mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT SCOPING REPORT

COMMENT PERIOD: 13th May 2024 – 13th June 2024

LISTED ACTIVITIES ASSOCIATED WITH MINING

EXPANSION OF EXISTING MINING RIGHT AREA

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA), 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (NEMWA), 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED)

NAME OF APPLICANT:	Queenstown Quarry (Pty) Ltd
TEL NO:	+27 12 652 0107
FAX NO:	+27 86 588 4526
POSTAL ADDRESS:	PO Box 2577, Komani, 5322
PHYSICAL ADDRESS:	Farm Lesseyton 81 near Komani in the Eastern Cape
FILE REFERENCE NO. SAMRAD:	**EC 009 MR/102**

Please note that certain sections of this report will **only** be completed / updated after the commenting period. These sections are highlighted in yellow.

The format of the report follows the template provided by the competent authority (The Department of Mineral Resources and Energy)

REVIEW RECORD

DRAFTING AND REVIEW OF REPORT

	NAME	DESIGNATION
AUTHORS	Marli Burger	Registered EAP (Aquastrat Solutions (Pty) Ltd)
APPLICANT CONTRIBUTION	Malan Zerwick	Mine Manager (Queenstown Quarry (Pty) Ltd)
	Johann Pretorius	HSE Compliance Manager (Raumix Aggregates (Pty) Ltd)
REVIEWER	Greg Coates	Project Manager (Umhlaba Environmental Consulting CC)

ACCEPTANCE OF DRAFT REPORT FOR CONSULTATION

	NAME	DATE	SIGNATURE
AUTHOR	Marli Burger	7th May 2024	
APPLICANT	Malan Zerwick	8th May 2024	

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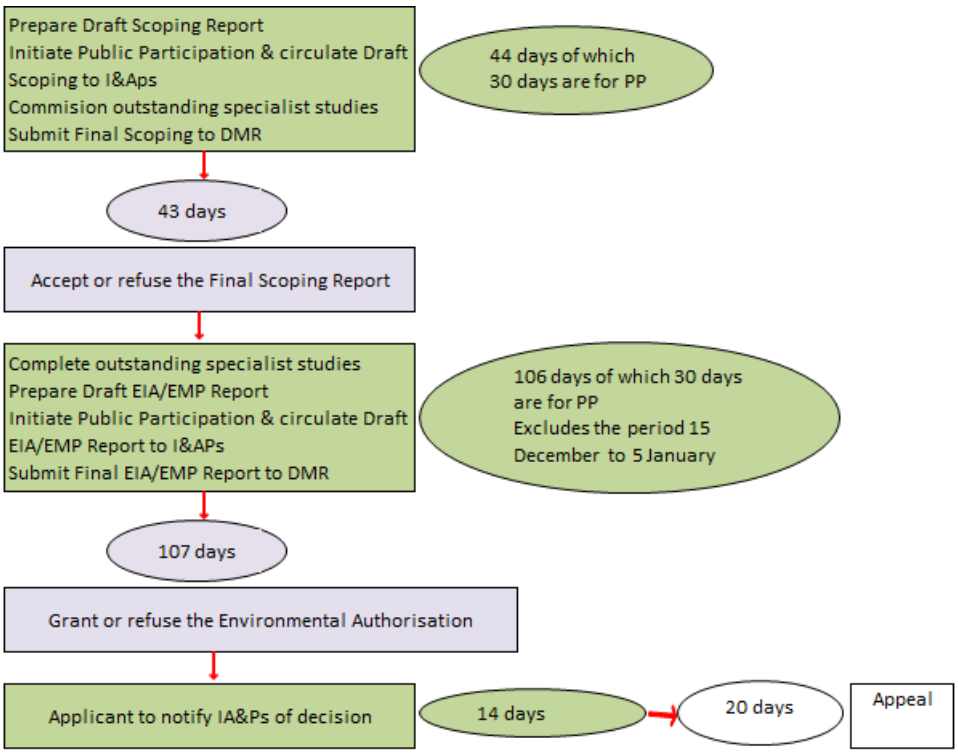
UMHLABA
ENVIRONMENTAL CONSULTING

THE PURPOSE OF THIS DOCUMENT

Queenstown Quarry is an existing open cast quartzite and dolerite mining operation (active since the 1970's) that wishes to expand the operation to include additional resources identified adjacent to the existing mining right area. In order to change the existing mining right area, Queenstown Quarry need to submit an application to the Department of Mineral Resources and Energy in terms of Section 102 of the Mineral and Petroleum Resources Development Act (MPRDA), No. 28 of 2002 as amended. The application reference number is **EC 009 MR/102**. The proposed activities also require applications in terms of the National Environmental Management Act (NEMA), No. 107 of 1998 as amended. The application process must follow the Scoping and Environmental Impact Assessment process as per the Environmental Impact Assessment Regulations, 2014 as amended. An overview of the process is provided in the figure below. This process begins with the scoping phase where the proposed activities, baseline environment and potential impacts are determined. Once these are defined, the required specialist studies are undertaken and an informed impact assessment is undertaken with a management plan being developed. Both phases involve Public Participation where Interested and Affected Parties (I&AP) have an opportunity to review the draft reports for a period of 30 days each phase and provide comments to be incorporated into the final reports. The final documents are then submitted to the Competent Authority to consider in their decision making process to either grant or refuse the authorisation.



Bundu has appointed the following project team to undertake the necessary processes:

Role	Responsible Person	Company
NEMA application (Registered EAP)	Marli Burger	Aquastrat Solutions (Pty) Ltd
MPRDA (S102) application	Greg Coates	Umhlaba Environmental Consulting CC
Public Participation Process	Vumile Ribeiro	Niara Environmental Consultants (Pty) Ltd

This document is the Draft Scoping Report and is being made available to the public for comment as per the Regulations. Should you wish to register as an I&AP and submit comments on the contents of this report please refer to the Background Information Document (BID) accessible online at https://niara.co.za/downloads/ or contact Mrs Ribeiro at the details provided below. I&AP's are requested to provide feedback on the baseline presented and their perceived concern areas in terms of potential impacts. Please ensure that your comments are submitted on or before the **13th June 2024**. *Please note in accordance with POPIA and NEMA, personal information is collected and processed by the applicant/EAP and shared with the Competent Authority to enable informed decision making.*

Tel: 082 767 2786
Email: stakeholder@niara.co.za
Post: Office 1 Palm Place Office Park 22 Bram Fischer Drive, Linden, Johannesburg, 2195

EXECUTIVE SUMMARY

Site Location and Proposed Project

The Queenstown Quarry operation has a converted Mining Right EC 009 MR for 36.25 ha over the Farm Lesseyton 81, located 7km west of Komani (Queenstown) in the Eastern Cape. The operation also has a mining permit EC 10498 MP for 4.9 ha directly adjacent to the mining right. Queenstown Quarry (Pty) Ltd is the mining right holder whilst Komani Quarry (Pty) Ltd is the mining permit holder. Both holders have entered into a mining offtake agreement with Raumix Aggregates (Pty) Ltd who are the entity responsible for the operation of the quarry including the use of the existing equipment, infrastructure, labour force, and services.

The proposed expansion of the existing operation would be to include additional resource which would extend the life of the operation. It is important to note that the operational activities, infrastructure, equipment and work force would not change from the present. The application is only to extend the life of the operation.

The proposed expansion area is presented in the Figure below. This area takes into consideration the following;

- Identified resource along the ridge to the south and west
- Identified area for stockpiling to the north and east
- 50m buffer from the N6
- Inclusion of the mining permit held by Komani Quarry (Pty) Ltd which is to be closed when the S102 is approved

The expansion will increase the mining right area from 36.2505ha to 79.3270ha.

Need and Desirability

Viable reserves have been identified adjacent to the existing minng right area and if this mining right and associated waste management licence is granted it would in effect extend the life of the existing mining operation, and the following benefits could translate:

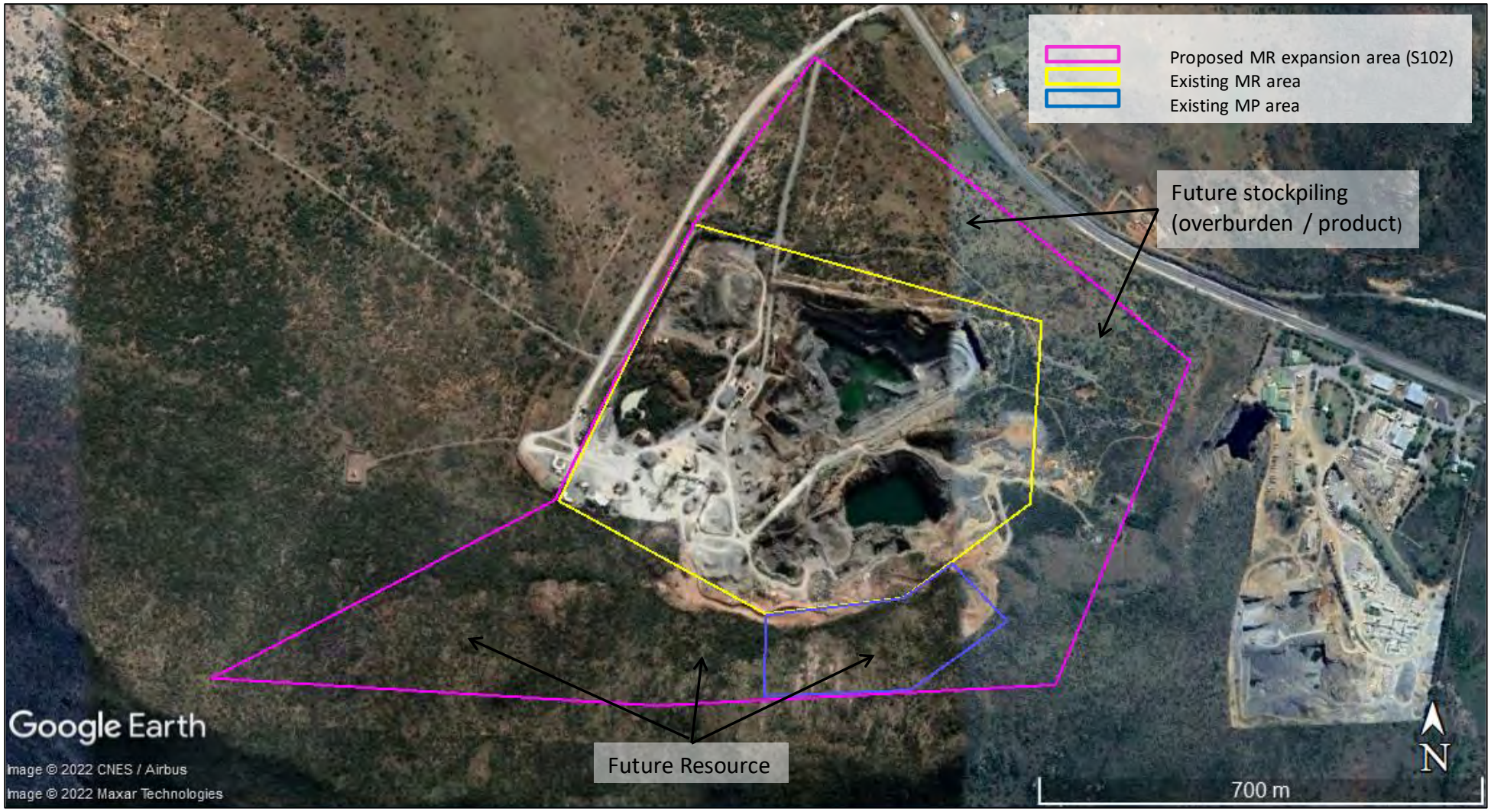
- Prolonged economic benefits in terms of employment opportunities (due to the extended life of mine, people will be employed for longer);
- Prolonged local economic development benefits through the implementation of the social and labour plan.
- Prolonged provision of a source of building materials within the local area.

Current Landuse and Environmental Sensitivity

It is important to note that Queenstown Quarry has been operating since 1970. The farm Lesseyton No 81 is situated in a rural setting intersected by road, rail and electrical infrastructure. Historically, the property was exclusively used for agricultural purposes, upon which the land use gradually changed to include both mining (at Queenstown Quarry) as well as the development of Lesseyton residential area. The mine is bordered by agricultural land to the west and south. Immediately to the north is the N6 nighway and beyond is the growing rural community of Lesseyton. Adjacent and to the east of the mining area is another hard rock quarry as well as the manufacturing of civil and engineering concrete products. Further to the east and south from the mining area are small agricultural holdings located in the Hilcrest and Amberdale areas.

As the mine has been operating for a number of years, the current footprint of 36.2505ha is mostly transformed as it is a well-developed opencast mining operation. The following infrastructure / mining development are already established and will continue to be utilised to expand the quarry pit:

- Quartzite quarry
- Dolerite quarry
- Crushing, screening and washing plants
- Water tank
- Settlement dam
- Stockpile area
- Wash bay and workshop
- Offices, stores, diesel depot, transformer house and weigh bridge
- Overburden dumps


Proposed MR expansion area (S102)
Existing MR area
Existing MP area
Future stockpiling (overburden / product)
Future Resource
Google Earth
Image © 2022 CNES / Airbus
Image © 2022 Maxar Technologies
700 m
N

The proposed future stockpiling area, as indicated to the north and east of the existing operation, would expand into an area that exihibits signs of previous disturbance, likely from agriculture. The proposed future resource area, as indicated to the south and west of the existing operation, would expand into the ridge which exihibits undisturbed natural habitats. A screening assessment using the National Screening Tool identified Terrestrial Biodiversity and Palaeontology as potentially highly sensitive. Specialist studies for these aspects were undertaken with the following conclusions:

Heritage: "*No archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint. It is well known that Iron Age, especially Late Iron Age stone-walled settlements do not usually occur on steep mountainous slopes. It is therefore recommended, from a cultural heritage perspective that the proposed mining activities may proceed*".

Palaeontology: "*This letter serves as a Letter of Exemption. It is in compliance with The Minimum Standards for Palaeontological Components of Heritage Impact Assessment Reports, SAHRA APMHOB, Guidelines 2012. The development is underlain by the rocks of the Karoo Supergroup, Jurassic, Early Triassic, Permian in age, with a VERY HIGH Palaeontological Sensitivity (Almond et al. 2009*). This development will take place on igneous rocks, therefore, the impact will be VERY LOW*".

Biodiversity: "*The amount of natural habitat potentially affected is relatively small compared to the extent of the site, and will also be in an area that is between the current quarry and the neighbouring one to the east. The amount of habitat affected is negligible relative to the extent of the vegetation type. It is also insignificant relative to the size of the CBA2 area. In terms of plant species of concern, it is not expected that either of the two plant species that are confirmed to occur on site will be affected by the proposed activities. The location of the one sensitive plant species, listed as Near Threatened, is known to the mine manager. The proposed expansion avoids this species. The other species, Asparagus spinescens, will also not be directly affected and will persist on site*".

It is important to note however that the Biodiversity specialist report does suggest limiting the area where expansion may occur without further studies. This area is illustrated by the green border in the Figure below. When expansion beyond this area is anticipated, further studies should be done to identify further potential individual plants of interest that require either avoidance or relocation. In the case of relocation, the appropriate permits should be obtained first.

Although the screening tool also identified Aquatic Biodiversity as potentially highly sensitive, it is confirmed that there are no wetlands or water courses within or near to the application area.

During the process of this Scoping Phase the following environmental attributes will be considered further against the baseline information currently available (presented in this report) and in consultation with Interested and Affected Parties to agree on the attributes that need to be prioritised for assessment during the Environmental Impact Assessment Phase:

- Aesthetics / Visual
- Blasting (vibrations and fly sock)
- Dust / Air Quality
- Fauna and Flora
- Noise / Sound levels
- Sensitive receptors (surrounding land uses)
- Sites of cultural and heritage importance
- Soil and agricultural
- Socio-economic
- Water (ground and surface)

Should you wish to participate in the consultation process please register by sending your name, contact details and interest in the project to stakeholder@niara.co.za. Further information and project updates will be provided upon registration. The consultation period for this Scoping Phase will end on the 13th June 2024 therefore all comments on this draft Scoping Report must be submitted before this date.

ISISHWANKATHELO SEBHUNGA

IQueenstown Quarry ngumsebenzi okhoyo okhoyo we-quartzite ovulekileyo kunye ne-dolerite mining (esebenzayo ukususela ngeminyaka yoo-1970) enqwenela ukwandisa umsebenzi ukuze iquke izixhobo ezongezelelekileyo ezichongiweyo kufuphi nendawo esele ikho yelungelo lomgodi. Ukuze kuguqulwe indawo esele ikho yelungelo lokumbiwa kwemigodi, iQueenstown Quarry kufuneka ingenise isicelo kwiSebe leMithombo yeziMbiwa naMandla ngokweCandelo le-102 loMthetho woPhuhliso lweMithombo yeziMbiwa nePetroleum (MPRDA), uNombolo 28 ka-2002 njengoko ulungisiwe; kunye nokungenisa izicelo zezigunyaziso ezifanelekileyo zokusingqongileyo kunye nenkunkuma ngokoMthetho woLawulo lokusiNgqongileyo weSizwe (NEMA), enguNombolo 107 ka-1998 njengoko ulungisiwe. Inkqubo yogunyaziso lokusingqongileyo kufuneka ilandele inkqubo yoHlolo kunye nenkqubo yoVavanyo lweMpembelelo yokusiNgqongileyo ngokweMimiselo yoVavanyo lweMpembelelo yokuSingqongileyo, ka-2014 njengoko ilungisiwe, ebandakanya uThatho-nxaxheba loLuntu.

IQueenstown Quarry yonyule iQela leProjekthi lilandelayo ukuba liqhube inkqubo yesicelo eyimfuneko:

Indima	Umntu onoxanduva	Inkampani
NEMA Application	Marli Burger (Registered EAP)	Aquastrat Solutions (Pty) Ltd
MPRDA (S102) Application	Greg Coates	Umhlaba Environmental Consulting CC
Public Participation Process	Vumile Ribeiro	Niara Environmental Consultants (Pty) Ltd

Olu xwebhu yiNgxelo yoYilo lweNgcingane kwaye lwenziwa lufumaneke kuluntu ukuze luhlomle ngokweMimiselo. Ukuba unqwenela ukufaka amagqabantshintshi ngokuqulethwe yile ngxelo nceda ujonge kuXwebhu loLwazi olungeMvelaphi (BID) olufumaneka kwi-intanethi apha https://niara.co.za/downloads/ okanye uqhagamshelane noNksk Ribeiro kwezi nkcukacha zinikwe ngezantsi. Nceda uqinisekise ukuba izimvo zakho zingeniswa ngomhla okanye ngaphambi kwe 13th June 2024.

