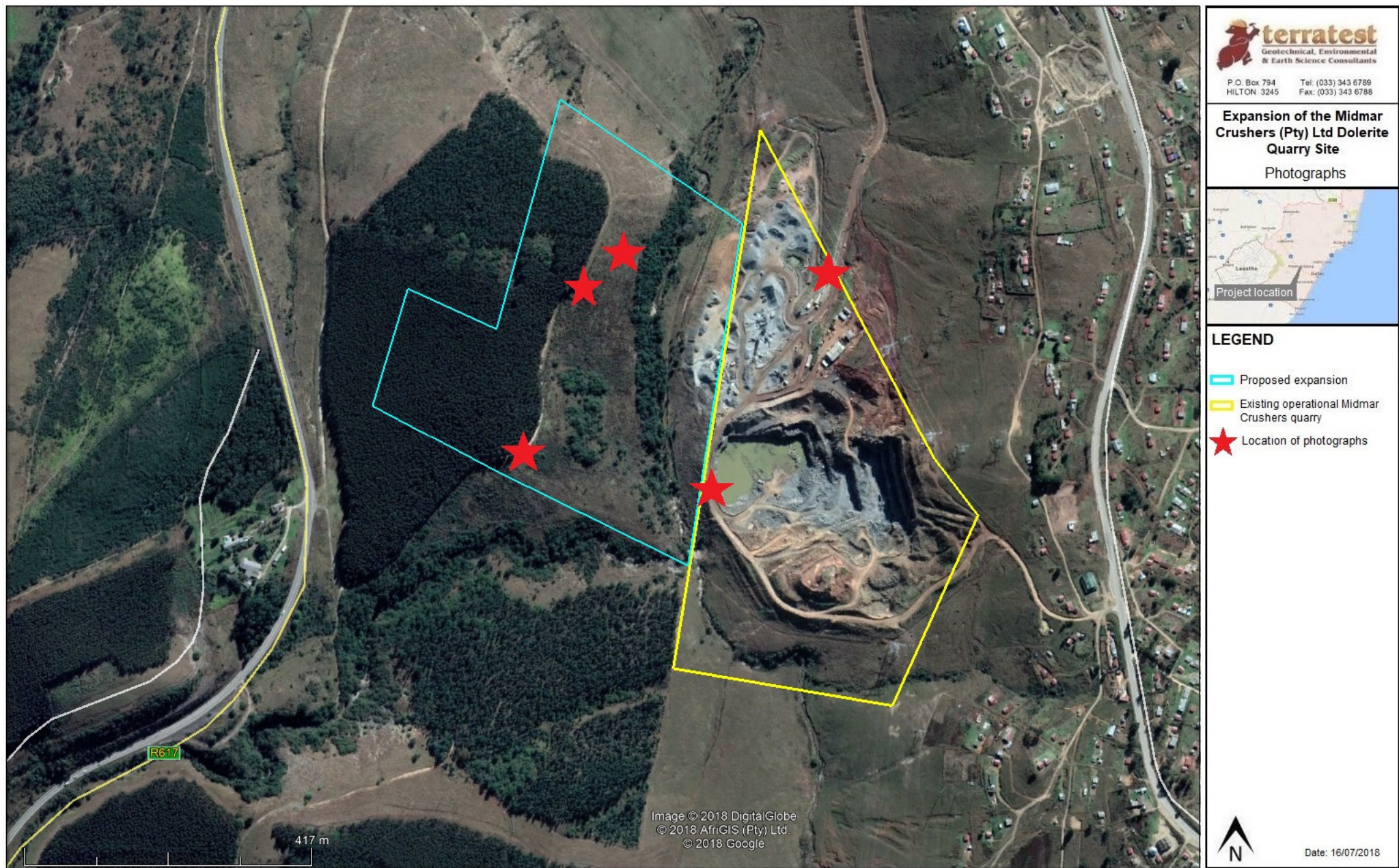


FIGURE 4-3: Location of Plates as referenced above from Plate 4-3 to Plate 4-8

## 5 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

Table 5-1 provides a list of all the applicable legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA Regulations (2014, as amended).

**TABLE 5-1:** Applicable legislation, policies and/or guidelines

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	ADMINISTERING AUTHORITY:	DATE:
The Constitution of the Republic of South Africa (Act 108 of 1996) – Bill of Rights, Section 24, “everyone has the right to an environment that is not harmful to their health or well-being”.	Republic of South Africa	1996
National Environmental Management Act (Act 107 of 1998) – for its potential to cause degradation of the environment (Section 28).	Department of Environmental Affairs	1998
Environmental Conservation Act (Act 73) – for potential environmental degradation.	Department of Environmental Affairs	1989
Mineral and Petroleum Resources Development Act (Act 28 of 2002) – for the regulation of mining and mining related activities.	Department of Mineral Resources	2002
Minerals and Petroleum Resources Development Act (Act 28 of 2002), Government Notice R577 of April 2004 - for the separation of clean and dirty water run-off in terms of surface water drainage.	Department of Mineral Resources	2004
National Water Act (Act 36 of 1998) – for potential to cause pollution of water resources defined under the Act (Section 19 and 21).	Department of Water Affairs and Forestry	1998
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) – for protection of agricultural resources and for control and removal of alien invasive plants.	National Department of Agriculture	1983
Subdivision of Agricultural Land Act, Act 70 of 1970 – for the subdivision of agricultural land.	National Department of Agriculture	1970
National Forests Act (Act 84 of 1998) – for the protection of trees.	Department of Agriculture, Forestry and Fisheries	1998
The National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEM: AQA) – outlines the norms and standards with regards to air quality management planning, monitoring, compliance and management measures	Department of Environmental Affairs	1998
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) – for protection of biodiversity.	Department of Agriculture and Environmental Affairs & Ezemvelo KZN Wildlife	2004
The National Heritage Resources Act (Act No 25 of 1999 as amended) – for the identification and preservation of items of heritage importance.	Department of Arts and Culture (Amafa KwaZulu-Natal)	1999
Integrated Environmental Management Guideline; Guideline on Need and Desirability (2017).	Department of Environmental Affairs, Pretoria, South Africa	2017
Guideline 4: Public Participation in support of the EIA Regulations (2005).	Department of Environmental Affairs and Tourism	2006
Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations.	Department of Environmental Affairs, Pretoria, South Africa	2017
Guideline 7: Detailed Guide to Implementation of the Environmental Impact Assessment Regulations (2006).	Department of Environmental Affairs and Tourism	2007
Guideline: Public Participation guideline (2017) - For implementation of the Public Participation Process.	Department of Environmental Affairs	2017
Guideline: Need and Desirability (2017) - For Need and Desirability motivation.	Department of Environmental Affairs	2017
UMngeni Langalibalele Municipal By-Laws.	Local Municipality	Updated accordingly

## 6 DEVELOPMENT MOTIVATION

### 6.1 NEED & DESIRABILITY

The westward expansion of the Midmar Crushers (Pty) Ltd quarry aims at increasing the reserve available to quarry as the current reserve, at the existing quarry is almost depleted. It is therefore a business development strategy to mine available resources in close proximity to the existing quarry as this will save on transportation costs, as well as quarry development expenses. All operational infrastructure required to quarry dolerite, including crusher and administration facilities, are already present at the existing and authorised<sup>2</sup> Midmar Crushers (Pty) Ltd quarry site. Resources quarried off-site of the existing quarry can therefore be processed at the existing quarry, utilising existing infrastructure.

The westward expansion of the existing Midmar Crushers (Pty) Ltd quarry, over confirmed dolerite deposits, is also considered to be a continuation of the quarrying activity, which is in-keeping with the surrounding land use activities and is therefore considered to be a continuation of activities within the same area.

The westward expansion of the Midmar Crushers (Pty) Ltd site ensures that Midmar Crushers (Pty) Ltd continues their operations given the presence of the existing dolerite deposit. In this regard, the current Midmar Group employees (150 staff) will retain their positions. Further, Midmar Crushers (Pty) Ltd is the main supplier of dolerite to the uMngeni Local Municipality given their location and is the only supplier of dolerite stone between Mpophomeni and Underberg. They are therefore a local supplier of dolerite.

The westward expansion of Midmar Crushers (Pty) Ltd will therefore ensure the future operation of the company and continued employment for the 150 staff members. It must be noted, however, that the westward expansion of the Midmar Crushers (Pty) Ltd quarry will not create any additional direct employment opportunities.

### 6.2 PLANNING INITIATIVES

#### 6.2.1 KZN Provincial Growth and Development Plan (PGDP)

The KwaZulu-Natal Provincial Growth and Development Plan (2016/17) was designed to be aligned to and in synergy with the National Development Plan and is a primary overarching strategic framework for development in KwaZulu-Natal. It drives growth and development in the Province until the year 2035 and aims at addressing issues and challenges of poverty, inequality and unemployment. Strategic Objective 1.2: Enhance Sectoral development through trade investment and business retention highlights the importance of mining in ensuring the province's diversity in periods of economic volatility, *"In assessing the comparative and competitive advantages, as well as the nature and structure of the KZN economy, it has become evident that the lead sectors are industrial development and manufacturing, finance, real estate and business services, infrastructure development and construction, transport storage and communications, tourism, mining and beneficiation as well as wholesale and retail trade. The diversified nature of the KZN economy is one of its key strengths and has enabled resilience in response to economic volatility."*

The PGDP continues to note the current job loss in the province as a result of the current economic downturn, which is excessively high when measured against similar developing countries. An action plan has been developed to support growth of employment in the province, which incorporates three main high-level approaches. The first entails supporting established business in key sectors. The second entails creating new business and the third, which is applicable to this application, is the expansion of existing business.

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<sup>2</sup> Mining Right KZN30/5/1/2/2/188 MR.

Such expansion allows for established business to continue operating, therefore maintaining a work force and ensuring continued contribution to the Gross Domestic Product (GDP) (PGDP, 2016/17).

### **6.2.2 Integrated Development Plan**

The uMngeni Municipality 2016/2017 Integrated Development Plan (IDP) highlights the various corridors available in the municipality. The R617, off which the proposed expansion site is located, is considered to be a Primary Corridor as it provides a major linkage to the adjoining districts to the north, south and east. As per the IDP, *“The primary function of these corridors is long distance traffic movement, but development should be encouraged at appropriate locations along the corridors.”* The location of the existing quarry and the proposed expansion of the quarry along the Main Road R617 are both beneficial to the Midmar Group in terms of transport infrastructure, as well as to the Municipality given its proximity along a primary corridor, in line with the IDP.

## 7 MOTIVATION FOR THE PREFERRED SITE, ACTIVITY AND TECHNOLOGY ALTERNATIVE

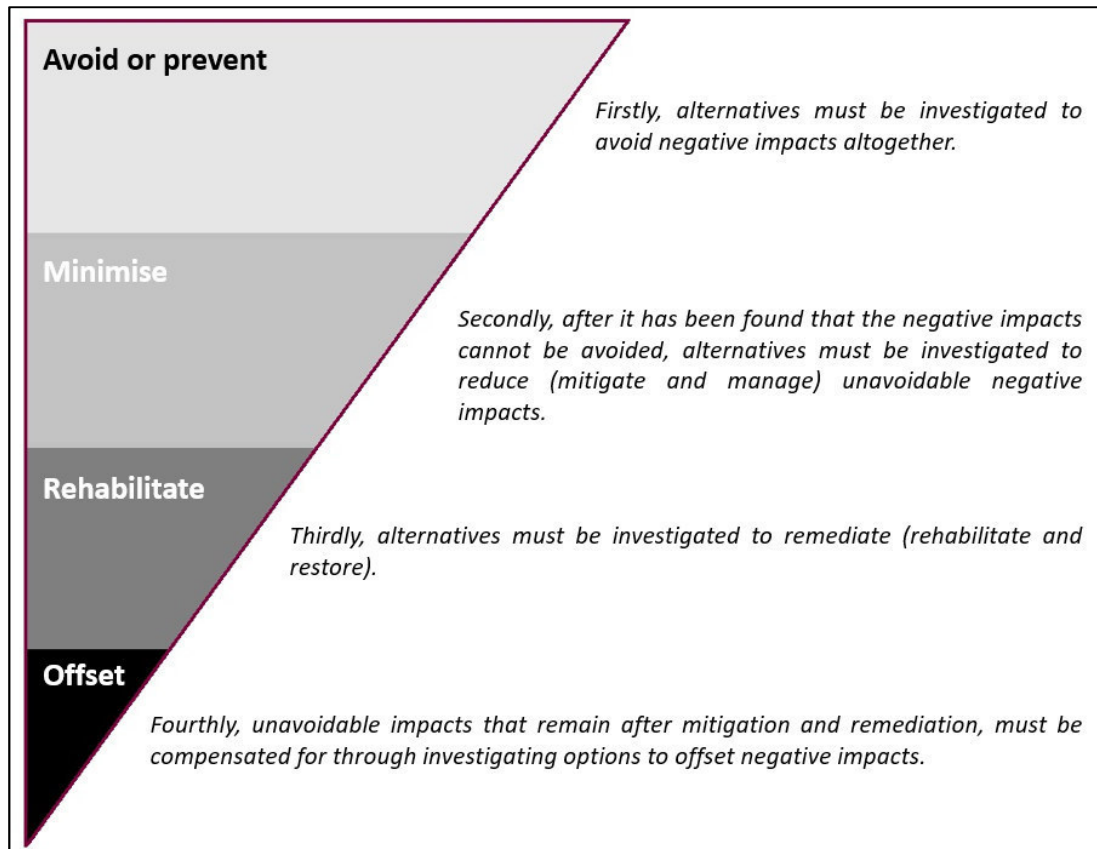
The proposed development triggers Listing Notice 1 (GNR 327), Activities 12, 19 and 27 and Listing Notice 3 (GNR 324), Activities 4 and 14 of the EIA Regulations, (2014, as amended).

As per GNR 326, Appendix 1(2)(b), alternatives for the proposed development are to be identified and considered. Chapter 1 of the EIA Regulations (2014, as amended) provides an interpretation of the word “alternatives”, which is to mean “*in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the -*

- a) *Property on which or location where the activity is proposed to be undertaken;*
- b) *Type of activity to be undertaken;*
- c) *Design or layout of the activity;*
- d) *Technology to be in the activity; or*
- e) *Operational aspects of the activity;*

*And includes the option of not implementing the activity.”*

The NEMA and the EIA Regulations (2014, as amended) also call for a hierarchical approach to impact management. The mitigation of negative impacts that a proposed development may have on the receiving environment must take on different forms depending on the significance of the impact and the area which may be affected. Therefore, mitigation requires proactive planning which is enabled by following the impact mitigation hierarchy. In this regard, during the assessment of alternatives it is preferable to investigate alternatives that avoid negative impacts in their entirety, and if this is not feasible, then alternatives which will reduce an unavoidable negative impact must be assessed through the adoption of mitigation and management measures. Progressing down the impact mitigation hierarchy, the rehabilitation of the negative impact must be considered and lastly, should the unavoidable impact remain post-mitigation and remediation, options to offset the negative impacts must be investigated. An illustration of the impact mitigation hierarchy is provided in Figure 7.1.



**FIGURE 7-1:** Impact Mitigation Hierarchy

In mining-based activities, the mitigation hierarchy approach is often difficult to achieve as the need and desirability of the application will result in large-scale impacts (i.e. significant disturbance to the receiving environment through the extraction of mineral resources from surface or subsurface) which cannot be avoided or prevented. However, impacts associated with the activity can be minimised through mitigation measures, management and rehabilitation activities.

Based on the above, the following alternatives are presented for the proposed westward expansion of Midmar Crushers (Pty) Ltd.

### 7.1 THE OPERATIONAL ASPECTS OF THE ACTIVITY

The operational phase of the quarry will involve blasting of the hard rock (dolerite) in the quarry, utilising a rock breaker pecker where necessary to break blasted rock into further fragments for sizing purposes; the loading of blasted dolerite onto tipper trucks and the transportation of loaded material along dedicated access roads to the existing operational quarry on the eastern side of the Nguklu River. There the rock will be deposited at the existing crushing plant for processing.

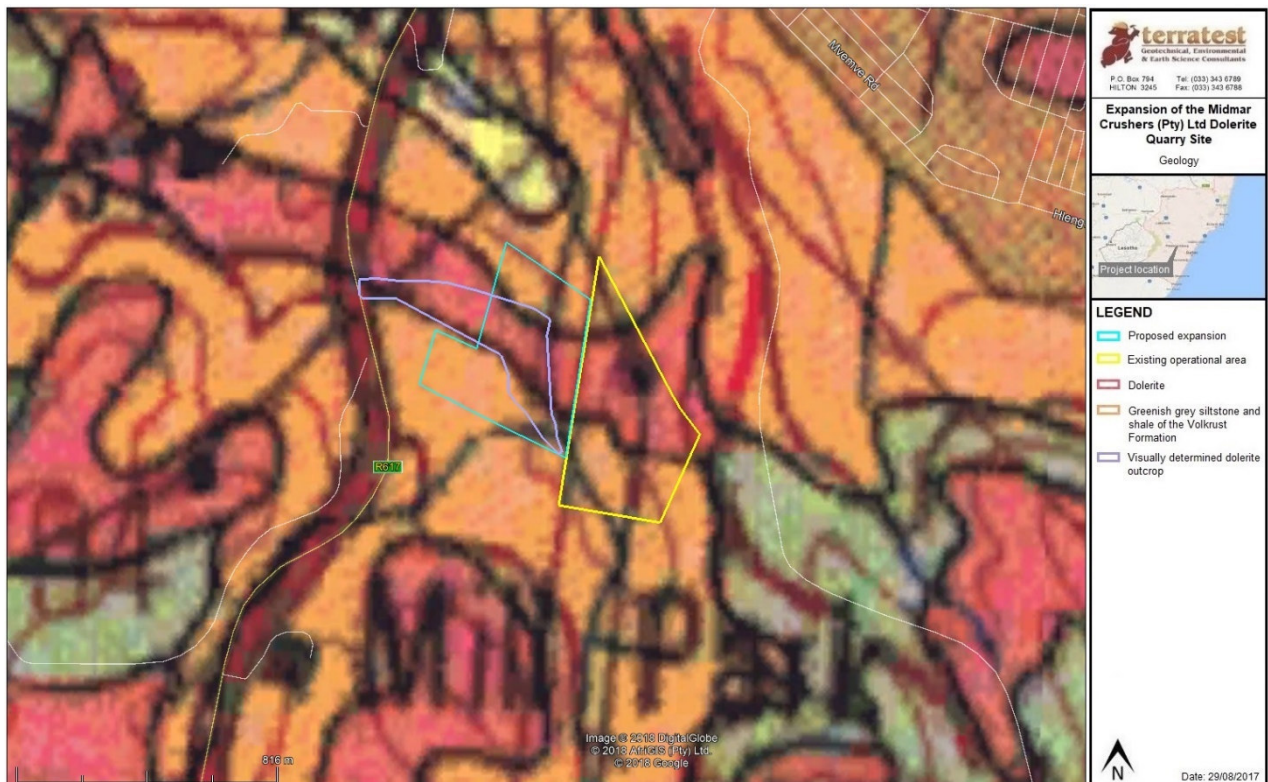
### 7.2 PREFERRED SITE ALTERNATIVE

The **Preferred Site Alternative** is located over the confirmed dolerite outcrop, located to the west of the existing Midmar Crushers (Pty) Ltd operations, on the opposite side of the Nguklu River. Given the close proximity of the site to the existing operations the Midmar Crushers quarry, this is considered to be the only site alternative which can meet the need and desirability of the project.

A Visual Geological Assessment of the site was undertaken on 05 September 2013 to assess the feasibility of the proposed westward expansion of Midmar Crushers, in terms of the presence of dolerite. The assessment was undertaken by Mr T. Spiers of Terratest (Pty) Ltd, an Engineering Geologist. The exercise entailed undertaking a visual assessment of the area lying between the Nguklu River and the Main Road R617 for the purposes of defining the dolerite rock body, according to visible surface features and exposures. The results indicated that the outcrop, or the near surface occurrence of dolerite within the area of interest, occupies an area of approximately 70 000m<sup>2</sup>, with an elevation difference of approximately 100m. Extending westwards from the crest of the hill towards Main Road R617 increases this area by at least a further 20 000m<sup>2</sup>.

In calculating the volumes of feasibility exploitable material, only the hillslope east of the crest was considered, as restricting quarrying to this area minimised the visual impact from the Main Road R617. Depending on the bench configurations adopted and assuming average depths of exploitation ranging between 15m and 30m, a conservative estimate would yield between 1 and 2 million m<sup>3</sup> of commercially crushable dolerite rock.

Figure 7-2 provides an illustration of the mapped dolerite present in the area as per the 1: 250 000 Geological Map Series 2930 Durban, in relation to the Visual Geological Assessment undertaken by Terratest (Pty) Ltd and the proposed westward expansion of the Midmar Crushers (Pty) Ltd quarry.



**FIGURE 7-2:** Geological Map



### 7.3 PREFERRED LAYOUT ALTERNATIVE

Upon appointment, Midmar Crushers (Pty) Ltd provided Terratest (Pty) Ltd with a proposed layout for expansion. This layout included for a 19.4ha area of expansion. This layout is referred to as **Layout Alternative 1**. During the Basic Assessment Process, various Specialist Studies were commissioned, including a Heritage Impact Assessment. The findings thereof identified four possible human grave sites within the Layout Alternative 1 expansion area (refer Section 7.3). As a result, the layout has been amended to avoid any possible contact with the four potential grave sites. The amended application area is referred to as **Layout Alternative 2 (Preferred Alternative)** and also allows for an expansion area of approximately 19.4ha.

The following subsections detail the two layout alternatives identified and are based on the findings of the Heritage Impact Assessment (Appendix 2: Specialist Studies).

#### 7.3.1 Layout Alternative 1

**Layout Alternative 1** is provided in Figure 7-3 and has taken cognisance of the confirmed dolerite outcrop and the Nguklu River. In this regard, a low-level bridge (causeway), is to be installed on the southern tip of the site, with access from the existing and operational Midmar Crushers (Pty) Ltd site. The low-level bridge (causeway) will allow for the single passage of tipper trucks to or from the site and will be 6m wide or less. It will have a bearing load of 50 tons. An access road will lead to a site camp platform which will house a single ablution facility, a site office, as well as overburden and topsoil stockpiles.

A gravel access road will also be aligned to the benches for the collection of dolerite as quarried, which will be transported off site via a dedicated gravel access road which will cross the Nguklu River approximately 400m downstream (i.e. to the north) of the first low-level bridge (causeway). In this regard, vehicles will enter the site from the existing Mining Right Area and traverse the low-level bridge as required, collect material from the quarry and continue out of the expansion area on the second low-level bridge back to the existing Mining Right Area where the material will be processed. The result thereof will result in a one-way traffic system through the expansion area which will eradicate the need for vehicle turning areas and will also increase road and traffic safety on site.

The layout of the facility was determined primarily based on the confirmed presence of dolerite as per the Visual Geological Assessment noted in Section 7.2. In this regard, the majority of the site is dedicated to quarry benches, which run alongside the confirmed dolerite outcrop, while restricting quarrying operations such that they do not impede on the recommended 40m watercourse buffer (as per the Wetland & Biodiversity Specialist Report: Appendix 2). The layout also allows for a 100m buffer from the Main Road R617 but includes realigning existing Eskom powerlines which cross the site on the north-western boundary. The site is approximately 19.4ha in size. Please refer to Figures 7-3 and 7-4.

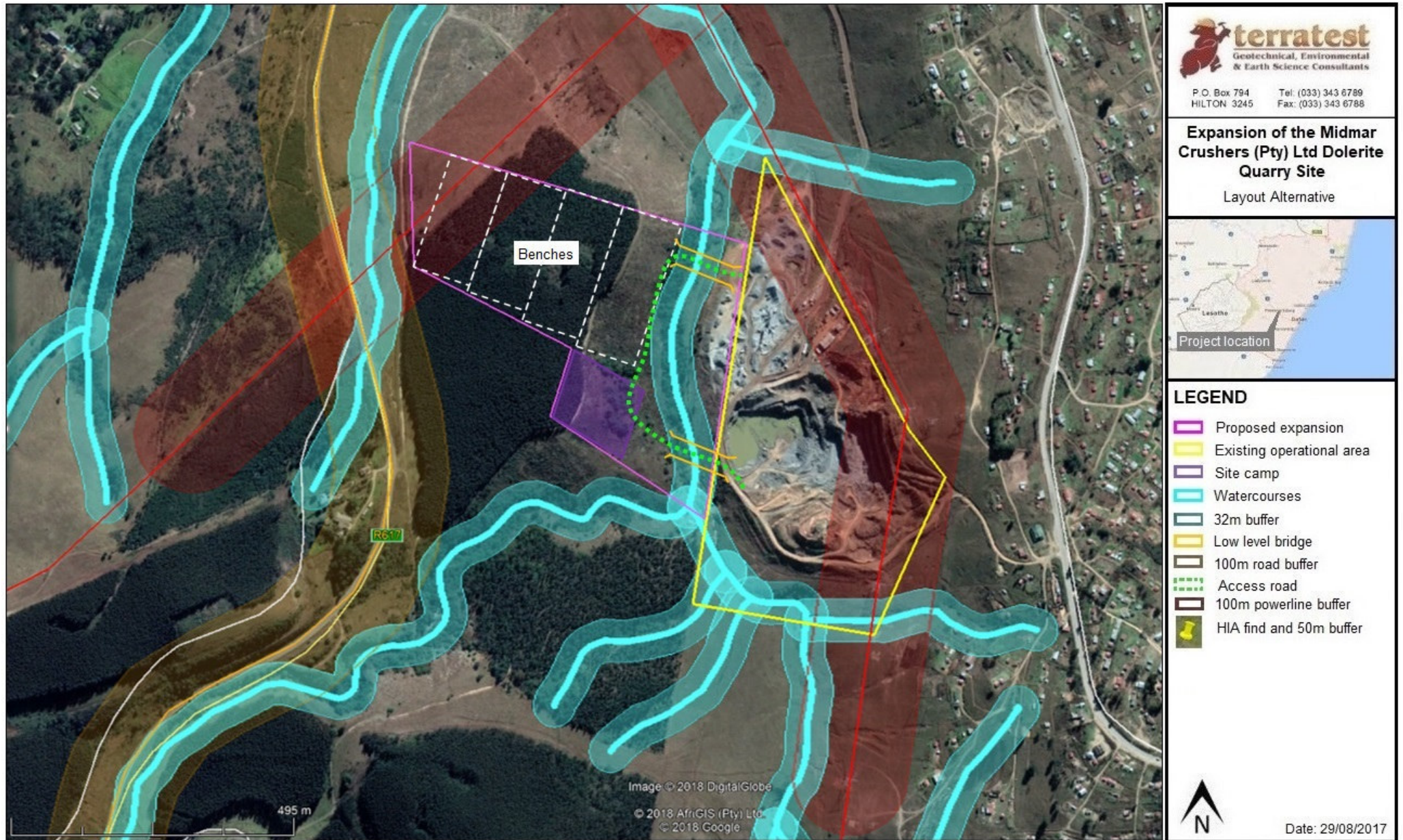


FIGURE 7-3: Layout Alternative 1 - Layout Map

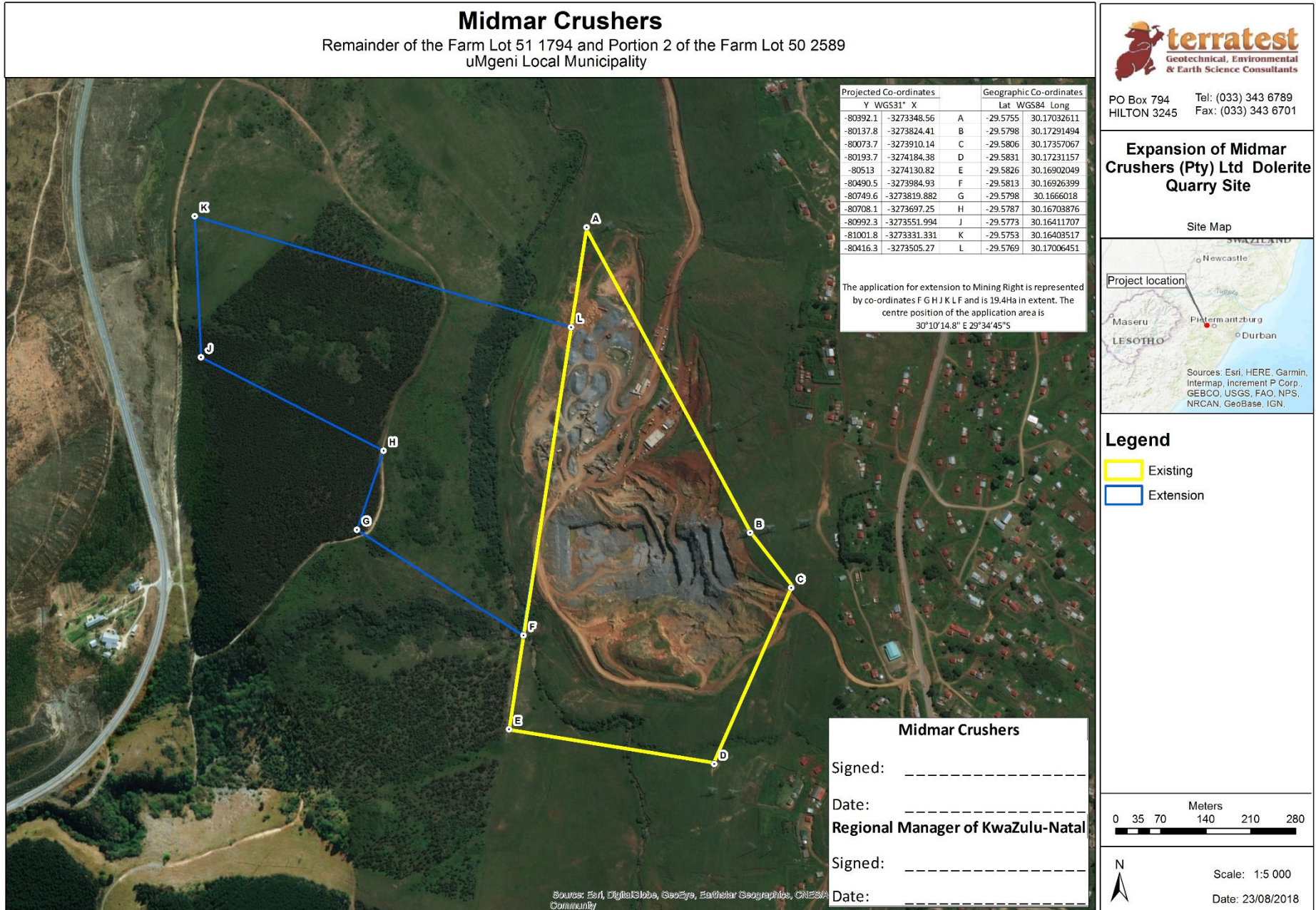


FIGURE 7-4: Layout Alternative 1 - Layout Map

### 7.3.2 Layout Alternative 2: Preferred Alternative

The preferred layout (**Layout Alternative 2**) is similar to Layout Alternative 1, however, cognisance has been taken of four potential grave sites identified by the Heritage Specialist. In this regard, the shape of the site has been amended in order to allow for the implementation of a 50m buffer around the potential grave sites. The size of the site, however, remains the same at 19.4ha. Buffers of 100m each from the Main Road R617 and the existing Eskom powerlines have also been implemented.