Umntu woqhagamshelwano: Nks Vumile Ribeiro
Umnxeba: 082 767 2786 Ifeksi: 086 605 1810
I-imeyile: stakeholder@niara.co.za
Idilesi Yeposi: I-Ofisi 1 Indawo yasePalm Office Park 22 Bram Fischer Drive, Linden, Johannesburg, 2195

Indawo yeSiza kunye neProjekthi eCetywayo:

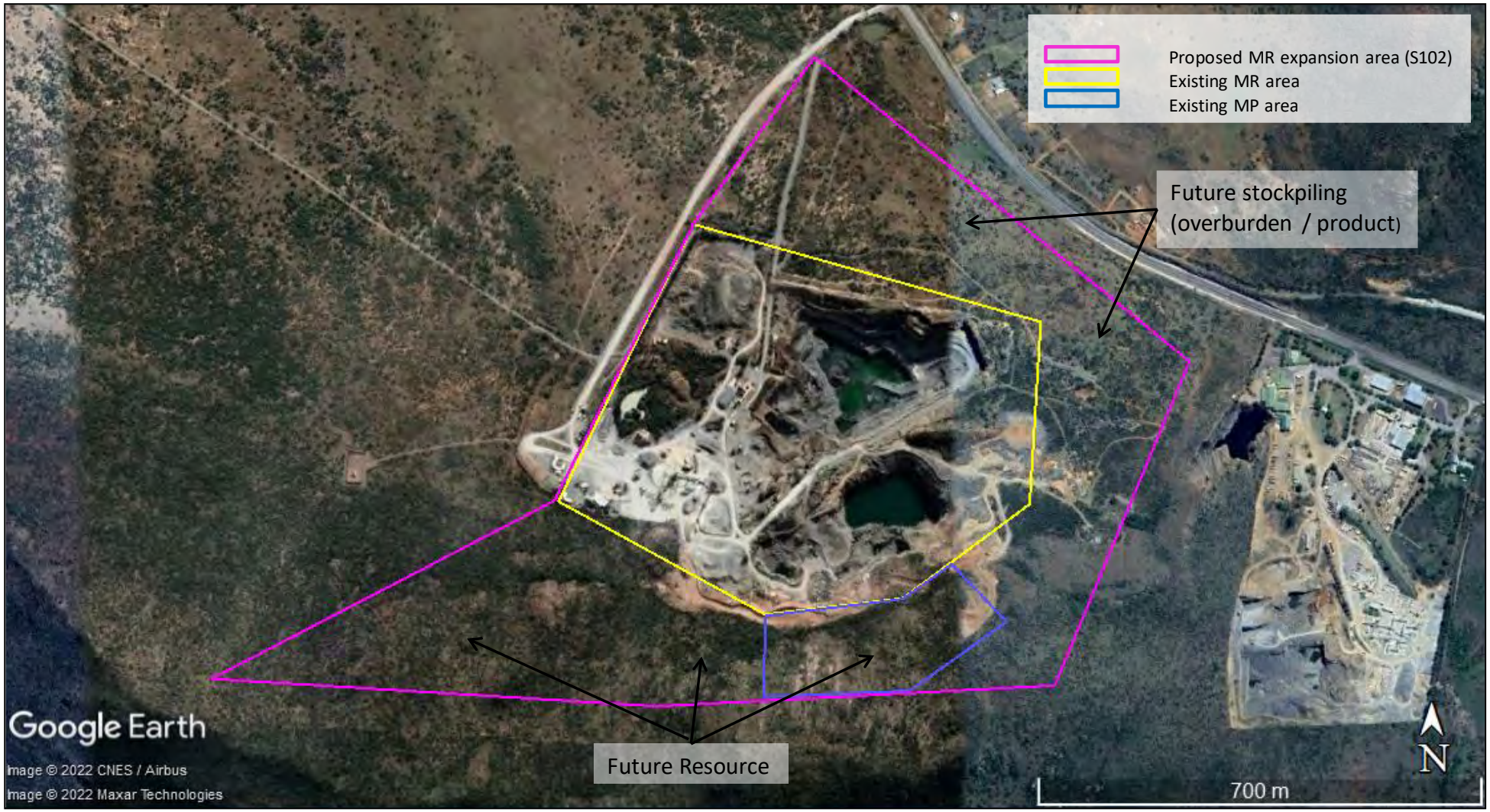
Umsebenzi waseQueenstown weQuery uneLungelo leMigodi eliguquliweyo EC 009 MR kangangeehektare ezingama-36.25 ngaphaya kweFama iLesseyton 81, emi kwi-7km kwintshona yeKomani (eQueenstown) eMpuma Koloni. Lo msebenzi ukwanemvume yokomba i-EC 10498 MP yeehektare ezi-4.9 emelene ngqo nelungelo lemigodi. IQueenstown Quarry (Pty) Ltd inelungelo lemigodi ngelixa iKomani Quarry (Pty) Ltd inguye umnini mvume yokomba. Bobabini abanini bangene kwisivumelwano sokuthotywa kwemigodi neRaumix Aggregates (Pty) Ltd abaliqumrhu elinoxanduva lokusebenza kwekwari kuquka nokusetyenziswa kwezixhobo ezikhoyo, iziseko ezingundoqo, abasebenzi kunye neenkonzo.

Ukwandiswa okucetywayo komsebenzi okhoyo kuya kuba kukubandakanya izixhobo ezongezelelweyo eziya kwandisa ubomi bomsebenzi. Kubalulekile ukuqaphela ukuba imisebenzi yokusebenza, iziseko zophuhliso, izixhobo kunye namandla okusebenza aziyi kutshintsha ukusuka ngoku. Isicelo kuphela ukwandisa ubomi bokusebenza.

Indawo yokwandiswa ecetywayo ibonakaliswe kulo Mzobo ungezantsi. Lo mmandla uthathela ingqalelo oku kulandelayo;

- Umthombo ochongiweyo ecaleni komqolo ukuya emazantsi nasentshona
- Indawo echongiweyo yokugcinwa kwempahla emantla nasempuma
- 50m isithinteli ukusuka ku-N6
- Ukuqukwa kwephepha-mvume lokomba iKomani Quarry (Pty) Ltd eliza kuvalwa xa iS102 yamkelwe.

Ukwandiswa kuya kwandisa indawo yamalungelo omgodi ukusuka kwi-36.2505ha ukuya kwi-79.3270ha.


Proposed MR expansion area (S102)
Existing MR area
Existing MP area
Future stockpiling (overburden / product)
Future Resource
Google Earth
Image © 2022 CNES / Airbus
Image © 2022 Maxar Technologies
700 m
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Imfuno kunye nemiNqweno

Oovimba abanokusebenziseka bachongiwe kufuphi nendawo esele ikho yelungelo lokumbiwa kwaye ukuba eli lungelo lemigodi kunye nelayisenisi yolawulo lwenkunkuma enxulumeneyo linikiwe liya kwandisa ubomi bomsebenzi okhoyo wokumba, kwaye ezi zibonelelo zilandelayo zinokutolika:

- Iinzuzo zezoqoqosho ixesha elide ngokwamathuba engqesho (ngenxa yobude bobomi bam, abantu baya kuqeshwa ixesha elide);
- Iinzuzo zophuhliso loqoqosho lwasekhaya ixesha elide ngokuphunyezwa kwesicwangciso sezentlalo nezabasebenzi.
- Ubonelelo lwexesha elide lomthombo wezinto zokwakha kwindawo yendawo.

Ukusetyenziswa Komhlaba Kwangoku Kunye Novakalelo Lomhlaba

Kubalulekile ukuqaphela ukuba iQueenstown Quarry isebenza ukusukela ngo-1970. Ifama iLesseyton enguNombolo 81 ikwindawo yasemaphandleni edibana neendlela, uloliwe kunye neziseko zombane. Ngokwembali, lo mhlaba wawusetyenziselwa iinjongo zolimo kuphela, apho ukusetyenziswa komhlaba kwatshintsha ngokuthe ngcembe ukubandakanya zombini imigodi (eQueenstown Quarry) kunye nophuhliso lwendawo yokuhlala yaseLesseyton. Lo mgodi ungqamene nomhlaba wokulima ngasentshona nasemazantsi. Kwangoko emantla nguhola wendlela u-N6 kwaye ngaphaya koluntu lwasezilalini olukhulayo lwaseLesseyton. Ecaleni nasempuma yommandla wemigodi yenye inkwali yamatye aqinileyo kunye nokuveliswa kweemveliso zekonkrithi zobunjineli kunye nezobunjineli. Empuma nasemazantsi ukusuka kwindawo enemigodi kukho iindawo ezincinci zezolimo ezikwindawo yaseHilcrest naseAmberdale.

Nanjengoko lo mgodi usebenze iminyaka eliqela, indawo ekhoyo ngoku eyi-36.2505ha iguquliwe kakhulu njengoko ingumsebenzi womgodi ovulekileyo ophuhliswe kakuhle. Ezi zibonelelo zilandelayo / uphuhliso lwemigodi sele lusekiwe kwaye luza kuqhubeka lusetyenziselwa ukwandisa imingxuma yekwari:

- Ikwari yequartzite
- Ikwari yaseDolerite
- Ukutyumza, ukuhluzwa kunye nokuhlamba izityalo
- Itanki yamanzi
- Idama lokuhlala
- Indawo ekugcinwa kuyo izinto
- Ibhayi yokuhlamba kunye nendawo yokusebenzela
- Iiofisi, iivenkile, indawo yokugcina idizili, indlu yetransformer kunye nebhulorho yokuweyisha
- Ukulahla umthwalo ogqithisileyo

Indawo ecetywayo yexesha elizayo yokugcinwa kwempahla, njengoko kubonisiwe emantla nasempuma yomsebenzi okhoyo, iya kwandiswa ibe yindawo ebonisa iimpawu zokuphazamiseka kwangaphambili, okunokwenzeka okuvela kwezolimo. Indawo ecetywayo yobutyebi bexesha elizayo, njengoko kubonisiwe emazantsi nakwintshona yomsebenzi okhoyo, iya kwandiswa ibe ngumqolo obonisa iindawo zokuhlala zendalo ezingaphazanyiswa. Uvavanyo lokuhlola olusebenzisa iSixhobo sokuHlola seSizwe ichonge i-Terestrial Biodiversity kunye nePalaeontology njengenokuba novakalelo oluphezulu. Uphononongo lweengcali kule miba lwenziwe ngezi zigqibo zilandelayo:

ILifa leMveli: *“Akukho zinto zakudala (zombini i-Stone Age kunye ne-Iron Age) izinto zobugcisa, iindibano, iimpawu, izakhiwo okanye iindawo zokuhlala ezirekhodiweyo ngexesha lovavanyo lweprojekthi. Kuyaziwa ukuba i-Iron Age, ngakumbi iindawo zokuhlala ezibiyelwe ngamatye kwiXesha le-Iron emva kwexesha aziqhelekanga ukwenzeka kumathambeka eentaba. Kuyacetyiswa ke ngoko, ngokwembono yelifa lemveli ukuba imisebenzi yemigodi ecetywayo ingaqhubeleka”*.

I-Palaeontology: *“Le leta isebenza njengeLeta yokuKhululwa. Ithobelana neMigangatho eMincinci yePalaeontological Components of Heritage Impact Assessment Reports, SAHRA APMHOB, Guidelines 2012. Uphuhliso lunyanzeliswa ngamatye eKaroo Supergroup, Jurassic, Early Triassic, Permian ngobudala, ene-VERY HIGH Sensi Palaeontological. (Amangile et al. 2009 *). Olu phuhliso luya kwenzeka kumatye e-igneous, ngoko ke, impembelelo iya kuba PHANTSI KAKHULU”.*

I-Biodiversity: *“Ubungakanani bendawo yokuhlala yendalo enokuthi ichaphazeleke buncinci xa kuthelekiswa nobungakanani besiza, kwaye iya kuba kwindawo ephakathi kwekwari yangoku kunye neselumelwane esempuma. Ubungakanani bendawo yokuhlala echatshazelweyo alinamsebenzi xa kuthelekiswa nobungakanani bohlobo lwezityalo. Kananjalo ayibalulekanga xa ithelekiswa nobukhulu bendawo ye-CBA2. Ngokumalunga neentlobo zezityalo ezixhalabisayo, akulindelekanga ukuba enye kweentlobo ezimbini zezityalo eziqinisekisiweyo ukuba zenzeka kwisiza ziyakuchatshazelwa yimisebenzi ecetywayo. Indawo yohlobo*

lwesityalo olunye olunovakalelo, oludweliswe njengePhantse eSesichengeni, yaziwa ngumphathi womgodi. Ukwandiswa okucetywayo kuthintela olu hlobo. Olunye uhlobo, i-Asparagus spinescens, nalo aluyi kuchaphazeleka ngokuthe ngqo kwaye luya kuqhubeka kwindawo".

Kubalulekile ukuqaphela nangona kunjalo ukuba ingxelo yengcali yeBiodiversity ayicebisi ukuba kuthintelwe indawo apho ukwanda kunokuthi kwenzeke ngaphandle kophononongo olongezelelweyo. Lo mmandla ubonakaliswa ngumda oluhlaza kuMzobo ongezantsi. Xa ukwanda ngaphaya kwalo mmandla kulindelwe, uphononongo olongezelelweyo kufuneka lwenziwe ukuchonga izityalo ezinokuthi zibe kho umdla ezifuna ukuphetshwa okanye ukufuduswa. Kwimeko yokufuduswa, iimvume ezifanelekileyo kufuneka zifunyanwe kuqala.

Nangona isixhobo sokuhlola sikwachonge i-Aquatic Biodiversity njengenokuba novakalelo oluphezulu, kuqinisekisiwe ukuba akukho migxobhozo okanye iindlela zamanzi ngaphakathi okanye kufuphi nendawo ekufakwa kuyo isicelo.

Ngexesha lenkqubo yesi Sigaba seNgcingane ezi mpawu zilandelayo zendalo ezingqongileyo ziya kuqwalaselwa ngakumbi ngokuchasene nolwazi olusisiseko olukhoyo ngoku (oluthiwe thaca kule ngxelo) kunye nokubonisana namaQela aNomdla naChaphazelekayo ukuba bavumelane ngeempawu ekufuneka zibekwe phambili ukuze zihlolwe ngexesha lokusiNgqongileyo. IsiGaba soVavanyo lweMpembelelo:

- Ubuhle bendawo / Iziphumo ezibonakalayo
- Uthuli / Umgangatho woMoya
- Izilwanyana nezityalo
- Amatye awabhabhayo
- Iimpawu zeJoloji
- Amanzi aphantsi komhlaba
- Ingxolo / amaqondo esandi
- Izamkeli ezibuthathaka
- Iindawo zelifa lemveli nemidla yenkcubeko
- Umhlaba kunye nezolimo
- Iingqwalasela zezentlalo noqoqosho
- Amanzi angaphezulu
- Ubume bomhlaba
- Iintshukumo (uqhushumbo)

Ukuba unqwenela ukuthatha inxaxheba kwinkqubo yokubonisana nceda ubhalise umdla wakho ku-stakeholder@niara.co.za. Ixesha lokubonisana kwesi Sigaba sokuSebenza liya kuphela ngo-13th June 2024.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

Abbreviations	Definition
CV	Curriculum Vitae
dBA	A-weighted decibel
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental impact assessment
EIR	Environmental Impact Report
EMF	Environmental Management Framework
EMPr	Environmental Management Programme Report
GN	General Notice
Ha	Hectares
I&APs	Interested and/or affected parties
IDP	Integrated Development Plan
MPRDA	Mineral and Petroleum Resources Development Act (MPRDA), No. 28 of 2002 as amended
NEMA	National Environmental Management Act (NEMA), No. 107 of 1998 as amended
SANS	South African National Standards
SR	Scoping Report
WULA	Water Use License Application

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (MPRDA), No. 28 of 2002 as amended, the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment (EIA) and an Environmental Management Programme (EMP) report in terms of the National Environmental Management Act (NEMA), No. 107 of 1998, it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

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

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template.

Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

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

1. OBJECTIVE OF THE ENVIRONMENTNAL IMPACT ASSESSMENT PROCESS

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

a) identify the relevant policies and legislation relevant to the activity;
b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
e) identify the key issues to be addressed in the assessment phase;
f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance , consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
g) Identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

2. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) **DETAILS OF**

( ) The EAP who prepared the Report

Table 1: Details of the EAP

Name of the Practitioner:	Marli Burger
Tel No.:	+27 72 284 9332
Fax No.:	N/A
E-mail Address:	oryxsolutionsafrica@gmail.com

(i) Expertise of the EAP

(a) *The qualifications of the EAP*

Table 2: Qualifications of the EAP.

Qualifications:	• MSc Aquatic Health • EAP No. 220/2019 • Pr. Sci. Nat 115534 See **Appendix 1** for a copy of the CV of the EAP.

(b) *Summary of the EAP's past experience*

Table 3: Experience of the EAP.

Years' Experience:	Marli Burger is a SACNASP and EAPASA Registered Environmental Consultant with 14 years of experience in environmental management. See **Appendix 2** for details.

b) **LOCATION OF THE OVERALL ACTIVITY**

Table 4: Description of project location.

Farm Name:	Lesseyton 81
Application Area (Ha):	79.3270 Hectares.
Magisterial District:	Chris Hani District Municipality and the Enoch Mgijima Local Municipality in the Eastern Cape Province.
Distance and Direction from Nearest Town:	Approximately 7km west of Komani (Queenstown). See Figure 1 below.
21 Digit Surveyor General Code for each Farm Portion:	C06200000000008100000

c) **LOCALITY MAP**

The Regulation 22 Plan is provided in **Appendix 3** depicting the location and extent of the application area in relation to major towns and infrastructure. The general location of the Queenstown Quarry is provided in Figure 1 below.

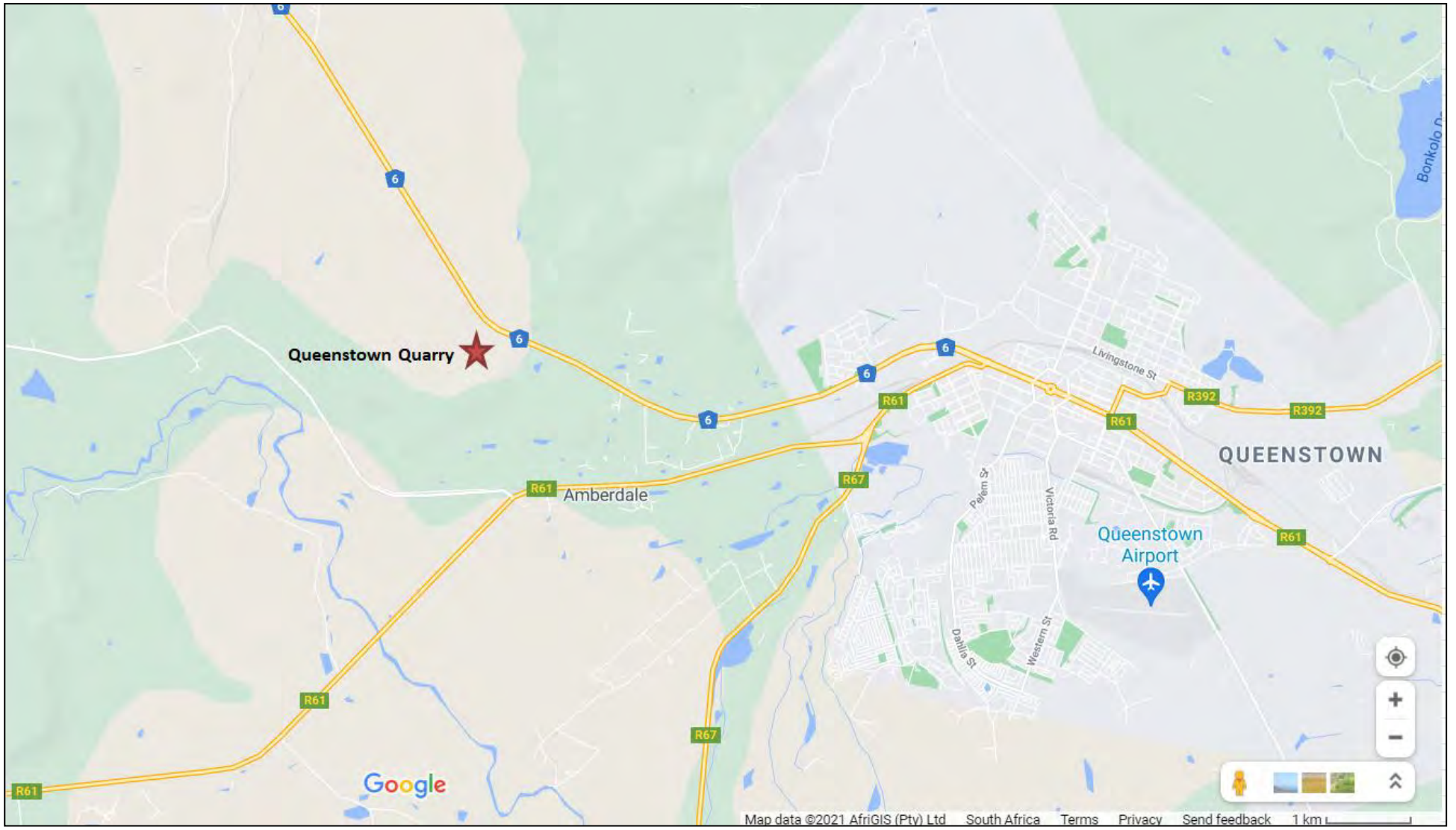


Figure 1: Locality map for Queenstown Quarry.

d) **DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY**

(i) Listed and specified activities

A map depicting the location and extent of the activities below is provided in **Appendix 4**.

Table 5: Listed and specified activities.

NAME OF ACTIVITY E.g. For mining,- excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	AERIAL EXTENT OF THE ACTIVITY (HA OR M²)	LISTED ACTIVITY Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985
Application to expand a mining right area in terms of Section 102 of the MPRDA	79.33 Ha	X	GNR 983: Activity 21D GNR 983: Activity 27 GNR 984 Activity 17 GNR 985 Activity 12 GNR 985 Activity 15 GNR 921 Gategory B Activity (11)
Site Preparation: • Clearing of vegetation and topsoil • Stockpiling of topsoil • Placement of mobile equipment • Establishment of stormwater and security controls			
Mining and Processing: • Drilling and blasting; • Crushing, screening and washing using a fixed and mobile plant, • Loading and hauling, • Stockpiling of product and overburden			
Rehabilitation: • Removing all infrastructure and equipment and inspecting for signs of pollution • Sloping high walls and backfilling overburden; • Establishment of indigenous vegetation; • Removal of alien vegetation			
Supporting Services: • Waste management • Sanitation; • Water supply and use; and • Diesel			

(ii) Description of the activities to be undertaken

The operation is an existing opencast mine. As this application is to simply expand the minng right area to include additional resources that will extend the life of mine, future activities will be a continuation of what is currently already being undertaken. Mining activities include the removal and stockpiling of topsoil and overburden to expose the underlying rock material which is then drilled and blasted. The loosened material is then loaded onto haul trucks and transported to a primary crusher. An indication of the current activities is provided in Figure 2. Figure 3 provides an indication of the future resource to be mined while Figure 4 provides an indication of the current dolerite pit and the ridge in the background to where expansion would occur.

Figure 2: Site layout of Queenstown Quarry indicating the current activities that will continue.

Figure 3: Indication of the future resource to be mined by extending the existing dolerite pit south and west.

Figure 4: Indication of the current dolerite pit and the ridge in the background to where expansion would occur.

Once the rock from the various pits is either stockpiled adjacent to the primary crusher or placed within the primary crusher, the responsibility of the material falls under the processing department. Processing is essentially one of crushing, washing and screening to produce the various grades (sizes) of aggregate products. Mined material is processed through a crushing plant to generate sand and stone products which are stockpiled to be sold to the readymix / construction industry. The existing plant configuration and capacity remains unchanged and no major modifications are planned. Figure 5 provides a simplified visual indication of the process flow of the various plants associated with Queenstown Quarry. A photograph of the processing plants has been provided in Figure 6.

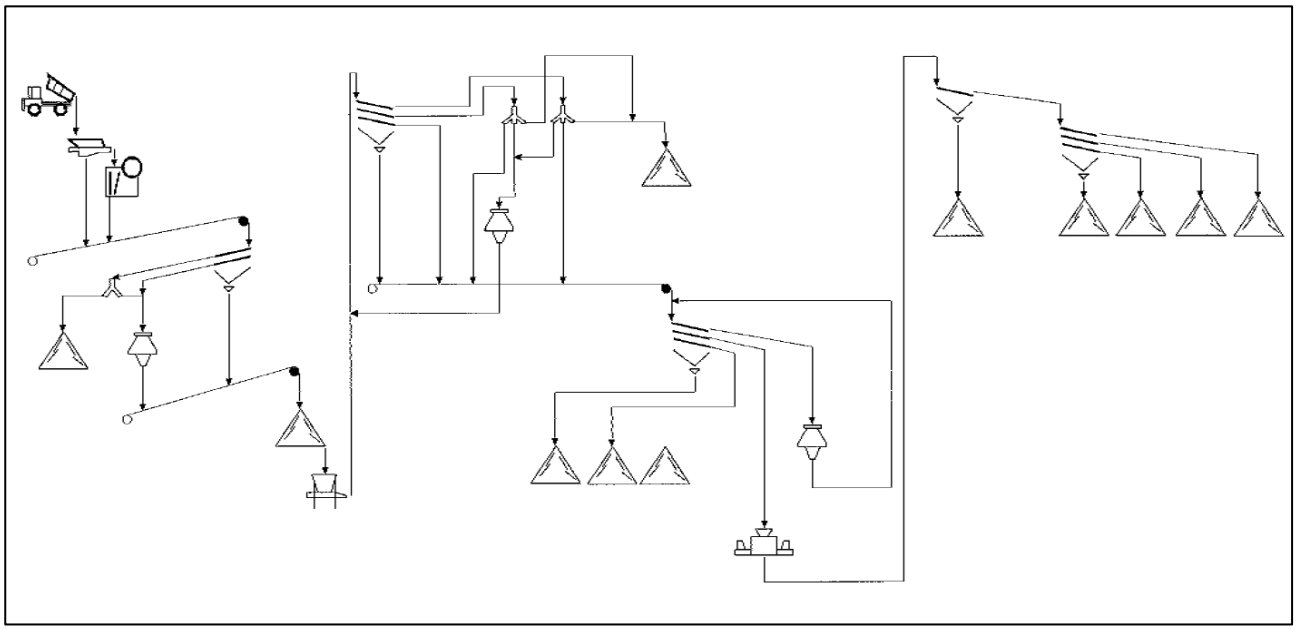


Figure 5: Process flow for the plant at Queenstown Quarry

The aggregate products are loaded onto client's trucks by means of a front-end loader. All material removed from site is sent over a weighbridge to ensure that the correct weight of material is taken and to avoid overloading. The final products are dispatched by road. The site layout for the processing area is given in Figure 7.

Figure 6: Photograph of stockpiles and plant area

Figure 7: Queenstown Quarry site layout - processing

e) **POLICY AND LEGISLATIVE CONTEXT**

This application triggers listed activities that may not commence without an environmental authorisation in terms of the:

- Listing Notices for the EIA Regulations, 2014 promulgated under the NEMA
- List of Waste Management Activities, 2013 promulgated under the NEM:WA

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
LEGISLATION	
Constitution of the Republic of South Africa, 1996 Everyone has the right: a. to an environment that is not harmful to their health or well-being; and b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that i. prevent pollution and ecological degradation; ii. promote conservation; and iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social	This basic environmental right contained in the bill of rights is preserved throughout the environmental legislation. The particulars regarding the impact assessment process is described in Section (h)(v) – (viii) and Section (i)(i) – (v) of this report. To give effect to Section 24 of the Constitution, an application for environmental authorisation is being made in terms of reasonable legislative and other measures.
Minerals and Petroleum Development Resources Act, Act 28 of 2002 (MPRDA) and the MPRDA Amendment Act, Act 49 of 2008. The MPRDA makes provision for equitable access to and sustainable development of the nation's mineral and petroleum resources. The recent amendment MPRDA resulted in changes to align specific environmental legislation associated with mining activities and aligned sections of NEMA and MPRDA to provide for one environmental management system. • The application is undertaken in line with Section 102 of the MPRDA • The DMRE is the competent authority overseeing the environmental authorisation process.	This application is to expand the existing minng right area and a S102 application will also be submitted.
National Environmental Management Act, Act 107 of 1998 (as amended)(NEMA) • The principles set out in Section 2 of NEMA guide the environmental requirements of the application. **2. Principles**.—(1) The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and— a. shall apply alongside all other appropriate and relevant considerations, including the State´s responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination; b. serve as the general framework within which environmental management and implementation plans must be formulated; c. serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment; d. serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and e. guide the interpretation, administration and implementation of this Act, and any other law concerned with the protection or management of the environment.	The principles of NEMA have been considered through out the report

(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. (3) Development must be socially, environmentally and economically sustainable. (4) (a) Sustainable development requires the consideration of all relevant factors including the following: i. That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; ii. that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; iii. that the disturbance of landscapes and sites that constitute the nation´s cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied; iv. that waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner; v. that the use and exploitation of nonrenewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource; vi. that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; vii. that a risk averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and viii. that negative impacts on the environment and on people´s environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied. (b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option. (c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons. (d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination. (e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle. (f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured. (g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge. (h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.	

(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment. (j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected. (k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law. (l) There must be intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment. (m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures. (n) Global and international responsibilities relating to the environment must be discharged in the national interest. (o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people´s common heritage. (p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment. (q) The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted. (r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure. **Section 28** of NEMA imposes a duty on any person who causes, has caused or may cause significant pollution or degradation to take reasonable measures to prevent, minimise and rectify significant pollution and environmental degradation. Non-compliance with the duty of care allows a competent authority to require that specified measures be taken (and if not taken, the competent authority may take those steps itself and recover the costs from various parties). Liability is retrospective.	
Environmental Impact Assessment Regulations, GN R 982 of 4 December 2014 Regulation 21 – 26 and Regulation 39 to 44. These regulations set out the process required to undertake the scoping and EIA process including the public participation process that must be undertaken as part of the EIA.	A scoping/EIA process and public participation process is being followed in terms of the EIA Regulations (2014). This report (i.e. the Scoping Report) forms part of the scoping phase of the EIA being undertaken and the public participation process is described in Section (h)(ii).
National Environmental Management: Waste Act, Act 59 of 2008 (NEM:WA) The Act was established to regulate waste management for the protection of human health and the environment by providing reasonable measures for: • Minimising the consumption of natural resources • Avoiding and minimising the generation of waste • Reducing, reusing, recycling and recovering waste • Treating and safely disposing of waste as a last resort • Prevention pollution and ecological degradation • Securing ecologically sustainable development while promoting justifiable economic and social development; • Promoting and ensuring the effective delivery of waste services;	Overburden and product stockpiles are considered by current legislation as residue stockpiles (by definition). Therefore Category B Activity 11 (GNR921) is included for authorisation.

• Remediating land where contamination presents, or may present, a significant risk of harm to health or the environment. • Achieving integrated waste management reporting and planning No person may commence with, undertake or conduct a waste management activity, except in accordance with a waste management licence. The DMRE is the applicable licencing authority for waste management activities associated with mining activities.	All waste generated as a result of the mining right activities will be disposed of appropriately. Proof of legal disposal will be maintained on site. In addition, the generation of potential waste will be minimised through ensuring employees are subjected to the appropriate environmental awareness campaign before commencement of mining right activities.
Regulation 704 (GN704) (Government Gazette 20118, 4 June 1999) Was drawn up to address these issues in relation to mining activities. Compliance to the requirements of GN704 is a legal requirement for all mining operations.	Considered when determining the extent of the additional area.
National Heritage Resources Act, 25 of 1999 ("NHRA") NHRA serves to protect and manage South African heritage and cultural resources, which include places, buildings, structures and equipment of cultural significance, historical settlements and townscapes, archaeological and paleontological sites, graves and burial grounds. The Act protects any heritage resources from damage by developments by stipulating in Section 38 that any person intending on undertaking any form of development which involves the activities listed below must, at the earliest stage of initiation, notify the South African Heritage Resources Association (SAHRA): **A.** the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; **B.** the construction of a bridge or similar structure exceeding 50 m in length; **C.** any development or other activity which will change the character of a site— i. exceeding 5 000 m2 in extent; or ii. involving three or more existing erven or subdivisions thereof; or iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority; **D**. the re-zoning of a site exceeding 10 000 m2 in extent; or **E**. any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.	An appropriate heritage specialist study will be completed and the recommendations from the report considered through out the environmental application process.
The National Environmental Management: Biodiversity Act, 2004 (NEM:BA) NEM:BA is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA. This includes: the protection of species and ecosystems; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment of a South African National Biodiversity Institute (SANBI). Section 52 of the Act provides for listing of threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected. The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems. Threatened terrestrial ecosystems have been delineated based on	The SANBI Land Use Decision Support Tool was consulted when determining the ecological baseline of the site. An appropriate biodiversity specialist study will be completed and the recommendations from the report considered through out the environmental application process.

the South African Vegetation Map, national forest types and priority areas identified in a provincial systematic biodiversity plan.	
National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) NEM:AQA has placed the responsibility for air quality management on local authorities that will be tasked with baseline characterisation, management and operation of ambient monitoring networks, licensing of listed activities, and emissions reduction strategies. GN893 of 2013 provides the list of activities in terms of Section 21(1)(a) for which licensing is required in terms of Chapter 5 of the Act. This notice further establishes minimum emission standards for the listed activities.	The principles of the NEM:AQA will be applied to the activities covered by this application.
National Dust Control Regulations (GN R 827) (Government Gazette 36974, 1 November 2013) The purpose of these regulations is to prescribe general measures for the control of dust in all areas.	Considered when proposing appropriate mitigation targets
GUIDELINES	
Enoch Mgijima Local Muncipality Integrated Development Plan for the period 2023 – 2024..	Considered when completing the socio economic conditions of the municipal area within which the proposed application area is situated.
SANS 10103:2008 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communication	Considered when proposing appropriate mitigation targets.
SANS 1929: Ambient Air Quality – Limits for Common Pollutants	Considered when proposing appropriate mitigation targets.
SANS 1137: Standard test method for the collection and measurement of dustfall (settleable particulate matter).	Considered when proposing monitoring requirements.
Guideline on Need and Desirability in terms of the EIA Regulations. UpdatediIntegrated environmental management guideline, March 2017.	Considered when completing the sections on need and desirability.
Public Participation Guideline in terms of NEMA EIA Guidelines, DEA 2017	Considered when completing the public participation process.
Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector, 2013	Considered during the screening exercise.

f) NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

This application is primarily influenced by the already established mining operation taking place at Queenstown Quarry. This application relates to the extension of the existing mining right to include additional resources that will extend the life of the operation.

Viable reserves have been identified adjacent to the existing minng right area and if this mining right and associated waste management licence is granted it would in effect extend the life of the existing mining operation, and the following benefits could translate:

- Prolonged economic benefits in terms of employment opportunities (due to the extended life of mine, people will be employed for longer);
- Prolonged local economic development benefits through the implementation of the social and labour plan.
- Prolonged provision of a source of building materials within the local area.

g) **PERIOD FOR WHICH AUTHORISATION IS REQUIRED**

The current minng right expires in March 2045. Should the Section 102 application be granted, the life of the operation in terms of available resaource will extend well past this date. The environmental authorisation will therefore be required for the duration of the mining right.

In addition , the waste management activities that have been applied for are applicable to the operational phase of the mine and associated mining activities and therefore the waste licence (environmental authorisation) must be linked to the life of mine and the period for which the mining right is granted.

Another pertinent aspect is that the mining right may be renewed for a further pre-determined period, in terms of Section 24 of the MPRDA. Therefore, prior to the expiration of the mining right a renewal of the mining right may be applied for to extend the mining right period for a further pre-determined period. Therefore, any renewal of the mining right must also be linked to the option of renewal of any waste management activities, should they be applicable, in the event that the mining right is renewed (granted).

h) **DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED SITE**

The aim of this section is to provide the details of the **alternatives** considered as part of this project with reference to the properties on which the activities will occur, the type of activities to be undertaken; the design or layout of the activities; the technology to be used; the operational aspects and the option of not implementing the activities.

The application area (**Appendix 3**) may be reviewed and potentially changed throughout the scoping phase after consideration of the following:

- Environmental features.
- Feedback from specialist reports
- Current land uses.
- Issues raised by Interested and Affected Parties.

(i) Details of the alternatives considered

*With reference to the site plan provided in **Appendix 4** and the location of the individual activities on site, provide details of the alternatives considered with respect to:*

a) The property on which or location where it is proposed to undertake the activity

This application is primarily influenced by the established mining operation taking place. This application relates to the extension of the existing mining right to include viable resource reserves that have been identified adjacent to the existing pit and would be the natural direction of expansion of the existing pit.

Hence, locational alternatives were not considered as the site has been selected based on it geology, i.e. the occurrence of the mineral resource and the fact it is adjacent to the existing mine.

b) The type of activity to be undertaken

No alternative activity other than the existing mining method has been considered. As this application is simply to extend the mineable area, the intention is to continue with the current mining methods as these have been proven to be the most viable options available to this particular operation.

c) The design or layout of the activity

The design and layout options associated with this proposed extension area are primarily influenced and limited by the occurrence of the geological resource (i.e. mining can only take place where there is a viable mineral resource). Initially a larger area was contemplated as indicated in Figure 8, primarily to instill a 500m radius around the explsoives magazine, however it was determined that there is unlikely to be any resource available immediately to the west of the existing operation and therefore the area of interest was reduced to that indicated in **Appendix 3**. The reduced area was defined by the following:

- Identified resource along the ridge to the south and west of the existing operation

- Identified area for stockpiling to the north and east of the existing operation
- 50m buffer from the N6
- Inclusion of the mining permit held by Komani Quarry (Pty) Ltd which is to be closed when this S102 is approved.

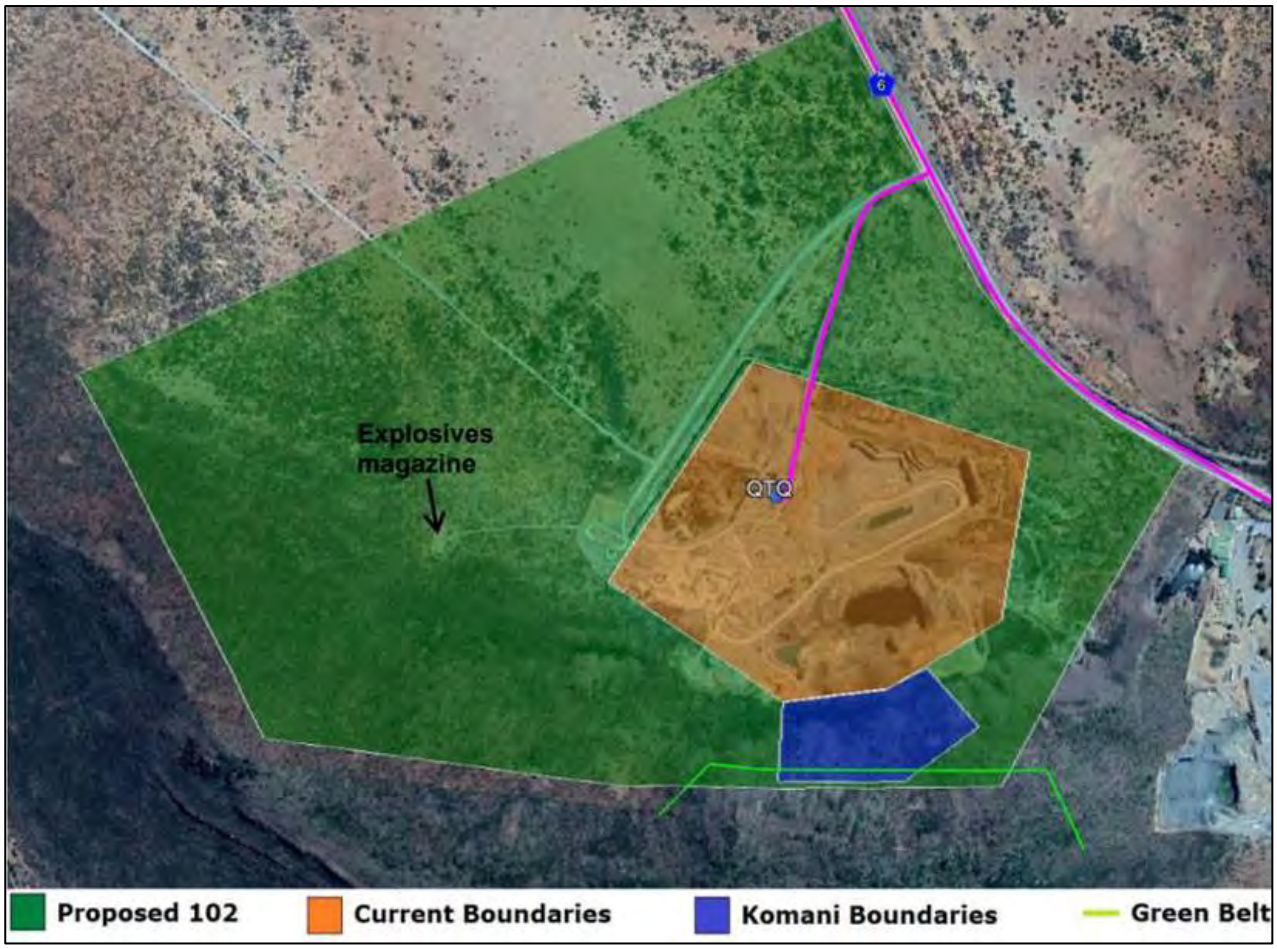


Figure 8: Initial alternative layout of the proposed extension area.

d) The technology to be used in the activity

No alternative technology other than the existing mining method has been considered. As this application is simply to extend the mineable area, the intention is to continue with the current mining methods and equipment as these have been proven to be the most viable options available to this particular operation.

e) The operational aspects of the activity

The main operational aspects are related to the environmental and cultural sensitivities that may be associated with the proposed extension area. From the National Screening Tool these have been identified to be:

- Biodiversity
- Heritage resources

Specialist studies for both of these aspects have been undertaken and are considered when defining the baseline environment. In addition, any feedback received during the consultation process will be considered for future operational alternatives.

f) The option of not implementing the activity

In essence, the “no-go” option would ultimately imply that the state of the environment for the proposaed extension area would remain as it is presently.