Similar to Layout Alternative 1, a low-level bridge (causeway) will allow for the single passage of tipper trucks to the site and will be 6m wide or less. It will have a bearing load of 50 tons. A gravel access road will lead to a site camp platform which will house a single ablution facility, a site office, as well as overburden and topsoil stockpiles.

A gravel access road will also be aligned to the benches for the collection of dolerite as quarried, which will be transported off site via a dedicated gravel access road which will cross the Nguklu River approximately 400m downstream (i.e. to the north) of the first low-level bridge (causeway). In this regard, vehicles will enter the site from the existing Mining Right Area and traverse the low-level bridge as required, collect material from the quarry and continue out of the expansion area on the second low-level bridge back to the existing Mining Right Area where the material will be processed. The result thereof will result in a one-way traffic system through the expansion area which will eradicate the need for vehicle turning areas and will also increase road and traffic safety on site.

The layout of the facility was determined primarily as a result of the Heritage Specialist's findings, as well as the confirmed presence of dolerite as per the Visual Geological Assessment noted in Section 7.2. In this regard, the majority of the site is dedicated to quarry benches, which run alongside the confirmed dolerite outcrop, while restricting quarrying operations such that they do not impede on the recommended 40m watercourse buffer. The layout also allows for a 100m buffer from the Main Road R617, as well as from the existing Eskom powerlines (hence no removal or relocated required) and is approximately 19.4ha in size. Please refer to Figures 7-5 and 7-6.

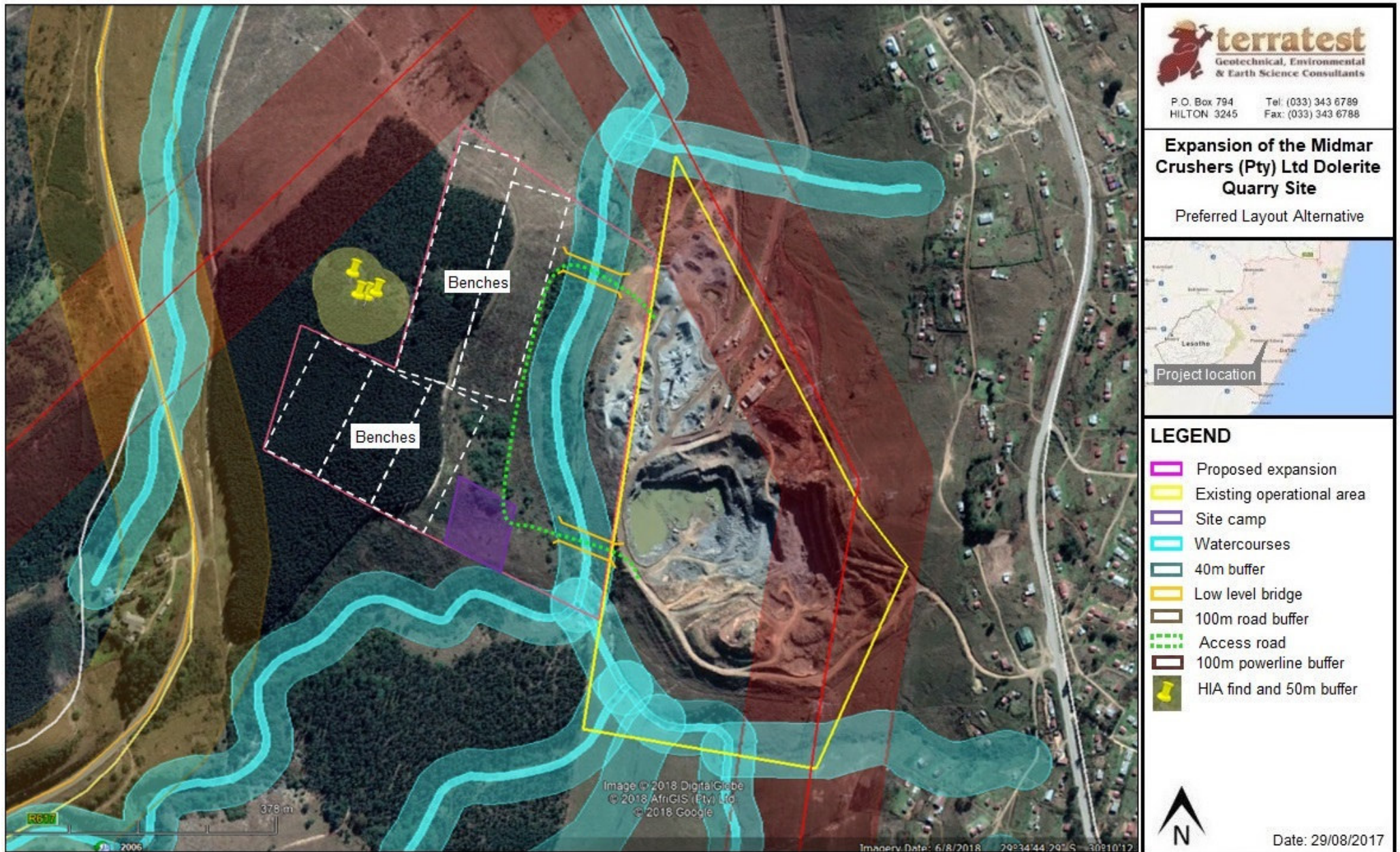


FIGURE 7-5: Layout Alternative 2 (Preferred Alternative) - Layout Map

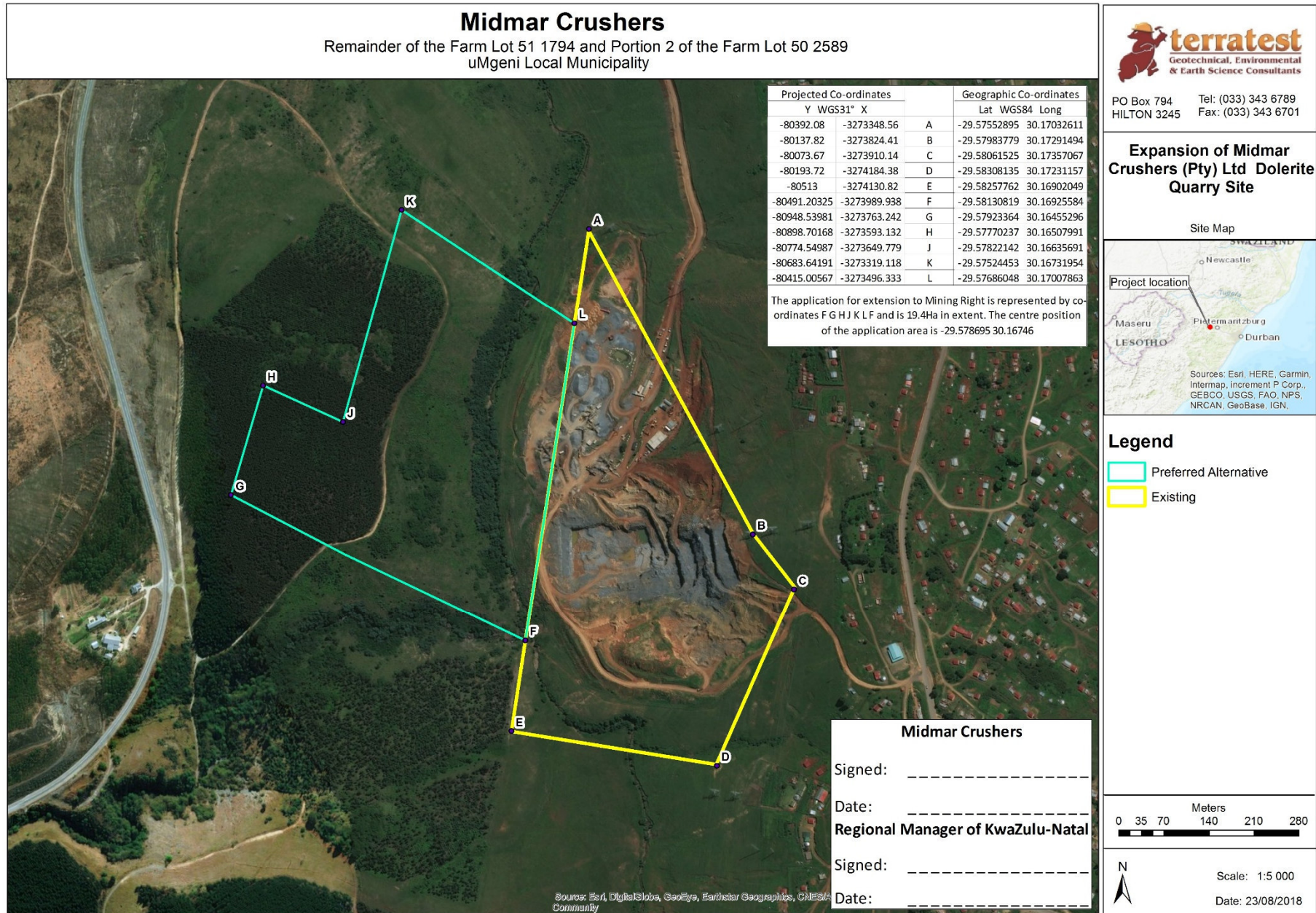


FIGURE 7-6: Layout Alternative 2 (Preferred Layout) - Layout Map

## 7.4 PREFERRED TECHNOLOGY ALTERNATIVE

### 7.4.1 Blasting

The proposed development is to establish a dolerite quarry. In this regard, the **Preferred Technology Alternative** to quarry the dolerite is blasting. The same technology is employed at the existing and operational Midmar Crushers (Pty) Ltd quarry. The blasted dolerite will be sized appropriately via a rock breaker pecker, loaded into a tipper truck and transported from the new quarry to the existing Midmar Crusher (Pty) Ltd quarry site located to the east of the Nguklu River, where it will be crushed. No crushing will occur on site. Blasting is the only reasonable and feasible technology alternative for the application given that the resource to be quarried is dolerite. In order to limit the cumulative impacts of blasting (i.e. noise, dust, vibrations etc.), only one quarry will be operated at any one time (i.e. either the existing or the proposed) until the existing quarry pit is rehabilitated. As a result, blasting and associated quarrying activities will only occur within one quarry pit at a time and not simultaneously.

### 7.4.2 River crossing

Both layout alternatives include for the construction of two low-level bridges (causeways) across the Nguklu River. In this regard, both bridges will be 6m wide or less and will each have a carrying capacity of 50 tons in order to allow for laden construction vehicles and operational vehicles to cross safely.

Construction will necessitate the temporary impedance of water in the river during construction as a result of cofferdam construction. Conduits will be placed in the watercourse during construction to allow for the free flow of water through built infrastructure where necessary. The causeway will be built to Department of Transport (DoT) requirements for construction on bedrock. Each access bridge will allow for the single passage of one heavy construction vehicle or operational vehicle at a time.

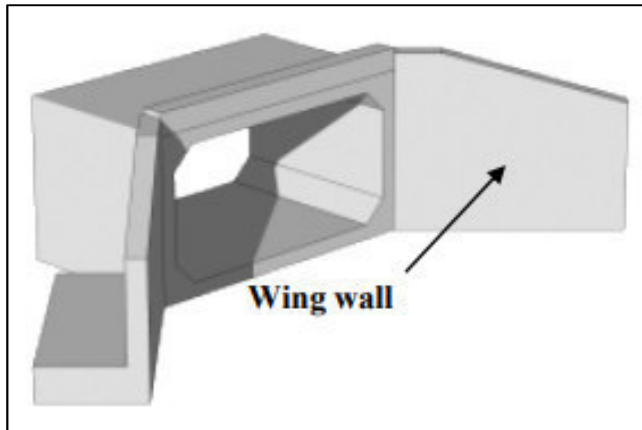
Two technology alternatives have been identified for the construction of a low-level bridge (causeway), namely a box culvert design (**Preferred Bridge Technology Alternative 1**) and a pipe culvert design (**Bridge Technology Alternative 2**).

#### PREFERRED BRIDGE TECHNOLOGY ALTERNATIVE 1: BOX CULVERT

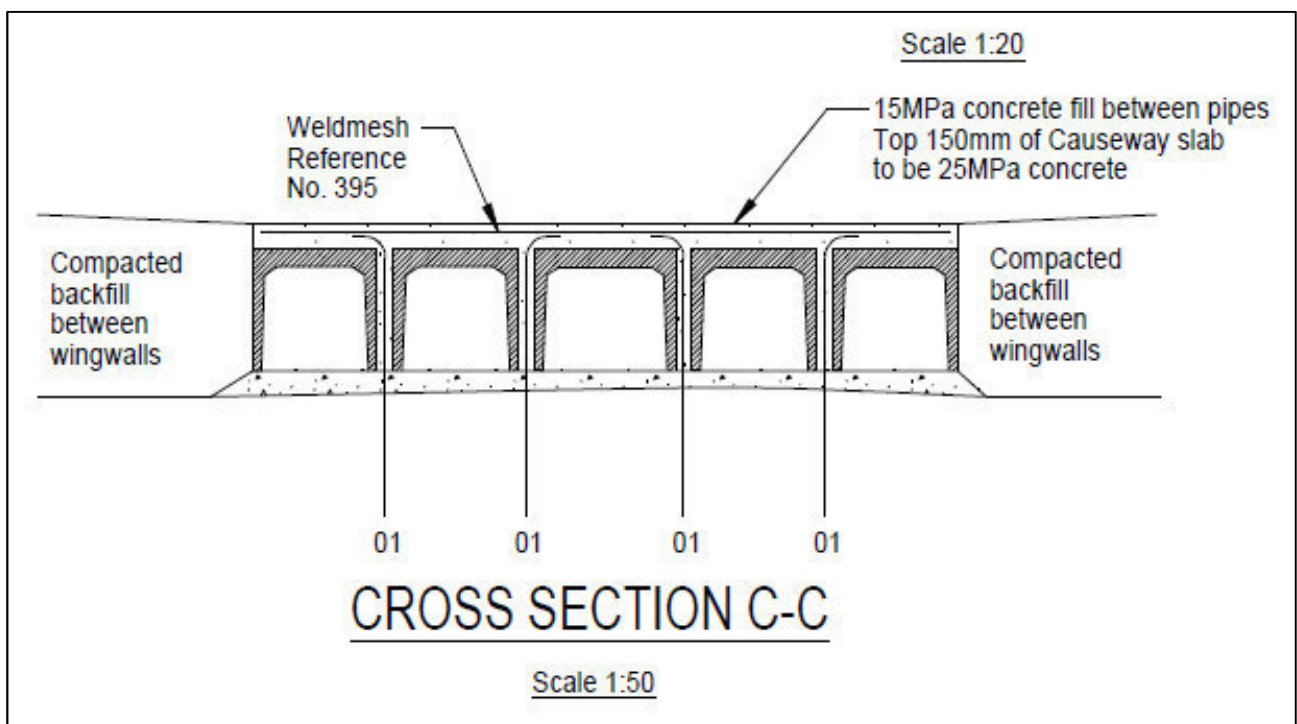
Box culverts have a concrete floor allowing for the smooth flow of water over surface and are usually comprised of reinforced concrete. The deck of the culvert can be used for the passage of vehicles and can be stacked side by side to increase length. Box culverts drain high volumes of water and can generally handle a higher flow rate than pipe culverts. This is beneficial given that the Nguklu River does experience high flow rates at times (refer Section 7-4 and Appendix 2: Specialist Studies).

Box culverts can be precast off site which limits impacts on the receiving environment via cement spillages. In terms of installation, the area of installation must be dried and therefore dewatering is necessary. The foundations must be set and laid and the culverts installed as necessary with tongue and groove joints to make a continuous structure. Concrete fill is placed between individual culverts and backfill compacted between wingwalls (refer Figure 7-6). Box culvert installations tend to be simple given their rigid frame structure. Refer Figure 7-7.

All dewatering activities will take cognisance of outflow points. These will be placed so as not to increase scow or erosion potential alongside or in the watercourse and silt traps or silt socks will be installed at every outflow point to prevent silt from entering any watercourse.



**FIGURE 7-7:** Illustration of wing walls on box culvert



**FIGURE 7-8:** Design of proposed low-level bridge (causeway) using box culverts

### BRIDGE TECHNOLOGY ALTERNATIVE 2: PIPE CULVERT

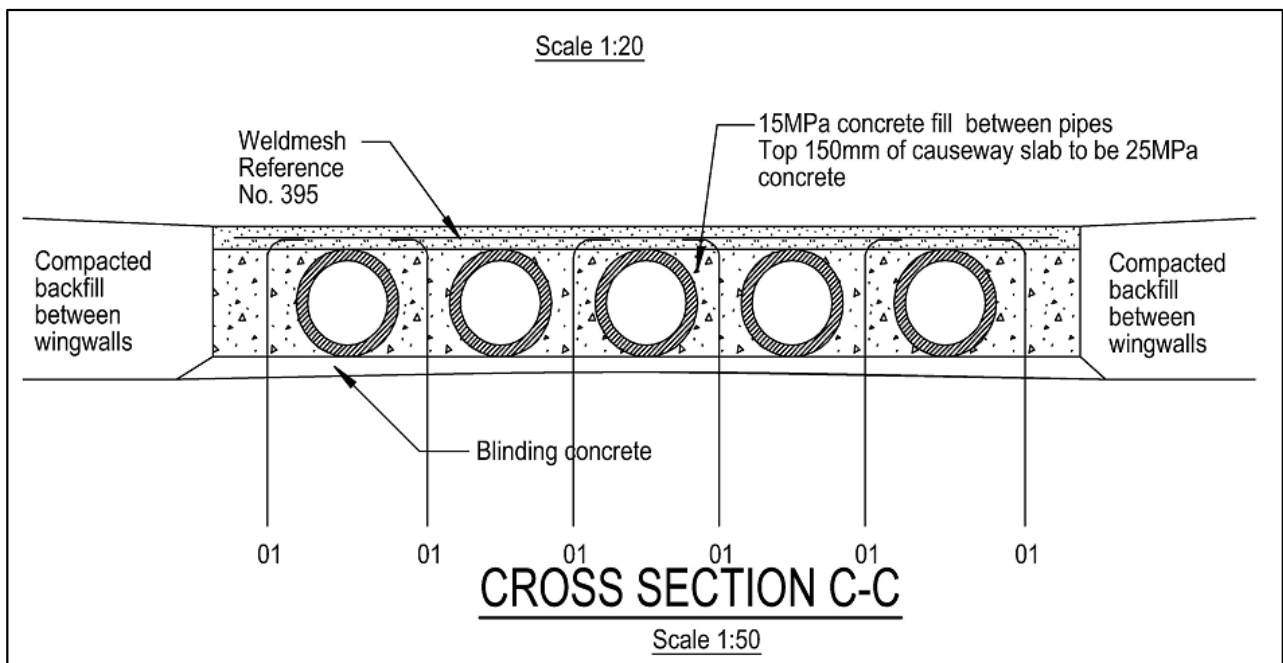
Pipes culverts are available in different shapes such as circular, elliptical and pipe arches. Although circular pipes are the most common, other shapes may be used depending on site conditions and constraints. Pipe culverts are easy to install and selection is dependent on hydraulic characteristics, performance and suitability. A limiting factor to utilising pipe culverts, however, is that debris may block the pipes when the Nguklu River experiences high flow rates (i.e. flooding).

Once the pipes are laid, the area in between the pipes are filled with concrete. Cement spillages from on-site mixing pose a threat to aquatic fauna. Similar to the proposed box culvert installation, all dewatering activities will take cognisance of outflow points. These will be placed so as not to increase scow or erosion potential alongside or in the watercourse and silt traps or silt socks will be installed at every outflow point to prevent silt from entering any watercourse. Refer to Figures 7-9 and 7-10.





**FIGURE 7-9:** Example of pipe culvert crossing in a watercourse



**FIGURE 7-10:** Design of proposed low-level bridge (causeway) use pipe culverts

**7.5 NO-GO ALTERNATIVE**

The no-go alternative will result in Midmar Crushers (Pty) Ltd not expanding their current operations. In this regard, the existing dolerite reserve which is authorised for quarrying will be depleted and operations at the existing site will be forced to stop. In this regard, the operation may have to close completely and current employment positions lost.

### 8 PUBLIC PARTICIPATION

To fulfil the necessary public participation required as part of the BA Process, the following methods of stakeholder engagement were and are in the process of being conducted by the EAP, as outlined below.

#### 8.1 NEWSPAPER ADVERTISEMENT

A newspaper advertisement was published at the outset of the project to inform the general public of the BA Process. An advertisement was published in English on 29 November 2017 in the Village Talk newspaper. A copy of the advertisement is included as Figure 8-1 and in Appendix 3 of this report.

**village Talk CLASSIFIEDS**

**BOOKKEEPER VACANCY**  
A company seeks the services of an energetic available individual to work full time at their head office based in Howick. Please note this is an AA / EE post.  
**Duties include:**  
• Manage and maintain Creditors and Debtors Reconciliations  
• Capture and reconcile cash books  
• Assist with SARS statutory when required (VAT 201, EMP 201 & 501)  
• Assist in month end procedures  
• Maintain financial files and records  
• Assist Financial Manager with all departmental matters when needed  
• Attend to telephonic and email queries and requests  
• Assist with General administrative matters  
• Project Costings  
• Bookkeeping duties up to Trial Balance  
• Full Salary processing and EMP's submissions  
**Requirements:**  
• Knowledge Of Pastel and VIP processing is a must  
• Knowledge Of Microsoft Applications  
• Relevant Bookkeeping Diploma  
Salary depends on experience. The company offers a 13th cheque and provident fund. Send a CV with certified copies of qualifications and expected salary to aadils@fintrail.co.za

**NO FRACKING THE KZN MIDLANDS**

**0000 NOTICES**  
**DOOR TO DOOR TRANSFERS AIRPORT TRANSFERS**  
0861 747 665 OR 083 225 5585

**I BUY CARS AND BAKKIES OLD OR NEW**  
AJAY 082 966 2384

**0005 Church Notices**  
HOWICK FAMILY FELLOWSHIP - 35 Bell Street SUNDAYS 9am-Family service 12pm-Zulu Service CONTACT 033 330 7835 or 084506 7414

**NOTICE OF AN APPLICATION FOR ENVIRONMENTAL AUTHORISATION AND WATER USE LICENCE APPLICATION FOR THE PROPOSED EXPANSION OF THE MIDMAR CRUSHERS (PTY) LTD DOLERITE QUARRY SITE, UMGENI LOCAL MUNICIPALITY, KWAZULU-NATAL (TERRATEST (PTY) LTD REF NO.: 41717)**  
Notice is hereby given in terms of the National Environmental Management Act, (Act No. 107 of 1998): Environmental Impact Assessment Regulations (2014, as amended), published in terms of Government Notice No. R982 (2014, as amended), of the intent to carry out a Basic Assessment Process for the abovementioned development.  
Notice is also hereby given in terms of National Water Act (Act No. 36 of 1998) that a Section 21 (c) and (i) Water Use Licence will also be applied for.  
**Proposed activity:** The proposal includes for the westward expansion of the existing Midmar Crushers (Pty) Ltd dolerite quarry site.  
**Proposed location:** Remainder of the Farm Lot 51 No. 1794. Site centre co-ordinates are 29°34'41.40" S; 30°09'55.89" E.  
**Competent Authority:** KwaZulu-Natal Department of Mineral Resources  
**Applicant:** Midmar Crushers (Pty) Ltd  
Should you wish to register as an Interested and Affected Party in these Applications, please submit your name, contact information and interest in the matter, as well as any comments or queries you may have to: Terratest (Pty) Ltd. Contact Person: Liz Dralle; Email: drallel@terratest.co.za; Address: Terratest, PO Box 794, Hilton 3245; Tel: 033 343 6789; Fax: 033 343 6701

**0100 HOLIDAY ACCOMMODATION**  
**0105 Bed & Breakfast**  
HARROW HILL B & B IN HOWICK Caroline's 3 star, elegant quiet & comfortable B & B near Hospitals, retirement villages & restaurants. 082 554 3678 www.harrowhillhowick.co.za PZ014096

**PRIVATE SELF CATERING UNIT**, independent of main house. Situated between High School and Ambers. Contact AH 033 3304562 or nstruanrob@gmail.com PZ014111

**THIS TLE DOW N COUNTRY HOUSE**. 20kms from Howick on the Karkloof road. Accommodation and food our way. Food strictly by appointment. Tel 082 491 0533 PZ014126

**0200 HOME IMPROVEMENTS**  
**0203 Asphaltting - Paving**  
PAVING & TARRING OF DRIVEWAYS BY Pave masters. Contact Martin Van Staden on 072 796 1360 or 033 3432350 PZ014082

**0215 Plumbers**  
**BURST geyser or problem geyser.** Phone 082 696 0356 PZ014113

**PLUMB IT DOC -Bathroom renovations shower doors tiling geysers plumbing maintenance and emergencies.** Call Martin 074 190 0661/079 990 4659 / 082 696 0356 PZ014112

**0225 Gardening / Landscaping**  
A 1 garden and tree felling services fully insured. Tel Mike 083 775 4230 PZ014080

**RS GARDEN SERVICES** Lawnmowing, refuse removals, plot clearing, tree felling, once off, personal supervision. Phone 082 464 1372 / 033 330 7083 PZ014099

**0342 For Hire**  
BOBCATS, TLB's, Tipper, Trenching machines and trailers for hire 033 3305965 / 330 2124 / 082 922 3735 PZ014104

**0520 Garden Flats / Cottages**  
LARGE 1 bedroom cottage to let R5000 per month. Available immediately Yvonne 082 294 9150 PZ014124

1 BED, 1 lounge, kitchen and bathroom DSTV, available immediately. Contact 073 857 3218 PZ014128

1 bedroom small cottage 17 Dec or 1 Jan. 033 3305186/082 698 3517 PZ014102

**0366 Pest Control**  
CATCH'EM PEST CONTROL For residential, commercial & industrial pest control, lawn treatments ETC. Contact: 062 234 9175 catchem.services@gmail.com. PZ014117

**0270 Fencing & Gates**  
CLYDESDALE. FENCING. Contact Dave on 0836422999 Our Fencing Systems PZ014101

**0300 SERVICES**  
**0321 Cleaning**  
A WONDERFUL clean by Lavender green carpet and upholstery cleaners. Fos 083 555 9588 PZ014085

CARPETS, upholstery, etc expertly steam cleaned. Call Will Bowker 060 760 4937/033 2395547/083 636 1303 PZ014125

**WANT TO SELL? Midlands Auctions Rob Wilson 082 479 9822 DULCET CENTRE Main Road, Howick**

**ANTIQUES**  
**Bi-monthly antiques auctions & weekly general auctions. Consider your options, then contact the experts.**  
**Cannon's Auctioneers**  
Phone: 033 343 3364/5/6/7 www.cannons.co.za cannons@futurenet.co.za

**0342 For Hire**  
Pet Accommodation  
DARGLE and Catter boarding, clipping kennels. M pets are while you 033 330 6  
HILTON E and C 033-34334  
REMOVE small deli need it. w 084 406 3268  
D. Vacanc So  
NTOMBI sleep in/out ref. Cont 402 6911  
PRECIOUS sleep in/out Has ref. C 2766  
PRISCA is in/out don't ref. Cont  
STHEMBI 5 days do ref. Cont  
THANDI s domestic v Contact 07  
ZIMLADY sleep in/out domestic v 074 354 4  
Transi C  
AIR TRANSF Hospital v 2602  
FC

FIGURE 8-1: Copy of advertisement in the Village Talk newspaper

**8.2 SITE NOTICE BOARDS**

Six (6) site notice boards were placed on site and around the area on 29 November 2017. The notice boards were written in English and isiZulu. Plates 8-1 to 8-4 provide evidence of the notice boards on site, while Figures 8-2 and 8-3 provide a copy of the site notice and Figure 8-4 provides an illustration of the location of the site notices on site.