Considering that a viable mineral resource has been identified in the proposed extension area, the “no-go” option would result in the sterilisation of that viable mineral resource.

Furthermore, the prolonged benefits as mentioned in Section F (Need and Desirability) above and associated with the extended life of the mine would not be realised.

(ii) Details of the public participation process followed

This section describes the information provided to the community, landowners and interested and affected parties (I&APs) to inform them in sufficient detail of what the proposed project would entail, in order for them to assess what impact the operation would have on them or the use of their land. A number of sections within the draft report can and will only be completed after undertaking the initial consultation process.

The following approach in undertaking the consultation process will be adopted:

Notification of I&APs:

- *In a Local Newspaper Advert*
- *Site Notice:* At the entrance to the site and along the main access road to the site.
- *Written Notices:* Notification letters including a Background Information Document will be emailed/posted to identified I&Aps, including the direct and adjacent landowners/occupiers, Government Departments and Organs of State.

Consultation with I&APs:

- *Public Meeting:* All registered I&APs will be invited to a public meeting where a presentation and discussion session will be held.
- *One on One Consultation:* Surrounding landowners/occupiers or any other directly affected individual will be consulted with individually if no attendance is made at the public meeting. Online video conferencing tools such as Microsoft Teams, Skype; Hang Out, Zoom and GoToMeeting will be used to engage with stakeholders for online discussions if required.
- *Request for Comments:* All I&APs will be encouraged and/or requested to indicate their feedback in writing and comment forms will be provided for this purpose.

Particulars of Public Participation Process:

- The DSR will be circulated to the registered I&APs for a period of 30 days. Details of the process undertaken to **consult** with registered I&APs including public meetings and one on one consultations, and all feedback and/or comments will be contained in the **Final Scoping Report (FSR).** The following proof of engagement will be attached to the FSR:
  - Copy of the newspaper advert.
  - Photographs of site notices.
  - Proof of emails and registered letters sent to I&APs.
  - Proof of meeting invitations to I&APs.
  - Copy of the meeting presentation.
  - Attendance registers of all I&APs at meetings held.
  - Minutes of the meetings held between any I&APs.

The FSR will be submitted to the Department of Mineral Resources and Energy (DMRE) whilst simultaneously I&APs will be provided with an opportunity to view the submitted copy of the FSR.

While Aquastrat and Umhlaba will manage the overall application process, a public participation specialist (Niara) will be appointed, who can communicate effectively and understands the local community to undertake aspects such as;

- Erecting the site notice
- Direct liaising with affected landowners, immediate adjacent landowner, residential homes within 500m of the closest edge of the mining permit (See Figure 1 below) and community representatives
- Be available to hold any one on one meeting requested
- Facilitate and implement a public meeting
- Undertake any verbal communication required
- Document all communication and feedback in English for inclusion into the final FSR and EIA/EMPr.

(iii) Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses) – To be completed after the initial consultation process

Table 6: List of I&APs notified and/or consulted with a summary of the issues raised.

INTERESTED AND AFFECTED PARTIES *List the names of persons consulted in this column, and* *Mark with an **X** where those who must be consulted were in fact consulted.*		DATE COMMENTS RECEIVED	ISSUES RAISED	EAPS RESPONSE TO ISSUES AS MANDATED BY THE APPLICANT	SECTION AND PARAGRAPH REFERENCE IN THIS REPORT WHERE THE ISSUES AND OR RESPONSE WERE INCORPORATED
AFFECTED PARTIES					
Landowner/s					
Lawful Occupier/s of the Land					
Landowners or Lawful Occupiers on Adjacent Properties					

INTERESTED AND AFFECTED PARTIES *List the names of persons consulted in this column, and* *Mark with an **X** where those who must be consulted were in fact consulted.*		DATE COMMENTS RECEIVED	ISSUES RAISED	EAPS RESPONSE TO ISSUES AS MANDATED BY THE APPLICANT	SECTION AND PARAGRAPH REFERENCE IN THIS REPORT WHERE THE ISSUES AND OR RESPONSE WERE INCORPORATED
Municipal Councillor	**X**				
Municipality	**X**				
Organs of State *(Responsible for infrastructure that may be affected E.g. Roads Department, Eskom, Telkom, DWA)*					
	X				
Communities					

INTERESTED AND AFFECTED PARTIES *List the names of persons consulted in this column, and* *Mark with an **X** where those who must be consulted were in fact consulted.*		DATE COMMENTS RECEIVED	ISSUES RAISED	EAPS RESPONSE TO ISSUES AS MANDATED BY THE APPLICANT	SECTION AND PARAGRAPH REFERENCE IN THIS REPORT WHERE THE ISSUES AND OR RESPONSE WERE INCORPORATED
Dept. of Land Affairs					
Traditional Leaders					
Dept. of Environmental Affairs					
Other Competent Authorities Affected					
OTHER AFFECTED PARTIES					

INTERESTED AND AFFECTED PARTIES *List the names of persons consulted in this column, and* *Mark with an **X** where those who must be consulted were in fact consulted.*	DATE COMMENTS RECEIVED	ISSUES RAISED	EAPS RESPONSE TO ISSUES AS MANDATED BY THE APPLICANT	SECTION AND PARAGRAPH REFERENCE IN THIS REPORT WHERE THE ISSUES AND OR RESPONSE WERE INCORPORATED
OTHER INTERESTED PARTIES				

(iv) The environmental attributes associated with the sites

(1) ***Baseline Environment***

(a) *Type of environment affected by the proposed activity*

The baseline environment is already well documented through the existing environmental authorisations for the current extent of the mining right and mining permit areas. This information for the majority of the environmental aspects is still relevant and has therefore been extrapolated directly from the following documents:

- *Updated Environmental Impact Assessment and Environmental Management Programme Report by Umhlaba Environmental Consulting CC dated October 2011*
- *Final Basic Assessment Report and Environmental Management Programme Report by Greenmined dated May 2019*

Where new information was required (specialist studies for the extension area), this has been included in the following sections:

- *Biodiversity*
- *Heritage and Palaeontology*

Where updated information (Integrated Development Plan) was available this was included in the following sections:

- *Socio-economic*

The baseline description can also be updated with any applicable information provided by interested and affected parties during the initial consultation process.

Climatology

The regional climatology is included in the description of the receiving environment to provide the reader with an understanding of the climatic conditions anticipated for the mining site. This information will then be used in the assessment of impacts that are influenced by seasonal factors, such as dust fallout, and storm water run-off, etc.

The South African Weather Services (SAWS) monitoring station located nearest to the mining site is the Queenstown weather station number 0123654A0, situated at 31°54' S 26°52' E, 1094 meters above mean sea level (mamsl). It is assumed that the long-term weather data recorded at the Queenstown weathers station will be representative of the climatic conditions (rainfall, evaporation and temperature) experienced on the mining property.

The SAWS recommends using a minimum of a 30 year period to generate what is known as the "normal" climatic conditions. This is to allow for the fluctuation in climatic conditions, particularly when considering rainfall. For the purposes of this report, the long-term average data obtained from the SAWS generally includes a 30 year period. In this case, the averaging period for rainfall is the same as the averaging period for wind field data.

Regional climate

South Africa is characterised by distinct seasonal variation in temperature and rainfall. The climate is described to be temperate with cold dry winters and warm wet summers.

Rainfall

Table 7 indicates the monthly average rainfall; 24-hour maximum recorded on a monthly basis and the number of rain days per month for the long-term (27 years). An average of 534mm of rainfall a year is recorded.

The rainy season for Queenstown is between October and April where 84% of the annual rainfall is recorded. During this period the monthly rainfall exceeds 41mm (peaking in March with 88mm), and falls over eight to eleven days a month. Very little rain is recorded between May and September and this period is considered the dry season.

Table 7: Long-term average monthly rainfall recorded at the SAWS Queenstown monitoring station

MONTH	MEAN MONTHLY RAINFALL (MM)	24-HR MAXIMUM		AVE. NO. OF DAYS WITH RAIN ≥ 0.1
		RAINFALL (MM)	YEAR (YYYY/DD)	
January	65	64	1970/08	10.5
February	84	69	1972/21	10.7
March	88	60	1978/03	11.6
April	41	48	1971/02	7.4
May	21	37	1979/04	4.8
June	15	32	1964/17	3.0
July	9	51	1983/24	2.2
August	21	62	1970/28	3.3
September	19	49	1987/26	4.5
October	48	39	1989/02	8.8
November	54	48	1988/27	8.2
December	69	120	1981/05	9.0
Year	**534**			**83.0**

Evaporation

The Mean Annual Evaporation (MAE) calculated for this quaternary catchment area (S31D) is 1600 - 1700 mm per annum (Midgley *et*. *al*., 1994a and 1994b). Due to the high annual evaporation in relation to the annual rainfall, the area is a water deficit area.

Temperature

Refer to **Table 8** for the mean, maximum and minimum temperatures for the area. The average daily maximum temperatures range from 29.3°C in January to 18.3°C in July and the extreme temperatures are about 40°C and 25.7°C respectively. The minimum temperatures range from 14.7°C in January and 3.1°C in July, whilst extreme lows may reach 7°C and -7.5°C respectively.

Table 8: Mean, maximum and minimum temperatures

MONTH	TEMPERATURES (°C)		
	MAXIMUM	MINIMUM	MEAN
January	29,3	14,7	22,0
February	28,3	14,8	21,5
March	26,5	13,4	20,0
April	23,6	9,5	16,5
May	20,6	6,0	13,3
June	17,9	3,2	10,5
July	18,3	3,1	10,7
August	20,1	5,0	12,5
September	22,6	7,7	15,2
October	24,0	9,6	16,8
November	26,2	11,6	18,9
December	28,4	13,5	21,0
Year	**23,8**	**9,3**	**16,6**

Extreme Weather

Table 9 indicates the annual average number of days in a 24 year period (period unknown) for extreme weather conditions to occur. Thunderstorms are the most prevalent type occurring on average for 41 days of a year. Less frequently, fog occurred for 26 days in a year and hail for 3 days. Snow was not recorded for Queenstown.

Table 9: Extreme weather conditions recorded at Queenstown.

MONTH	ANNUAL AVERAGE NUMBER OF DAYS IN 24 YEARS WITH			
	THUNDERSTORMS	HAIL	SNOW	FOG
January	6.7	0.4	-	2.7
February	6.3	0.2	-	2.7
March	5.8	0.6	-	3.7
April	2.8	0.3	-	3.3
May	1.2	0.1	-	2.4
June	0.4	0.0	-	1.4
July	0.4	0.1	-	1.7
August	0.6	0.0	-	2.0
September	1.2	0.1	-	2.5
October	4.5	0.3	-	1.7
November	4.8	0.6	-	0.6
December	6.4	0.4	-	1.5
Year	**41**	**3**	**-**	**26**

Wind Field Data

According to the annual average wind rose for Queenstown (**Figure 9**) the predominant wind direction is from the East.

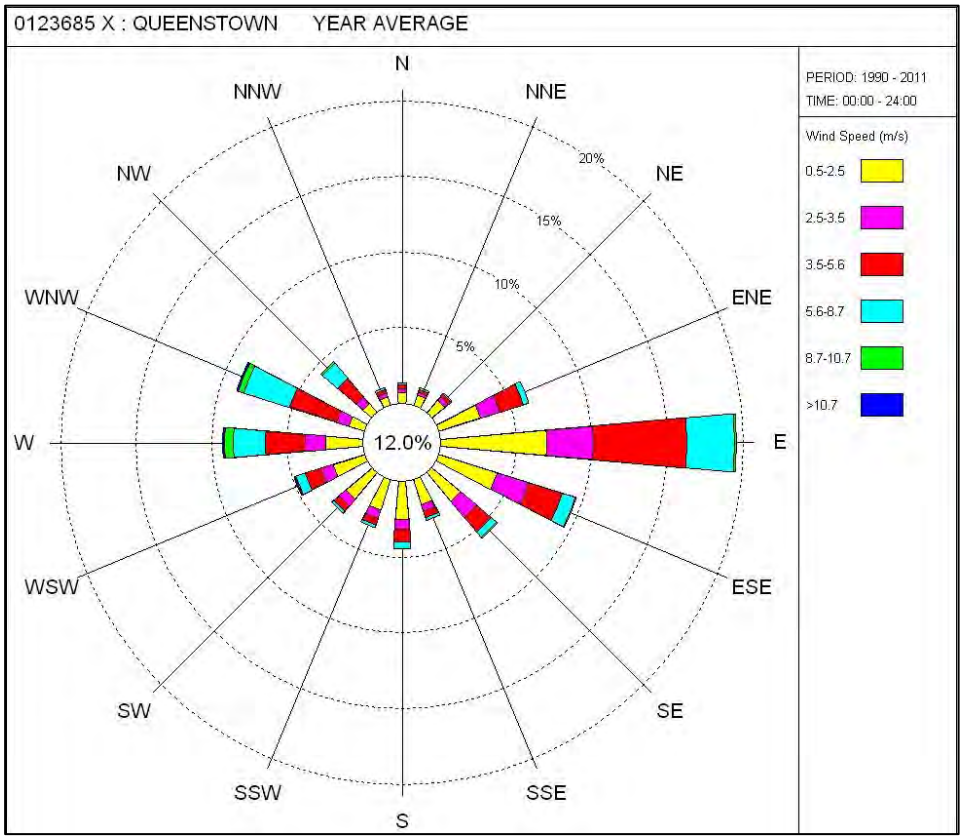


Figure 9: Predominant wind direction

Regional Geology

The area falls within the middle Beaufort Group (Middleton formation comprising mudstone, siltstone and sub-ordinate sandstone. See **Figure 11** below for a general geological map.

Local Geology

The geology of the quarry comprises mostly sedimentary rock intersected by dolerite and overlain by a veneer of colluvial and alluvial soils. The main sedimentary units consist of red, purple, grey and blue-green mudstone with subordinate sandstone in areas of high cut. The mudstone forms part of the Adelaide Subgroup, Beaufort Group, Karoo Sequence. This group of rocks forms part of the Katberg Formation,

Tarkastad Subgroup, Beaufort Group, Karoo Sequence. The geological units everywhere are overlain by a veneer of clayey and sitly colluvial and alluvial deposits

Topography

The natural (pre-mining) topography of the site can be described as undulating low hills with marked doleritic outcrops “koppies”, refer to **Figure 12**. A more site specific analysis reveals that the topography of the site slopes in a north-easterly direction. The current topography of the site is largely unnatural as a result of the mining activities. Areas where mining related activities have taken place have resulted in steep gradients, there are most obvious on the sides of the pits and on the sides of the overduren dumps. The topography of the extnsion area to the south and east is steep given the ridge (intended for future expansion of the dolerite pit), while the area to the north and east is fairly flat (intended for future stockpiling)

Soil and Agricultural Potential

The soils on site consist mainly of soils of the Swartland-Adelaide soil form; and shallow to absent Mispah-Camavon soil form. According to AGIS (2007) the following generalized soil patterns occur on site and is tabled in **Table 10** hereunder and illustrated in **Figure 10**.

Table 10: **Table of soil categories**

Depth	Clay Class	Clay	Leaching Class	Leaching	Soil Class	Description	Soil Class
< 450 mm	l	>= 15% and < 35%	f	non calcarious soils	EB	Soils with minimal development, usually shallow on hard or weathering rock, with or without intermittent diverse soils. Lime generally present in part or most of the landscape	SOILS WITH LIMITED PEDOLOGICAL DEVELOPMENT
>= 450 mm and < 750 mm	l	>= 15% and < 35%	g	calcarious soils	CB	Soils with a marked clay accumulation, strongly structured and a reddish colour	SOILS WITH A STRONG TEXTURE CONTRAST

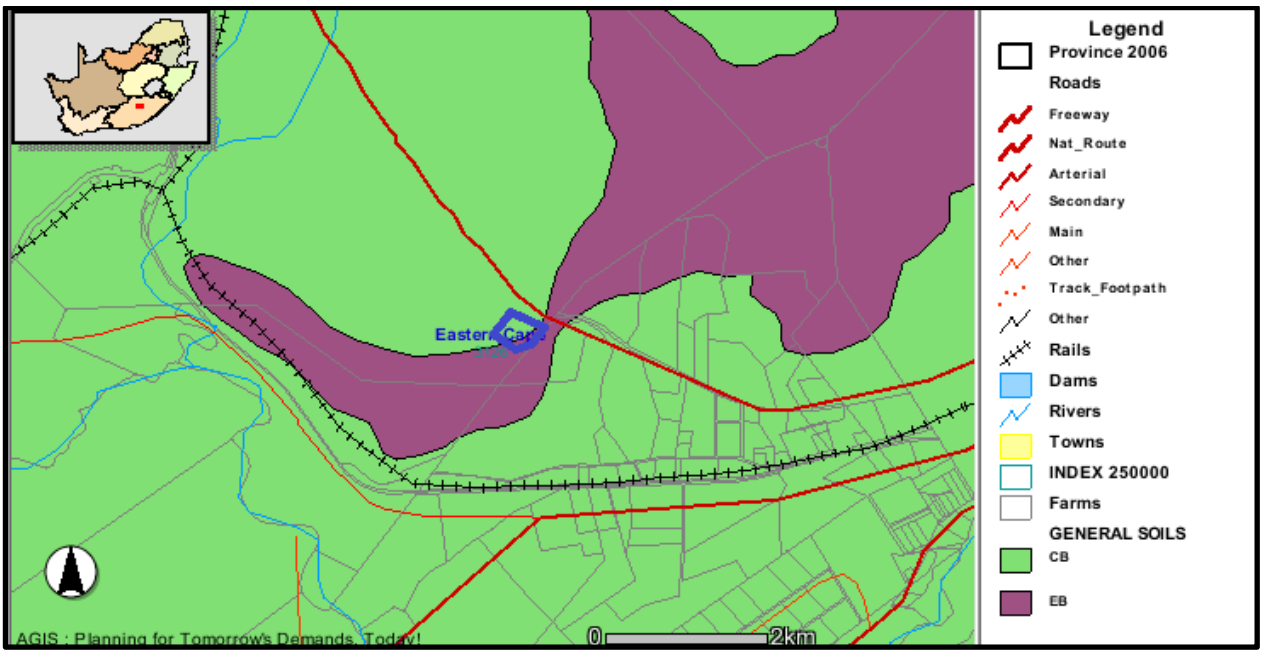
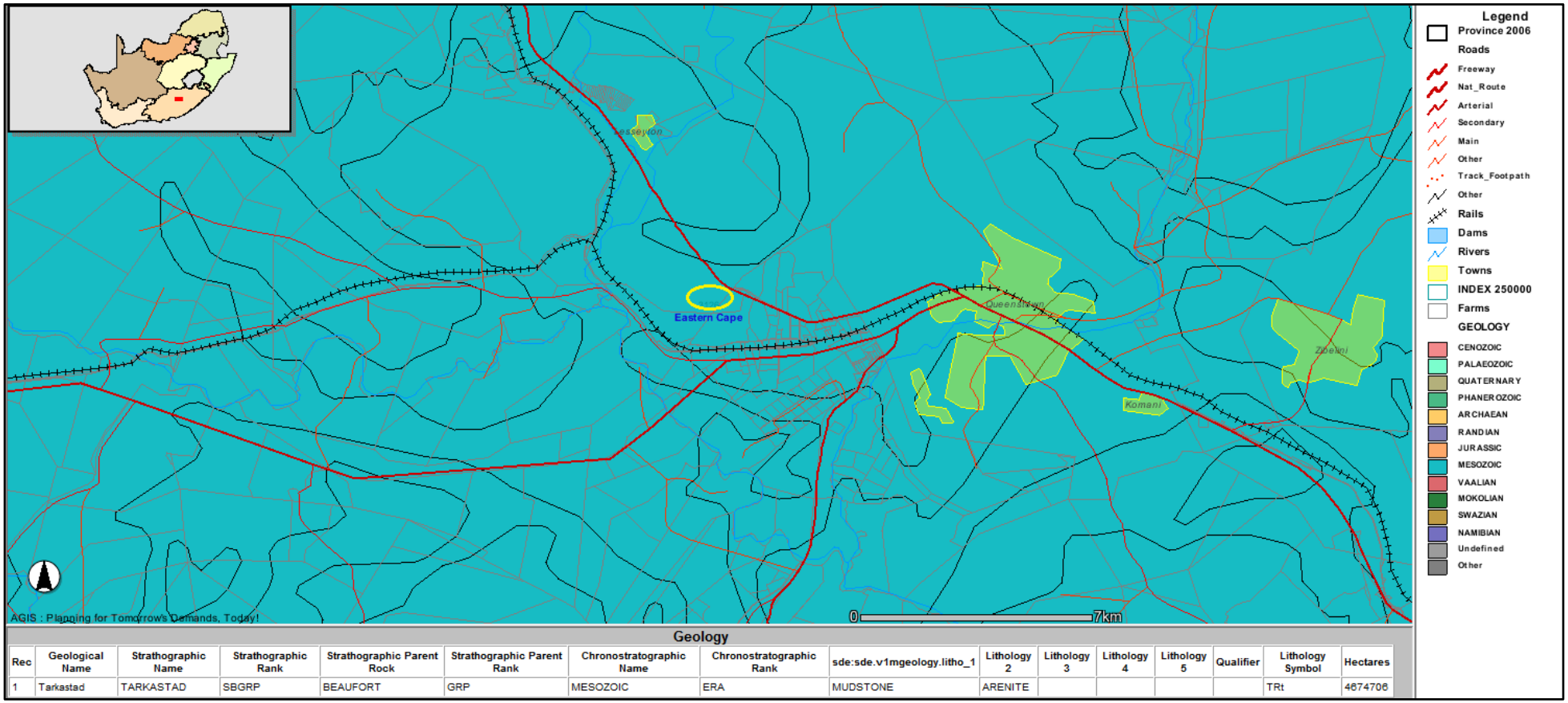


Figure 10: Soil Map (adapted from AGIS)



Geology

Rec	Geological Name	Strathographic Name	Strathographic Rank	Strathographic Parent Rock	Strathographic Parent Rank	Chronostratographic Name	Chronostratographic Rank	sde:sde.v1mgeology.litho_1	Lithology 2	Lithology 3	Lithology 4	Lithology 5	Qualifier	Lithology Symbol	Hectares
1	Tarkastad	TARKASTAD	SBGRP	BEAUFORT	GRP	MESOZOIC	ERA	MUDSTONE	ARENITE					TRt	4674706

Figure 11: General Geological Map (Agis 2011)

Figure 12: Google Earth 3D view (from the north) of the topography of the site (Queenstown Quarry).

Hydrology
The proposed mining area is situated in the Kei sub-water management area that forms part of the greater Mzimvubu to Kieskamma Water Management Area (ID 21). According to the National Freshwater Ecosystem Priority Areas (NFEPA) map as presented by SANBI, the NFEPA status of the study area is classified as a no priority area.

The Klaas Smits River passes the study area approximately 1.8 km to the west, but no rivers or other natural open water sources were identified in close proximity to the mining area. **Figure 13** shows the position of the known wetlands that occurs within the surrounding area. As depicted in the figure there are no rivers, streams or wetlands within the proposed mining area.

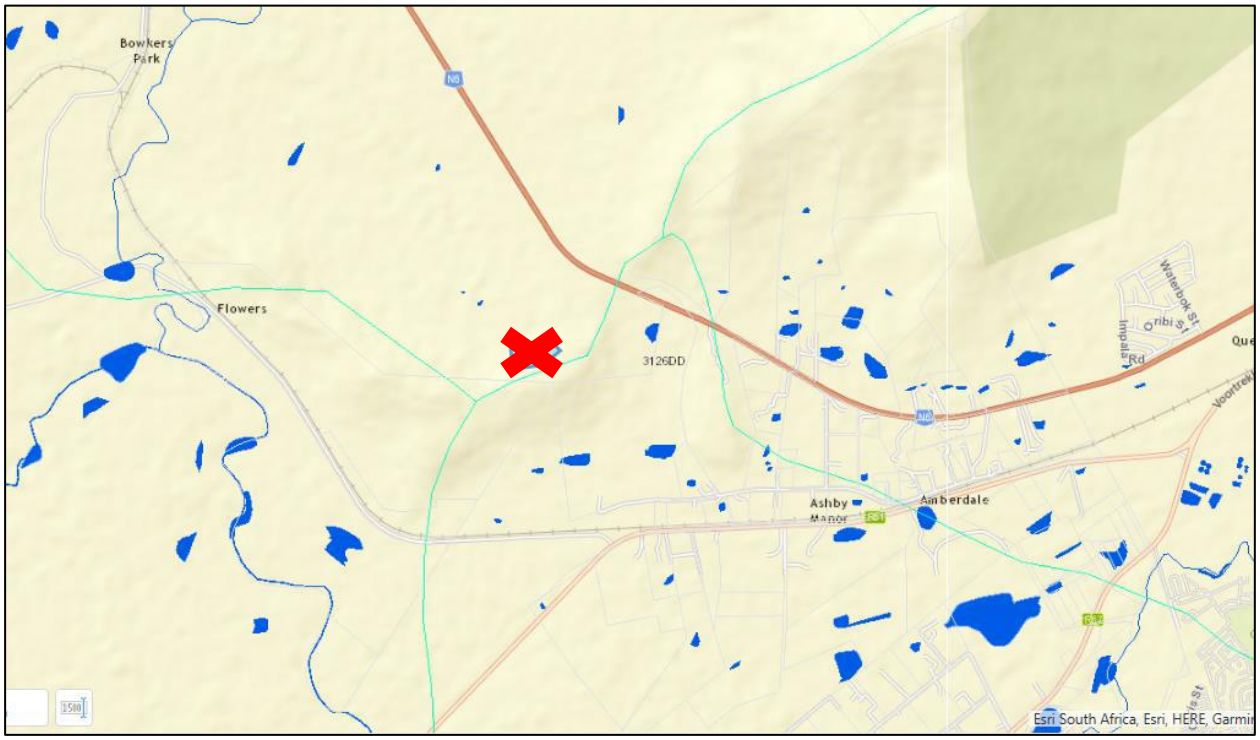


Figure 13: Map showing the position of known wetlands with relation to the study area (red cross). The Klaas Smits River is shown to the west of the proposed mining area. (Image obtained from the BGIS Map Viewer – Eastern Cape Biodiversity Conservation Plan)

Ground Water
The information presented in this section of the report has been done by means of only a desktop study. It will however be necessary to conduct a specialist study to determine the ground water usage in the area and the impact of the mining activities on the groundwater on the mining area as well as on surrounding areas.

Groundwater Zone
On the basis of open type (primary or secondary), lithostratigraphy, physiography and climate, South Africa has been divided into 64 hydrological regions (Vegter, 2001). Based on this classification, Queenstown Quarry is located over the Ciskeian Costal Foreland and Middleveld ground water region (Region 43).

This region consists mainly of secondary water-bearing formations, with the water-bearing rock being predominantly composite in nature, meaning no major rock type is dominant, several lithostratigraphic units are involved and there are more extensive primary aquifers than alluvial deposits (Vegter, 2001). In secondary water-bearing formations, the movement of water through the rock is via secondary openings that have originated from processes that affect rocks after they were formed, such as tectonic deformation, weathering and unloading through degradation of the land surface. These secondary opening are planar and were formed along joints, cleavage, bedding and fault planes (Vegter, 2001). The occurrence and availability of ground water at any point is determined by (Vegter, 2001):

- Storage and transmissive properties of the geological formation,
- Rate of ground water movement to discharge points,
- Rate of ground water discharge as springs, effluent seepage in steams, and
- Loss through evapo-transpiration.

Depth of water table
According to Vegter (1995b), the mean depth to the water table in the region of the site is 10m to 20m below surface, with a standard deviation of 8m to 15m.

Groundwater Use
Queenstown Quarry has been granted with a general authorisation to extract 410m³ of water per annum from a borehole situated on Portion 5 of the Farm Lesseyton No 81.

Groundwater Quality
At the time of completion of this document no ground water quality data was available.

Flora and Fauna
Flora
There are two regional vegetation types in the study area, namely Queenstown Thornveld Gs16 and Tarkastad Montane Shrubland Gs17 (distribution relative to the site shown in **Figure 14**). Detail on the characteristics of these vegetation types is presented in the specialist report provided in **Appendix 5**.

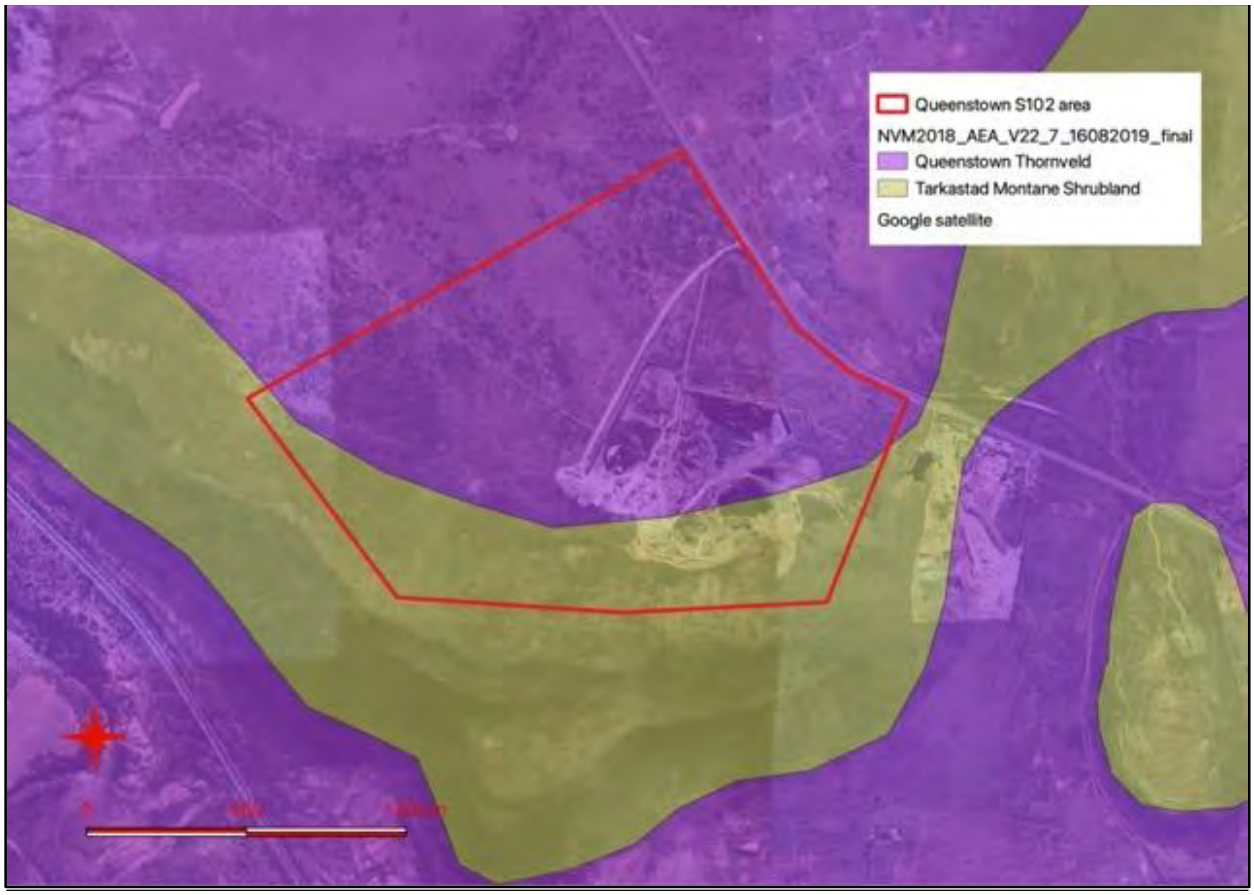


Figure 14: Regional vegetation types of the site and surrounding areas (Hoare, 2022).

Terrestrial biodiversity was idenfied as very highly sensitive by the National Screening Tool for the proposed expansion area. A specialist study was therefore undertaken to investigate the sensitivities of the site. From a detailed site assessment, the specialist study identified that "*the natural habitats on site are determined by the presence of the ridge, which occurs along the southern boundary of the site and slopes down northwards. The main habitats on site largely follow the national vegetation types. The lowlands are covered with thornveld and the ridge has a relatively dense thicket interspersed with rocky outcrops.*" The various natural and transformed habitats that occur on site, shown in **Figure 15** while a panoramic view over the site from near the centre point of the southern boundary is shown in **Figure 16**.

Figure 15: Identified habitat types (Hoare, 2022).

Figure 16: Panaramic view of the site from the ridge towards the north (Hoare, 2022).

The specialist report in **Appendix 5** provides an extensive list of the vegetation species comprising the various habitats. There is one species, *Asparagus spinescens*, listed as Rare, that was found twice on site (ridge and rocky outcrop). A Near Threatened sensitive species was also found on site near the base of the ridge. There are two other listed plant species that potentially occur on site, *Indigofera ovina* and Sensitive species 1248. The key habitats are the ridge and the rocky outcrops on the ridge.

After assessing the potential impact of the proposed expansion area on the flora identified, the specialist report concludes the following, "*The amount of natural habitat potentially affected is relatively small compared to the extent of the site, and will also be in an area that is between the current quarry and the neighbouring one to the east. The amount of habitat affected is negligible relative to the extent of the vegetation type. It is also insignificant relative to the size of the CBA2 area.*

In terms of plant species of concern, it is not expected that either of the two plant species that are confirmed to occur on site will be affected by the proposed activities. The location of the one sensitive plant species, listed as Near Threatened, is known to the mine manager. The proposed expansion avoids this species. The other species, Asparagus spinescens, will also not be directly affected and will persist on site".

It is important to note however that the specialist report does suggest limiting the area where expansion may occur without further studies. This area is illustrated in **Figure 23**. When expansion beyond this area is anticipated, further studies should be done to identify further potential individual plants of interest that require either avoidance or relocation. In the case of relocation, the appropriate permits should be obtained first.

Fauna

Providing an accurate list of the faunal species occurring on the property is not feasible and will serve no benefit for impact assessments and / or environmental managementInstead, focus has been placed on discussing the red data species that have been recorded in the study area, hence information pertaining only to red data species have been presented below.

Mammals: Mammals species list and habitat descriptions obtained from Red Data Book of the Mammals of South Africa – A Conservation Assessment (EWT, 2004). A list of mammals is contained in **Table 11**.

Table 11: **List of mammals**

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT DESCRIPTION	PROBABILITY FOR OCCURRENCE ON SITE
Diceros bicornis bicornis	Black Rhino	CR	Sub-tropical/Tropical Savanna. Browser occurring in the arid and semi-arid regions of the Northern and Western cape extending into the xeric and mesic thicket of the Eastern Cape.	Not probable
Hyaena brunnea	Brown Hyena	NT	Savanna; Subtropical/Tropical Shrubland and Grassland; and Urban areas.	Not probable
Lutra maculicollis	Spotted-necked Otter	NT	Aquatic. Artificial water storage areas; ponds, rivers, streams, creeks and wetlands.	Not probable
Rhinolophus clivosus	Geoffroy's Horsehoe Bat	NT	Caves and subterranean habitats; Savanna; Temperate Shrubland; Grassland; Subtropical/Tropical Dry fynbos, savanna, woodland, succulent and Nama Karoo, grassland. Cave dwelling insectivore.	Not probable
Mystromys albicaudatus	White-tailed Rat	EN	Temperate. Requires sandy soils with good cover.	Small possibility

According to the EMPR compiled by Coastal & Resources Management (August 2005) a faunal study indicated that small rodents and reptiles (rats, mice, lizards, hyrax and snakes are some reintroduced game) with the occasional scrub hare could occur on the site.

Birds: A number of birds have been identified by means of conducting a desktop study and has been tabled in **Table 12** hereunder.

Table 12: **List of birds**

SCIENTIFIC NAME	COMMON NAME	SARDB	HABITAT DESCRIPTION	SUITABILITY OF HABITATS ON SITE		
				Use	Suitability	Overall
Gyps coprotheres	Cape Vulture	VU	Wide range of habitats, closely linked to subsistence communal-grazing areas.	Foraging: Roosting: Breeding:	Not suitable Not suitable Not suitable	Unlikely to be present
Aquila Rapax	Tawny Eagle	VU		Foraging: Roosting: Breeding:	Not suitable Not suitable Not suitable	Unlikely to be present
Polemaetus Bellicosus	Martial Eagle	VU	Open woodland in fairly flat country, inclu. arid and mesic savanna and forest edges; also open shrublands with drainage line woodland or high-tension pylons, and open farmland with clumps of trees. Rare in mountainous areas.	Foraging: Roosting: Breeding:	Not suitable Not suitable Not suitable	Unlikely to be present
Cirus ranivorus	African Marsh-Harrier	VU	Almost exclusively inland and coastal areas.	Foraging: Roosting: Breeding:	Not suitable Not suitable Not suitable	Unlikely to be present
Falco naumanni	Lesser Kestrel	VU	Warm, dry, open or lightly wooded environments. In South Africa, concentrated in grassy Karoo, western fringes	Foraging: Roosting:	Not suitable Not suitable	Unlikely to be present

SCIENTIFIC NAME	COMMON NAME	SARDB	HABITAT DESCRIPTION	SUITABILITY OF HABITATS ON SITE		
				Use	Suitability	Overall
			of grassland biome and south-east Kalahari. Generally avoids foraging in transformed habitats but occurs in some agricultural areas inclu. croplands in fynbos and renosterveld of Western Cape.	Breeding:	None	
Anthropoides paradiseus	Blue Crane	VU	Open grassland and grassland Karoo ecotone.	Foraging: Roosting: Breeding:	Not suitable Not suitable Not suitable	Unlikely to be present
Ardeotis kori	Kori Bustard	VU		Foraging: Roosting: Breeding:	Not suitable Not suitable Not suitable	Unlikely to be present

Table 13 lists of red data bird species recorded in the quarter degree square, in which the mine is located (3126DD), during SABAP1. As there is very poor coverage for SABAP2, the occurrence of these species cannot be confirmed for the pentad in which the mine is located (3150_2645).