The purpose of the site notice was to inform neighbours and community members of the proposed BA Application. The details of the EAP were also provided should any member of the public require additional information or wish to register as an IAP in the Application.



**PLATE 8-1:** Site notices at entrance to Midmar Crushers quarry (zoomed image)



**PLATE 8-2:** Site notices at entrance to Midmar Crushers quarry



**PLATE 8-3:** Site notices on access road to Midmar Crushers quarry



**PLATE 8-4:** Site notices positioned on site

**NOTICE OF AN APPLICATION FOR ENVIRONMENTAL AUTHORISATION AND WATER USE LICENCE APPLICATION THE PROPOSED EXPANSION OF THE MIDMAR CRUSHERS (PTY) LTD DOLERITE QUARRY SITE, UMGENI LOCAL MUNICIPALITY, KWAZULU-NATAL (TERRATEST (PTY) LTD REF NO.: 41717)**

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**Proposed location:** Remainder of the Farm Lot 51 No. 1794. Site centre co-ordinates are: 29°34'41.40" S; 30°09'55.89" E.

**Competent Authority:** KwaZulu-Natal Department of Mineral Resources

**Applicant:** Midmar Crushers (Pty) Ltd

Should you wish to register as an Interested and Affected Party (IAP) in this Application, please submit your name, contact information and interest in the matter, as well as any comments or queries you may have to:

**Terratest (Pty) Ltd c/o Liz Dralle**  
 Email: dralle@terratest.co.za      Tel: 033 343 6789      Fax: 033 343 6701  
 Address: Terratest, PO Box 794, Hilton 3245

Site Locality Map

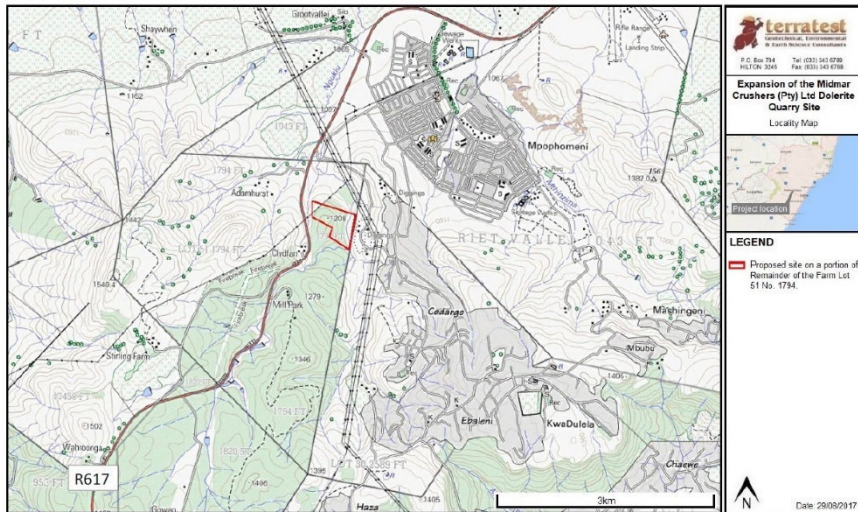


FIGURE 8-2: English site notice

**ISAZISO SESICELO SOKUGUNYAZWA NGOKWEMVELO KANYE NESICELO SOKUSETSHENZISWA KWAMANZI SOHLELO OLUHLONGOZWAYO LOKWANDISA KWE-MIDMAR CRUSHERS (PTY) LTD DOLERITE QUARRY SITE, UMGENI LOCAL MUNICIPALITY, KWAZULU-NATALI (TERRATEST (PTY) LTD REF NO.: 41717)**

Isaziso sinikezwa ngokoMthetho Wezokuphathwa Kwezemvelo kaZwelonke, (uMthetho No. 107 ka 1998): Imithethonqubo yokuHlola koMthelela Kwezemvelo (2014, njengoba ichitshiyelwe), eshicilelwe ngokweSaziso sikaHulumeni No. R982 (2014, njengoba ichitshiyelwe), ngenhloso yokulandela Inqubo Yokuhlola Eyisisekelo.

Isaziso siphinde sinikezwe ngokwemigomo yoMthetho kaZwelonke Wamanzi (uMthetho No. 36 ka 1998) ukuthi isigaba 21 (c) kanye (i) weLayisensi Yokusetshenziwa Kwamanzi nakuyo kuzofakwa isicelo.

**Umsebenzi ohlongozwayo:** Lesisiphakamiso sifaka ukwandiswa kweMidmar crushers (Pty) Ltd dolerite quarry ohlangothini olungasetshonalanga.

**Indawo ephakanyisiwe:** Insalela yepulazi i-Lot 51 No. 1794. Indawo itholakala kulezixhumanisi ezilandelayo: 29°34'41.40" S; 30°09'55.89" E.

**Isiphathimandla esinamandla:** UMnyango wezokuMbiwa Phansi waKwaZulu-Natal.

**Ofaka Isicelo:** Midmar Crushers (Pty) Ltd

Uma ufisa ukubhalisa njengothintekayo noma Onentshisekelo kulesisicelo, sicela uthumele igama, iminingwano yokuxhumana, intshisekelo yakho kuloludaba, kanye nokuphawula noma imibuzo ongase ubenakho:

**Terratest (Pty) Ltd c/o Liz Dralle**  
 Email: dralle@terratest.co.za      Tel: 033 343 6789      Fax: 033 343 6701  
 Address: Terratest, PO Box 794, Hilton 3245

Imephu Yendawo

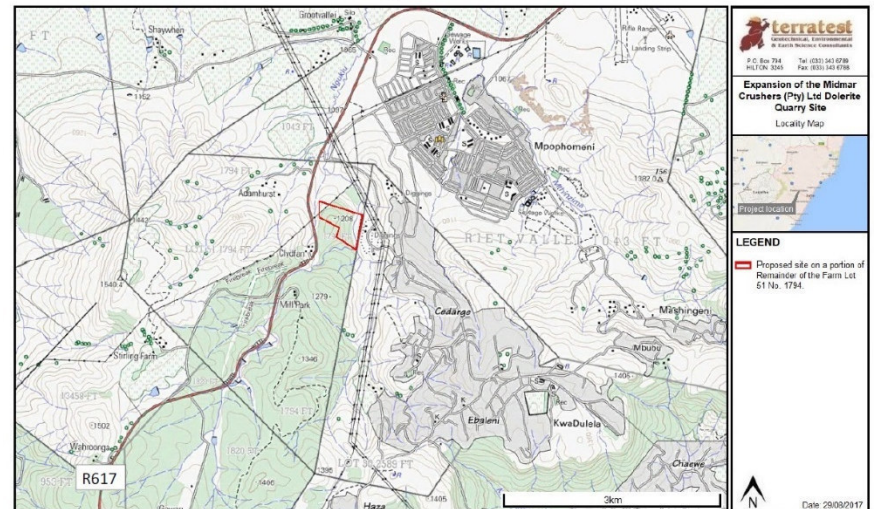


FIGURE 8-3: IsiZulu Site Notice



FIGURE 8-4: Location of site notices on site

### **8.3 WRITTEN NOTIFICATION TO AUTHORITIES AND NEIGHBOURS**

#### **8.3.1 Interested and Affected Parties (IAPs)**

A register of IAPs was compiled as per Section 42 of the EIA Regulations, 2014 (as amended). This included all relevant authorities, Government Departments, the Local Municipality, the District Municipality, relevant conservation bodies and non-governmental organisations (NGO's), as well as neighbouring landowners, business and the surrounding community. This register was regularly updated to include those IAPs responding to the newspaper advertisements, site notice boards and Notification Letters. A copy of the IAP Register is included as Appendix 3 of this report.

#### **8.3.2 Notification Letter**

A Notification Letter was compiled and circulated to all identified IAPs by email and post on 21 November 2017. The purpose of the Notification Letter was to provide preliminary information regarding the project and its location. Furthermore, the Notification Letter invited preliminary comments from IAPs and requested those notified to provide details of other potential IAPs which they may be aware of. A copy of the Notification Letter is included as Appendix 3 of this report.

### **8.4 PUBLIC MEETING**

A Public Meeting will be held post circulation of this report. All registered IAPs will be notified of and invited to the Public Meeting.

### **8.5 COMMENTS RECEIVED**

Following the publication of newspaper advertisements, placement of on-site notice boards and distribution of Notification Letters, the following comments as per Table 8-1 have been received by IAPs. Please refer to Appendix 3 for original comment.

TABLE 8-1: IAP comment received

DATE	IAP	COMMENT	RESPONSE
22.11.2017 received via email	Deputy Manager: Land Use Regulatory Unit: Department of Agriculture and Environmental Affairs: Macro Planning – Mr P. Mans.	<p>This serves a notice of receipt and confirms that your application has been captured in our electronic Land Use Database.</p> <p>Details of your application as captured:</p> <ul style="list-style-type: none"> <li>Type: Development:</li> <li>Your refence number:</li> <li>Property description: Lot 51 No. 1794 Rem Portion and Remainder.</li> </ul> <p>Please quote this reference number in all queries: Land Use Reference No. 2017/11/4605</p>	Noted. No response required.
29.11.2017 received via email	Department of Agriculture, Forestry and Fisheries: Directorate: Land Use and Soil Management - Mr R. Baca.	<p>With reference to this application, this office would like the Final BAR/EMP document to address the following issues:</p> <ul style="list-style-type: none"> <li>The current land use for the sites that will be directly affected by the proposed development, as well as the anticipated impacts and mitigation measures;</li> <li>The proposed total development footprint for the proposed expansion, or total area to be directly affected by the proposed development;</li> <li>The impact that the proposed development will have on the available or surrounding wetlands and/or rivers or streams; and how will it be mitigated;</li> <li>Total distance for the proposed development from the nearest homestead and the anticipated impacts and how they will be mitigated, including blasting;</li> </ul>	<p>The landuse adjacent to the site is as follows:</p> <ul style="list-style-type: none"> <li>East: Mining (existing Midmar Crushers (Pty) Ltd) site;</li> <li>South: Agriculture</li> <li>West: Main Road 617, agriculture and two homesteads;</li> <li>North: Agriculture and settlement</li> </ul> <p>The total expansion area will be 19.4ha.</p> <p>As per the Wetland and Biodiversity Specialist (Section 10-1 and Appendix 2), no wetlands will be impacted by the proposed expansion and limited impact is expected on the Nguklu River, provided the following mitigation measures are implemented (as included in the EMP: Appendix 4):</p> <ul style="list-style-type: none"> <li>The lower end of the new quarry area must be enclosed by an earthen berm which will catch and contain dirty water and other materials from passing down the slope into the river.</li> <li>The area between the new quarry boundary and the stream must be maintained as a no-go buffer strip. This strip will have a minimum width of 40m.</li> <li>An alien plant eradication programme must be undertaken, and sustained, in the buffer area including the strip of woody vegetation. Key species to be targeted include Black wattle, Lantana, Bugweed, Bramble, Syringa, and Castor-oil Plant.</li> <li>The woody vegetation must be protected from fire by burning a five metre break along its margin each year. This action will encourage a natural ecotonal plant community to develop.</li> </ul> <p>The closest homestead is approximately 195m from the site. Blasting impacts cannot be mitigated against, but they will be</p>

DATE	IAP	COMMENT	RESPONSE
		<ul style="list-style-type: none"> <li>• Impact that the proposed activity will have on surrounding agricultural land and the mitigation measures;</li> <li>• The handling of the topsoil for later use during the rehabilitation stage;</li> <li>• Soil erosion and its mitigation measures;</li> <li>• Information on fauna and flora for the areas that will be affected by the proposed development;</li> <li>• Alien plant control plan that will be implemented on a continuous basis; and</li> <li>• Availability of alternative sites and their sustainability versus motivation for the preferred site.</li> </ul>	<p>managed as per the Midmar Crushers (Pty) Ltd current Blasting Management Plan. Please refer to Sections 9.9 and 11.</p> <p>The site is currently an <i>eucalyptus</i> plantation. As a result of the proposed expansion, this area will be lost to the quarry. Any surrounding agricultural land will not be impacted by the quarrying activities.</p> <p>Topsoil will be stripped and stockpiled on site in a designated area. The stockpile will be surrounded will berms to protect it from stormwater. Please refer to the EMPr for further information (Appendix 4).</p> <p>Soil impacts are contained in Table 11-8 and 11-9 and associated mitigation measures contained in the EMPr (Appendix 4).</p> <p>A Wetland and Biodiversity Assessment has been conducted (Appendix 2). The impact to flora is considered to be negligible given the use of the site currently and historically as an <i>eucalyptus</i> plantation. In terms of fauna, it is recommended that a search and rescue for the Midlands Dwarf Chameleon be undertaken prior to construction. Please refer to the Section 10.1.1 and the Specialist Study (Appendix 2) for further information.</p> <p>An Alien Control Programme is attached to the EMPr (Appendix 4). Kindly refer.</p> <p>Please refer to Section 7: Alternatives of this report.</p> <p>Upon appointment, Midmar Crushers (Pty) Ltd provided Terratest (Pty) Ltd with a proposed layout for expansion taking cognisance of the dolerite outcrop. This layout included for a 19.4ha area of expansion on which to develop the proposed new quarry. This layout is referred to as Layout Alternative 1. During the Basic Assessment Process, various Specialist Studies were commissioned, including a Heritage Impact Assessment. The findings thereof identified four possible human grave sites within the Layout Alternative 1 expansion area. As a result, the layout has been amended to avoid any possible contact with the four potential grave sites. The amended application area is referred to as Layout Alternative 2 (Preferred Alternative) and allows for an expansion area of approximately 19.4ha.</p>
05.12.2017 received via email	Department of Transport - Mrs J. Reddy.	I am trying to locate my refence for this project, can you assist?	The project is only in its initial stages, so no Department of Transport refence would have been created for the project as yet.
11.12.2017 received via email	Department of Transport - Mrs J. Reddy.	Your update letter refers. The Application was received on 27 November 2017. You are advised that eh Application in the process of being investigate and that you will be advised accordingly of this Department's comment. When communicating will this office, please supply the above mentioned file reference (Ref: T10/2/2/2963/3).	Noted.



DATE	IAP	COMMENT	RESPONSE
12.12.2017 received via email	Neighbour - Portion 8 of Lot 51 No. 1794 – Ms D. Dorning.	We hereby register an Interested and Affected Parties with regard to the notice of application for Environmental Authorisation and Water Use Licence Applications for the proposed expansion of Midmar Crushers Quarry.  Interest in matter: Concerned neighbour whose farm is opposite and close to the proposed expansion. My property is Portion 8 of Lot 51 No. 1794.	Thank you for your email. You have been registered as an Interested and Affected Party in both Applications and will accordingly be informed of project progress.  Noted.
12.12.2017 received via email	Neighbour - Portion 5 of Lot 51 No.1794 – Mr K. Camons.	We hereby register an Interested and Affected Parties with regard to the notice of application for Environmental Authorisation and Water Use Licence Applications for the proposed expansion of Midmar Crushers Quarry.  Interest in matter: Concerned neighbour whose farm is opposite and close to the proposed expansion. My property is Portion 5 of Lot 51 No. 1794.	Thank you for your email. You have been registered as an Interested and Affected Party in both Applications and will accordingly be informed of project progress.  Noted.
11.12.2017 received via email	Neighbour - Windfall Farm – Mr B. Mattison.	We would like to register as affected parties.	Thank you for your email. Your details have been captured in the Interested and Affected Party (IAP) Register for this Application. You will be notified of any developments, pertinent to the project, as they occur.
11.12.2017 received via email	Neighbour - Windfall Farm – Ms S. Mattison.	We would like to register as affected parties.	Thank you for your email. Your details have been captured in the Interested and Affected Party (IAP) Register for this Application. You will be notified of any developments, pertinent to the project, as they occur.

## 8.6 CIRCULATION OF DRAFT BASIC ASSESSMENT REPORT FOR COMMENT

Copies of the Draft BA Report have been circulated to the following Key Stakeholders and IAPs for review and comment on 10 September 2018:

- Ezemvelo KZN Wildlife: Mr A. Blackmore;
- Department of Water and Sanitation: Ms N. Mokoena;
- Department of Transport: Mrs J. Reddy;
- uMngeni Local Municipality: Mr M. Hattingh
- uMgungundlovu District Municipality: Ms M. Khomo;
- Amafa Heritage: SAHRIS;
- DAEA: Macro Planning Directorate: Mr P. Mans;
- Department of Agriculture, Forestry and Fisheries: Mr R. Baca;
- Department of Cooperative Governance and Traditional Affairs: Mr M. de Lange; and
- Department of Economic Development, Tourism and Environmental Affairs: Mr K. Govindasamy;
- and
- Department of Mineral Resources: Mr K. Moodley.

All registered IAPs were notified of the availability of the Draft BA Report and the deadline for comments, being on, or before 11 October 2018. A copy of the BA report was placed in the Mpophomeni Public Library (Nelson Mandela Highway, Mpophomeni B, Mpophomeni) for public review on 10 September 2018. A complete copy of the report has also been uploaded onto the Terratest (Pty) Ltd website ([www.terratest.co.za](http://www.terratest.co.za)) for public access and review.

A Public Meeting will be held post circulation of the Draft Basic Assessment Report. All registered IAPs will be notified of the time, date and venue of the Public Meeting.

After 10 October 2018, the required Application for Environmental Authorisation will be submitted to the DMR and an additional Public Participation period of 30 days will be conducted. All registered IAPs will be accordingly notified.

All State Departments that administer a law relating to a matter affecting the environment, specific to the Application, are reminded that in terms of the EIA Regulations (2014), GNR 326 43(2), as amended, all comment must be submitted to the EAP within 30 days of the EAP requesting such. Should no comment be received within the 30-day commenting period, it will be assumed that the relevant State Department has no comment to provide.

## 9 DESCRIPTION OF THE BASELINE ENVIRONMENT

### 9.1 TOPOGRAPHY

The site falls on gently sloping hillside. Figure 9-1 provides an illustration of the topography of the site, running from a west-east direction.



FIGURE 9-1: Site gradient

### 9.2 VEGETATION

Mucina and Rutherford<sup>3</sup> (2006) note that the site is comprised of Midlands Mistbelt Grassland and Southern KwaZulu-Natal Moist Grassland. Midlands Mistbelt Grassland is found scattered throughout KwaZulu-Natal and the south-western portion of the Eastern Cape. It occurs on hilly, rolling landscapes and is dominated by forb-rich, tall, sour *Themeda triandra* grasslands. These grasslands, however, are generally found to be transformed due to the invasion of the native 'Ngongoni grass' (*Aristida junciformis subsp. junciformis*). Only a few patches of the original species-rich grasslands remain.

As illustrated by the 2008 Ezemvelo KZN Wildlife dataset (see Figure 9-2), the site is located within a transformed area and thus the presence of *Themeda triandra* grasslands is limited, especially given the fact that the property has been utilised as a *eucalyptus* plantation for the past several years. This is further substantiated by uMngeni Municipality's Critical Biodiversity Areas Map which notes that the site is located in a transformed area (refer to Figure 9-3).

Some of the area around the quarry area are shown by Ezemvelo KZN Wildlife to be in a Critical Biodiversity Area and to be "Irreplaceable". However, the proposed mining area (i.e. site) is largely excluded as it is in existing timber (*eucalyptus*) plantations or other degraded areas.

<sup>3</sup> Mucina, L. & Rutherford, M.C. (eds) 2006. The vegetation of South Africa. Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

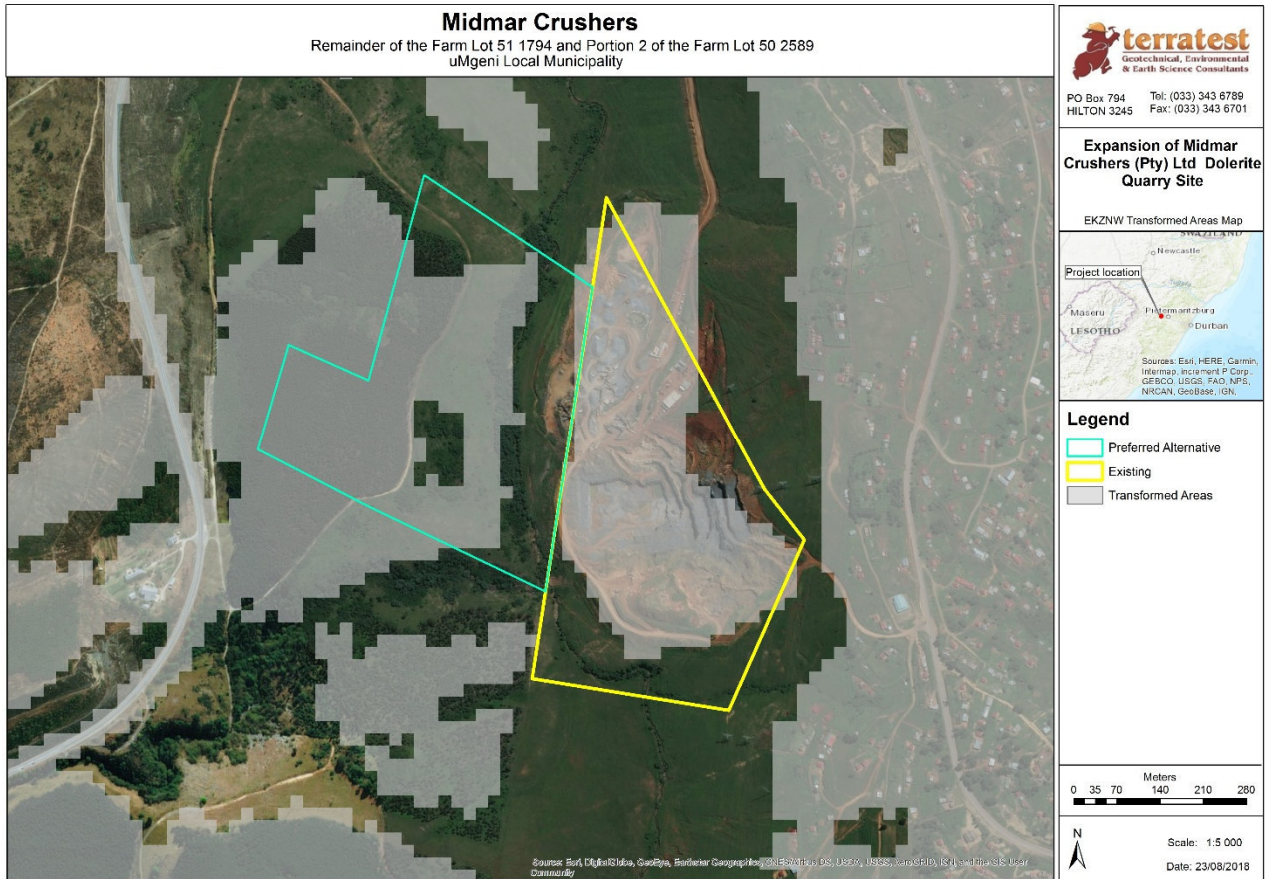


FIGURE 9-2: Transformed landcover [Source: EKZN Wildlife dataset]

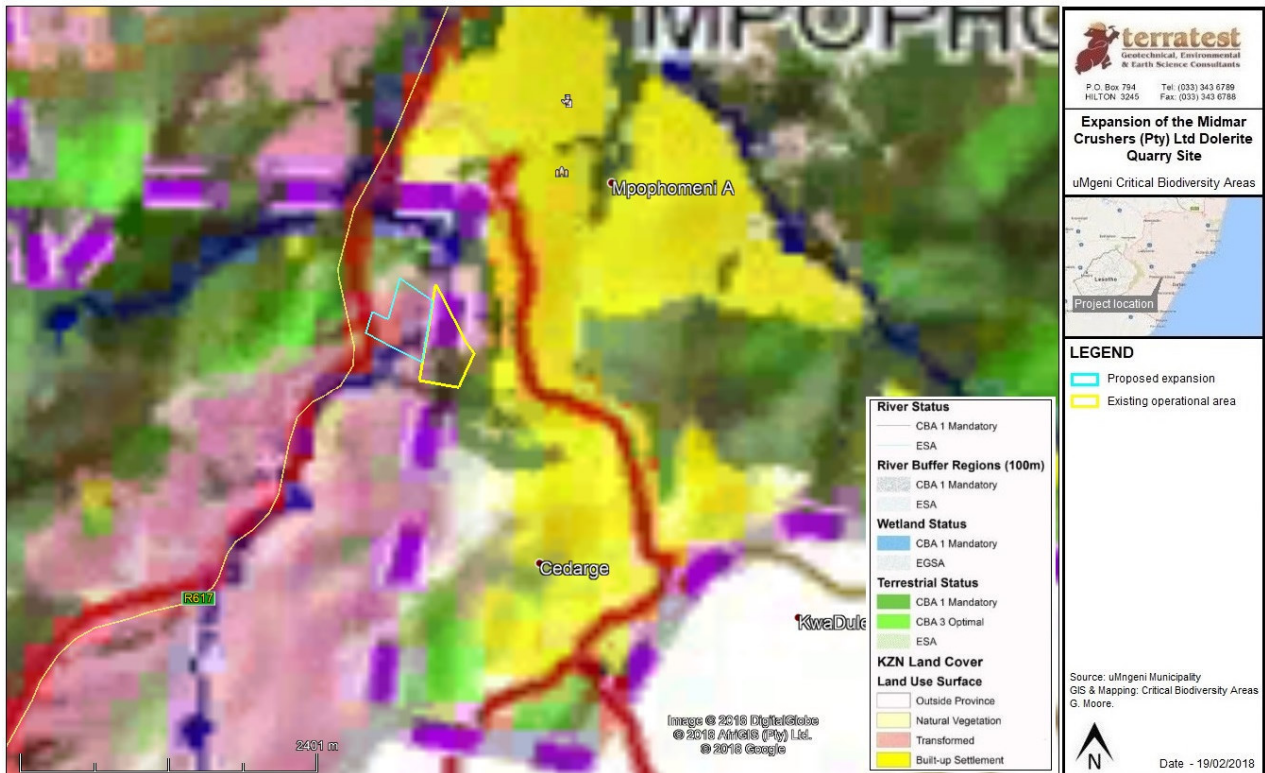


FIGURE 9-3: Transformed areas as per uMngeni Municipality [Source: uMngeni GIS & Mapping]

### 9.3 FAUNA

The study area is listed in the SANBI Threatened Ecosystems Database as being in the Midmar Valley. It is within the 5km buffer area of the Midmar Dam Nature Reserve. However, given the level of transformation on site, limited threatened species are considered to be present. This is further substantiated by Ezemvelo KZN Wildlife's Transformation map which indicates that the area is nearly totally transformed (see Figure 9-2 in Section 9.2 above). Thus, the site is not considered to require any form of protection from a biodiversity perspective since the site has been operating as a dedicated *eucalyptus* plantation for several years.