Table 13: **List of red data birds species**

COMMON NAME	SCIENTIFIC NAME	RD STATUS	SABAP1 (3126DD) REPORTING RATE	SABAP2 (3150_2645)
Cape Vulture	*Gyps coprotheres*	V	2.0% - 8.2%	Poor coverage
Lesser Kestrel	*Falco naumanni*	V	2.0% - 7.1%	Poor coverage
Blue Crane	*Anthropoides paradiseus*	V	2.0% - 7.6%	Poor coverage
Grey Crowned Crane	*Balearica regulorum*	V	10.0% - 29.9%	Poor coverage
Black Stork	*Ciconia nigra*	NT	<2%	Poor coverage
Melodious Lark	*Mirafra cheniana*	NT	4.8% - 9%	Poor coverage
Blue Korhaan	*Eupodotis caerulescens*	NT	2% - 12.9%	Poor coverage
Lanner Falcon	*Falco biarmicus*	NT	<2%	Poor coverage
Secretarybird	*Sagittarius serpentarius*	NT (V globally)	2% - 10.2%	Poor coverage

V = Vulnerable NT = Near Threatened

Reptiles: Reptile species list and habitat descriptions obtained from South African Red Data Book – Reptiles and Amphibians (Branch, 1988). See **Table 14** below.

Table 14: **List of Reptiles**

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT DESCRIPTION	PROBABILITY FOR OCCURRENCE ON SITE
Homoroselaps dorsalis	Striped Harliquin Snake	Rare	Usually collected in old termitaria or under stones in grassveld. Diet unknown, but possibly consisting of thread snakes	Unlikely

Amphibians: Amphibian species list and habitat descriptions obtained from Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland (Minter et al., 2004). See **Table 15** below.

Table 15: **List of amphibians**

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT DESCRIPTION	PROBABILITY FOR OCCURRENCE ON SITE
Pyxicephalus adspersus	Giant bullfrog	NT	Inhabits a variety of vegetation types in the Grassland, Savanna, Nama Karoo and thicket biomes. It typically breeds in seasonal, shallow, grassy pans in flat, open areas but also utilizes non-permanent vleis and shallow water on the margins of waterholes and dams. Although they sometimes inhabit clay soils, they prefer sandy substrates.	Unlikely

Invertebrates: No red data atlas is available for invertebrates. Therefore, no assessment is possible without undertaking a specialist study.

Local Socio-economic Structure

The local socio-economic information was obtained from the Integrated Development Plan 2023\24 for the Enoch Mgijima Local Municipality.

The proposed mining area is located on the border of ward 10 and 18 of the Enoch Mgijima Local Municipality (EMLM). EMLM is a Category B municipality and is regarded as an economic hub, due to its strategic position in the Chris Hani District Municipality. It is positioned in the middle of the national corridors to the Gauteng, Western Cape, KwaZulu-Natal, Northern Cape and Free State provinces. Parts of the municipality are developed with the relevant infrastructure so that modes of transport such as railway, road and a small airport are available to be utilized.

A summary of Key Demographic and Socio-Economic Highlights of Enoch Mgijima Local Municipality is provided in **Figure 18** with the latest statistics available (2016) showing the total population of the region is 267 011 of which 36% is younger than 14, 56% is aged between 15 and 64 and the elderly (65+) totals 8%. Of the total population, 92% is black, 3.4% is coloured, and 3.3% is white. The population is predominantly female dominated at 52.5%. Approximately 29% of the combined population is employed, whilst 16% is unemployed, and 47% is not actively involved in any job search as they have either lost hope and/or are unemployable. The GDP (gross domestic product) contribution of the EMLM to the Chris Hani District Municipality's GDP was at R 12.8 billion in 2016 which equates to 48% of the Chris Hani District Municipality GDP.

Sites of Archaeological or Cultural Interest

No sites of cultural heritage interest were recorded for either of the existing environmental authorisations associated with Queenstown Quarry. Given the proposed expansion of the mining right area would extend into previously unsurveyed areas, a phase 1 heritage investigation of these areas was undertaken by a specialist. An indication of the survey route taken by the speicliast is provided in **Figure 17**.

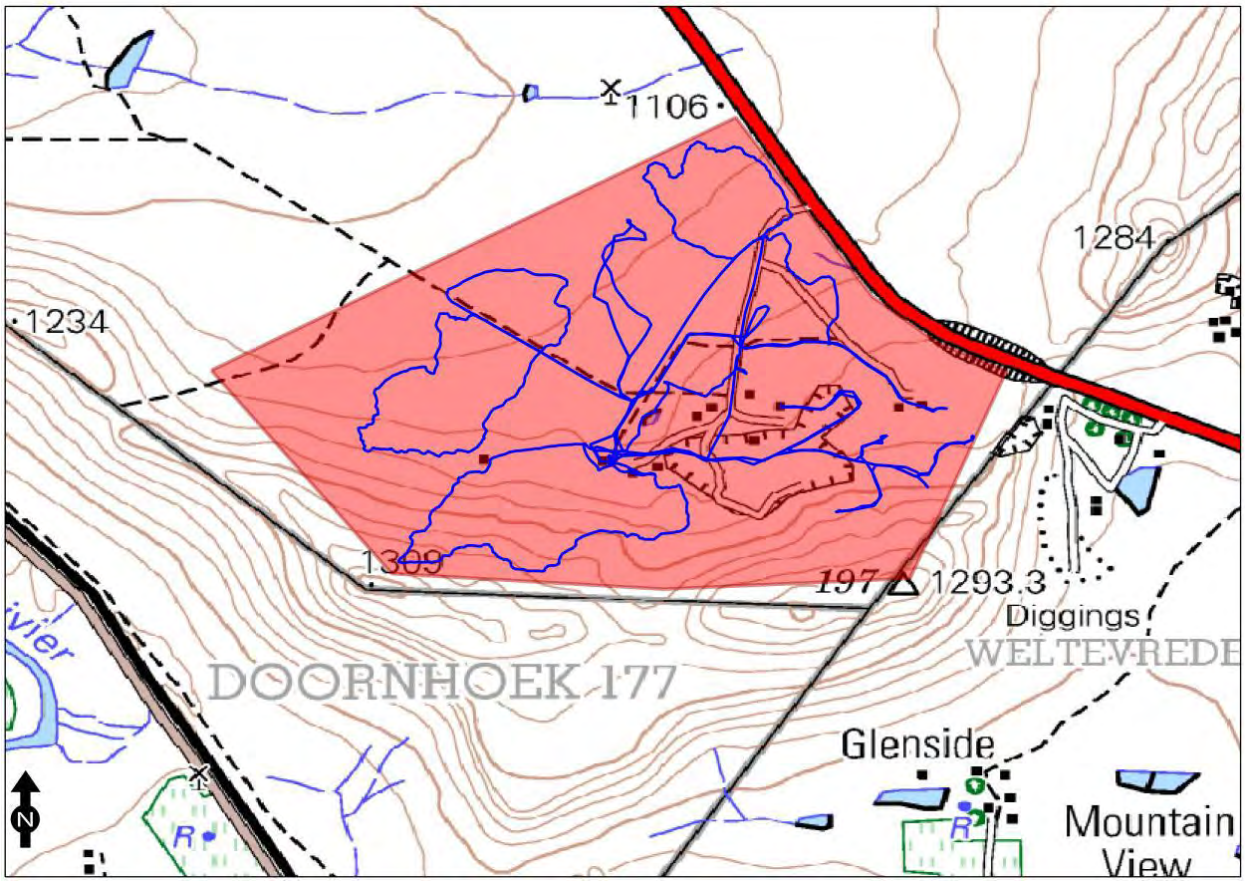
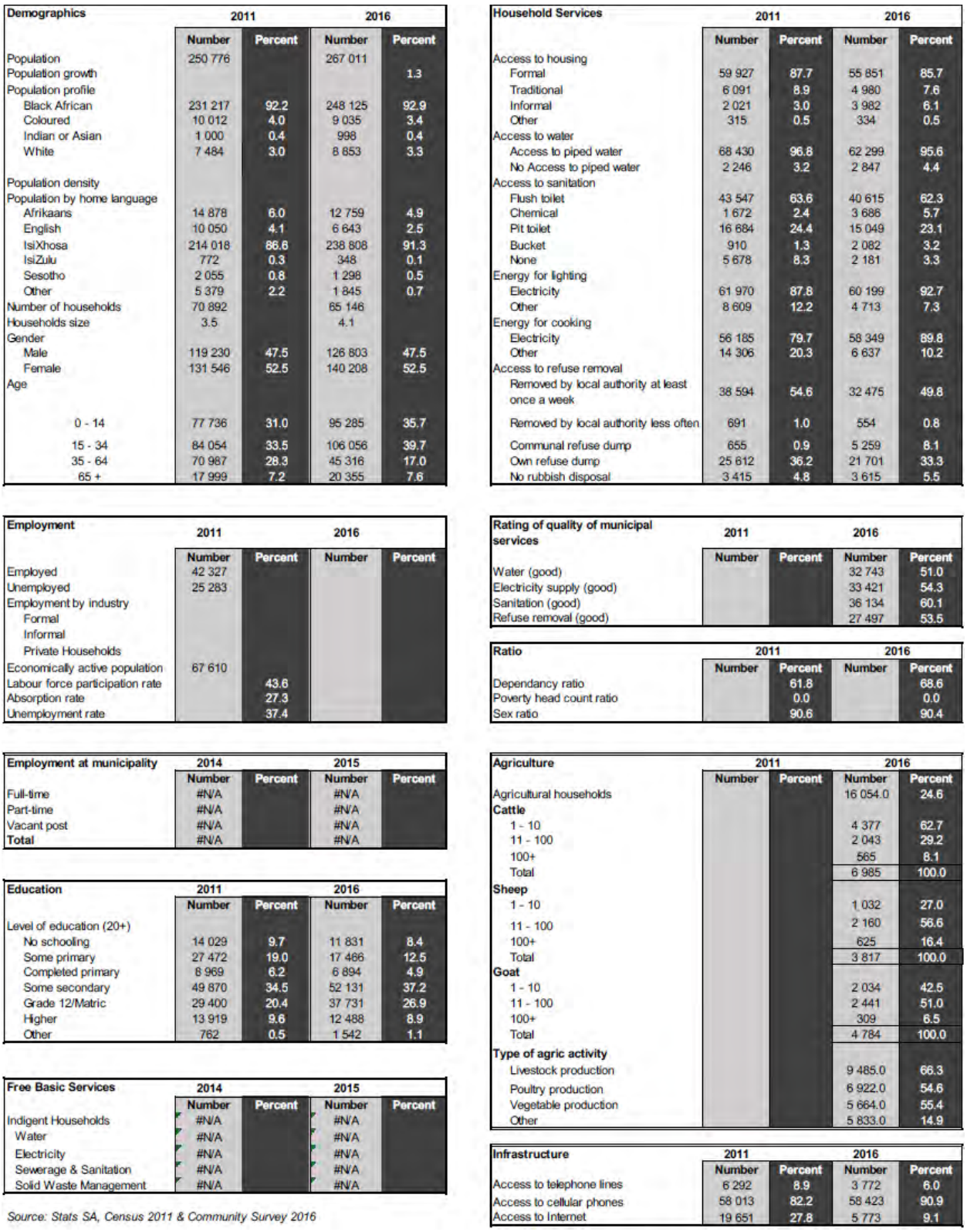


Figure 17: Survey route taken by the heritage specialist (Coetzee, 2022).



Demographics	2011		2016	
	Number	Percent	Number	Percent
Population	250 776		267 011	
Population growth				1.3
Population profile				
Black African	231 217	92.2	248 125	92.9
Coloured	10 012	4.0	9 035	3.4
Indian or Asian	1 000	0.4	998	0.4
White	7 484	3.0	8 853	3.3
Population density				
Population by home language				
Afrikaans	14 878	6.0	12 759	4.9
English	10 050	4.1	6 643	2.5
IsiXhosa	214 018	86.6	238 808	91.3
IsiZulu	772	0.3	348	0.1
Sesotho	2 055	0.8	1 298	0.5
Other	5 379	2.2	1 845	0.7
Number of households	70 892		65 146	
Households size	3.5		4.1	
Gender				
Male	119 230	47.5	126 803	47.5
Female	131 546	52.5	140 208	52.5
Age				
0 - 14	77 736	31.0	95 285	35.7
15 - 34	84 054	33.5	106 056	39.7
35 - 64	70 987	28.3	45 316	17.0
65 +	17 999	7.2	20 355	7.6

Household Services	2011		2016	
	Number	Percent	Number	Percent
Access to housing				
Formal	59 927	87.7	55 851	85.7
Traditional	6 091	8.9	4 980	7.6
Informal	2 021	3.0	3 982	6.1
Other	315	0.5	334	0.5
Access to water				
Access to piped water	68 430	96.8	62 299	95.6
No Access to piped water	2 246	3.2	2 847	4.4
Access to sanitation				
Flush toilet	43 547	63.6	40 615	62.3
Chemical	1 672	2.4	3 686	5.7
Pit toilet	16 684	24.4	15 049	23.1
Bucket	910	1.3	2 082	3.2
None	5 678	8.3	2 181	3.3
Energy for lighting				
Electricity	61 970	87.8	60 199	92.7
Other	8 609	12.2	4 713	7.3
Energy for cooking				
Electricity	56 185	79.7	58 349	89.8
Other	14 306	20.3	6 637	10.2
Access to refuse removal				
Removed by local authority at least once a week	38 594	54.6	32 475	49.8
Removed by local authority less often	691	1.0	554	0.8
Communal refuse dump	655	0.9	5 259	8.1
Own refuse dump	25 612	36.2	21 701	33.3
No rubbish disposal	3 415	4.8	3 615	5.5

Employment	2011		2016	
	Number	Percent	Number	Percent
Employed	42 327			
Unemployed	25 283			
Employment by industry				
Formal				
Informal				
Private Households				
Economically active population	67 610			
Labour force participation rate		43.6		
Absorption rate		27.3		
Unemployment rate		37.4		

Rating of quality of municipal services	2011		2016	
	Number	Percent	Number	Percent
Water (good)			32 743	51.0
Electricity supply (good)			33 421	54.3
Sanitation (good)			36 134	60.1
Refuse removal (good)			27 497	53.5

Ratio	2011		2016	
	Number	Percent	Number	Percent
Dependancy ratio		61.8		68.6
Poverty head count ratio		0.0		0.0
Sex ratio		90.6		90.4

Employment at municipality	2014		2015	
	Number	Percent	Number	Percent
Full-time	#N/A		#N/A	
Part-time	#N/A		#N/A	
Vacant post	#N/A		#N/A	
Total	#N/A		#N/A	

Agriculture	2011		2016	
	Number	Percent	Number	Percent
Agricultural households			16 054.0	24.6
Cattle				
1 - 10			4 377	62.7
11 - 100			2 043	29.2
100+			565	8.1
Total			6 985	100.0
Sheep				
1 - 10			1 032	27.0
11 - 100			2 160	56.6
100+			625	16.4
Total			3 817	100.0
Goat				
1 - 10			2 034	42.5
11 - 100			2 441	51.0
100+			309	6.5
Total			4 784	100.0
Type of agric activity				
Livestock production			9 485.0	66.3
Poultry production			6 922.0	54.6
Vegetable production			5 664.0	55.4
Other			5 833.0	14.9

Education	2011		2016	
	Number	Percent	Number	Percent
Level of education (20+)				
No schooling	14 029	9.7	11 831	8.4
Some primary	27 472	19.0	17 466	12.5
Completed primary	8 969	6.2	6 894	4.9
Some secondary	49 870	34.5	52 131	37.2
Grade 12/Matric	29 400	20.4	37 731	26.9
Higher	13 919	9.6	12 488	8.9
Other	762	0.5	1 542	1.1

Infrastructure	2011		2016	
	Number	Percent	Number	Percent
Access to telephone lines	6 292	8.9	3 772	6.0
Access to cellular phones	58 013	82.2	58 423	90.9
Access to Internet	19 651	27.8	5 773	9.1

Free Basic Services	2014		2015	
	Number	Percent	Number	Percent
Indigent Households	#N/A		#N/A	
Water	#N/A		#N/A	
Electricity	#N/A		#N/A	
Sewerage & Sanitation	#N/A		#N/A	
Solid Waste Management	#N/A		#N/A	

Source: Stats SA, Census 2011 & Community Survey 2016

Figure 18: Summary of Key Demographic and Socio-Economic Highlights of Enoch Mgijima Local Municipality (EMLM IDP, 2023)

A summary of the findings of the survey as per the specialist report provide in **Appendix 6** is as follows, "*No archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint. It is well known that Iron Age, especially Late Iron Age stone-walled settlements do not usually occur on steep mountainous slopes. It is therefore recommended, from a cultural heritage perspective that the proposed mining activities may proceed*".

The National Screening Tool identified the expansion area to be highly sensitive for the palaeontological theme. A specialist opinion was therefore obtained as part of the heritage specialist study (see Addendum 5 to the Heritage report provided in **Appendix 6**). A summary of the review as per the report is "*This letter serves as a Letter of Exemption. It is in compliance with The Minimum Standards for Palaeontological Components of Heritage Impact Assessment Reports, SAHRA APMHOB, Guidelines 2012. The development is underlain by the rocks of the Karoo Supergroup, Jurassic, Early Triassic, Permian in age, with a VERY HIGH Palaeontological Sensitivity (Almond et al. 2009*). This development will take place on igneous rocks, therefore, the impact will be VERY LOW*".

Air Quality

The quarrying and processing activities generate dust which if not controlled could have a negative impact on the surrounding land users. Two forms of air quality monitoring are undertaken at Queenstown Quarry.:

- Occupational Health and Safety Monitoring: Monitoring of dust concentrations suspended in the atmosphere (measured in µg/m^3). Results are compared with Occupational Exposure Limits (OEL) – 8 hour a day exposure.
- Environmental Monitoring: Dust fallout monitoring to determine dustfall rates on the property boundary. This form of monitoring is considered "environmental monitoring". Only the "environmental monitoring" (dust fallout monitoring) results are of interest for the EMP as the can be used to determine the impact on off-site receptors.

The prevalent wind direction of the study area is in an eastern direction from December to March, changing from April from due east to west-north-west until September when it gradually returns to its eastern trend. Currently the air quality of the study area is impacted on by the operations of Queenstown Quarry, the N6 road users, the Civil and General Quarry, and to a lesser extend agricultural practices.

Emission into the atmosphere is controlled by the National Environmental Management: Air Quality Act, 2004. The proposed mining activity does not trigger an application in terms of the said act, and emissions to be generated is expected to mainly entail dust due to the displacement of soil and transport of material on gravel roads. As the prevalent wind direction is in an easterly direction the hill will screen dust generated at Queenstown Quarry from the operations/residents on the opposite side.

Dust fallout monitoring, at the Queenstown Quarry, is undertaken on a monthly basis. Based on the monitoring results reviewed to date, dust does not pose a concern to the surrounding environment. The quarry has also not received any dust related complaints from surrounding receptors.

Noise

Traffic along the N6, as well as the mining operations of Queenstown Quarry and the Civil and General Quarry on the adjacent property are the main sources of noise that increase the natural noise levels of the immediate receiving environment. Other sources include agriculture and the growing community of Lesseyton. Boundary sound level monitoring is undertaken at Queenstown Quarry with the last survey (July 2022) not highlighting any issues.