The Ezemvelo KZN Wildlife Minset database has, however, been consulted and the following species of conservation significance have been identified as potentially being present in the area, as per Table 9-1.

**TABLE 9-1:** Minset data [Source: Ezemvelo KZN Wildlife]

FEATURE PRIORITY NUMBER				
1	2	3	4	5
<i>Scelotes bourquini</i>	<i>Senecio exuberans</i>	<i>Orachrysops ariadne</i>	<i>Dierama reynoldsii</i>	Midlands Mistbelt Grassland
<i>Kniphofia buechananii</i>	Southern KwaZulu-Natal Moist Grassland	<i>Dierama reynoldsii</i>	<i>Spinotarsus glomeratus</i>	<i>Spinotarsus glomeratus</i>
		<i>Euonyma lymneaeformis</i>	Midlands Mistbelt Grassland	<i>Dierama reynoldsii</i>
			<i>Orachrysops ariadne</i>	<i>Bradypodion bourquini</i>
			<i>Bradypodion thamnobates</i>	

An Ezemvelo KZN Wildlife Minset Data map is provided in Figure 9-4. Further detailed information is provided in Section 10: Specialist Studies and a Watercourse and Biodiversity Assessment Report is attached as Appendix 2 giving further motivation for the level of significance on site.

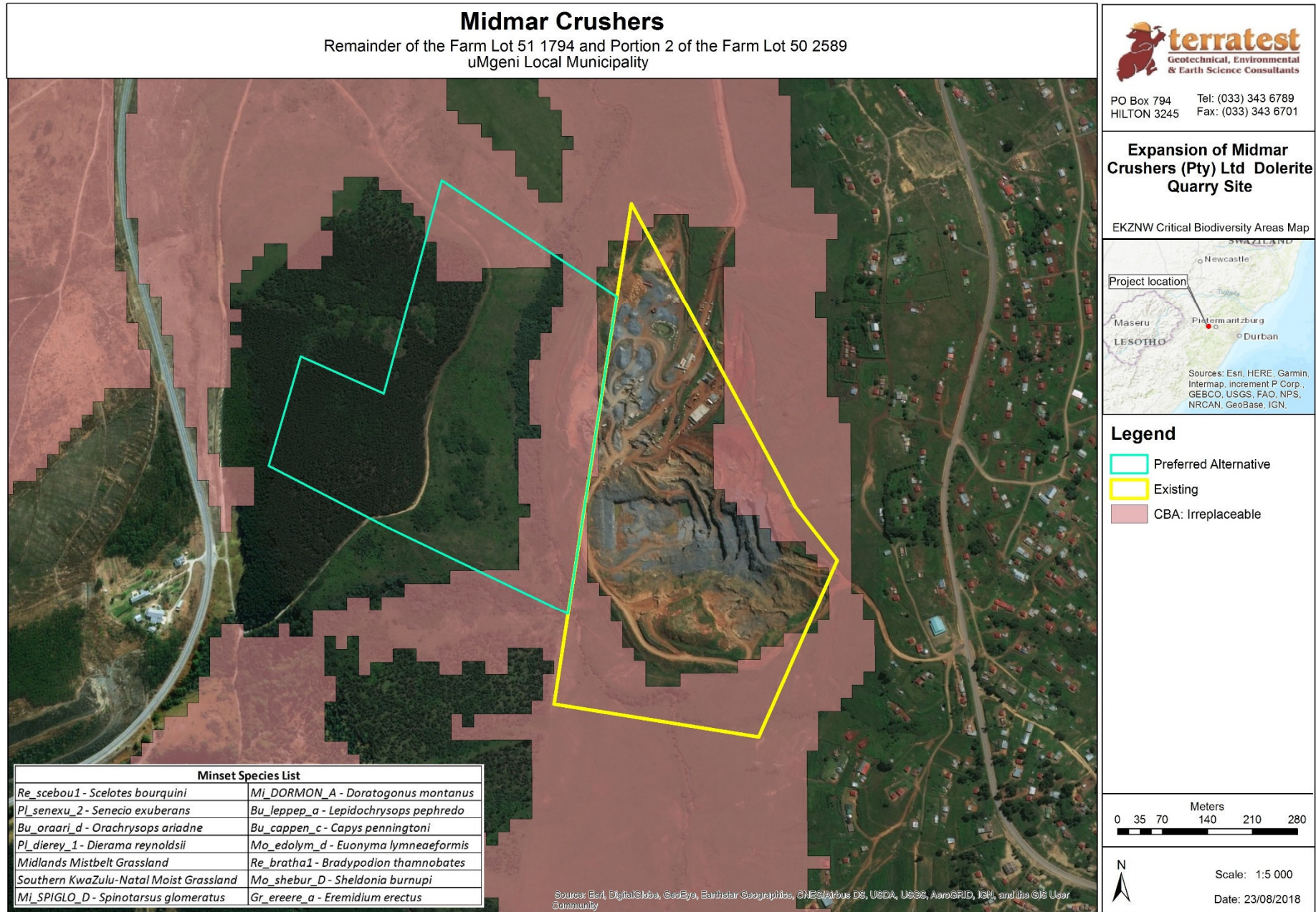
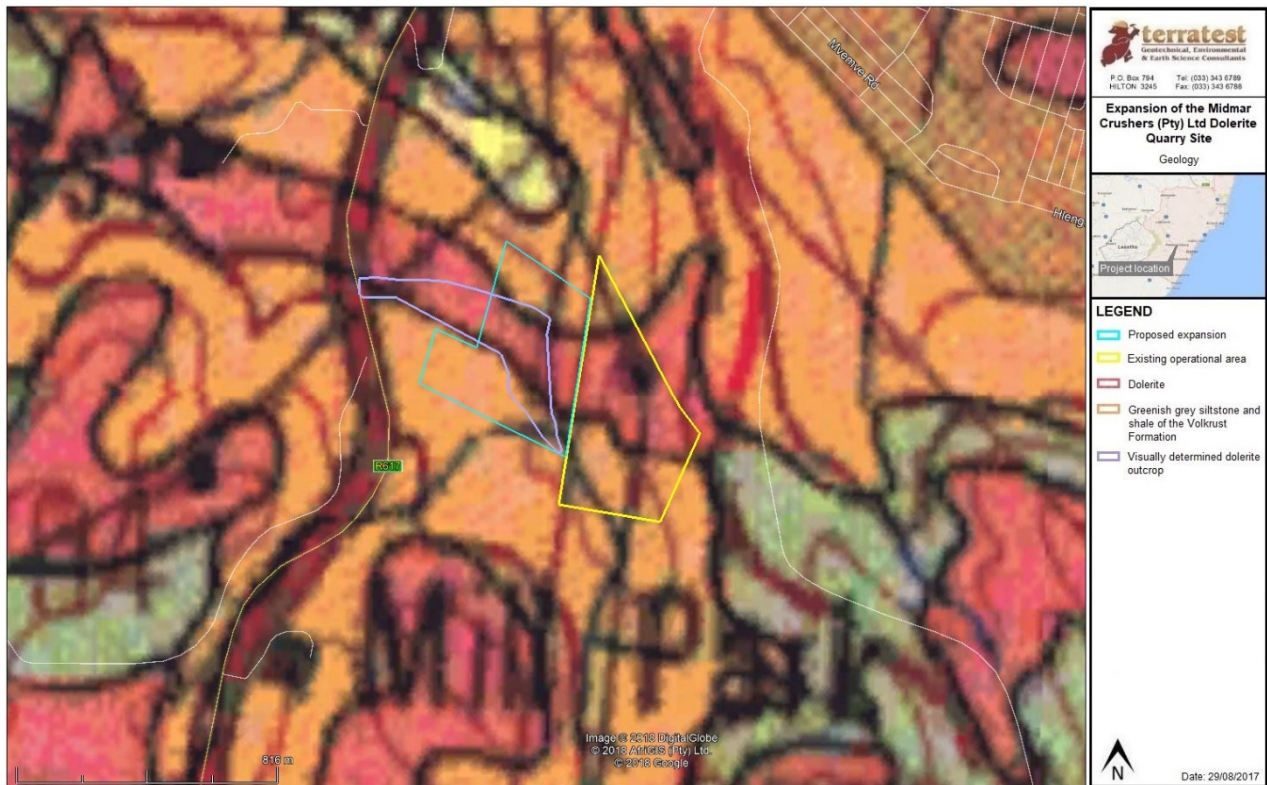


FIGURE 9-4: Ezemvelo KZN Wildlife Minset Data Map

### 9.4 GEOLOGY

The site is underlain predominantly by an elongated east-west trending dolerite sill. A visual assessment of the area was undertaken of the area lying between the stream and the Main Road R617 for the purposes of defining the extent of the dolerite rock body, according to visible surface features and exposures. Dolerite was identified predominantly at the surface, within the area of interest. Those areas not identified as dolerite are underlain by sedimentary rocks of the Volksrust Formation and Adelaide Formation. As the dolerite intrusion is concordant (intruded parallel to the bedding of the country rock), it is likely that dolerite within the area of interest will also extend beneath the surrounding sedimentary rocks, although further investigation would be required to determine its lateral extent and depth beneath the sedimentary cover rocks. In calculating the volumes of feasibly exploitable material, only the hillslope east of the crest has been considered, as restricting quarrying to this area minimises its visual impact from the main road. Depending upon the bench configurations adopted and assuming average depths of exploitation ranging between 15m and 30m, a conservative estimate would yield between 1 and 2 million m<sup>3</sup> of commercially crushable dolerite rock. Figure 9-5 presents the dolerite sill identified on site overlaid on the Geological Map.



**FIGURE 9-5:** Visual assessment of dolerite sill on site

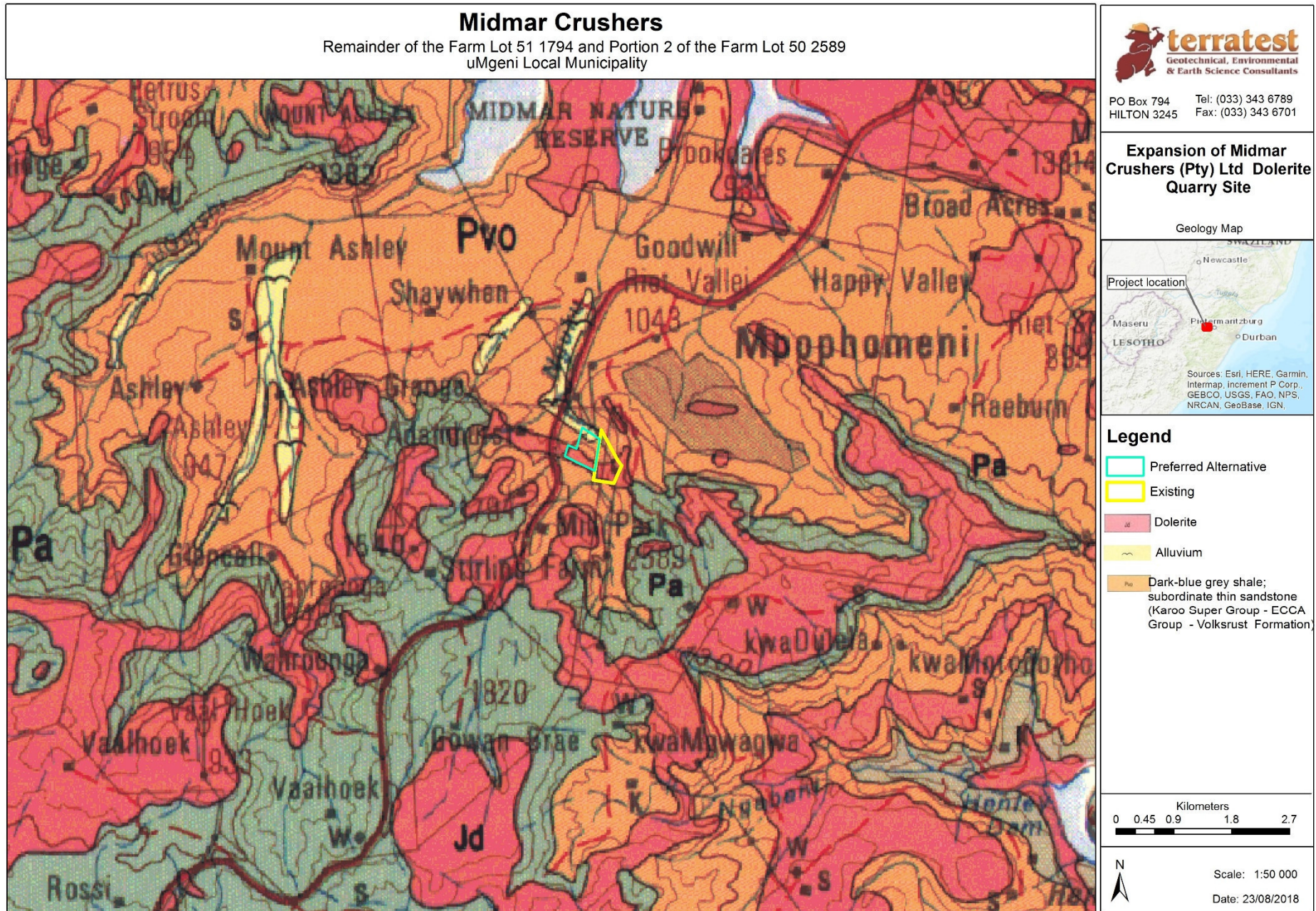


FIGURE 9-6: Geology of the general area



## 9.5 HYDROLOGY

The Nguklu River and tributaries flow around the site, forming part of the U20C catchment. The area of the catchment is 27 892ha. A Wetland Specialist conducted a site visit in May 2018 and identified a series of small toe-seep zones associated with the Nguklu River. All were located on the eastern bank of the Nguklu River below the existing, operational quarry and are considered to be very small with the largest being approximately 5m to 8m in width. Their presence was indicated by clumps of River Grass (*Arundinella nepalensis*) not by soil indicators.

It is inferred that the toe-slope seeps have developed as a result of seasonal groundwater, which is seasonally forced towards by the same dolerite intrusion that is being mined in the existing quarry. The seep patches are providing small patches of habitat for a few species, but their distribution is so restricted that they are not of high significance. Since they are all on the same side of the river as is the existing quarry, they will not be subject to disturbance by the proposed expansion.

The Nguklu River does on occasion flood very strongly. The flood events are short in duration, but water levels do rise several metres above the normal base flow level.

A second watercourse passes down the western side of the proposed quarry expansion area. This watercourse is non-perennial and has very low biodiversity value.

## 9.6 CLIMATE

Howick has an annual average rainfall of 843mm, with most rainfall occurring during the summer months. The average midday temperatures for Howick range from 18.9°C in June to 25.8°C in February. An average annual rainfall graph is provided as Figure 9-7.

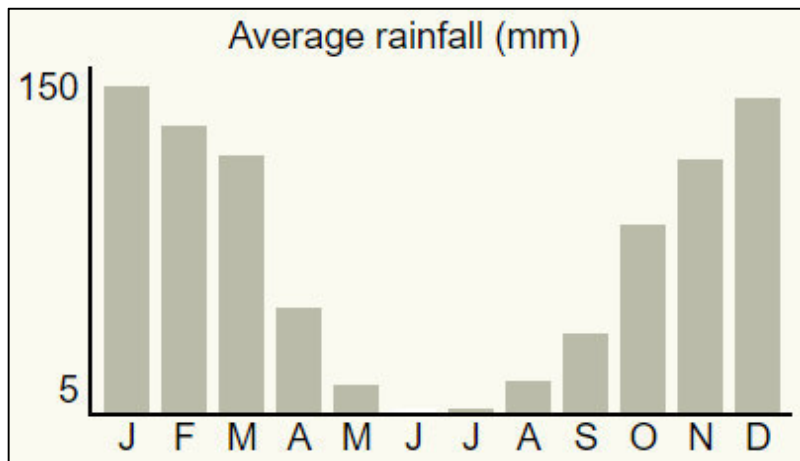


FIGURE 9-7: Annual average rainfall graph [Source: SA Explorer, 2017]

## 9.7 CULTURAL, HISTORICAL AND ARCHAEOLOGICAL RESOURCES

The site is located on a dolerite sill, which is classified as an intrusive igneous rock. This rock type is formed through the slow cooling and solidification of magma beneath the earth's surface. In this regard, fossils are not found in dolerite as no plant or animal matter would be able to withstand the extreme temperatures of the molten magma prior to cooling. As such, the Palaeontological Map supplied by the South African Heritage Resources Agency (SAHRA) notes that the site is largely considered to have a zero / insignificant sensitivity due to the presence of the dolerite sill. Please refer to Figure 9-8.

A Heritage Impact Assessment has been conducted on the site, the results of which are attached as Appendix 2 and summarised in Section 10. The Specialist identified four possible human grave sites within the **Layout Alternative 1** expansion area. As a result, the layout was amended to avoid any possible contact with the four potential grave sites, including implementing a 50m no-go buffer. Please refer to Figure 9-9.

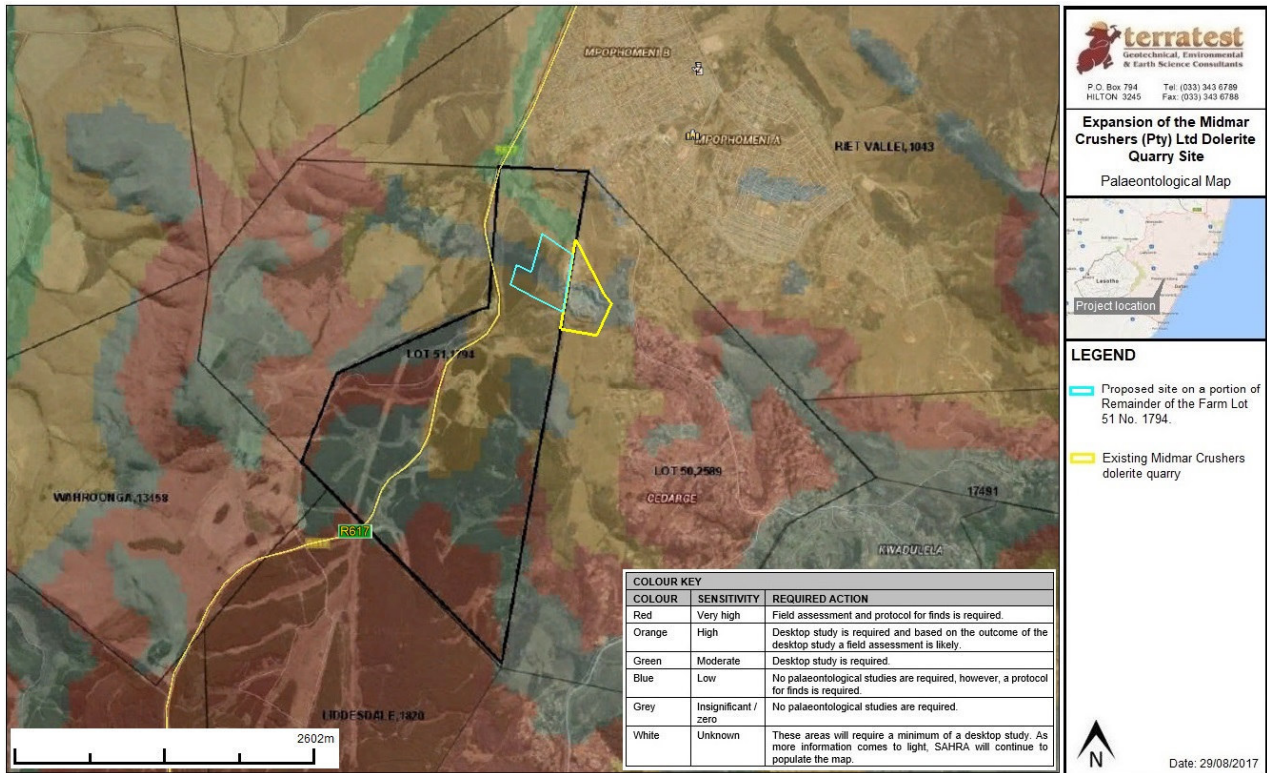


FIGURE 9-8: Palaeontological sensitivity map



FIGURE 9-9: HIA findings and 50m no-go buffer implemented

### 9.8 SOCIO-ECONOMIC

#### Competitive advantage

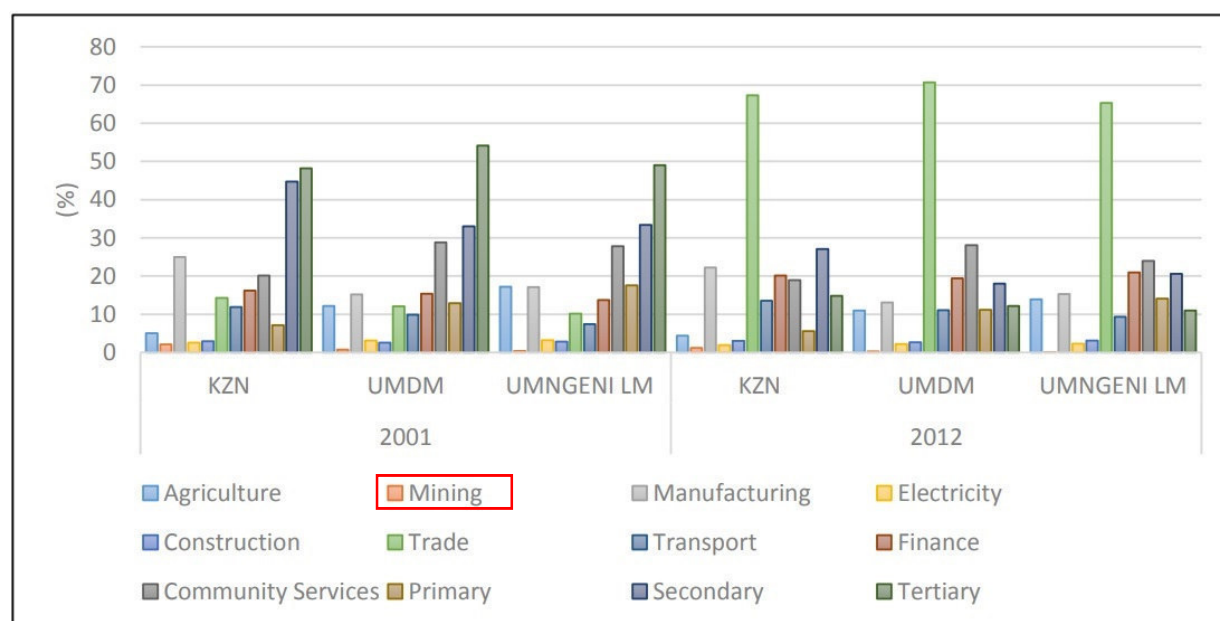
The uMngeni Local Municipality's Integrated Development Plan (IDP) notes that the proximity of the municipality to the N3, a national corridor, provides for easy access for businesses to the major national economic hubs of Johannesburg and Durban. Further, the municipality is situated less than 30km from the Capital City of KwaZulu-Natal, Pietermaritzburg, which allows for access to a variety of economic activities and trade. The municipality has one of the highest Capital Expenditures as a proportion of nominal GDP within the district which translates into the municipality reinvesting back money into the infrastructure required to sustain the economy. The municipality has one of the highest literacy rates in the district which affords skilled labour for current and future investments (uMngeni IDP, 2016/2017).

#### Main economic contributors

Table 9-2 and Figure 9-10 illustrate the Gross Domestic Product (GDP) percentage contribution of the municipality in the context of KwaZulu-Natal and that of the uMngungundlovu District Municipality, with regards to mining activities.

**TABLE 9-2:** Sector contribution towards GDP [Source: UMngeni IDP, 2016/2017]

Sector	KZN (%)		UMDM (%)		uMngeni LM (%)	
	2001	2012	2001	2012	2001	2012
<b>Primary</b>	<b>7.1</b>	<b>5.6</b>	<b>12.9</b>	<b>11.2</b>	<b>17.6</b>	<b>14.1</b>
Agriculture	5.0	4.4	12.2	11.0	17.2	13.9
Mining	2.1	1.2	0.7	0.3	0.4	0.1
<b>Secondary</b>	<b>44.7</b>	<b>27.1</b>	<b>33.0</b>	<b>18.0</b>	<b>33.4</b>	<b>20.6</b>
Manufacturing	25.0	22.2	15.2	13.1	17.1	15.3
Electricity	2.6	1.9	3.1	2.2	3.2	2.3
Construction	2.9	3.0	2.6	2.7	2.8	3.1
Trade	14.3	67.3	12.1	70.7	10.2	65.3
<b>Tertiary</b>	<b>48.2</b>	<b>14.8</b>	<b>54.1</b>	<b>12.2</b>	<b>49.0</b>	<b>11.0</b>
Transport	11.9	13.5	9.9	11.1	7.4	9.3
Finance	16.2	20.1	15.4	19.4	13.7	20.9
Community Services	20.1	18.9	28.8	28.1	27.8	24.0



**FIGURE 9-10:** Percentage contribution to GDP [Source: UMngeni IDP, 2016/2017]

The Primary Sector within the municipality, consisting of the mining and agricultural sectors is the second highest contributor to the regional GDP.

The expansion of the dolerite quarry will ensure the future operations of Midmar Crushers (Pty) Ltd in the municipality which will contribute to the continued contribution to the GDP. Further, it will ensure the continued employment of the current staff compliment.

### **9.9 CURRENT LAND USE**

The majority of the site has been under afforestation for several years, as managed by SAPPI. In this regard, the immediate current land use on site is agricultural plantation. Human settlement is located to the north and east of the site. Smaller pockets of settlement are sporadically located to the west and south.

The Surveyor General database notes that two watercourses straddle the site to the east and west respectfully. The Main Road R617 runs past the site to the east and is located more than 100m away from the road. Several existing access roads are present on site.

The current existing, authorised and operational dolerite mine is located to the immediate west of the site. Please refer to Figure 9-11.

The closest identified homestead is located approximately 195m southwest of the site.



FIGURE 9-11: Land Use Map

## 10 SPECIALIST STUDIES

### 10.1 BIODIVERSITY AND WETLAND ASSESSMENT

Terratest (Pty) Ltd was appointed to undertake a Watercourse and Biodiversity Assessment of all wetlands and watercourses located within 500m of the site, as well as to identify the impact that the proposed expansion would have on the surrounding fauna and flora on site. Mitigation measures and recommendations have also been presented based on the impacts identified.

The Watercourse and Biodiversity Assessment Report is attached as Appendix 2: Specialist Studies. The relevant details of the specialist who conducted the assessment are noted in Table 10-1.

**TABLE 10-1:** Details of Specialist

Name of specialist	Education qualifications	Field of expertise	Title of specialist report as attached in Appendix 2
Mr Jake Alletson	BSc Hons (Zoology)	Aquatic and terrestrial ecology, Environmental Impact Assessment, landscape scale, Conservation science and planning.	Assessment of wetlands, watercourses, and biodiversity at the site of the proposed expansion of the Midmar Crushers Quarry near Mopophomeni, KwaZulu-Natal.

An impact assessment study of the proposed expansion utilised the following databases:

- Vegetation type. Source: Mucina and Rutherford (2006);
- KwaZulu-Natal Biodiversity Sector Plan;
- KwaZulu-Natal Minset Database;
- KwaZulu-Natal Provincial Conservation Plan;
- KwaZulu-Natal Landscape Transformation Database;
- The SANBI Threatened Ecosystem Database and Mapping;
- Wetlands. Sources: KwaZulu-Natal provincial Wetland Database and Mapping. National Freshwater Ecosystem Priority Areas (NFEPA) database and maps; and
- Faunal diversity. Sources Important Bird Areas (Birdlife South Africa), species literature for reptiles and amphibians; and
- Google Earth.

Following a desktop study, the specialist conducted a site survey on 17-18 May 2018. The results thereof are presented below (refer to Appendix 2: Specialist Studies).

#### 10.1.1 Biodiversity: Field survey

##### VEGETATION

The vegetation in the study area was found to be in poor condition, as a result of historical and existing *eucalyptus* plantations. Some of the plantation areas are on a steep slope and soil erosion is evident. Basal cover is generally poor with areas of bare soil being commonly visible. This is attributed to not only the timber plantations, but also to the fact that the area is now extensively grazed by cattle.

The indigenous flowering plant species identified on site are listed in Table 10-2 and the alien species identified are listed in Table 10-3.

**TABLE 10-2:** List of indigenous flowering plant species found on site

SCIENTIFIC NAME	COMMON NAME	STATUS
<i>Acacia sieberiana</i> var <i>woodii</i>	Paperbark thorn	Least Concern
<i>Aloe arborescens</i>	Krantz aloe	Least Concern
<i>Aloe maculata</i>	Common soap aloe	Least Concern
<i>Alysicarpus rugosus</i>	Pioneer fodder plant	Least Concern
<i>Asparagus</i> sp.	Asparagus	-
<i>Athrixia phyllicoides</i>	Bushman's tea shrub	Least Concern
<i>Berkheya</i> spp.	Berkheya	Least Concern
<i>Blumea mollis</i>	Soft herb	Least Concern
<i>Chaetacanthus burchellii</i>	Fairy stars	Least Concern
<i>Cheilanthes quadripinnata</i>	Four pinnate lip fern	Least Concern
<i>Clematis brachiata</i>	Traveller's joy	Least Concern
<i>Conostomium natalense</i>	Wild Penta	Least Concern
<i>Crassula</i> cf. <i>orbiculata</i>	Crassula	Least Concern
<i>Cussonia spicata</i>	Cabbage tree	Least Concern
<i>Dais</i> <i>cotonifolia</i>	Pompom tree	Least Concern
<i>Diospyros lyciodes</i>	Bluebush	Least Concern
<i>Eriosema</i> cf. <i>distinctum</i>	Scarlet Eriosema	Least Concern
<i>Felicia erigeroides</i>	Wild Michaelmas daisy	Least Concern
<i>Felicia muricata</i>	White felicia	Least Concern
<i>Gazania krebsiana</i>	Common gazania	Least Concern
<i>Geranium</i> sp.	Geranium	-
<i>Gerbera piloselloides</i>	Small yellow gerbera	Least Concern
<i>Helichrysum pilosellum</i>	Woolly-leaved everlasting	Least Concern
<i>Hypoxis</i> cf. <i>iridifolia</i>	Yellow star flower	Least Concern
<i>Leonotis leonurus</i>	Wild dagga	Least Concern
<i>Lippia javanica</i>	Lemon bush	Least Concern
<i>Mohria vestita</i>	Scented fern	Least Concern
<i>Oxalis semiloba</i>	Sorrel	Least Concern
<i>Persicaria</i> cf. <i>serrulata</i>	Knotweed	Least Concern
<i>Plectranthus</i> spp.	Spur flower	Least Concern
<i>Polygala virgata</i>	Purple broom	Least Concern
<i>Printzia</i> cf. <i>pyrifolia</i>	Giant daisy bush	-
<i>Pteridium aquilinum</i>	Bracken	Least Concern
<i>Rabdosiella calycina</i>	Upland fly bush	Least Concern
<i>Searsia</i> cf. <i>dentata</i>	Nana-berry	Least Concern
<i>Senecio deltoideus</i>	Herbaceous scrambler	Least Concern
<i>Senecio isatideus</i>	Dan's cabbage	Least Concern
<i>Senecio madagascariensis</i>	Annual herb	Least Concern
<i>Senecio polyanthemoides</i>	Many-flowered senecio	Least Concern
<i>Sida dregei</i>	Spider leg	Least Concern
<i>Stachys aethiopica</i>	African stachys	Least Concern
<i>Teucrium kraussii</i>	Soft shrublet	Least Concern
<i>Trifolium africanum</i>	Wild clover	Least Concern
<i>Wahlenbergia grandiflora</i>	Bell flower	Least Concern
<i>Zizyphus mucronata</i>	Buffalo thorn	Least Concern

No species of conservation concern were found.

**TABLE 10-3:** List of alien weed plant species found on site

SCIENTIFIC NAME	COMMON NAME	SANBI CATEGORY
<i>Acacia mearnsii</i>	Black wattle	1b
<i>Bidens formosa</i>	Cosmos	
<i>Bidens pilosa</i>	Blackjack	
<i>Centella asiatica</i>	Marsh pennywort	
<i>Cirsium vulgare</i>	Scotch thistle	1b
<i>Datura stramonium</i>	Common thorn apple	1b
<i>Ipomoea purpurea</i>	Morning glory	1b
<i>Lantana camara</i>	Lantana, Tickberry	1b
<i>Melia azedarach</i>	Syringa	1b
<i>Ricinus communis</i>	Castor-oil plant	2
<i>Rubus sp.</i>	Bramble	1b
<i>Salix cf. babylonica</i>	Willow	
<i>Solanum incanum</i>	Bitter apple	
<i>Solanum mauritianum</i>	Bugweed	1b
<i>Tagetes minuta</i>	Khaki weed	
<i>Verbena bonariensis</i>	Purple top	1b
<i>Xanthium strumarium L.</i>	Large cocklebur	1b

## FAUNA

During the site visit all animal species seen and identified were noted. Table 10-4 lists the relevant species with the exception of the Midlands Dwarf Chameleon which is listed as “Vulnerable”. None of the species noted or captured are of conservation concern.

**TABLE 10-4.** List of animal species seen or detected on the property and immediate (< 500 m) surrounds

Taxon	Scientific Name	Common Name	Notes
<b>Mammals</b>	-	-	-
<b>Birds</b>	<i>Lophaetus occipitalis</i>	Long-crested Eagle	Near timber plantation.
	<i>Buteo rufofuscus</i>	Jackal Buzzard	Near timber plantation.
	<i>Bubulcus ibis</i>	Cattle Egret	With grazing cattle.
	<i>Bostrychia hagedash</i>	Hadedah Ibis	Foraging in grassland.
	<i>Alcedo cristata</i>	Malachite Kingfisher	Seen near the river.
	<i>Onychognathus morio</i>	Red-winged Starling	Common in woody vegetation.
	<i>Dicrurus adsimilis</i>	Fork-tailed Drongo	Common in woody vegetation.
	<i>Telophorus zeylonus</i>	Bokmakierie	Seen near river
	<i>Lanius collaris</i>	Common Fiscal	Common.
	<i>Pyconotus tricolor</i>	Dark-capped Bulbul	Common.
	<i>Ploceas cucullatus</i>	Village Weaver	Seen in open areas.
	<i>Saxicola torquatus</i>	Stone Chat	Seen in open areas.
	<i>Corvus capensis</i>	Cape Crow	Flew over the site.
	<i>Cossypha caffra</i>	Cape Robin-chat	Seen in woody vegetation.
	<i>Muscicapa adusta</i>	African Dusky Flycatcher	Seen once in woody vegetation.
	<i>Euplectes axillaris</i>	Fan-tailed Widow	Seen near the river.
	<i>Riparia paludicola</i>	Brown-throated Martin	Foraging over the grassland.



Taxon	Scientific Name	Common Name	Notes
	<i>Columba guinea</i>	Speckled (Rock) Pigeon	Flew over the site.
	<i>Streptopelia semitorquata</i>	Red-eyed Dove	Flew over the site.
	<i>Motacilla capensis</i>	Cape Wagtail	Near river.
	<i>Zosterops senegalensis</i>	White-eye	Seen in woody vegetation.
	<i>Cisticola tinniens</i>	Levaillant's Cisticola	Common in grassland.
	<i>Estrilda astrild</i>	Common Waxbill	Common in grassland.
Reptiles	<i>Bradypodion thamnobates</i>	Midlands Dwarf Chameleon	Caught in the grassland area.
	<i>Trachylepis punctatissima</i>	Speckled Rock Skink	Seen in a rocky area.
Frogs	<i>Afrana angolensis</i>	Common River Frog	Near the river. Common.
	<i>Xenopus laevis</i>	Platanna	In river pools.
Fish	<i>Amphilius natalensis</i>	Natal Mountain Catlet	In river. Three caught. 65mm – 125mm.
Invertebrates	<i>Byblia ilithyia</i>	Spotted joker	Butterflies
	<i>Danaus chrysippus</i>	African monarch	
	<i>Eurema brigitta</i>	Broadbordered grass yellow	
	<i>Pardopsis punctatissima</i>	Polka dot	
	<i>Precis octavia</i>	Gaudy commodore	

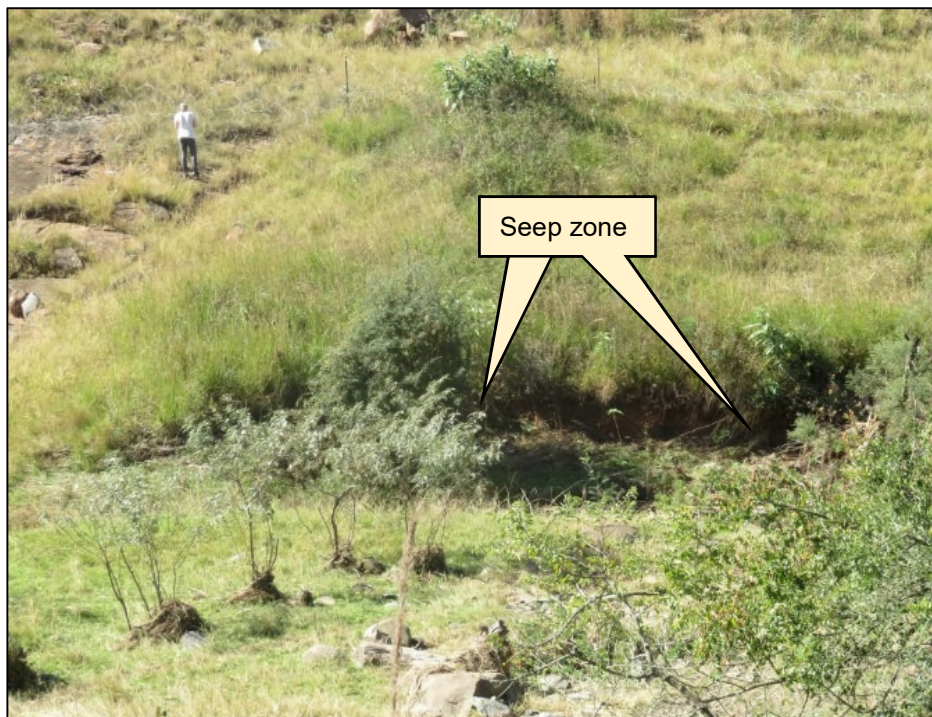
### 10.1.2 Wetlands

The only wetlands found on the site were a series of very small seep zones associated with the Nguklu River. All were located on the eastern bank and so are located below the existing quarry. See Figure 10-1. The individual patches are very small with the largest only being 5m - 8m in width and their presence was indicated by clumps of River Grass (*Arundinella nepalensis*), not by soil indicators. As the wetland patches are so small and so restricted in their distribution, they were not delineated and assessed in the normal manner.



**FIGURE 10-1:** Seep wetlands identified on site

It is inferred that the wetlands are toe-slope seeps which have developed as a result of seasonal groundwater which is forced to surface by the same dolerite intrusion that is being mined in the existing quarry. The seep patches are providing small patches of habitat, but their distribution is so restricted that they are not of high significance. Since they are all on the same side of the river as is the existing quarry they will not be subject to disturbance by the proposed expansion.



**PLATE 10-1:** Seep zone alongside the river channel

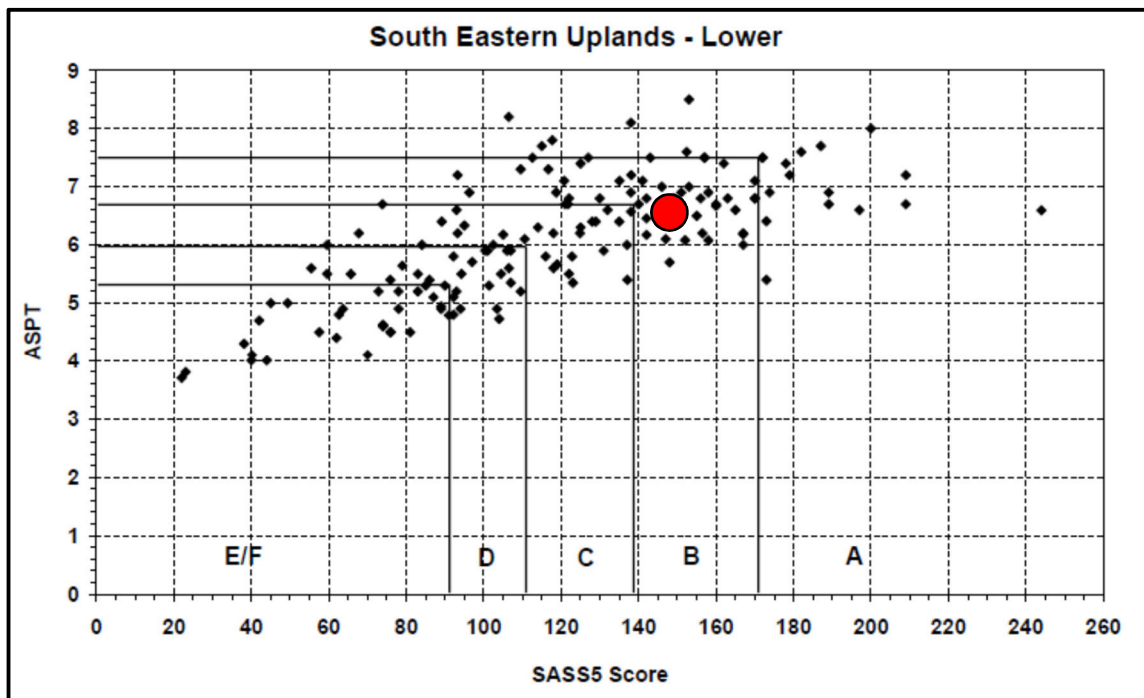
**10.1.3 Nguklu River, River Health (SASS) and Fish Surveys**

The results of the River Health South African Scoring System (SASS) survey are shown in Table 10-5. Although the habitat was found to be less than ideal, with the vegetation biotope in particular being poorly represented, several high scoring families were found to be present. These were the *Platycnemidae*, *Polycentropodidae*, *Lepidostomatidae*, and the *Dixidae*. The result is that the Nguklu River is a Class B River as defined in Table 10-6 and Figure 10-5.

Only one species of fish was found to be present in the river. It is the Natal Mountain Catlet (*Amphilius natalensis*). At the site this species is within its known distribution range, but at slightly lower altitude than is common for it. Its presence supports the high river class given by the SASS score.

**TABLE 10-5:** Results of the SASS surveys for the Nguklu River

HABITAT TYPE	SCORES	
Stones-in-current, and Stones-out-of-current	SASS Score	88
	No. of Taxa	12
	ASPT	73
Vegetation	SASS Score	99
	No. of Taxa	16
	ASPT	6.2
Mud, sand, and gravel	SASS Score	63
	No. of Taxa	10
	ASPT	6.3
Composite of all three types	SASS Score	154
	No. of Taxa	23
	ASPT	6.7
<b>River Class:</b>	<b>B</b>	



**FIGURE 10-2:** Biological bands for the Lower South Eastern Uplands Ecoregion. The red circle denotes the results from the study site

**TABLE 10-6:** Definitions of the PES categories [Source: Macfarlane *et al*, (2008)]

Impact Category	Description	Present State Category
None	<b>Unmodified, natural</b>	<b>A</b>
Small	<b>Largely Natural</b> with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	<b>B</b>
Moderate	<b>Moderately Modified.</b> A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.	<b>C</b>
Large	<b>Largely Modified.</b> A large change in ecosystem processes and loss of natural habitat and biota has occurred.	<b>D</b>
Serious	<b>Seriously Modified.</b> The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable.	<b>E</b>
Critical	<b>Critical Modification.</b> The modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	<b>F</b>

It is to be noted that a second watercourse passes down the western side of the proposed quarry expansion area. This channel has seasonal flows and was almost dry at the time of the survey. It has very low biodiversity value. During the course of the field surveys it was noted that the Nguklu River does on occasion flood very strongly. The flood events will mostly be of short duration but water levels can rise several metres above the normal base flow level.

The extent of flooding will need to be taken into consideration when the bridges across the Nguklu River are designed and built. Failure to do so will result in damage to the bridges and their approaches, and consequent erosion of the river banks. It is recommended that the bridge sites be positioned downstream of the western tributary and that the design be commissioned by a qualified engineer. Further, due to the ecological sensitivity of the stream the construction contractor must provide a method statement prior to any work being done and the statement must be approved by the engineer and an appropriate environmental specialist.

#### 10.1.4 Consideration of the study findings

The findings of the studies undertaken at the site of the proposed quarry expansion indicate that the natural environment is presently in moderate to poor condition. In accordance to the landscape classification shown in Table 10-7, it is placed in Class D in terms of biodiversity and functional condition.

**TABLE 10-7:** Classification of landscapes according to their biodiversity and functional condition

CLASS	DESCRIPTION
A	<ul style="list-style-type: none"> <li>Human habitation is absent or, at most, very sparse. No agriculture or livestock.</li> <li>Landscape is unmodified, natural.</li> <li>The biological, soil, and water resource bases have not been decreased at all.</li> <li>Ecosystem services are all intact.</li> <li>The biota is essentially intact and unchanged. No alien species.</li> </ul>
B	<ul style="list-style-type: none"> <li>Human habitation is sparse. Some agriculture and livestock.</li> <li>Landscape is largely natural with few modifications</li> <li>The biological, soil, and water resource bases have been decreased to a small extent.</li> <li>Exploitation is sustainable.</li> <li>Ecosystem services are largely intact and are at a sustainable level.</li> </ul>

CLASS	DESCRIPTION
	<ul style="list-style-type: none"> <li>A small change in natural habitats and biota may have taken place. Perhaps a few, non-invasive alien plant species.</li> </ul>
C	<ul style="list-style-type: none"> <li>Human habitation is moderate and fairly evenly spread. Agriculture widespread and grazing and trampling by livestock are significant. Agriculture is primarily subsistence only.</li> <li>Landscape is moderately modified.</li> <li>The biological, soil, and water resource bases have been decreased to a moderate extent.</li> <li>Exploitation approaches the limit of sustainability.</li> <li>Some or all ecosystem services are under threat of failure.</li> <li>A change of natural habitat and biota may have taken place but the ecosystem functions are essentially unchanged. Alien plant species common. Some may be invasive.</li> </ul>
D	<ul style="list-style-type: none"> <li>Human habitation is dense and definite clustering is evident. Agriculture changes from subsistence to commercial. Some commercial/industrial activity.</li> <li>Landscape is largely modified.</li> <li>The biological, soil, and water resource bases have been decreased to a large extent.</li> <li>Exploitation exceeds sustainable levels.</li> <li>Ecosystem services are severely depleted.</li> <li>Large changes in natural habitat, biota, and basic ecosystem functions, have occurred. Alien plant species are abundant and may have displaced a large percentage of the natural vegetation.</li> </ul>
E	<ul style="list-style-type: none"> <li>Human habitation is very dense and approaches the peri-urban to urban condition. Landscape is significantly modified. Agriculture and stock grazing become less significant and commercial/industrial activity proliferates.</li> <li>The biological, soil, and water resource bases have been seriously decreased. Exploitation is drastically beyond the sustainable yield. Dependence on local resources falls away as food and water must be imported from elsewhere.</li> <li>In effect, all ecosystem services are destroyed.</li> <li>The loss of natural habitat, biota, and basic ecosystem functions, is extensive. Alien plant species may predominate but are being displaced by the built environment.</li> </ul>
F	<ul style="list-style-type: none"> <li>Human habitation is fully urban and/or commercial/industrial. Landscape is critically modified</li> <li>The biological, soil, and water resource bases have been critically decreased but become locally irrelevant as all food and water are imported.</li> <li>Modifications to the natural environment have reached a critical level with an almost total loss of unbuilt habitat. Most basic ecosystem functions have been destroyed and the changes are essentially irreversible.</li> </ul>

The assessment of the landscape is based on the following considerations:

- Vegetation:** The vegetation in the area, although mapped as being of high conservation value, is in reality severely degraded. This transformation has come about primarily as a result of the timber (*eucalyptus*) production in the area. Although some areas are no longer under plantation, the recovery thereof has been hampered by overgrazing by cattle and by invasion of alien weed species.
- Fauna:** Although the Midlands Dwarf Chameleon was found at the site, the greater part of the natural fauna has been reduced or lost. The reasons for the losses include transformation of most of the surrounding area for either timber plantations, or for residential development. Much of the latter is semi-formal and is not well serviced. The presence of dogs in the study area suggests that some hunting is done there.
- Nguklu River:** Flows in the Nguklu River will have been reduced as a result of the timber plantations and abstractions from dams upstream. The eastern side of the catchment is overgrazed and some soil erosion is evident. However, the high SASS score which was obtained, together with the fish species found, suggests that the riverine ecology is not severely damaged. This apparent paradox is likely due to the greater part of the landscape disruption in the catchment having taken place on higher ground and not on the lower slopes.

Attention was given to Midmar Dam which is downstream of the site, but as it is at least 3.5km away, and as the present quarry is having no effect on it, it is considered that the new quarry will also be of no threat.

#### 10.1.4.1 Impacts

The expansion of the quarry operation could have a number of environmental impacts both on the immediate site and in the surrounding area. The predicted impacts are as follows:

- **Loss of flora:** The impact on the flora in the footprint will be severe with almost total loss anticipated. The significance of the loss is reduced as the area is already severely transformed by timber (*eucalyptus*) plantations and overgrazing of the grassland remnant.
- **Loss of fauna:** The fauna in the area is already severely depleted as a result of the existing quarry, the timber plantations and various other anthropogenic activities including hunting with dogs.
- **Impacts on wetlands:** No impacts on wetlands are anticipated.
- **Impacts on the Nguklu River:** The present quarry does not appear to be having an adverse effect on the river as a large earth berm is present between the quarry and the channel. The river's good condition suggests that local impacts on it are small.

The expansion of the quarry will entail two new road crossings. These will entail some clearing of riparian vegetation, and the actual construction of the bridges which will entail some risks including the use of concrete near the water. Some introduction of sediment may occur during the construction phase and also during the operational phase. However, the latter is likely to be minimal as the material being transported will be hard rock.

In addition to the above impacts at the site, consideration was also given to alternative developments for the site and to cumulative impacts.

- **Alternatives to the proposed development:** The proposed development is an expansion of an existing viable operation which has a limited future operational life, but which provides employment for many people. The opening of a new site immediately adjacent to the existing site is almost certainly a lesser impact than opening a completely new site elsewhere.
- **Cumulative impacts:** The new quarry area will be in an area which is already extensively transformed.

#### 10.1.4.2 Recommendations

##### Loss of vegetation

Mitigation measures must include the following actions:

- No indigenous vegetation outside of the mine footprint may be damaged.
- The area between the new quarry boundary (i.e. expansion site) and the stream must be maintained as a buffer strip. This strip must have a minimum width of approximately 40m.
- An alien plant eradication programme must be undertaken and sustained in the buffer area including the strip of woody vegetation. Key species to be targeted include Black Wattle, Lantana, Bugweed, Bramble, Syringa and Castor-oil Plant.
- The grassland areas must be managed for maximum biodiversity conservation. The first two actions are relevant and a regime of veld burns on a biannual basis must be established. The woody vegetation along the river must be protected by burning a five metre break along its margin each year. This action will encourage a natural ecotonal plant community to develop.

While the above measures are intended to protect the remaining indigenous vegetation on the property, they will not be able to reduce the intensity or the significance of the quarries impact. However, they will prevent the secondary footprint of the operation from increasing.

## Loss of fauna

Mitigation measures must include the following actions:

- Shortly prior to the start of any construction on the site, a chameleon capture and translocation operation must be undertaken. The animals captured must be translocated to a nearby site with suitable habitat. This site could be in the indigenous vegetation alongside the tributary stream west of the existing quarry.

The mitigation suggested will not prevent the impact on larger animal species from taking place. However, careful preservation of some natural vegetation will provide habitat for smaller species.

## Wetlands

No impacts on wetlands are anticipated.

## Nguklu River

Mitigation measures put forward include the following actions:

- The lower end of the new quarry area should be enclosed by an earthen berm which will catch and contain dirty water and other materials from passing down the slope into the river.
- All the area between the new quarry boundary and the stream should be maintained as a buffer strip. This strip must have a minimum width of approximately 40m.
- An alien plant eradication programme must be undertaken, and sustained, in the buffer area including the strip of woody vegetation. Key species to be targeted include Black Wattle, Lantana, Bugweed, Bramble, Syringa, and Castor-oil Plant.
- Protect the woody vegetation from fire by burning a five metre break along its margin each year. This action will encourage a natural ecotonal plant community to develop.

### 10.1.5 Conclusion and recommendations

The project area is already significantly transformed as a result of timber (*eucalyptus*) plantations, both present and past and so the magnitude of any impacts on the greater landscape is much reduced. For these reasons, it is considered that there are **no biodiversity related fatal flaws** associated with the establishment of the proposed quarry expansion. To this end, it is suggested that the development may be authorised but with consideration of the following conditions:

- All the mitigatory actions recommended must be carried out;
- The area must be monitored once a year to check that the mitigation measures are effective. Particular attention must be given to the following:
  - The area downslope of the containing berm must be inspected to check for any soil or other material which may have moved from the quarry into the buffer area;
  - The buffer area must be checked for weeds and especially those which are listed for removal;
  - Adherence to the veld burning programme should be checked; and
- The bridges over the Nguklu River must be properly designed and the recommendations proposed implemented.

## 10.2 HERITAGE & PALAEOLOGICAL IMPACT ASSESSMENT

UMLANDO: Archaeological Surveys and Heritage Management was appointed to undertake a Heritage Survey, as well as to conduct an impact assessment of the proposed expansion on the surrounding environments. Mitigation measures and recommendations have also been presented based on the impacts identified.

The Heritage Survey Report is attached as Appendix 2: Specialist Studies. The relevant details of the specialist who undertook the work is noted in Table 10-8.

**TABLE 10-8:** Details of Specialist

Name of specialist	Education qualifications	Field of expertise	Title of specialist report as attached in Appendix 2
Mr Gavin Anderson	M. Phil Archaeology/Social Psychology	Heritage Impact Assessment	Heritage survey of the proposed Midmar Crushers quarry extension, Mpopomeni, KwaZulu-Natal.

A field survey was conducted on 21 May 2018. Four heritage features were recorded during the survey as detailed in Table 10-9:

**TABLE 10-9:** Identified heritage features

NO.	SITE	SOUTH	EAST
1	Potential house or grave	29°34'38.85"S	30° 9'57.16"E
2	Potential grave	29°34'38.68"S	30° 9'57.62"E
3	Potential grave	29°34'37.82"S	30° 9'56.43"E
4	Potential grave	29°34'38.78"S	30° 9'56.70"E

The results of the Heritage Survey are presented below.

### 10.2.1 Field Survey

The Heritage Specialist was informed by a neighbouring landowner while on site that a settlement containing graves is present at the apex of the hill. It was indicated that these graves are visited by local descendent. The Heritage Specialist identified a stone circle and what appeared to be three possible sunken cairns, but no specific graves were observed. The confirmation of such can only be determined upon exhumation.

The following significance and mitigation measures have therefore been proposed.

Significance: The general area where GPS points were taken should be considered of high significance until such time as the potential graves have been identified by the local community.

Mitigation: A 50m no-go buffer must be implemented around this area or an extensive process of Public Participation is to be held as conducted in accordance to the National Heritage Resources Act (Act No. 25 of 1999) and the KwaZulu-Natal Heritage Acts of 1997 and 2008. Further detail is provided in a Heritage Management Plan contained within the Heritage Impact Assessment Report (Appendix 2 of this report).

In order to create the least amount of impact on the identified heritage findings, a **new layout alternative** has been adopted, taking cognisance of the recommended 50m no-go buffer area. i.e. **Layout Alternative 2 (Preferred Alternative)**, refer Section 7.

No other items of heritage significance were identified on site.