While the quarry has not received any complaints specific to noise in the past, it must be noted that the Lesseyton Community is expanding towards the quarry with the closest dwellings now being 250m to the north across from the N6 highway. It is suggested however that noise from the highway would impact on the community more than the quarry.

Visual

The proposed expansion of the dolerite quarry will be visible from the north, north-west, and north-east due to its position against the rise of the hill. To the south, south-west and south-east the excavation will be screened by the hill.

Figure 19 shows the viewshed analysis for a ±10 km radius undertaken for the Komani mining permit application. This is deemed to be indicative of the visual impact from the proposed continued expansion of the pit from the mining permit area where the green shaded areas indicate the positions from where the mining area will be visible. The analysis shows that the proposed visual impact will be high towards the north, north-west and north-east due to the elevation of the earmarked area. It is therefore anticipated that

the proposed mine will be highly visible within the short to medium distance zone; however, as the distance between the proposed development and the observer increases the visual impact will decrease. To the south, south-west and south-east the visual impact will be negligible as the mining area will be screened by the hill.

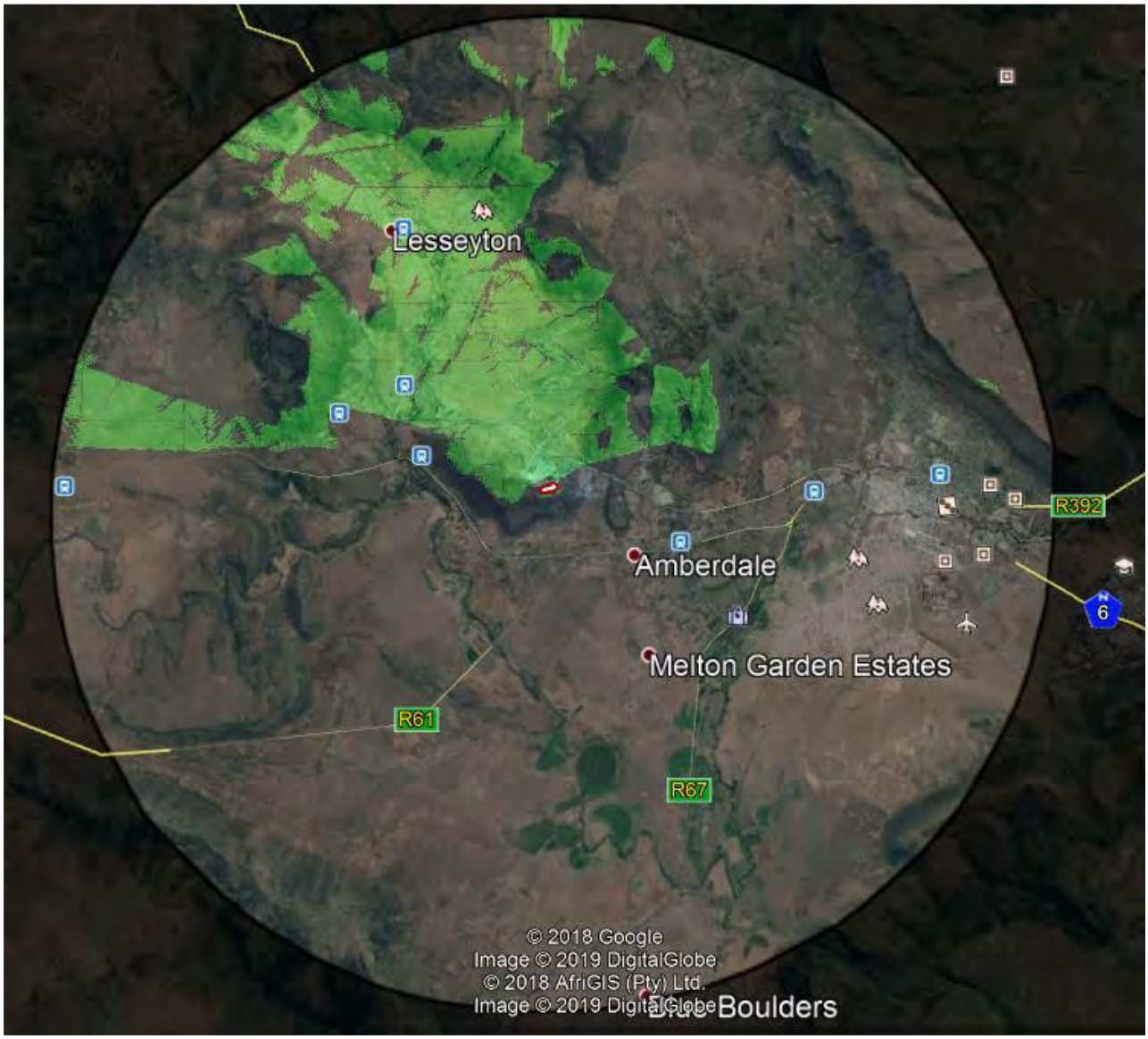


Figure 19: Viewshed of the proposed mining area where the green shaded areas indicate the positions from where the mining area (red polygon) will be visible. (Greenmined, 2019).

(b) *Description of the current land uses*

It is important to note that Queenstown Quarry has been operating since 1970. The farm Lesseyton No 81 is situated in a rural setting intersected by road, rail and electrical infrastructure. Historically, the property was exclusively used for agricultural purposes, upon which the land use gradually changed to include both mining (at Queenstown Quarry) as well as the development of Lesseyton residential area. The mine is bordered by agricultural land to the west and south. Immediately to the north is the N6 nighway and beyond is the growing rural community of Lesseyton. Adjacent and to the east of the mining area is another hard rock quarry as well as the manufacturing of civil and engineering concrete products. Further to the east and south from the mining area are small agricultural holdings located in the Hilcrest and Amberdale areas. Refer to **Figure 21** for an indication of the surrounding activities relative to the mine.

(c) *Description of specific environmental features and infrastructure on the site*

When the proposed mining footprint is layered over the Mining and Biodiversity Map, the majority of the area extends into an area of high biodiversity importance with a corresponding rating of high risk for mining. The High Biodiversity Importance area (in terms of the Mining and Biodiversity Guideline) corresponds with the boundaries of the CBA identified in terms of the Eastern Cape Biodiversity Conservation Plan.

Critical biodiversity areas are terrestrial (and aquatic where applicable) features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. According to the guidelines for bioregional plans, three basic CBA categories can be identified based on three high-level and management objectives (table below).

Table 16: Definition and framework for linking CBA's to land-use planning and decision making guidelines based on a set of high-level land biodiversity management objectives (Adapted from the guidelines for bioregional plans (Anon 2008)).

CBA CATEGORY	DESCRIPTION
Critical Biodiversity Areas (CBAs) Definition: CBAs are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses.	
Protected Area (PA) & CBA1	**Natural Landscape:** Ecosystem and species are fully intact and undisturbed. These are areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost then targets will not be met. These are landscapes that are at or past their limits of acceptable change.
CBA 2	Near-natural Landscape: Ecosystems and species are largely intact and undisturbed. Areas with intermediate irreplaceability or some flexibility in terms of the area required to meet biodiversity targets. There are options for loss of some components of biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising the ability to achieve targets. These are landscapes that are approaching but have not passed their limits of acceptable change.
Ecologically Support Areas (ESAs) Definition: ESAs are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and / or in delivering ecosystem services that support socio-economic development, such as water provision, food mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas.	
ESA	**Functional Landscapes:** Ecosystem is moderately to significantly disturb but still able to maintain basic functionality. Individual species or other biodiversity indicators may be severely disturbed or

	reduced. These are areas with a low irreplaceability with respect to biodiversity pattern targets only.

The ecological sensitivity of the site was confirmed by a specialist biodiversity study (Hoare, 2022) with the respective sensitivities illustrated in **Figure 20** below. Given these sensitivities, the areas where expansion may continue without further studies is suggested to be limited as per **Figure 23**. When expansion beyond this area is anticipated, further studies should be done to identify further individual plants of interest that require either avoidance or relocation. In the case of relocation, the appropriate permits should be obtained first.

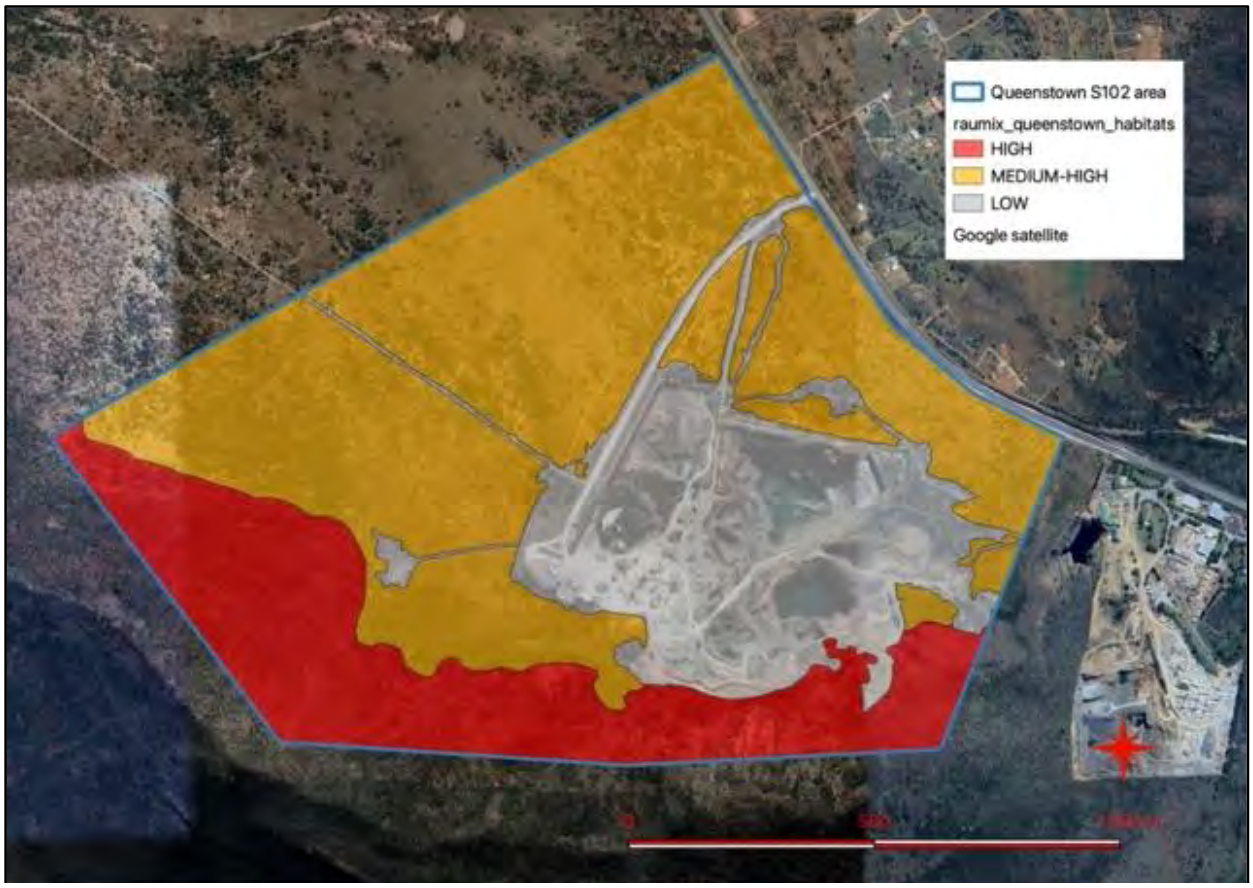


Figure 20: Habitat sensitivity (Hoare, 2022).

As the mine has been operating for a number of years it is a well-developed opencast mining operation. The following infrastructure / mining development are already established and are illustrated in Figure 2 and Figure 7:

- Quartzite quarry
- Dolerite quarry
- Crushing, screening and washing plants
- Water tank
- Settlement dam
- Stockpile area
- Wash bay and workshop
- Offices, stores, diesel depot, transformer house and weigh bridge
- Overburden dumps

LAND USE MAP

QUEENSTOWN QUARRIES (PTY) LTD

SITUATED ON A CERTAIN PORTION OF THE FARM LESSEYTON 81

MAGISTERIAL DISTRICT OF QUEENSTOWN

MAP KEY

- MINING AREA
- AGRICULTURAL HOLDINGS
- QUARRY, CIVIL AND ENGINEERING CONCRETE PRODUCTS
- BUILDINGS/STRUCTURES/RESIDENCES
- ROADS
- DISTANCE MEASUREMENTS FROM QUARRY TO BUIDINGS
- FARM BOUNDARIES

OTHER SURROUNDING LAND USES ARE FOR AGRICULTURAL PURPOSES

NOT TO SCALE

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Date 9 OCTOBER 2011

Figure 21: Aerial photo showing the location of surrounding activities relative to the Queenstown Quarry. (Aerial photo from Google Earth .)

(d) *Environmental and current land use map*

(Show all environmental, and current land use features).

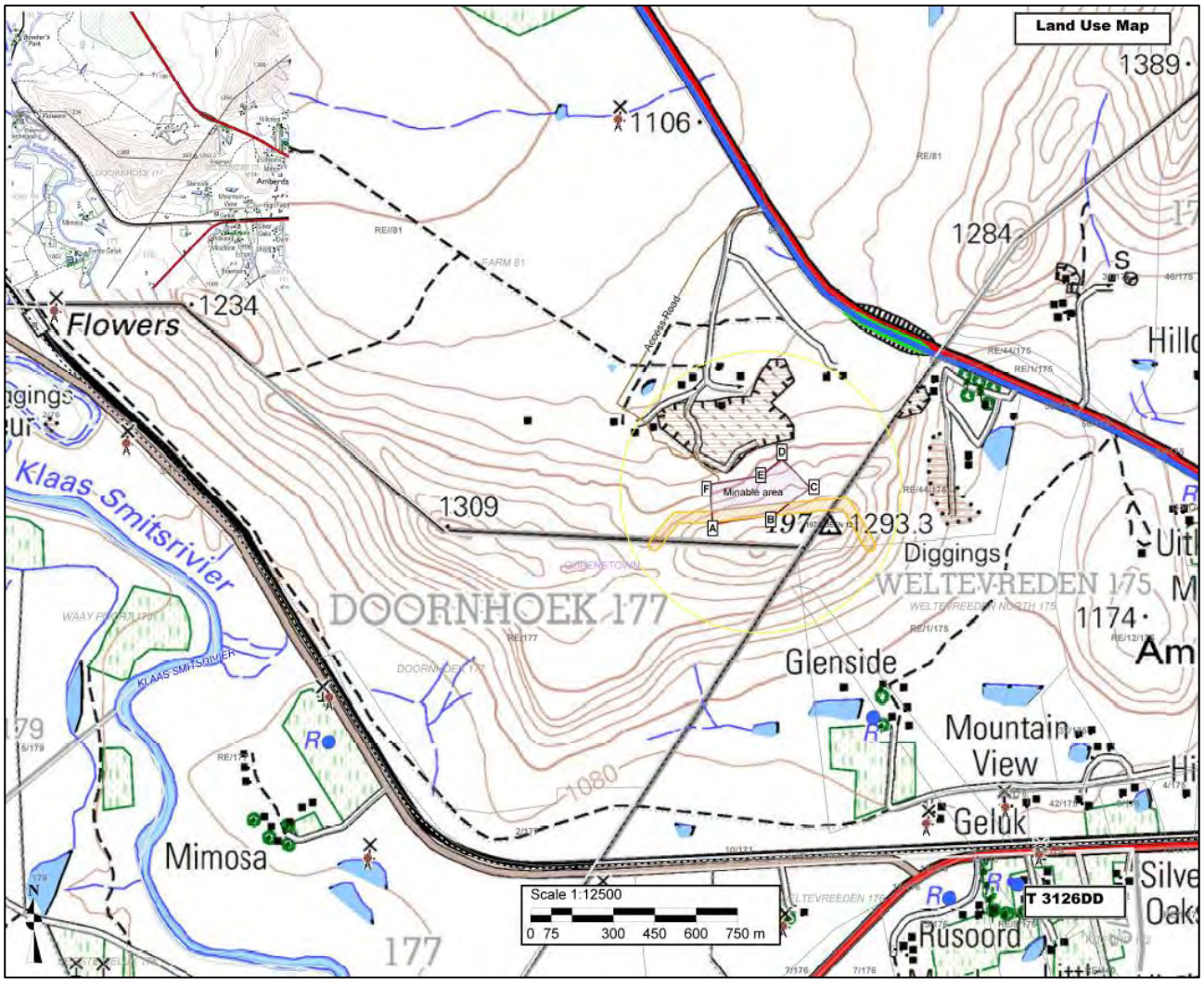

Figure 22: Current landuse map (Greenmined, 2019).

Figure 23: Environmental features map showing the suggested expansion areas allowed without further studies (within the green border)(Hoare, 2022).

(v) Impacts identified – To be completed after the initial consultation process.

And

(vi) Methodology used in determining the significance of environmental impacts

Prior to undertaking an impact assessment, a screening level assessment is performed which considers any possible impact of the proposed activities on any environmental attribute. This is undertaken to identify potential significant impacts. If there is no potential for a significant impact, then it is not considered any further. Only potentially significant impacts are subjected to a full impact assessment.

Considering the baseline environment, all proposed activities are evaluated against the environmental attributes (provisional list provided below but will be finalised after consultation process) to identify potential impacts / risks. These impacts / risks will be subject to a screening process and classified as either insignificant, uncertain, or potentially significant impacts / risks (definitions in table below). In the report submitted for review by the Competent Authority;

- Insignificant impacts / risks will be described and **not** assessed any further.
- Uncertain impacts / risks will be investigated further until such time they can be categories into insignificant of potentially significant
- Potentially significant impacts / risks will be subjected to further assessment to determine the significance of the impact / risk.

Environmental Attributes (presented alphabetically):	
• Aesthetics / Visual effects	• Sensitive receptors
• Dust / Air Quality	• Sites of heritage & cultural interest
• Fauna and Flora	• Soil and agricultural
• Fly rock	• Socio-economic considerations
• Geological features	• Surface water
• Ground water	• Topography
• Noise / Sound levels	• Blast vibrations

All potential impacts are then categorised as follows in the table below (Table 17):

The *"informed by"* section will be categorised into;
- Known impact (an impact that is known by experience)
- Identified during consultation (updated after completion of the consultation process)
- Identified by Specialist

The *"probability"* of the impact will be categorised into;
- Improbable
- Probable and
- Definite

The *"duration"* of the impact will be categorised into;
- Short term (impact will cease within 6 months)
- Medium term (impact will cease within 5 years)
- Life of Mine (LoM)
- Permenant

The *"extent to which the impact can be reversed"* will be categorised into;
- Partial
- Total
- None

The *"extent to which impact may cause irreplaceable loss of resources"* will be categorised into:
- Likely
- Unlikely

Using the above definitions, the identified impacts are then classified as either insignificant, uncertain, or potentially significant impacts / risks (definitions in table below);

- Insignificant impacts / risks will be described during the EIA phase and not assessed any further.
- Uncertain impacts / risks will be investigated further during the EIA phase until such time they can be categorised into insignificant or potentially significant
- Potentially significant impacts / risks will be subjected to further assessment during the EIA phase to determine the significance of the impact / risk in order to assign the appropriate management measures.

The table below summarises the potential impacts identified for the activities proposed within the initial site layout.