### **10.2.2 Palaeontological Impact Assessment**

As per the Heritage Impact Assessment Report (Appendix 2), *“The SAHRIS map indicates that some of the area is of medium palaeontological sensitivity. This map is slightly inaccurate in that the study area is mostly dolerite and only the fringes have fossil bearing shale deposits. The quarry will be mining dolerite only.”*

Based on the Heritage Authorities (i.e. Amafa) review of the Heritage Impact Assessment Report and Draft Basic Assessment Report, which has been uploaded onto the South African Heritage Resources Information System (SAHRIS), a Paleontological Impact Assessment of the site may be required. This will be confirmed during the 30 day public participation period of the Draft Basic Assessment Report. Registered IAPs will be notified accordingly.

## 11 IMPACT ASSESSMENT AND MITIGATION MEASURES

### 11.1 IMPACT ASSESSMENT METHODOLOGY

The EIA Regulations (2014, as amended), prescribe requirements to be adhered to and objectives to be reached when undertaking Impact Assessments. These are noted in the following sections contained within the EIA Regulations (2014, as amended):

- Regulation 326, Appendix 1, Section 2 and Section 3 – Basic Assessment Impact Requirements; and
- Regulation 326, Appendix 2 and Appendix 3 – Environmental Impact Assessment Requirements.

In terms of these Regulations, the following should be considered when undertaking an Impact Assessment:

- A description and assessment of the significance of any environmental impact including:
  - Cumulative impacts that may occur as a result of the undertaking of the activity during the project life cycle;
  - Nature of the impact;
  - Extent and duration of the impact;
  - The probability of the impact occurring;
  - The degree to which the impact can be reversed;
  - The degree to which the impact may cause irreplaceable loss of resources; and
  - The degree to which the impact can be mitigated.

The overall significance of an impact / effect has been ascertained by attributing numerical ratings to each identified impact. The numerical scores obtained for each identified impact have been multiplied by the probability of the impact occurring before and after mitigation. High values suggest that a predicted impact / effect is more significant, whilst low values suggest that a predicted impact / effect is less significant.

The interpretation of the overall significance of impacts is presented in Table 11-1.

**TABLE 11-1:** Interpretation of the significance scoring of a negative impact / effect<sup>4</sup>

Scoring value	Significance
<b>&gt;35</b>	<b>High - The impact is total / consuming / eliminating</b> - In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. Mitigation may not be possible / practical. <u>Consider a potential fatal flaw in the project.</u>
<b>25 - 35</b>	<b>High - The impact is profound</b> - In the case of adverse impacts, there are few opportunities for mitigation that could offset the impact, or mitigation has a limited effect on the impact. Social, cultural and economic activities of communities are disrupted to such an extent that their operation is severely impeded. Mitigation may not be possible / practical. <u>Consider a potential fatal flaw in the project.</u>
<b>20 – 25</b>	<b>Medium - The impact is considerable / substantial</b> - The impact is of great importance. Failure to mitigate with the objective of reducing the impact to acceptable levels could render the entire project option or entire project proposal unacceptable. <u>Mitigation is therefore essential.</u>

<sup>4</sup> Source: adapted from Glasson J, Therivel R & Chadwick A. Introduction to Environmental Impact Assessment, 2<sup>nd</sup> Edition. 1999. pp 258. Spoon Press, United Kingdom.

Scoring value	Significance
7 – 20	<b>Medium - The impact is material / important to investigate</b> - The impact is of importance and is therefore considered to have a substantial impact. <u>Mitigation is required to reduce the negative impacts and such impacts need to be evaluated carefully.</u>
4 – 7	<b>Low - The impact is marginal / slight / minor</b> - The impact is of little importance, but may require limited mitigation; or it may be rendered acceptable in light of proposed mitigation.
0 – 4	<b>Low - The impact is unimportant / inconsequential / indiscernible</b> – no mitigation required, or it may be rendered acceptable in light of proposed mitigation.

The significance rating of each identified impact / effect was further reviewed by the Environmental Assessment Practitioner (EAP) by applying professional judgement.

For the purpose of this assessment, the impact significance for each identified impact was evaluated according to the following key criteria outlined in the sub-sections below.

### NATURE OF IMPACT

The environmental impacts of a project are those resultant changes in environmental parameters, in space and time, compared with what would have happened had the project not been undertaken. It is an appraisal of the type of effect the activity would have on the affected environmental parameter. Its description includes what is being affected, and how.

### SPATIAL EXTENT

This addresses the physical and spatial scale of the impact. A series of standard terms and ratings used in this assessment relating to the spatial extent of an impact / effect are outlined in Table 11-2.

**TABLE 11-2:** Rating scale for the assessment of the spatial extent of a predicted effect / impact

RATING	SPATIAL DESCRIPTOR
7	<b>International</b> - The impacted area extends beyond national boundaries.
6	<b>National</b> - The impacted area extends beyond provincial boundaries.
5	<b>Ecosystem</b> - The impact could affect areas essentially linked to the site in terms of significantly impacting ecosystem functioning.
4	<b>Regional</b> - The impact could affect the site including the neighbouring areas, transport routes and surrounding towns etc.
3	<b>Landscape</b> - The impact could affect all areas generally visible to the naked eye, as well as those areas essentially linked to the site in terms of ecosystem functioning.
2	<b>Local</b> - The impacted area extends slightly further than the actual physical disturbance footprint and could affect the whole, or a measurable portion of adjacent areas.
1	<b>Site Related</b> - The impacted area extends only as far as the activity e.g. the footprint; the loss is considered inconsequential in terms of the spatial context of the relevant environmental or social aspect.

### SEVERITY / INTENSITY / MAGNITUDE

This provides a qualitative assessment of the severity of a predicted impact / effect. A series of standard terms and ratings used in this assessment which relate to the magnitude of an impact / effect are outlined in Table 11-3.

**TABLE 11-3:** Rating scale for the assessment of the severity / magnitude of a predicted effect / impact

RATING	MAGNITUDE DESCRIPTOR
7	<b>Total / consuming / eliminating</b> - Function or process of the affected environment is altered to the extent that it is permanently changed.
6	<b>Profound / considerable / substantial</b> - Function or process of the affected environment is altered to the extent where it is permanently modified to a sub-optimal state.
5	<b>Material / important</b> - The affected environment is altered, but function and process continue, albeit in a modified way.
4	<b>Discernible / noticeable</b> - Function or process of the affected environment is altered to the extent where it is temporarily altered, be it in a positive or negative manner.
3	<b>Marginal / slight / minor</b> - The affected environment is altered, but natural function and process continue.
2	<b>Unimportant / inconsequential / indiscernible</b> - The impact temporarily alters the affected environment in such a way that the natural processes or functions are negligibly affected.
1	<b>No effect / not applicable</b>

### DURATION

This describes the predicted lifetime / temporal scale of the predicted impact. A series of standard terms and ratings used in this assessment are included in Table 11-4.

**TABLE 11-4:** Rating scale for the assessment of the temporal scale of a predicted effect / impact

RATING	TEMPORAL DESCRIPTOR
7	<b>Long term</b> – Permanent or more than 15 years post decommissioning. The impact remains beyond decommissioning and cannot be negated.
3	<b>Medium term</b> – Lifespan of the project. Reversible between 5 to 15 years post decommissioning.
1	<b>Short term</b> – Quickly reversible. Less than the project lifespan. The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the project phases or within 0 -5 years.

### IRREPLACEABLE LOSS OF RESOURCES

Environmental resources cannot always be replaced; once destroyed, some may be lost forever. It may be possible to replace, compensate for or reconstruct a lost resource in some cases, but substitutions are rarely ideal. The loss of a resource may become more serious later, and the assessment must take this into account. A series of standard terms and ratings used in this assessment are included in Table 11-5.

**TABLE 11-5:** Rating scale for the assessment of loss of resources due to a predicted effect / impact

RATING	RESOURCE LOSS DESCRIPTOR
7	<b>Permanent</b> – The loss of a non-renewable / threatened resource which cannot be renewed / recovered with, or through, natural process in a time span of over 15 years, <u>or by artificial means.</u>
5	<b>Long term</b> – The loss of a non-renewable / threatened resource which cannot be renewed / recovered with, or through, natural process in a time span of over 15 years, <u>but can be mitigated by other means.</u>
4	<b>Loss of an ‘at risk’ resource</b> - one that is not deemed critical for biodiversity targets, planning goals, community welfare, agricultural production, or other criteria, but cumulative effects may render such loss as significant.
3	<b>Medium term</b> – The resource can be recovered within the lifespan of the project. The resource can be renewed / recovered with mitigation or will be mitigated through natural process in a span between 5 and 15 years.
2	<b>Loss of an ‘expendable’ resource</b> - one that is not deemed critical for biodiversity targets, planning goals, community welfare, agricultural production, or other criteria.
1	<b>Short-term</b> – Quickly recoverable. Less than the project lifespan. The resource can be renewed / recovered with mitigation or will be mitigated through natural process in a span shorter than any of the project phases, or in a time span of 0 to 5 years.

### REVERSIBILITY / POTENTIAL FOR REHABILITATION

The distinction between reversible and irreversible impacts is a very important one and the irreversible impacts not susceptible to mitigation can constitute significant impacts in an EIA (Glasson et al, 1999). The potential for rehabilitation is the major determinant factor when considering the temporal scale of most predicted impacts. A series of standard terms and ratings used in this assessment are included in Table 11-6.

**TABLE 11-6:** Rating scale for the assessment of reversibility of a predicted effect / impact

RATING	REVERSIBILITY DESCRIPTOR
7	<b>Long term</b> – The impact / effect will never be returned to its benchmark state.
3	<b>Medium term</b> – The impact / effect will be returned to its benchmark state through mitigation or natural processes in a span shorter than the lifetime of the project, or in a time span between 5 and 15 years.
1	<b>Short term</b> – The impact / effect will be returned to its benchmark state through mitigation or natural processes in a span shorter than any of the phases of the project, or in a time span of 0 to 5 years.

## PROBABILITY

The assessment of the probability / likelihood of an impact / effect has been undertaken in accordance with ratings and descriptors provided in Table 11-7.

**TABLE 11-7:** Rating scale for the assessment of the probability of a predicted effect / impact

RATING	PROBABILITY DESCRIPTOR
1.0	Absolute certainty / will occur
0.9	Near certainty / very high probability
0.7 – 0.8	High probability / to be expected
0.4 - 0.6	Medium probability / strongly anticipated
0.3	Low probability / anticipated
0.2	Possibility
0.0 - 0.1	Remote possibility / unlikely

## 11.2 MITIGATION

In terms of the assessment process, the potential to mitigate the negative impacts is determined and rated for each identified impact and mitigation objectives that would result in a measurable reduction, or enhancement of the impact, are taken into account. The significance of environmental impacts has therefore been assessed taking into account any proposed mitigation measures. The significance of the impact “without mitigation” is therefore the prime determinant of the nature and degree of mitigation required.

## 11.3 IMPACTS IDENTIFIED

The operational phase of the quarry will involve blasting of the hard rock (dolerite) in the quarry; utilising a rock breaker pecker where necessary to break blasted rock into further fragments for sizing purposes; the loading of blasted dolerite onto tipper trucks and the transportation of loaded material along the dedicated access road, to the existing operational quarry on the eastern side of the Nguklu River. There the rock will be deposited at the existing crushing plant for processing.

### 11.3.1 Site Alternative

The **preferred site alternative** is located over the confirmed dolerite outcrop, located to the west of the existing Midmar Crushers (Pty) Ltd operations, on the opposite side of the Nguklu River. Given the close proximity of the site to the existing operations the Midmar Crushers (Pty) Ltd quarry, this is considered to be the only site alternative which can meet the need and desirability of the Application.

Upon appointment, Midmar Crushers (Pty) Ltd provided Terratest (Pty) Ltd with a proposed layout for expansion. This layout included for a 19.4ha area of expansion (i.e. site). This layout is referred to as **Layout Alternative 1**. During the Basic Assessment Process, various Specialist Studies were commissioned, including a Heritage Impact Assessment. The findings thereof identified four possible human grave sites within the Layout Alternative 1 expansion area (refer Section 10). As a result, the layout has been amended to avoid any possible contact with the four potential grave sites. The amended application area is referred to as **Layout Alternative 2 (Preferred Alternative)** and also allows for an expansion area of approximately 19.4ha.

The following subsections detail the two layout alternatives identified and are based on the findings of the Heritage Impact Assessment (Appendix 2).

### 11.3.2 Layout Alternatives

**Layout Alternative 1:** The preferred layout alternative is provided in Figure 7-3 and has taken cognisance of the confirmed dolerite outcrop and the Nguklu River. In this regard, a low-level bridge (causeway), is to be installed on the southern tip of the site, with access from the existing and operational Midmar Crushers site. The low-level bridge (causeway) will allow for the single passage of tipper trucks to the site and will be 6m wide or less. It will have a bearing load of 50 tons. An access road will lead to a site camp platform which will house a single ablution facility, a site office, as well as overburden and topsoil stockpiles.

A gravel access road will also be aligned to the benches for the collection of dolerite as quarried, which will be transported off site via a dedicated gravel access road which will cross the Nguklu River approximately 400m downstream (i.e. to the north) of the first low-level bridge (causeway). In this regard, vehicles will enter the site from the existing Mining Right Area and traverse the low-level bridge as required, collect material from the quarry and continue out of the expansion area on the second low-level bridge back to the existing Mining Right Area where the material will be processed. The result thereof will result in a one-way traffic system through the expansion area which will eradicate the need for vehicle turning areas and will also increase road and traffic safety on site.

The layout of the facility was determined primarily based on the confirmed presence of dolerite as per the Visual Geological Assessment noted in Section 7.2. In this regard, the majority of the site is dedicated to quarry benches, which run alongside the confirmed dolerite outcrop, while restricting quarrying operations such that they do not impede on the recommended 40m watercourse buffer (as per the Wetland & Biodiversity Specialist Report: Appendix 2). The layout also allows for a 100m buffer from the Main Road R617 but includes realigning existing Eskom powerlines which cross the site on the north-western boundary. The site is approximately 19.4ha in size.

The preferred layout (**Layout Alternative 2**) is similar to Layout Alternative 1, however, cognisance has been taken of four potential grave sites identified by the Heritage Specialist. In this regard, the shape of the site has been amended in order to allow for the implementation of a 50m buffer around the potential grave sites. The size of the site, however, remains the same at 19.4ha. Buffers of 100m each from the Main Road R617 and the existing Eskom powerlines have also been implemented.

Similar to Layout Alternative 1, a low-level bridge (causeway) will allow for the single passage of tipper trucks to the site and will be 6m wide or less. It will have a bearing load of 50 tons. A gravel access road will lead to a site camp platform which will house a single ablution facility, a site office, as well as overburden and topsoil stockpiles.

A gravel access road will also be aligned to the benches for the collection of dolerite as quarried, which will be transported off site via a dedicated gravel access road which will cross the Nguklu River approximately 400m downstream (i.e. to the north) of the first low-level bridge (causeway). In this regard, vehicles will enter the site from the existing Mining Right Area and traverse the low-level bridge as required, collect material from the quarry and continue out of the expansion area on the second low-level bridge back to the existing Mining Right Area where the material will be processed. The result thereof will result in a one-way traffic system through the expansion area which will eradicate the need for vehicle turning areas and will also increase road and traffic safety on site.

The layout of the facility was determined primarily as a result of the Heritage Specialist's findings, as well as the confirmed presence of dolerite as per the Visual Geological Assessment noted in Section 7.2. In this regard, the majority of the site is dedicated to quarry benches, which run alongside the confirmed dolerite outcrop, while restricting quarrying operations such that they do not impede on the recommended 40m

watercourse buffer. The layout also allows for a 100m buffer from the Main Road R617, as well as from the existing Eskom powerlines (hence no removal or relocated required) and is approximately 19.4ha in size.

### 11.3.3 Technology Alternative

The **preferred quarry technology** alternative is blasting. The same technology is employed at the existing and operational Midmar Crushers (Pty) Ltd quarry. The blasted dolerite will be sized appropriately via a rock breaker pecker, loaded into a tipper truck and transported from the mine to the existing Midmar Crusher (Pty) Ltd mine site located to the east of the Nguklu River, where it will be crushed at an existing crushing facility. No crushing will occur on site. Blasting is the only reasonable and feasible technology alternative for the application.

### 11.3.4 Bridge Technology Alternatives

Construction will necessitate the temporary impedance of water in the river during construction as a result of cofferdam construction. Conduits will be placed in the watercourse during construction to allow for the free flow of water through built infrastructure where necessary. The causeway will be built to Department of Transport (DoT) requirements for construction on bedrock. Each access bridge will allow for the single passage of one heavy construction vehicle or operational vehicle at a time.

Two technology alternatives have been identified for the construction of a low-level bridge (causeway), namely a box culvert design (**Preferred Bridge Technology Alternative 1**) and a pipe culvert design (**Bridge Technology Alternative 2**).

**Preferred Bridge Technology Alternative 1:** Box culverts have a concrete floor allowing for the smooth flow of water through it and are usually comprised of reinforced concrete. The deck of the culvert can be used for the passage of vehicles and can be stacked side by side to increase length. Box culverts drain high volumes of water and can generally handle a higher flow rate than pipe culverts.

Box culverts can be precast off site which limits impacts on the receiving environment via cement spillages. In terms of installation, the area of installation must be dried and therefore dewatering is necessary. The foundations must be set and laid and the culverts installed as necessary with tongue and groove joints to make a continuous structure. Concrete fill is placed between individual culverts and backfill compacted between wingwalls. Box culvert installations tend to be simple given their rigid frame structure.

All dewatering activities will take cognisance of outflow points. These will be placed so as not to increase scow or erosion potential alongside or in the watercourse and silt traps or silt socks will be installed at every outflow point to prevent silt from entering any watercourse.

The installation of pipe culverts are considered to be the **Bridge Technology Alternative 2**. Pipe culverts are available in different shapes such as circular, elliptical and pipe arches. Although circular pipes are the most common, other shapes might be used depending on site conditions and constraints at the Pipe culverts are easy to install and selection is dependent on hydraulic, performance and suitability. A limiting factor to utilising pipe culverts, however, is that debris may block the pipes during high flow rates. As per the Watercourse Specialists' Report (Appendix 2 and Section 10), heavy downpours do affect the Nguklu River, which results in debris being transported downstream during such events (i.e. flooding).

Once the pipes are laid, the area in between the pipes are filled with concrete. Cement spillages from on-site mixing pose a threat to aquatic fauna. Similar to the proposed box culvert installation, all dewatering activities will take cognisance of outflow points. These will be placed so as not to increase scow or erosion potential alongside or in the watercourse and silt traps or silt socks will be installed at every outflow point to prevent silt from entering any watercourse.



### 11.3.5 No-go Alternative

The **no-go alternative** will result in Midmar Crushers (Pty) Ltd not expanding their operations. In this regard, the existing dolerite reserve will be completely depleted and operations at the existing site will be forced to stop. In this regard, the operation may have to close completely and current employment positions lost.

Based on the identification of the above alternatives, the specialist studies conducted and construction and operational works that will be required to implement the proposed expansion, the following potential impacts to the receiving environment have been identified:

- Impacts to soils during construction and operation;
- Impacts to surrounding vegetation during construction and operation;
- Impacts to local fauna during construction and operation;
- Air quality (dust) deterioration and an increase in noise pollution as a result of construction and operational activities;
- Vibration impacts as a result of blasting operations;
- An increase in construction traffic as a result of construction activities;
- The impact of construction waste as a result of construction activities;
- Socio-economic impacts both during construction and operational phases;
- Safety and security impacts associated with construction and operational activities;
- Watercourse disturbance as a result of construction and operational activities; and
- Potential disturbance to items of heritage and palaeontological significance during construction and operation.

The impacts identified for the proposed expansion and the associated mitigation measures which directly and indirectly relate to the Listed Activities being applied for are provided in Tables 11-8 and 11-9. Please note that both Tables identify impacts and mitigation measures for the Site Alternative, Layout Alternative 1, Preferred Layout (i.e. Layout Alternative 2), the Preferred Technology Alternative, the Preferred Bridge Technology Alternative 1 and the Bridge Technology Alternative 2 inclusively.

**TABLE 11-8:** Construction phase impacts identified and associated mitigation measures

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
Soil	<ul style="list-style-type: none"> <li>Potential disturbances include compaction, physical removal and pollution:               <ul style="list-style-type: none"> <li>The exposed soil surfaces have the potential to erode easily if left uncovered or unrehabilitated which could lead to the loss of soil and vegetation;</li> <li>Potential loss of stockpiled topsoil and other materials if not protected properly;</li> <li>Insufficient stormwater control measures may result in localised high levels of soil erosion which may lead to decreased water quality in surrounding watercourses;</li> <li>Bank instability alongside the Nguklu River and drainage lines could cause erosion;</li> <li>Increased erosion could result in increased sedimentation which could impact on ecological processes;</li> <li>The additional hardened surfaces created during construction will increase the amount of stormwater runoff which has the potential to cause erosion;</li> <li>Soil contamination through hydrocarbon spillages on site;</li> <li>Physical disturbance of soil and plant removal may result in soil erosion/loss; and</li> <li>Erosion and potential soil loss from cut and fill activities.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Soil erosion prevention measures should be implemented such as gabions, sand bags etc. whilst energy dissipaters must be constructed at any surface water outflow points;</li> <li>The site must be monitored weekly for any signs of off-site siltation and erosion;</li> <li>All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding;</li> <li>All exposed earth not required for operational activities must be rehabilitated promptly with suitable vegetation to stabilise the soil;</li> <li>Any exposed earth not required for operational activities must be rehabilitated promptly with suitable vegetation to protect the soil. Vigorous grasses planted with fertiliser are very effective at covering exposed soil. It is important to note, that the use of fertilisers, must be undertaken with caution and must not be allowed, in any circumstances, to run into drainage lines, to avoid any possible eutrophication impacts;</li> <li>Drip trays must be utilised under all standing plant to prevent hydrocarbon spillages. Should spillages occur, the contaminated soil is to be removed, contained in a plastic packet and appropriately disposed of at a licenced Hazardous Waste Facility; and</li> <li>Excavated soil must be retained with the topsoil and the subsoil being stockpiled separately (i.e. topsoil and overburden must be stockpiled in the designated on-site mining area).</li> </ul>
Flora and fauna	<ul style="list-style-type: none"> <li>Disturbance of the site may lead to encroachment of alien plant species on-site and in the surrounding areas;</li> <li>An increase in alien invasive species may therefore result in a possible loss in biodiversity;</li> <li>Potential off-site pollution as a result of accidental spillages of petrochemicals or bituminous substances; and</li> <li>Loss of habitat, especially in terms of the Midlands Dwarf Chameleon.</li> </ul>	<ul style="list-style-type: none"> <li>Identify sensitive fauna and flora prior to construction works. A search and research is required for the Midlands Dwarf Chameleon prior to construction commencing as per the recommendations of the Biodiversity Specialist (Section 10 and Appendix 2);</li> <li>Site personnel must undergo Environmental Training and be educated on keeping any vegetation disturbance to a minimum;</li> <li>Poaching or harvesting of indigenous flora / fauna is strictly forbidden;</li> <li>Alien plant encroachment must be monitored and prevented as outlined in the EMPr (Appendix 4);</li> <li>A 40m wide no-go buffer is to be implemented along the Nguklu River. Construction of the two access bridges are permitted to a construction footprint of 500m<sup>2</sup> each only;</li> <li>The construction footprint of the entire site is to be fenced to prevent the ingress of stray cattle;</li> <li>A rigorous programme of alien weed control must be implemented;</li> <li>No hunting is permitted on-site or the surrounding areas;</li> </ul>

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<ul style="list-style-type: none"> <li>No animals required for hunting e.g. dogs, under the supervision of construction workers, should be allowed into the area. All construction personnel on the property should be informed of this ruling; and</li> <li>Any construction personnel found to be poaching in the area should be subjected to a disciplinary hearing.</li> </ul>
Air quality and noise pollution	<ul style="list-style-type: none"> <li>Dust generation from soil stripping, excavations, vehicle traffic on the access roads and motor vehicle fumes will have an impact on air quality in terms of exhaust emissions and dust;</li> <li>Increase in noise from the operation of machinery and equipment, as well as the construction vehicle traffic; and</li> <li>Dust and noise will be created during the construction phase, which may impact on the local community in terms of noise and dust.</li> </ul>	<ul style="list-style-type: none"> <li>All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of the EMPr (Appendix 4);</li> <li>Road dampening must be undertaken to prevent excess dust during construction;</li> <li>Operational Hours: Normal working hours must be implemented. No quarrying works are permitted on Sundays; and</li> <li>Construction personnel should be made aware of the need to prevent unnecessary noise such as hooting and shouting.</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>Increase in construction vehicles in the area;</li> <li>Possible lane closures, traffic delays and congestion during the construction phase;</li> <li>Slow-moving construction vehicles on the surrounding roads may cause accidents; and</li> <li>If not properly maintained, increased road use to existing surrounding road infrastructure, for access purposes by construction personnel, may cause damage to the existing road infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate temporary traffic control and warning signage must be erected and implemented on all affected roads in the vicinity;</li> <li>Construction worker's / construction vehicles must take heed of normal road safety regulations, thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual;</li> <li>Flagmen are to be placed at relevant points along the construction footprint to warn motorists of construction works; and</li> <li>Any damage to surrounding roads should be repaired as soon as possible to prevent further deterioration to the road network.</li> </ul>
Waste	<ul style="list-style-type: none"> <li>There is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (e.g. oil / bitumen spills, litter from personnel on-site, sewage from ablutions etc.); and</li> <li>Waste generation could be created by the following: <ul style="list-style-type: none"> <li>Solid waste - plastics, metal, wood, concrete, stone;</li> <li>Chemical waste- petrochemicals, resins and paints; and</li> <li>Sewage generated by employees.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is encouraged;</li> <li>All solid waste must be disposed of at a registered landfill site and records maintained to confirm safe disposal;</li> <li>Adequate scavenger-proof refuse disposal containers must be supplied to control solid waste on-site;</li> <li>It should be ensured that existing waste disposal facilities in the area are able to accommodate the increased waste generated from the proposed construction;</li> <li>Chemical waste must be stored in appropriate containers and disposed of at a licensed disposal facility;</li> <li>Portable sanitation facilities must be erected for construction personnel. Use of these facilities should be enforced (these facilities should be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities should also be monitored and</li> </ul>

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<p>serviced regularly so as to prevent contamination of the watercourses, including the Nguklu River;</p> <ul style="list-style-type: none"> <li>The construction site must be inspected for litter on a daily basis. Extra care should be taken on windy days. Precautions must be taken to avoid litter from entering wetlands / watercourses;</li> <li>Soil that is contaminated with e.g. cement, petrochemicals or paint, must be disposed of at a registered waste disposal site and is NOT to be deposited into watercourses;</li> <li>It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment (ground and surface water and soil contamination). Hazardous substance storage must not take place within 100m of a watercourse or within the 1:100 year floodline; and</li> <li>Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / DMR etc.) and must be remediated as per the EMP (Appendix 4).</li> </ul>
Socio-Economic	<ul style="list-style-type: none"> <li>Creation of job opportunities for skilled personnel (e.g. engineers, specialists etc.) and non-skilled personnel (e.g. labourers);</li> <li>Skills development of the local community through employment opportunities;</li> <li>Social anxiety may arise should the surrounding community not be adequately notified of the proposed activity; and</li> <li>Possible economic benefits to local suppliers of building materials as goods and services may be purchased from these entities during the construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>Inform the surrounding communities and general public of the proposed activity as soon as possible. This will serve to ease potential social anxiety;</li> <li>Local people should be employed where possible; and</li> <li>A Community Liaison Officer could assist in raising any concerns / complaints noted by the affected community, landowners or business owners to the contractor.</li> </ul>
Existing infrastructure disturbance	<ul style="list-style-type: none"> <li>If construction activities are not executed mindfully the existing powerlines and the Main Road R617 could be damaged.</li> </ul>	<ul style="list-style-type: none"> <li>Notify appropriate stakeholders as soon as possible of potential disturbance, e.g. Eskom, Department of Transport;</li> <li>A 100m no-go buffer area must be demarcated around powerlines and the Main Road R617; and</li> <li>No-go areas must be demarcated prior to construction commencing.</li> </ul>
Safety and security	<ul style="list-style-type: none"> <li>There is potential for construction labour to trespass onto neighbouring properties; and</li> <li>Construction personnel / construction vehicles – movement of construction personnel and vehicles may pose a potential health and safety risk to road users and local residents.</li> </ul>	<ul style="list-style-type: none"> <li>Any construction personnel found to be trespassing must be subjected to a disciplinary hearing;</li> <li>Construction worker's / construction vehicles must take heed of normal road safety regulations, thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual; and</li> <li>A designated speed limit must be set by the developer to limit possible road strikes.</li> </ul>

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
Water Resources	<ul style="list-style-type: none"> <li>Contamination of ground and surface water and soil through accidental spillages of petrochemicals from vehicles, equipment or concrete;</li> <li>The additional hardened surfaces created during construction will increase the amount of stormwater runoff, which has the potential to cause erosion and create turbidity in the Nguklu River;</li> <li>Possible damage to the watercourses and surrounds; and</li> <li>Risk of initiating erosion rills / gullies.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate stormwater / surface water management measures must be put in place before construction commences. The measures implemented must be maintained;</li> <li>An appropriate number of toilets (1 toilet for every 20 workers) must be provided for labourers during the construction phase. These must be maintained in a satisfactory condition and a minimum of 100m away from any watercourses or outside of the 1:100 year floodline;</li> <li>Any contaminated water associated with construction activities must be contained in separate areas or receptacles such as Jo-Jo tanks or water-proof drums, and must not be allowed to enter into watercourses;</li> <li>The construction camp should be positioned on previously disturbed areas (if possible) and outside of the 1:100 year floodline;</li> <li>Soil erosion prevention measures must be implemented such as gabions, sand bags, berms etc. whilst energy dissipaters must be constructed at any surface water outflow points. The site should be monitored by the Contractor weekly for any signs of off-site siltation. All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding;</li> <li>Appropriate silt control mechanisms must be installed around all soil excavations to prevent silt from entering surrounding watercourses;</li> <li>Should any excavations require dewatering, this is to occur through an adequately designed silt trap prior to discharge. All silt traps are to be regularly monitored and maintained to ensure efficient and effective use;</li> <li>Watercourse bank slopes must be graded to the lowest possible angle to prevent scour and erosion potential;</li> <li>Watercourse bank slopes must be planted with indigenous grasses;</li> <li>No surplus soil or other such material may be disposed of in the channels; and</li> <li>Working within the Nguklu River for construction of access bridge: <ul style="list-style-type: none"> <li>The soil excavated from the river / river banks must be retained with soil being stockpiled separately from other stockpiles. The soil must then be returned in the reverse order to which it was removed so as to re-establish the original soil profiles as best possible;</li> <li>Compaction of the soils to match the porosity of the surrounds must be undertaken;</li> <li>The trenches must be rehabilitated with a vegetation cover which matches that of the surrounds. It is recommended that any riverine plants which are excavated should be set aside and be kept moist until they can be returned for use on the banks; and</li> <li>A rigorous programme of alien weed control must be implemented and sustained until the vegetation cover on the banks is well established and complete.</li> </ul> </li> <li>All recommendations of the Wetland and Biodiversity Specialist are to be implemented (Section 10 and Appendix 2);</li> </ul>

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<ul style="list-style-type: none"> <li>The lower end of the new quarry area must be enclosed with an earthen berm to intercept dirty water and materials from passing down slope into the Nguklu River; and</li> <li>The woody vegetation alongside the river must be protected by maintaining an annual 5m firebreak.</li> </ul>
Heritage & Palaeontological	<ul style="list-style-type: none"> <li>Potential disruption to items of significance.</li> </ul>	<ul style="list-style-type: none"> <li>The layout has been amended to avoid any items of heritage significance as identified by the Heritage Specialist (refer Section 10 and Appendix 2); and</li> <li>Should items of heritage significance be discovered, construction in that specific area must stop; the area is to be cordoned off; and an appropriately qualified Heritage Specialist or Amafa is to be immediately notified. Should a grave be discovered, the same methodology is to be employed and the South African Police Service immediately notified.</li> </ul>

**TABLE 11-9:**Operational phase impacts identified and associated mitigation measures

OPERATIONAL RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
Soil	<ul style="list-style-type: none"> <li>Impacts includes compaction, physical removal and pollution:               <ul style="list-style-type: none"> <li>Potential loss of stockpiled topsoil and other materials if not protected properly;</li> <li>Insufficient stormwater control measures may result in localised high levels of soil erosion which may lead to decreased water quality in surrounding watercourses;</li> <li>Bank instability alongside the Nguklu River and drainage lines could cause erosion;</li> <li>Increased erosion could result in increased sedimentation which could impact on ecological processes;</li> <li>The additional hardened surfaces created during construction will increase the amount of stormwater runoff which has the potential to cause erosion;</li> <li>Soil contamination through hydrocarbon spillages on site; and</li> <li>Erosion and potential soil loss from cut and fill activities.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Soil erosion prevention measures should be implemented such as gabions, sand bags etc. whilst energy dissipaters must be constructed at any surface water outflow points;</li> <li>The site must be monitored weekly for any signs of off-site siltation and erosion;</li> <li>Drip trays must be utilised under all standing plant to prevent hydrocarbon spillages. Should spillages occur, the contaminated soil is to be removed, contained in a plastic packet and appropriately disposed of at a licenced Hazardous Waste Facility; and</li> <li>Excavated soil must be retained with the topsoil and the subsoil being stockpiled separately (i.e. topsoil and overburden must be stockpiled in the designated on-site mining area).</li> </ul>
Flora and fauna	<ul style="list-style-type: none"> <li>Disturbance of the site may lead to encroachment of alien plant species on-site and in the surrounding areas;</li> <li>An increase in alien invasive species may therefore result in a possible loss in biodiversity; and</li> <li>Potential off-site pollution as a result of accidental spillages of petrochemicals or bituminous substances.</li> </ul>	<ul style="list-style-type: none"> <li>Site personnel must undergo Environmental Training and be educated on keeping any vegetation disturbance to a minimum;</li> <li>Poaching or harvesting of indigenous flora / fauna is strictly forbidden;</li> <li>Alien plant encroachment must be monitored and prevented as outlined in the EMPr (Appendix 4);</li> <li>A 40m wide no-go buffer is to be implemented along the Nguklu River;</li> <li>Woody vegetation alongside the Nguklu River is to be protected via the annual burning of a 5m firebreak;</li> <li>The construction footprint of the entire site is to be fenced to prevent the ingress of stray cattle;</li> <li>A rigorous programme of alien weed control must be implemented;</li> <li>No hunting is permitted on-site or the surrounding areas;</li> <li>No animals required for hunting e.g. dogs, under the supervision of construction workers, should be allowed into the area. All construction personnel on the property should be informed of this ruling; and</li> <li>Any construction personnel found to be poaching in the area should be subjected to a disciplinary hearing.</li> </ul>
Air quality and noise pollution	<ul style="list-style-type: none"> <li>Dust generation from excavations / blasting and exhaust emissions from plant; and</li> <li>Increase in noise from the operation of machinery and blasting.</li> </ul>	<ul style="list-style-type: none"> <li>All machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of the EMPr (Appendix 4);</li> <li>Road dampening should be undertaken to prevent excess dust;</li> </ul>

OPERATIONAL RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<ul style="list-style-type: none"> <li>Operational Hours: Normal working hours must be implemented. No quarrying works are permitted on Sundays; and</li> <li>Personnel should be made aware of the need to prevent unnecessary noise such as hooting and shouting.</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>No traffic impacts are expected on the surrounding environment as all traffic will be contained within the Midmar Crushers (Pty) Ltd operational area. Additional traffic impacts will be created as the proposed expansion will only be implemented as the existing quarry is decommissioned.</li> </ul>	<ul style="list-style-type: none"> <li>Traffic speed limits will be implemented on site for all operational vehicles; and</li> <li>Appropriate signage will be implemented at the bridge crossings detailing load capacities and entrance and exit points only; and</li> <li>All persons entering the quarry area will be require a Health and Safety Mine Induction.</li> </ul>
Waste	<ul style="list-style-type: none"> <li>No operational waste impacts are expected on the surrounding environment from the activity. If anything, a small amount of domestic waste may be generated.</li> </ul>	<ul style="list-style-type: none"> <li>Domestic waste will be collected and disposed of appropriately.</li> </ul>
Socio-Economic	<ul style="list-style-type: none"> <li>Continued employment of Midmar Crushers (Pty) Ltd staff at the expansion site;</li> <li>Increase in availability of dolerite reserve;</li> <li>Continuation of land use;</li> <li>Local supplier of dolerite; and</li> <li>Social anxiety may arise should the surrounding community not be adequately notified of the proposed activity.</li> </ul>	<ul style="list-style-type: none"> <li>Inform the surrounding communities and general public of the proposed activity as soon as possible. This will serve to ease potential social anxiety; and</li> <li>A Community Liaison Officer could assist in raising any concerns / complaints noted by the affected community, landowners or business owners to the contractor.</li> </ul>
Existing infrastructure disturbance	<ul style="list-style-type: none"> <li>If operational activities are not contained within the designated area, existing powerlines and the Main Road R617 could be damaged.</li> </ul>	<ul style="list-style-type: none"> <li>A 100m no-go buffer area must be demarcated around powerlines and the Main Road R617.</li> </ul>
Safety and security	<ul style="list-style-type: none"> <li>Movement of operational personnel and vehicles may pose a potential health and safety risk to road users; and</li> <li>Impacts associated with blasting.</li> </ul>	<ul style="list-style-type: none"> <li>Worker's and vehicles must take heed of normal road safety regulations thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual;</li> <li>A designated speed limit must be set to limit possible road strikes;</li> <li>All persons entering the quarry area will be require a Health and Safety Mine Induction; and</li> <li>Blasting will be conducted by an accredited service provider and will utilise the existing Midmar Crushers (Pty) Ltd Blasting Management Plan and principles with prior approval from the DMR, Quarry Operator and owner to ensure safety regulations are adhered to.</li> </ul>
Water Resources	<ul style="list-style-type: none"> <li>Contamination of ground and surface water and soil through accidental spillages of petrochemicals from vehicles, equipment or concrete;</li> <li>The additional hardened surfaces created during operational will increase the amount of stormwater runoff, which has the potential to cause erosion and create turbidity in the Nguklu River;</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate stormwater / surface water management measures must be implemented and maintained throughout operation;</li> <li>An appropriate number of toilets (1 toilet for every 20 workers) must be provided for labourers during the construction phase. These must be maintained in a satisfactory condition and a minimum of 100m away from any watercourses or outside of the 1:100 year floodline;</li> </ul>



OPERATIONAL RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
	<ul style="list-style-type: none"> <li>Possible damage to the watercourses and surrounds; and</li> <li>Risk of initiating erosion rills / gullies.</li> </ul>	<ul style="list-style-type: none"> <li>Any contaminated water associated with activities must be contained in separate areas or receptacles such as Jo-Jo tanks or water-proof drums, and must not be allowed to enter into watercourses;</li> <li>Soil erosion prevention measures must be implemented such as gabions, sand bags, berms etc. whilst energy dissipaters must be constructed at any surface water outflow points. The site must be monitored weekly for any signs of off-site siltation;</li> <li>Appropriate silt control mechanisms must be installed around all soil excavations to prevent silt from entering surrounding watercourses;</li> <li>Should any excavations require dewatering, this is to occur through an adequately designed silt trap prior to discharge. All silt traps are to be regularly monitored and maintained to ensure efficient and effective use;</li> <li>All recommendations of the Wetland and Biodiversity Specialist are to be implemented (Section 10 and Appendix 2);</li> <li>A 40m no-go buffer area must be demarcated around the Nguklu River;</li> <li>The lower end of the new quarry area must be enclosed with an earthen berm to intercept dirty water and materials from passing down slope into the Nguklu River; and</li> <li>The woody vegetation alongside the river must be protected by maintaining an annual 5m firebreak.</li> </ul>
Heritage & Palaeontological	<ul style="list-style-type: none"> <li>Potential disruption to items of significance.</li> </ul>	<ul style="list-style-type: none"> <li>A 50m no-go buffer area must be implemented around the identified heritage finds (refer Section 10 and Appendix 2); and</li> <li>Should items of heritage significance be discovered, operation in that specific area must stop; the area is to be cordoned off; and an appropriately qualified Heritage Specialist or Amafa is to be immediately notified. Should a grave be discovered, the same methodology is to be employed and the South African Police Service immediately notified.</li> </ul>
Blasting	<ul style="list-style-type: none"> <li>Vibration impacts.</li> </ul>	<p>Mitigation measures for blasting cannot be provided, however, they can be managed. In this regard, the existing Blasting Management Plan and principles utilised by Midmar Crushers (Pty) Ltd currently at the existing site will be implemented for the new expansion site, with prior approval from the DMR, Quarry Operator and Owner. The Blasting Management Plan will make allocations for the undertaking of the following pre-blasting activities:</p> <ul style="list-style-type: none"> <li>Informing surrounding landowners and communities that may be impacted by the blasting of the timing and procedures of any blasting event;</li> <li>Inspection and photographic recording of all structural damage to any structures (buildings, roads etc.) within a radius of 500m of the blasting site, by an independent assessor, before any blasting is to take place;</li> <li>Making allocations for the use of nitrate-free explosives where-ever possible (i.e. methods such as drilling and black powder, expanding mortar or old fashioned “plugs and feathers”); and</li> </ul>

OPERATIONAL RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<ul style="list-style-type: none"> <li>The use of noise mufflers and/or soft explosives during blasting.</li> </ul> <p>The Blasting Management Plan will include early warning specifications prior to blasting taking place informing surrounding residents of the intended blast. This will take the form of a siren that will sound 15 minutes before blasting that will be audible up to a radius of 1km from the site. During blasting events, if deemed necessary through an internal risk assessment, traffic signs will be utilised on the Main Road R617 advising motorists of scheduled blasting dates and times. In addition, traffic points men will be employed to temporarily stop vehicles travelling past the site.</p> <p>The Blasting Management Plan will include suitably approved noise and dust prevention measures, as well as approved measures to contain and limit the occurrence of fly rock during blasting. Further, the Blasting Management Plan will include the post-blasting monitoring of all structures identified to be of risk and recorded prior to the blasting activity. Any damage resulting from vibrations caused by blasting will be recorded and corrected by suitable measures in agreement with the owners of these structures. Upon implementation of mitigation measures to the structures, a photographic record will again be taken of these structures. This assessing process and recording will be completed by an independent assessor.</p> <p>Any damage caused by possible fly rock will be recorded and addressed in a manner agreed to by the owner of the damaged structures. Upon completion of these mitigation measures, the affected structures will again be recorded photographically.</p>

## 12 IMPACT ASSESSMENT

Tables 12-1 – 12-14 present the impact assessment findings in relation to the proposed construction and operation activities for the Site Alternative, Layout Alternative 1, Layout Alternative 2 (i.e. Preferred Layout Alternative), the Preferred Technology Alternative, the Preferred Bridge Technology Alternative 1 and the Bridge Technology Alternative 2 and the No-go Alternative.

### 12.1 CONSTRUCTION IMPACTS

**TABLE 12-1:** Assessment of impacts for the Site Alternative

CONSTRUCTION IMPACTS: Site Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	4	2	6	4	7	1	3	7	1	1	0.4	27	4.4
	Flora and fauna	3	2	4	2	3	3	3	7	7	0.9	0.7	18	11.9
	Air quality and noise pollution	3	2	6	5	7	3	2	7	1	0.9	0.7	22.5	9.1
	Traffic	2	1	3	2	1	1	1	1	1	0.6	0.3	4.8	1.8
	Waste	2	1	3	1	1	1	1	1	1	0.4	0.2	3.2	1
	Socio-Economic	2	2	2	2	1	1	1	1	1	0.8	0.8	5.6	5.6
	Existing infrastructure disturbance	2	1	5	1	1	1	3	1	1	0.5	0.2	6	1.4
	Safety and security	2	1	5	2	1	1	1	1	1	0.5	0.2	5	1.2
	Water Resources	4	1	6	3	3	1	4	1	1	0.5	0.1	9	1
	Heritage & Palaeontological	1	1	7	1	7	1	7	7	1	0.8	0.1	23.2	1.1
<b>Overall impact significance</b>													<b>MEDIUM</b>	<b>LOW</b>
													<b>12</b>	<b>4</b>

**Significance:** Based on the outcome of the significance scoring noted in Table 12-1, the overall significance impact for the Site Alternative without mitigation, is considered to be MEDIUM, with a score of 12. With mitigation, the overall significance impact is considered to be LOW, with a score of 4.

The greatest impact of significance is considered to be the damage, disruption or loss of soil. This is to be expected given that the site will be cleared of all topsoil and subsoil. Mitigation measures to prevent or limit this impact include stockpiling topsoil and subsoil appropriately to use in the rehabilitation phase. Heritage and palaeontological impacts are rated as the second highest possible impact, should they not be previously identified on site prior to construction commencing. However, with the correct mitigation measures employed as noted in Table 11-8 and as per the EMPr (Appendix 4), these impacts can be significantly reduced. As such, it is recommended that the proposed Site Alternative be adopted.

**TABLE 12-2:** Assessment of impacts for the Layout Alternative 1

CONSTRUCTION IMPACTS: Layout Alternative 1	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	2	1	6	4	3	1	3	7	3	1	0.6	21	7.2
	Flora and fauna	2	1	5	2	3	1	3	3	7	1	0.6	16	8.4
	Air quality and noise pollution	2	1	4	3	3	1	2	1	1	0.9	0.6	10.8	4.8
	Traffic	3	2	4	2	1	1	1	1	1	0.9	0.3	9	2.1
	Waste	2	1	4	1	1	1	1	1	1	0.7	0.2	6.3	1
	Socio-Economic	2	2	2	2	1	1	1	1	1	0.8	0.8	5.6	5.6
	Existing infrastructure disturbance	2	1	5	1	1	1	3	1	1	0.5	0.2	6	1.4
	Safety and security	2	1	5	2	1	1	1	1	1	0.5	0.2	5	1.2
	Water Resources	4	1	6	3	3	1	4	1	3	0.5	0.1	9	1.2
	Heritage & Palaeontological	1	1	7	7	7	7	7	7	7	1	1	29	29
<b>Overall impact significance</b>													<b>MEDIUM</b> 12	<b>LOW</b> 6

**Significance:** Based on the outcome of the significance scoring noted in Table 12-2, the overall significance impact for Layout Alternative 1 without mitigation, is considered to be MEDIUM, with a score of 12. With mitigation, the overall significance impact is considered to be LOW, with a score of 6.

The greatest impact of significance is considered to be damage to heritage and palaeontological resources, while soil impacts are rated as the second highest possible impact. The impact to heritage and palaeontological resources is very high, both with and without mitigation. This is a result of Layout Alternative 1 including the potential grave sites identified by the Heritage Specialist (Appendix 2). The mitigation measures proposed would not decrease the level of impact which could be inflicted should this Layout Alternative be adopted. Given this high level of significance, an additional Layout Alternative, i.e. Layout Alternative 2, has been provided for (please see Table 12-3). It is therefore recommended that Layout Alternative 1 not be adopted.

**TABLE 12-3:** Assessment of impacts for the Layout Alternative 2 (Preferred Alternative)

CONSTRUCTION IMPACTS: Layout Alternative 2 (Preferred Alternative)	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	2	1	6	4	3	1	3	7	3	1	0.6	21	7.2
Flora and fauna	2	1	5	2	3	1	3	3	7	1	0.6	16	8.4	
Air quality and noise pollution	2	1	4	3	3	1	2	1	1	0.9	0.6	10.8	4.8	
Traffic	3	2	4	2	1	1	1	1	1	0.9	0.3	9	2.1	
Waste	2	1	4	1	1	1	1	1	1	0.7	0.2	6.3	1	
Socio-Economic	2	2	2	2	1	1	1	1	1	0.8	0.8	5.6	5.6	
Existing infrastructure disturbance	2	1	5	1	1	1	3	1	1	0.5	0.2	6	1.4	
Safety and security	2	1	5	2	1	1	1	1	1	0.5	0.2	5	1.2	
Water Resources	4	1	6	3	3	1	4	1	3	0.5	0.1	9	1.2	
Heritage & Palaeontological	1	1	1	1	1	1	1	1	1	0.6	0.6	3	3	
<b>Overall impact significance</b>												<b>MEDIUM</b> 9	<b>LOW</b> 4	

**Significance:** Based on the outcome of the significance scoring noted in Table 12-3, the overall significance impact for Layout Alternative 2 (Preferred Alternative) without mitigation, is considered to be MEDIUM, with a score of 9. With mitigation, the overall significance impact is considered to be LOW, with a score of 4.

The greatest impact of significance is considered to be the potential impact on soils, while flora and fauna impacts are rated as the second highest possible impact. This is to be expected given that the site will be cleared of all topsoil and subsoil, as well as vegetation (mainly *eucalyptus* plantations). However, with the correct mitigation measures employed as noted in Table 11-8 and as per the EMPr (Appendix 4), these impacts can be significantly reduced. The impact to heritage and palaeontological resources is significantly reduced when compared to Layout Alternative 1 as the site avoids the potential graves identified and includes for a 50m buffer. As such, it is recommended that the Layout Alternative 2 (Preferred Alternative) be adopted.

**TABLE 12-4:** Assessment of impacts for the Technology Alternative

CONSTRUCTION IMPACTS: Technology Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	2	1	6	4	3	1	3	7	3	1	0.6	21	7.2
	Flora and fauna	3	2	5	2	3	1	3	3	7	1	0.6	17	9
	Air quality and noise pollution	3	2	5	4	1	1	2	1	1	0.9	0.7	10.8	7
	Traffic	3	2	4	2	1	1	1	1	1	0.9	0.3	9	2.1
	Waste	2	1	4	1	1	1	1	1	1	0.7	0.2	6.3	1
	Socio-Economic	2	2	2	2	1	1	1	1	1	0.8	0.8	5.6	5.6
	Existing infrastructure disturbance	3	3	5	4	1	1	4	1	1	0.6	0.5	8.4	6.5
	Safety and security	2	1	5	2	1	1	4	1	1	0.5	0.2	6.5	1.8
	Water Resources	4	1	6	3	3	1	4	1	3	0.5	0.1	9	1.2
	Heritage & Palaeontological	1	1	1	1	1	1	1	1	1	0.6	0.6	3	3
<b>Overall impact significance</b>													<b>MEDIUM</b> 10	<b>LOW</b> 4

**Significance:** Based on the outcome of the significance scoring noted in Table 12-4, the overall significance impact for the Technology Alternative without mitigation, is considered to be MEDIUM, with a score of 10. With mitigation, the overall significance impact is considered to be LOW, with a score of 4.

The greatest impact of significance is considered to be the impact to soil resources, while flora and fauna impacts are rated as the second highest possible impact. However, with the correct mitigation measures employed as noted in Table 11-8, and as per the EMPr (Appendix 4), these impacts can be significantly reduced through the correct removal and stockpiling of the resources.

**TABLE 12-5:** Assessment of impacts for the Preferred Bridge Technology Alternative 1

CONSTRUCTION IMPACTS: Technology Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	2	1	3	1	3	1	2	1	1	1	1	11	6
	Flora and fauna	2	1	3	1	3	1	2	1	1	1	1	11	6
	Air quality and noise pollution	2	1	3	1	1	1	1	1	1	0.9	0.7	7.2	3.5
	Traffic	3	2	4	2	1	1	1	1	1	0.9	0.3	9	2.1
	Waste	2	1	4	1	1	1	1	1	1	0.7	0.2	6.3	1
	Socio-Economic	2	2	2	2	1	1	1	1	1	0.8	0.8	5.6	5.6
	Existing infrastructure disturbance	2	1	4	2	1	1	1	1	1	0.5	0.5	4.5	3
	Safety and security	2	2	5	4	1	1	3	1	1	0.3	0.3	3.6	3.3
	Water Resources	3	2	5	5	1	1	3	3	3	1	0.8	15	11.2
	Heritage & Palaeontological	1	1	1	1	1	1	1	1	1	0.6	0.6	3	3
<b>Overall impact significance</b>													<b>MEDIUM</b> 8	<b>LOW</b> 4

**Significance:** Based on the outcome of the significance scoring noted in Table 12-5, the overall significance impact for the Preferred Bridge Technology Alternative 1 (box culvert bridge installation) without mitigation, is considered to be MEDIUM, with a score of 8. With mitigation, the overall significance impact is considered to be LOW, with a score of 4.

The greatest impact of significance is considered to be the impact to water resources, while soil and flora and fauna impacts are rated as the second highest possible impact. As construction will occur within the Nguklu River, the impact to water resources is expected. However, with the correct mitigation measures employed as noted in Table 11-8 and as per the EMPr (Appendix 4), these impacts can be significantly reduced. It is recommended that the Preferred Bridge Technology Alternative 1 be adopted.

**TABLE 12-6:** Assessment of impacts for the Bridge Technology Alternative 2

CONSTRUCTION IMPACTS: Technology Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	2	1	3	1	3	1	2	1	1	1	1	11	6
	Flora and fauna	2	1	3	1	3	1	2	1	1	1	1	11	6
	Air quality and noise pollution	2	1	3	1	1	1	1	1	1	0.9	0.7	7.2	3.5
	Traffic	3	2	4	2	1	1	1	1	1	0.9	0.3	9	2.1
	Waste	3	3	5	5	1	1	3	3	3	0.7	0.2	10.5	3
	Socio-Economic	2	2	2	2	1	1	1	1	1	0.8	0.8	5.6	5.6
	Existing infrastructure disturbance	2	1	4	2	1	1	1	1	1	0.5	0.5	4.5	3
	Safety and security	2	2	5	4	1	1	3	1	1	0.3	0.3	3.6	3.3
	Water Resources	3	3	5	5	1	1	3	3	3	1	1	15	15
	Heritage & Palaeontological	1	1	1	1	1	1	1	1	1	0.6	0.6	3	3
<b>Overall impact significance</b>													<b>MEDIUM</b> 8	<b>LOW</b> 5

**Significance:** Based on the outcome of the significance scoring noted in Table 12-6, the overall significance impact for the Bridge Technology Alternative 2 (pipe culvert bridge installation) without mitigation, is considered to be MEDIUM, with a score of 8. With mitigation, the overall significance impact is considered to be LOW, with a score of 5.

The greatest impact of significance is considered to be the impact to water resources, while soil and flora and fauna impacts are rated as the second highest possible impact. As construction will occur within the Nguklu River, the impact to water resources is expected. However, with the correct mitigation measures employed as noted in Table 11-8 and as per the EMPr (Appendix 4), these impacts can be significantly reduced.



**TABLE 12-7:** Assessment of impacts for the No-go Alternative

CONSTRUCTION IMPACTS: No-go Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	1	1	1	1	1	1	1	1	1	1	1	5	5
	Flora and fauna	1	1	1	1	1	1	1	1	1	1	1	5	5
	Air quality and noise pollution	1	1	1	1	1	1	1	1	1	1	1	5	5
	Traffic	1	1	1	1	1	1	1	1	1	1	1	5	5
	Waste	1	1	1	1	1	1	1	1	1	1	1	5	5
	Socio-Economic	1	1	1	1	1	1	1	1	1	1	1	5	5
	Existing infrastructure disturbance	1	1	1	1	1	1	1	1	1	1	1	5	5
	Safety and security	1	1	1	1	1	1	1	1	1	1	1	5	5
	Water Resources	1	1	1	1	1	1	1	1	1	1	1	5	5
	Heritage & Palaeontological	1	1	1	1	1	1	1	1	1	1	1	5	5
<b>Overall impact significance</b>													<b>LOW</b> 5	<b>LOW</b> 5

**Significance:** Based on the outcome of the significance scoring noted in Table 12-7, the overall significance impact for the No-go Alternative without mitigation, is considered to be LOW, with a score of 5. As this is the No-go Alternative, mitigation will not be implemented as the *status quo* will continue. In this regard, the significance of the impact remains the same as no construction will occur on site. In this regard, however, the need and desirability of the Application is to be considered (Section 6), as the proposed expansion will result in the following positive impacts on a local and regional level:

- Expansion will increase the size of the dolerite reserve available to quarry;
- Expansion of the existing quarry is preferable to creating a brand-new quarry elsewhere, taking into consideration the environmental disturbance of such, as well as business development costs;
- Continuation of land use activities in the immediate area;
- The expansion will result in the retention of current Midmar Group employees (150 staff); and
- The proposed expansion supports the goals of KZN Provincial Growth and Development Plan and Spatial Development Framework of the uMngeni Local Municipality's Integrated Development Plan.

Based on the above, it is recommended that the No-go Alternative not be adopted.

## 12.2 OPERATIONAL IMPACTS

**TABLE 12-8:** Assessment of impacts for the Site Alternative

OPERATIONAL IMPACTS: Site Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	3	2	7	6	7	3	5	7	7	1	0.8	29	18.4
Flora and fauna	3	2	5	4	7	3	3	3	1	1	0.8	21	10.4	
Air quality and noise pollution	3	1	5	4	3	1	3	3	1	0.8	0.6	13.6	6	
Traffic	2	1	2	1	3	1	2	3	1	0.4	0.2	4.8	1.2	
Waste	3	1	3	1	3	1	2	3	1	0.4	0.2	5.6	1.2	
Socio-Economic	1	1	4	4	3	3	3	3	3	0.4	0.4	5.6	5.6	
Existing infrastructure disturbance	3	1	5	4	3	1	3	3	1	0.7	0.4	11.9	4	
Safety and security	2	1	4	2	3	1	2	3	1	0.5	0.3	7	2.1	
Water Resources	3	2	5	3	3	1	3	3	1	0.8	0.2	13.6	2	
Heritage & Palaeontological	1	1	7	1	7	1	7	7	1	0.8	0.1	23.2	1.1	
Blasting	3	1	6	5	3	1	5	3	1	1	0.9	20	11.7	
<b>Overall impact significance</b>												<b>MEDIUM</b> 14	<b>LOW</b> 6	

**Significance:** Based on the outcome of the significance scoring noted in Table 12-8, the overall significance impact for the Site Alternative without mitigation, is considered to be MEDIUM, with a score of 14. With mitigation, the overall significance impact is considered to be LOW, with a score of 6.

The greatest impact of significance is considered to be the damage, disruption or loss of soil. This is to be expected given that the site will be cleared of all topsoil and subsoil. Mitigation measures to prevent or limit this impact include stockpiling topsoil and subsoil appropriately to use in the rehabilitation phase. Heritage and palaeontological impacts are rated as the second highest possible impact, should they not be previously identified on site prior to construction commencing. However, with the correct mitigation measures employed as noted in Table 11-9 and as per the EMPr (Appendix 4), these impacts can be significantly reduced. As such, it is recommended that the proposed Site Alternative be adopted.

**TABLE 12-9:** Assessment of impacts for the Layout Alternative 1

OPERATIONAL IMPACTS: Layout Alternative 1	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	3	2	7	6	7	3	5	7	7	1	0.8	29	18.4
	Flora and fauna	3	2	5	4	7	3	3	3	1	1	0.8	21	10.4
	Air quality and noise pollution	3	1	5	4	3	1	3	3	1	0.8	0.6	13.6	6
	Traffic	2	1	2	1	3	1	2	3	1	0.4	0.2	4.8	1.2
	Waste	3	1	3	1	3	1	2	3	1	0.4	0.2	5.6	1.2
	Socio-Economic	1	1	4	4	3	3	3	3	3	0.4	0.4	5.6	5.6
	Existing infrastructure disturbance	3	1	5	4	3	1	3	3	1	0.7	0.4	11.9	4
	Safety and security	2	1	4	2	3	1	2	3	1	0.5	0.3	7	2.1
	Water Resources	3	2	5	3	3	1	3	3	1	0.8	0.2	13.6	2
	Heritage & Palaeontological	1	1	7	7	7	7	7	7	7	1	1	29	29
	Blasting	3	1	6	5	3	1	5	3	1	1	0.9	20	11.7
<b>Overall impact significance</b>													<b>MEDIUM 15</b>	<b>MEDIUM 8</b>

**Significance:** Based on the outcome of the significance scoring noted in Table 12-9, the overall significance impact for Layout Alternative 1 without mitigation, is considered to be MEDIUM, with a score of 15. With mitigation, the overall significance impact is considered to be LOW, with a score of 8.

The greatest impacts of significance are considered to be damage to heritage and palaeontological resources, as well as soil impacts. This is a result of Layout Alternative 1 including the potential grave sites identified by the Heritage Specialist (Appendix 2). The mitigation measures proposed would not decrease the level of impact which could be inflicted should this Layout Alternative be adopted. Further, soil impacts are expected to be high given the activity which quarrying entails. Given this high level of significance, an additional Layout Alternative, i.e. Layout Alternative 2, has been provided for (please see Table 12-10). It is therefore recommended that Layout Alternative 1 not be adopted.

**TABLE 12-10:** Assessment of impacts for the Layout Alternative 2 (Preferred Alternative)

OPERATIONAL IMPACTS: Layout Alternative 2 (Preferred Alternative)	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	3	2	7	6	7	3	5	7	7	1	0.8	29	18.4
	Flora and fauna	3	2	5	4	7	3	3	3	1	1	0.8	21	10.4
	Air quality and noise pollution	3	1	5	4	3	1	3	3	1	0.8	0.6	13.6	6
	Traffic	2	1	2	1	3	1	2	3	1	0.4	0.2	4.8	1.2
	Waste	3	1	3	1	3	1	2	3	1	0.4	0.2	5.6	1.2
	Socio-Economic	1	1	4	4	3	3	3	3	3	0.4	0.4	5.6	5.6
	Existing infrastructure disturbance	3	1	5	4	3	1	3	3	1	0.7	0.4	11.9	4
	Safety and security	2	1	4	2	3	1	2	3	1	0.5	0.3	7	2.1
	Water Resources	3	2	5	3	3	1	3	3	1	0.8	0.2	13.6	2
	Heritage & Palaeontological	1	1	1	1	1	1	1	1	1	1	1	5	5
	Blasting	3	1	6	5	3	1	5	3	1	1	0.9	20	11.7
<b>Overall impact significance</b>													<b>MEDIUM 12</b>	<b>LOW 6</b>

**Significance:** Based on the outcome of the significance scoring noted in Table 12-10, the overall significance impact for Layout Alternative 2 (Preferred Alternative) without mitigation, is considered to be MEDIUM, with a score of 12. With mitigation, the overall significance impact is considered to be LOW, with a score of 6.

The greatest impact of significance is considered to be the potential impact on soils, while flora and fauna impacts are rated as the second highest possible impact. This is to be expected given that the site will be cleared of all topsoil and subsoil, as well as vegetation (mainly *eucalyptus* plantations). However, with the correct mitigation measures employed as noted in Table 11-9 and as per the EMPr (Appendix 4), these impacts can be significantly reduced. The impact to heritage and palaeontological resources is significantly reduced when compared to Layout Alternative 1 as the site avoids the potential graves identified and includes for a 50m buffer. As such, it is recommended that the Layout Alternative 2 (Preferred Alternative) be adopted.

**TABLE 12-11:** Assessment of impacts for the Technology Alternative

OPERATIONAL IMPACTS: Technology Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	3	1	5	4	3	3	3	7	7	1	0.6	21	10.8
	Flora and fauna	2	1	5	4	3	3	2	7	3	0.8	0.6	15.2	7.8
	Air quality and noise pollution	2	1	5	3	3	3	2	3	3	1	1	15	12
	Traffic	2	1	4	2	3	3	1	3	1	0.5	0.3	6.5	2.4
	Waste	2	1	3	1	3	3	1	3	1	0.6	0.2	7.2	1.4
	Socio-Economic	2	1	2	2	3	3	1	1	1	0.2	0.2	1.8	1.6
	Existing infrastructure disturbance	2	1	4	2	3	3	1	3	1	0.6	0.6	7.8	4.8
	Safety and security	2	1	5	3	3	3	1	3	3	0.4	0.2	5.6	2.2
	Water Resources	2	1	5	3	3	3	3	3	3	0.7	0.2	11.2	2.6
	Heritage & Palaeontological	1	1	1	1	3	3	7	7	1	0.9	0.1	17.1	1.3
	Blasting	2	1	5	3	3	3	4	3	3	1	1	17	14
<b>Overall impact significance</b>													<b>MEDIUM 11</b>	<b>LOW 6</b>

**Significance:** Based on the outcome of the significance scoring noted in Table 12-11, the overall significance impact for the Technology Alternative without mitigation, is considered to be MEDIUM, with a score of 11. With mitigation, the overall significance impact is considered to be LOW, with a score of 6.

The greatest impact of significance is considered to be the impact to soil resources, while heritage and palaeontological impacts are rated as the second highest possible impact should they not be cornered off and protected from any quarrying activities. It must be noted that the new proposed expansion site will only become fully operational once the resource at the existing quarry is depleted and is decommissioned therefore, therefore cumulative impacts from blasting activities will not be experienced. However, with the correct mitigation measures employed as noted in Table 11-9, and as per the EMP (Appendix 4), these impacts can be significantly reduced.

**TABLE 12-12:** Assessment of impacts for the Preferred Bridge Technology Alternative 1

OPERATIONAL IMPACTS: Technology Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
		Soil	2	1	5	3	3		1	3	3	1		
Flora and fauna	2	1	5	3	3	1	4	3	1	0.9	0.5	15.3	5	
Air quality and noise pollution	2	1	3	2	3	1	1	3	1	0.5	0.2	6	1.2	
Traffic	2	1	2	1	3	1	1	3	1	0.4	0.2	4.4	1	
Waste	2	1	4	2	3	1	2	3	1	0.5	0.2	7	1.4	
Socio-Economic	1	1	1	1	1	1	1	1	1	0.1	0.1	0.5	0.5	
Existing infrastructure disturbance	1	1	1	1	1	1	1	1	1	1	1	5	5	
Safety and security	1	1	3	2	3	1	1	3	1	0.3	0.1	3.3	0.6	
Water Resources	2	1	6	4	7	1	4	3	3	0.9	0.6	19.8	7.8	
Heritage & Palaeontological	1	1	2	1	1	1	1	1	1	0.1	0.1	0.6	0.5	
Blasting	1	1	1	1	1	1	1	1	1	1	1	5	5	
<b>Overall impact significance</b>												<b>MEDIUM</b> 8	<b>LOW</b> 3	

**Significance:** Based on the outcome of the significance scoring noted in Table 12-12, the overall significance impact for the Preferred Bridge Technology Alternative 1 (box culvert bridge installation) without mitigation, is considered to be MEDIUM, with a score of 8. With mitigation, the overall significance impact is considered to be LOW, with a score of 3.

The greatest impact of significance is considered to be the impact to water resources, while soil impacts are rated as the second highest possible impact. As construction will occur within the Nguklu River, the impact to water resources is expected. However, with the correct mitigation measures employed as noted in Table 11-9 and as per the EMP (Appendix 4), these impacts can be significantly reduced through the maintenance of the culverts via the clearance of debris and via the monitoring of river banks for signs of soil erosion and the immediate mitigation thereof. It is recommended that the Preferred Bridge Technology Alternative 1 be adopted.

**TABLE 12-13:** Assessment of impacts for the Bridge Technology Alternative 2

OPERATIONAL IMPACTS: Technology Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
		Soil	2	1	5	3	3		1	3	3	1		
Flora and fauna	2	1	5	3	3	1	4	3	1	0.9	0.5	15.3	5	
Air quality and noise pollution	2	1	3	2	3	1	1	3	1	0.5	0.2	6	1.2	
Traffic	2	1	2	1	3	1	1	3	1	0.4	0.2	4.4	1	
Waste	2	1	4	2	3	1	2	3	1	0.5	0.2	7	1.4	
Socio-Economic	1	1	1	1	1	1	1	1	1	0.1	0.1	0.5	0.5	
Existing infrastructure disturbance	1	1	1	1	1	1	1	1	1	1	1	5	5	
Safety and security	1	1	3	2	3	1	1	3	1	0.3	0.1	3.3	0.6	
Water Resources	2	2	6	5	7	3	4	3	3	0.9	0.7	19.8	11.9	
Heritage & Palaeontological	1	1	2	1	1	1	1	1	1	0.1	0.1	0.6	0.5	
Blasting	1	1	1	1	1	1	1	1	1	1	1	5	5	
<b>Overall impact significance</b>												<b>MEDIUM</b> 8	<b>LOW</b> 3	

**Significance:** Based on the outcome of the significance scoring noted in Table 12-13, the overall significance impact for the Bridge Technology Alternative 2 (pipe culvert bridge installation) without mitigation, is considered to be MEDIUM, with a score of 8. With mitigation, the overall significance impact is considered to be LOW, with a score of 3.

The greatest impact of significance is considered to be the impact to water resources, while soil impacts are rated as the second highest possible impact. As construction will occur within the Nguklu River, the impact to water resources is expected. However, with the correct mitigation measures employed as noted in Table 11-9 and as per the EMPr (Appendix 4), these impacts can be significantly reduced through the maintenance of the culverts via the clearance of debris and via the monitoring of river banks for signs of soil erosion and the immediate mitigation thereof. However, as pipe culverts tend to hamper the passage of a debris more than box culverts, it is recommended this alternative bridge design not be adopted.

**TABLE 12-14:** Assessment of impacts for the No-go Alternative

OPERATIONAL IMPACTS: No-go Alternative	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
	Soil	1	1	1	1	1	1	1	1	1	1	1	5	5
	Flora and fauna	1	1	1	1	1	1	1	1	1	1	1	5	5
	Air quality and noise pollution	1	1	1	1	1	1	1	1	1	1	1	5	5
	Traffic	1	1	1	1	1	1	1	1	1	1	1	5	5
	Waste	1	1	1	1	1	1	1	1	1	1	1	5	5
	Socio-Economic	1	1	1	1	1	1	1	1	1	1	1	5	5
	Existing infrastructure disturbance	1	1	1	1	1	1	1	1	1	1	1	5	5
	Safety and security	1	1	1	1	1	1	1	1	1	1	1	5	5
	Water Resources	1	1	1	1	1	1	1	1	1	1	1	5	5
	Heritage & Palaeontological	1	1	1	1	1	1	1	1	1	1	1	5	5
	Blasting	1	1	1	1	1	1	1	1	1	1	1	5	5
<b>Overall impact significance</b>													<b>LOW 5</b>	<b>LOW 5</b>

**Significance:** Based on the outcome of the significance scoring noted in Table 12-14, the overall significance impact for the No-go Alternative without mitigation, is considered to be LOW, with a score of 5. As this is the No-go Alternative, mitigation will not be implemented as the *status quo* will continue. In this regard, the significance of the impact remains the same as no operation will occur on site. In this regard, however, the need and desirability of the Application is to be considered (Section 6), as the proposed expansion will result in the following positive impacts on a local and regional level:

- Expansion will increase the size of the dolerite reserve available to quarry;
- Expansion of the existing quarry is preferable to creating a brand-new quarry elsewhere, taking into consideration the environmental disturbance of such, as well as business development costs;
- Continuation of land use activities in the immediate area;
- The expansion will result in the retention of current Midmar Group employees (150 staff); and
- The proposed expansion supports the goals of KZN Provincial Growth and Development Plan and Spatial Development Framework of the uMngeni Local Municipality's Integrated Development Plan.

Based on the above, it is recommended that the No-go Alternative not be adopted.



### 12.3 SIGNIFICANCE SUMMARY

Based on the outcome of the significance scoring noted in Tables 12-1 – 12-14 the following is recommended:

- The Site Alternative **should be** adopted;
- The Layout Alternative 2 (Preferred Alternative) **should be** adopted; and
- The Technology Alternative **should be** adopted;
- The Bridge Technology Alternative 1 should be adopted;
- The Layout Alternative 1 should **not** be adopted;
- The Bridge Technology Alternative 2 should **not** be adopted; and
- The No-go Alternative should **not** be adopted.

### 13 ENVIRONMENTAL IMPACT STATEMENT

Based on the assessment undertaken, the following conclusions are made:

- The Preferred **Site Alternative** is located over the confirmed dolerite outcrop, located to the west of the existing Midmar Crushers (Pty) Ltd operations, on the opposite side of the Nguklu River. Given the close proximity of the site to the existing operations the Midmar Crushers quarry, this is considered to be the only site alternative which can meet the need and desirability of the project.
- The **preferred layout (Layout Alternative 2)** excludes the four potential grave sites identified by the Heritage Specialist. In this regard, the site has been reshaped to allow for the implementation of a 50m buffer around the potential grave sites. A 100m buffer from the Main Road R617 and existing Eskom powerlines has also been permitted.

Construction of a low-level bridge (causeway) will allow for the single passage of tipper trucks to the site and will be 6m wide or less. It will have a bearing load of 50 tons. A gravel access road will lead to a site camp platform which will house a single ablution facility, a site office, as well as overburden and topsoil stockpiles.

A gravel access road will also be aligned to the benches for the collection of dolerite as quarried, which will be transported off site via a gravel access road which will cross the Nguklu River approximately 400m downstream (i.e. to the north) of the first low-level bridge (causeway). The result thereof will result in a one-way traffic system through the expansion area which will eradicate the need for vehicle turning areas and will also increase road and traffic safety on site.
- The development is to establish a dolerite quarry. In this regard, the **Preferred Technology Alternative** to quarry the dolerite is blasting. The same technology is employed at the existing and operational Midmar Crushers (Pty) Ltd quarry. The blasted dolerite will be sized appropriately via a rock breaker pecker, loaded into a tipper truck and transported from the new quarry to the existing Midmar Crusher (Pty) Ltd quarry site located to the east of the Nguklu River, where it will be crushed. No crushing will occur on site. Blasting is the only reasonable and feasible technology alternative for the application given that the resource to be quarried is dolerite. In order to limit the cumulative impacts of operation, only one quarry will be utilised at any one time, until such time as the existing quarry pit is rehabilitated. As a result, blasting and associated quarrying activities will only occur within one quarry pit at a time and not simultaneously.
- Two technology alternatives have been identified for the construction of a low-level bridge (causeway), namely a box culvert design (Preferred Bridge Technology Alternative 1) and a pipe culvert design (Bridge Technology Alternative 2).

Both layout alternatives include for the construction of two low-level bridges (causeways) across the Nguklu River. In this regard, both bridges will be 6m wide or less and will each have a carrying capacity of 50 tons in order to allow for laden construction vehicles and operational vehicles to cross safely.

Construction will necessitate the temporary impedance of water in the river during construction as a result of cofferdam construction. Conduits will be placed in the watercourse during construction to allow for the free flow of water through built infrastructure where necessary. The causeway will be built to Department of Transport (DoT) requirements for construction on bedrock. Each access bridge will allow for the single passage of one heavy construction vehicle or operational vehicle at a time. It is recommended that a box culvert design be adopted.

Assuming all phases of the project adhere to the conditions stated in the EMPr (Appendix 4) it is believed that the impacts associated with the proposed expansion will have a limited significant environmental impact on the surrounding environment. However, cognisance must be given the physical alteration of the landscape through quarrying activities. Mitigation measures will include for the sloping of the benches once quarried, as well as for the reinstatement of topsoil and vegetation, but the site will never be returned to its benchmark state. All disturbance associated with the quarry alongside the Nguklu River and within the riverine zone (including the low-level bridges), will be rehabilitated.

Positive impacts associated with expansion include:

- Expansion will increase the size of the dolerite reserve available to quarry;
- Expansion of the existing quarry is preferable to creating a brand-new quarry elsewhere, taking into consideration the environmental disturbance of such, as well as business development costs;
- Continuation of land use activities in the immediate area;
- The expansion will result in the retention of current Midmar Group employees (150 staff);
- The proposed expansion supports the goals of KZN Provincial Growth and Development Plan and Spatial Development Framework of the uMngeni Local Municipality's Integrated Development Plan; and
- Local economic growth and development.

It is perceived that these impacts will be long term and will have sustainable benefits at both a local and regional level.

It must be ensured that the construction and operational phases, in no way, hampers the integrity of any of the items of heritage significance identified on site, and that post-construction rehabilitation includes creating a safe environment that is not prone to soil erosion or the propagation of alien invasive weeds.

After the construction phase of the project, the contractors must ensure that all hazardous materials are removed from the site and that rehabilitation of site, including the Nguklu River is undertaken according to the requirements of the EMPr (Appendix 4), as well as the recommendations of the Biodiversity and Watercourse Specialist (Appendix 2: Specialist Studies).

Any alien plant management programmes that are implemented during the construction phase must be maintained throughout operation and in the rehabilitation phase of the project. It is important that the Nguklu River is monitored for alien plant infestation.

## 14 RECOMMENDATIONS OF THE EAP

The proposed expansion should not result in impacts on the natural or social environment that are highly detrimental, nor result in undue risks to the natural environment. The nature and types of negative impacts do not outweigh the potential benefits of this project, provided that the localised impacts of the construction and operational phase are adequately mitigated and managed. In this regard, an EMPr has been compiled and is attached to this report (see Appendix 4). It is recommended that external bi-monthly EMPr monitoring takes place by an independent Environmental Control Officer (ECO) to ensure that the requirements of the EMPr are being correctly implemented, thus ensuring the protection of the surrounding environs during construction.

It is the recommendation of the EAP that the following management and mitigation measures be incorporated into any project approvals which may be issued:

- The recommendations of the Biodiversity and Watercourse Identification and Delineation Assessment Report must be adhered to (Appendix 2: Specialist Studies):
  - No indigenous vegetation outside of the quarry footprint may be damaged;
  - The area between the new quarry boundary (i.e. expansion site) and the stream must be maintained as a buffer strip. This strip must have a minimum width of approximately 40m;
  - An alien plant eradication programme must be undertaken and sustained in the buffer area including the strip of woody vegetation. Key species to be targeted include Black Wattle, Lantana, Bugweed, Bramble, Syringa and Castor-oil Plant;
  - The grassland areas must be managed for maximum biodiversity conservation. The first two actions are relevant and a regime of veld burns on a biannual basis must be established. The woody vegetation along the river must be protected by burning a five metre break along its margin each year. This action will encourage a natural ecotonal plant community to develop;
  - Shortly prior to the start of any construction on the site, a chameleon capture and translocation operation must be undertaken. The animals captured must be translocated to a nearby site with suitable habitat. This site could be in the indigenous vegetation alongside the tributary stream west of the existing quarry;
  - The lower end of the new quarry area should be enclosed by an earthen berm which will catch and contain dirty water and other materials from passing down the slope into the river;
  - Protect the woody vegetation from fire by burning a five metre break along its margin each year. This action will encourage a natural ecotonal plant community to develop;
  - The area must be monitored once a year to check that the mitigation measures are effective. Particular attention must be given to the following:
    - The area downslope of the containing berm must be inspected to check for any soil or other material which may have moved from the quarry into the buffer area;
    - The buffer area must be checked for weeds and especially those which are listed for removal;
    - Adherence to the veld burning programme should be checked; and
    - The bridges over the Nguklu River must be properly designed and the recommendations proposed implemented.
- A rigorous programme of alien weed control must be implemented and sustained.

A No-go Areas Map is provided in Figure 15-1 indicating areas where **quarrying** is not to occur.

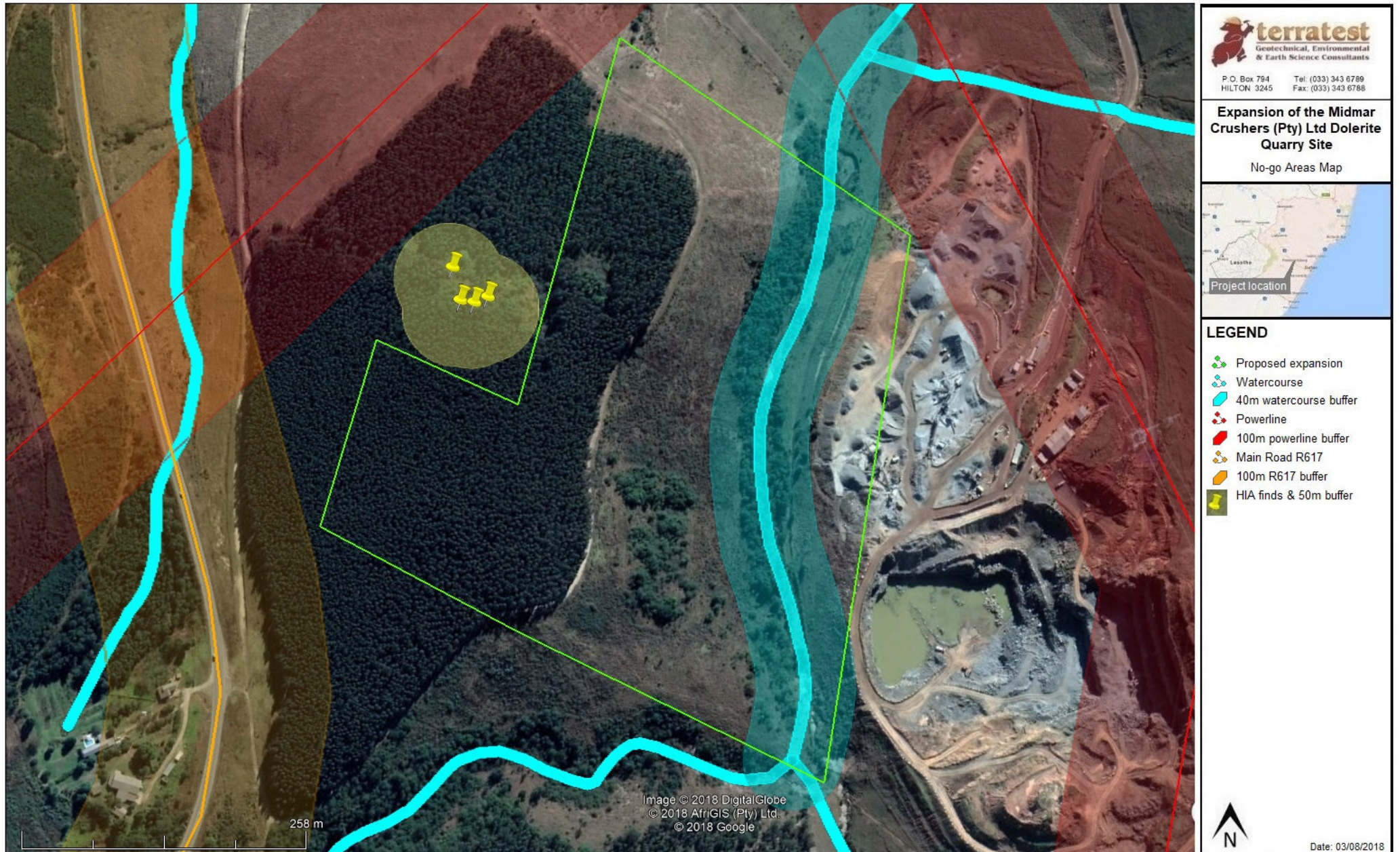


FIGURE 14-1: No-go areas identified by buffers (i.e. 40m watercourse buffer, 100m Main Road R617 buffer and 100m Eskom powerline buffer)

## 15 CONSTRUCTION TIMEFRAMES

Construction timeframes are estimated to be 36 months.

It is requested that the Environmental Authorisation, if issued by the Competent Authority, have a construction implementation period of ten (10) years from date of signature in order to account for any unforeseen planning considerations.

## 16 SUBMISSION AND CONSIDERATION OF DOCUMENTATION BY THE COMPETENT AUTHORITY

It is to be noted that in terms of the EIA Regulations (2014), GNR 326 43(2) as amended, all State Departments that administer a law relating to a matter affecting the environment, specific to the Application, must submit comments within 30 days to the EAP, as per the request of the EAP. Should no comment be received within the 30-day commenting period, it will be assumed that the relevant State Department has no comment to provide.

All comments received in response to the BA Report will be attached to, summarised and responded to in a final version of the BA Report (i.e. Final BA Report), which will be submitted to the Competent Authority, (i.e. DMR) for consideration in terms of issuing an Environmental Authorisation.

## 17 UNDERTAKING

Terratest (Pty) Ltd hereby confirms that the information provided in this report is correct at the time of compilation and was compiled with input from Midmar Crushers (Pty) Ltd.

Terratest (Pty) Ltd further confirms that all comments received from Stakeholders and IAPs will be included in the Final BA Report submitted to the DMR. Further, a record has to-date and will continue to be kept of all comments, which will be consolidated and incorporated into all subsequent reports, either submitted for comment to IAPs, or to the DMR for consideration and decision-making.

**For Terratest (Pty) Ltd:**



**LIZ DRALLE**  
**SNR ENVIRONMENTAL SCIENTIST**

## 18 REFERENCES

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**APPENDIX 1: CVs of the EAP**

**APPENDIX 2: Specialist Studies**

- **Biodiversity and Watercourse Identification and Delineation Assessment**
- **Heritage Impact Assessment**



## **APPENDIX 3: Public Participation documentation**

## **APPENDIX 4: Environmental Management Programme**