Table 17: Identified impacts and risks (resulting from the screening level assessment)

ACTIVITY *[list taken from d(i)]*	IMPACT ASPECT	INFORMED BY	SIGNIFICANCE	PROBABILITY OF IMPACT	DURATION OF IMPACT	EXTENT CAN BE REVERSED	IRREPLACEABLE LOSS OF RESOURCES	AVOIDED, MITIGATED, OR MANAGED?
Site Preparation: • Clearing of vegetation and topsoil • Stockpiling of topsoil • Placement of mobile equipment • Establishment of stormwater and security controls Mining and Processing: • Drilling and blasting; • Crushing, screening and washing using a fixed and mobile plant, • Loading and hauling, • Stockpiling of product and overburden Rehabilitation: • Removing all infrastructure and equipment and inspecting for signs of pollution • Sloping high walls and backfilling overburden; • Establishment of indigenous vegetation; • Removal of alien vegetation Supporting Services: • Waste management • Sanitation; • Water supply and use; and • Diesel	Dust	Known	Uncertain	Probable	Short term	Total	Unlikely	Mitigate & Manage
	Noise	Known	Uncertain	Probable	Short term	Total	Unlikely	Mitigate & Manage
	Ecology (flora & fauna)	Specialist Input	Uncertain	Definite	Permanent	Partial	Likely	Mitigate & Manage
	Surface water (wetlands)	Known	Uncertain	Improbable	Permanent	Partial	Unlikely	Avoid
	Destruction of soil structure	Known	Uncertain	Definite	Permanent	None	Likely	Mitigate & Manage
	Erosion	Known	Uncertain	Probable	Medium term	Partial	Likely	Mitigate & Manage
	Visual	Known	Uncertain	Definite	Life of Mine	Partial	Likely	Mitigate & Manage
	Fly rock	Known	Uncertain	Improbable	Short term	Total	Unlikely	Mitigate & Manage
	Blast vibrations	Known	Uncertain	Improbable	Short term	Total	Unlikely	Mitigate & Manage
	Altered surface water run-off patterns	Known	Uncertain	Definite	Life of Mine	Partial	Likely	Mitigate & Manage
	Socio-economic	Known	Uncertain	Definite	Life of Mine	Total	Likely	Mitigate & Manage
	Heritage	Specialist Input	Uncertain	Improbable	Permanent	None	Unlikely	Avoid

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

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

This section may be updated if specific comments on this aspect is received from I&APs resulting from the public review of the draft Scoping Report.

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

This section will be completed after the initial consultation process.

COMMENTS RECEIVED ON THE DRAFT SCOPING REPORT		
NAME OF I&AP	POSITIVE AND NEGATIVE COMMENTS RAISED	POSSIBLE MITIGATION MEASURES TO ADDRESS I&AP COMMENTS
	•	•
	•	•
	•	•
	•	•
	•	•
	•	•

(ix) The outcome of the site selection matrix (Final Site Layout Plan)

(Provide a final site lay out plan as informed by the process of consultation with interested and affected parties).

This section will be completed after the initial consultation process.

(x) Motivation where no alternatives sites were considered.

And

(xi) Statement motivating the preferred site.

(Provide a statement motivation for the final site layout that is proposed).

The design and layout options associated with this proposed extension area are primarily influenced and limited by the occurrence of the geological resource (i.e. mining can only take place where there is a viable mineral resource). Initially a larger area was contemplated as indicated in Figure 8, primarily to instill a 500m radius around the explsoives magazine, however it was determined that there is unlikely to be any resource available immediately to the west of the existing operation and therefore the area of interest was reduced to that indicated in **Appendix 3**. The reduced area was defined by the following:

- Identified resource along the ridge to the south and west of the existing operation
- Identified area for stockpiling to the north and east of the existing operation
- 50m buffer from the N6
- Inclusion of the mining permit held by Komani Quarry (Pty) Ltd which is to be closed when this S102 is approved.

i) PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

(i) Description of the alternatives to be considered including the option of not going ahead with the activity

No reasonable or feasible alternatives have been identified. Alternatives are discussed in Section 2(h) of this report, please make reference to Section 2(h) for the discussion and reasoning as to why no alternatives have been identified.

(ii) Description of the aspects to be assessed as part of the environmental impact assessment process

Impacts and risks identified in Table 17 **will be** assessed using the methodology described in Section I (iv and v) below. These impacts and risks will assessed in the EIR.

Any additional aspects, risks or impacts, not identified in Table 17, and raised by I&APs from the public review of this draft Scoping Report will be assessed in EIR.

(iii) Description of aspects to be assessed by specialists

The following Specialist Studies have been completed

- Heritage Impact Assessment
- Biodiversity (Floral) Assessment

The outcomes and findings of these studies have been discussed in the Baseline Environment description in this report and the full specialist reports are provided in the Appendices.

Additional specialist studies may be included within the list after the initial consultation process.

(iv) Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

And

(v) The proposed method of assessing duration significance

An Impact Ranking Tool is a quantitative manner of investigating, assessing and evaluating the potential impacts / risks resulting from the activities associated with the proposed activity on the receiving environment; i.e. the biophysical, socio-economic and cultural heritage environment. The following information provides an explanation the impact assessment tool to be used by the EAP to determine the significant environmental impacts of the proposed mining activities on the environment. The following definitions are applicable:

Environment (as defined in NEMA): The surroundings within which humans exist and that are made up of:

- the land, water and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part or combination of the above, and the interrelationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;

Activity: A specific deed, action or function, that takes place at an operation.

- E.g. stripping of topsoil or mining of granite.

Aspect: Considered to be a direct effect of an activity*, which* has an influence on the environment. It is neither categorised as positive or negative.

- E.g. Mining of granite (an activity) causes dust fallout and noise (both are aspects of the activity).

Impact: The end-result of an aspect that occurred due to an activity, resulting in an influence (change) on the environment. The influence is either positive or negative. The determination as to whether an impact is positive or negative is subjective. For example:

- E.g. Dust, an aspect of mining (an activity), cause a nuisance to neighbouring houses (an impact – negative from the perspective of the homeowner).

Cumulative Impacts: Cumulative Impacts will be considered where off-site activities (not related to the operation being evaluated) will result in the same impact at the receptors being considered.

- E.g. dust will be considered cumulatively for a mine located adjacent to a field which is ploughed. The spatial extent for the consideration of off-site impacts will be determined individually for each impact depending on factors such as the medium of dispersal of the pollutant causing the impact.

Environmental Impact Assessment: A formal or informal procedure producing a quantitative estimate of the environmental impact resulting from an activity.

Significance: A determination of the importance of a particular impact and in doing so incorporates extent, frequency and severity. The criteria for determining this significance is described further below.

Criteria to Consider when Determining Significance:
The ranking of impacts / determination of significance is estimated using two criteria, namely **Consequence** and **Probability**.

The ***Consequence*** of an impact resulting from an aspect is expressed as a combination of:

Nature of impact: An indication of the extent of the damage (negative impacts) or benefit (positive impacts) the impact inflicts on natural, cultural, and/or social functions (environment).

Extent of impact: A spatial indication of the area impacted (i.e. how far from activity the impact is realized) or spatial extent of the importance of the potential impact (i.e if a heritage site of national importance will be impacted on site, then the extent is regarded as "national" and not "onsite").

Duration of impact: A temporal indication of the how long the effects of the impact will persist, assuming the activity creating the impact ceases. For example, the impact of noise is short lived (impact ceases when activity ceases) whereas the impact of removing topsoil exists for a much longer period of time or the impact of destroying a heritage finding is permanent.

Frequency of the aspect occurring: An indication of how often an aspect, as a result of a particular activity, is likely to occur. Note that this does not assess how often the impact occurs as it applies only to the aspect. For example mining takes place daily while the resultant frequency of the impacts occurring will vary based on a number of factors.

The ***Probability*** of an impact resulting from an aspect is expressed as:

Probability of impact occurring: An estimated indication of the potential for an impact to occur. For example if there is a small overburden dump, what is the probability of adjacent landowners regarding the dump as a visual impact? Probability is based on the author's experience.

Determining Significance before Controls
Using the criteria explanation above, scores are assigned to each the criteria. The scoring range has been selected to represent the scale in which varying impacts can occur. The combination of scores is then used to determine the ***Consequence*** and ***Probability***.

- Consequence is expressed as the sum of all criteria in order to get a score out of 100.
- Probability of the impact occurring is expressed as a score out varying from 1 to 10.

Multiplying the consequence score against the probability score provides for an **initial significance** ranking. The lowest potential score is 4 and the highest possible impact score is 1000.

The scoring table below provides an indication of the various scores than can be assigned to each category listed above.

CONSEQUENCE	***Nature*** of Impact:		
	Low	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are not affected.	1
	Low-Medium	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are affected insignificantly.	5
	Medium	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are altered.	10
	Medium-High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are severely altered.	15
	High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes will temporarily or permanently cease.	25
	Extent of Impact:		

	On-site	Impact occurs on-site (within the boundary of the mine).	1
	Neighbouring	Impact occurs within a 5km radius of the site.	5
	Local	Impact occurs within a 20km radius of the site.	10
	Regional	Impact occurs within a 100km radius of the site.	15
	National	Impact occurs within South Africa.	25
	Duration of Impact:		
	Very Short-term	The impact will cease within 1 week if the activity is stopped.	1
	Short-term	The impact will cease within 1 year if the activity is stopped.	5
	Medium-term	The impact will cease within 5 years if the activity is stopped.	10
	Long-term	After the operational life of the operation.	15
	Permanent	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.	25
	Frequency of occurrence of the activity:		
	Annually or less	Activity occurs at least once in a year or less frequently.	1
	6 months	Activity occurs at least once in 6 months.	5
	Monthly	Activity occurs at least weekly to once a month.	10
	Weekly	Activity occurs on operational days.	15
	Daily	Activity occurs daily.	25
PROBABILITY	***Probability*** of potential occurrence of the impact:		
	Improbable	The possibility of the impact materialising is very low either because of design or historic experience.	1
	Low	The possibility of the impact materialising is low either because of design or historic experience.	3
	Medium	There is a possibility that the impact will occur.	6
	High	There is a distinct possibility that the impact will occur.	8
	Definite	The impact will occur regardless of any prevention measures.	10

The **Final Significance** ranking (before considering the implication of the proposed mitigation measures) of an impact will also take cognizance of:

- Impacts / Issues raised by **Interested and Affected Parties**: During the consultation process, I&AP's have identify concerns relating to impacts resulting from the proposed activities associated with the proposed mine. Impacts identified by I&AP's will be assigned additional scoring.
- **Cumulative Impacts**: Cumulative Impacts will be considered where any off-site activities (not related to the operation being evaluated) will result in the same impact at the receptors being considered.

Below is a summary of the influence of external factors on final significance scoring:

External Factor	Description	Points to add
I&AP concerns	Unresolved Impact rasied as a concern by an I&AP	100
Cumulative impact	Impact can be considered cumulatively with off site impacts	50

The final significance ranking takes cognisance of the initial scoring plus any additional score associated with allocating an external factor. At no time can the sum total of all the scores exceed 1000.

Converting the Scores to a Significant Ranking Allocation:

The significance of an impact is considered to be classified into one of the following; High, Medium-High, Medium, Low-Medium or Low. Each of the classified impacts has a scoring band into which it falls. The bands have been determined by a combination of 25 years of experience of Umhlaba employees. The definition of each classification is provided below and focuses on the need for mitigation or management.

Significance:	
Low (4 – 60)	Management measures may not be necessary, but in some instances are encouraged to ensure that the impact remains of Low significance.
Low-Medium (61 – 200)	Management measures are usually encouraged to ensure that the impacts remain of Low-Medium significance.
Medium (201 – 400)	Management measures are required to ensure, at minimum, the significance of the impact does not increase.
Medium-High (401 – 650)	Management measures are required to reduce the significance of the impact to, at least, Medium significance.

High (>651)	Impact should be avoided, or if not possible, managed to reduce the significance of the impact to, at least, Medium significance (where possible).

Degree to which impact can be mitigated
This requirement is essentially achieved by determining significance before consideration of controls and then the significance after the consideration of management controls. The difference between the before and after controls is an indication of the "degree to which the impact can be mitigated".

The ***Significance*** of an impact can be reduced / reversed through the successful implementation of appropriate controls (mitigate / manage or avoid). The Table below provides a summary of the overarching controls that can be implemented and Umhlaba's perception of the degree in which the various controls can effectively reduce the initial significance of the impact.

Type of control	Description	% to be deducted
Engineering	Isolation, re-design, guarding, containment, safety device (e.g bunding of a fuel tank or concreting workshop)	40%
Procedural & administration	Policies, Procedures & work instructions (designating speed limits / implemeting vehicle maintrnance activities etc / demarcate buffer zones)	25%
Training and education	Training & competencies (ongoing awareness training of employees)	10%
Monitoring, measurement and maintenance	Continuous monitoring, Observations, inspections & testing, implementing maitenance (reacting to feedback from monitoring campaigns)	5%

Where management measures are implemented, they are categorised into one of the above reference type of controls and the initial significant ranking is reduced by the appropriate percentage. In many cases more than one control can be applied.

For example; should a mine require a diesel tank, the risk of a potential diesel spill from that tank needs to be considered in the initial significant ranking. If the mine commits and successfully implements the following management measures:

- To bund the diesel tank.
- To train employees on how to refill vehicles and what to do in case a minor spill occurs.
- The significant after controls would be reduced by 40% (for the bunding) and 10% due to the training commitment.

(vi) The stages at which the competent authority will be consulted

The competent authority for this application is the Department of Mineral and Resources and Energy (DMRE)

- The Section 102 application form and NEMA application form detailing the environmental triggers was submitted via the online portal SAMRAD.
- The DMRE will be made aware of the draft scoping report available for public comment from 13th May 2024 to 13th June 2024.
- A copy of the Final Scoping Report after implementing the initial consultation process will be submitted to the DMRE by uploading to SAMRAD and submitting hard copies to the Regional Managers Office. This must be done within 44 days of submitting the application as per the timeframes stipulated in the EIA Regulations.
- Once the DMRE has reviewed the scoping report, if it is approved, the DMRE will be made aware of the draft EIR and EMPr when available for a 30 day commenting period (i.e. public consultation).
- A copy of the Final EIR and EMPr will be submitted to the DMRE via SAMRAD and in hard copy to the Regional Managers Office for decision-making.

(vii) Particulars of the public participation process with regard to the impact assessment process that will be conducted

(1) ***Steps to be taken to notify interested and affected parties***

And

(2) ***Details of the engagement process to be followed***

And

(3) ***Description of the information to be provided to Interested and Affected Parties***

And

(viii) Description of the tasks that will be undertaken during the environmental impact assessment process

The initial public participation process is described in Section 2 (h) (ii).

During the EIA/EMP phase the following tasks will be completed;

- Inform registered I&AP's of the submission of the Final Scoping Report to the authorities and that the project is proceeding into the EIA phase.
- Complete any outstanding specialist studies.
- Complete the draft EIR associated with the environmental impact assessment phase of this application
- Circulate the draft EIR to all registered I&APs for a period of 30 days.
- Consider and address comments received from I&APs on the draft EIR and finalise the Final EIR
- Submit Final EIR to the authorities for decision-making.
- Once a decision is passed by the authorities, notify registered I&APs of the final decision and appeal process.

(ix) Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored

ACTIVITY *whether listed or not listed* (E.g. Excavations, blasting, stockpiles, discrd dumps or dams, loading, hauling and transport, water supply dams and boreholes, ablution, stores, workshops, processing plant, stormwater control, nerms, roads, pipelines, power lunes, conveyors etc…etc…etc.)	**POTENTIAL IMPACT** (E.g. Dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollurion etc... etc…)	**MITIGATION TYPE** *modify, remedy, control, or stop* (E.g. Noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc…etc..)	**POTENTIAL FOR RESIDUAL RISK**
Site Preparation: • Clearing of vegetation and topsoil • Stockpiling of topsoil • Placement of mobile equipment • Establishment of stormwater and security controls Mining and Processing: • Drilling and blasting; • Crushing, screening and washing using a fixed and mobile plant, • Loading and hauling, • Stockpiling of product and overburden Rehabilitation: • Removing all infrastructure and equipment and inspecting for signs of pollution • Sloping high walls and backfilling overburden; • Establishment of indigenous vegetation; • Removal of alien vegetation Supporting Services: • Waste management • Sanitation; • Water supply and use; and • Diesel	Dust	Dust control	None
	Noise	Noise control	None
	Ecology (flora & fauna)	Relocation, Rehabilitation	Likely
	Surface water (wetlands)	Avoidance	N/A – no wetlands
	Destruction of soil structure	No mitigation	Likely
	Erosion	Storm water control	Likely
	Visual	Concurrent rehabilitation	Likely
	Fly rock	Avoidance, Blasting control	None
	Blast vibrations	Avoidance, Blasting control	None
	Altered surface water run-off patterns	Storm water control	Likely
	Socio-economic	Implementation of SLP	LIkely
	Heritage	Avoidance	None

k) **Other INFORMATION REQUIRED BY THE COMPETENT AUTHORITY**

(1) Compliance with the provisions of sections 24(4)(a) and (b) read with Section 24(3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998) the EIA report must include the:

(a) ***Impact on the socio-economic conditions of any directly affected person***

A public participation process is being implemented as part of the environmental authorisation application process. This draft scoping report is currently undergoing the said public participation (i.e. public review). The purpose of the public participation process is to provide affected persons the opportunity to raise any potential concerns. As part of the consultation process the land claims commissioner will also be contacted to identify if there were any claims on land covered by this application.

Any concerns raised from the public review of this draft scoping (which ends on 13th June 2024) will be captured and addressed within the public participation section of this report [section H (iii)].

(b) ***Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act***

No sites of cultural heritage interest were recorded for either of the existing environmental authorisations associated with Queenstown Quarry. Given the proposed expansion of the mining right area would extend into previously unsurveyed areas, a phase 1 heritage investigation of these areas was undertaken by a specialist.

A summary of the findings of the survey as per the specialist report provided in **Appendix 6** is as follows, "*No archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint. It is well known that Iron Age, especially Late Iron Age stone-walled settlements do not usually occur on steep mountainous slopes. It is therefore recommended, from a cultural heritage perspective that the proposed mining activities may proceed*".

The National Screening Tool identified the expansion area to be highly sensitive for the palaeontological theme. A specialist opinion was therefore obtained as part of the heritage specialist study (see Addendum 5 to the Heritage report provided in **Appendix 6**). A summary of the review as per the report is "*This letter serves as a Letter of Exemption. It is in compliance with The Minimum Standards for Palaeontological Components of Heritage Impact Assessment Reports, SAHRA APMHOB, Guidelines 2012. The development is underlain by the rocks of the Karoo Supergroup, Jurassic, Early Triassic, Permian in age, with a VERY HIGH Palaeontological Sensitivity (Almond et al. 2009*). This development will take place on igneous rocks, therefore, the impact will be VERY LOW*".

l) **OTHER MATTERS REQUIRED IN TERMS OF SECTION 24(4)(A) AND (B) OF THE ACT**

Alternatives are discussed in Section 2(h) of this report, please make reference to Section 2(h) for the discussion and reasoning as to why no alternatives have been identified.

When completing the EIA phase of the application Section 24(4)(A) and (B) will be used as a checklist to ensure that all procedural requirements for the environmental authorisation process have been achieved.

With reference to Section 24(4)(b)(i) alterntives have been discussed in Section 2(h) of this report. It must be noted that the completion of the alternative sections of the report will only be completed after the initial consultation process.

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m) **UNDERTAKING REGARDING CORRECTNESS OF INFORMATION**

I **MARLI BURGER** HEREWITH UNDERTAKE THAT THE INFORMATION PROVIDED IN THE FOREGOING REPORT IS CORRECT, AND THAT THE COMMENTS AND INPUTS FROM STAKEHOLDERS AND INTERESTED AND AFFECTED PARTIES HAS BEEN CORRECTLY RECORDED IN THE REPORT.

To be signed after undertaking the initial consultation process.

SIGNATURE OF THE EAP

DATE: XXXXX

n) **UNDERTAKING REGARDING LEVEL OF AGREEMENT**

I **MARLI BURGER** HEREWITH UNDERTAKE THAT THE INFORMATION PROVIDED IN THE FOREGOING REPORT IS CORRECT, AND THAT THE LEVEL OF AGREEMENT WITH INTERESTED AND AFFECTED PARTIES AND STAKEHOLDERS HAS BEEN CORRECTLY RECORDED AND REPORT HEREIN

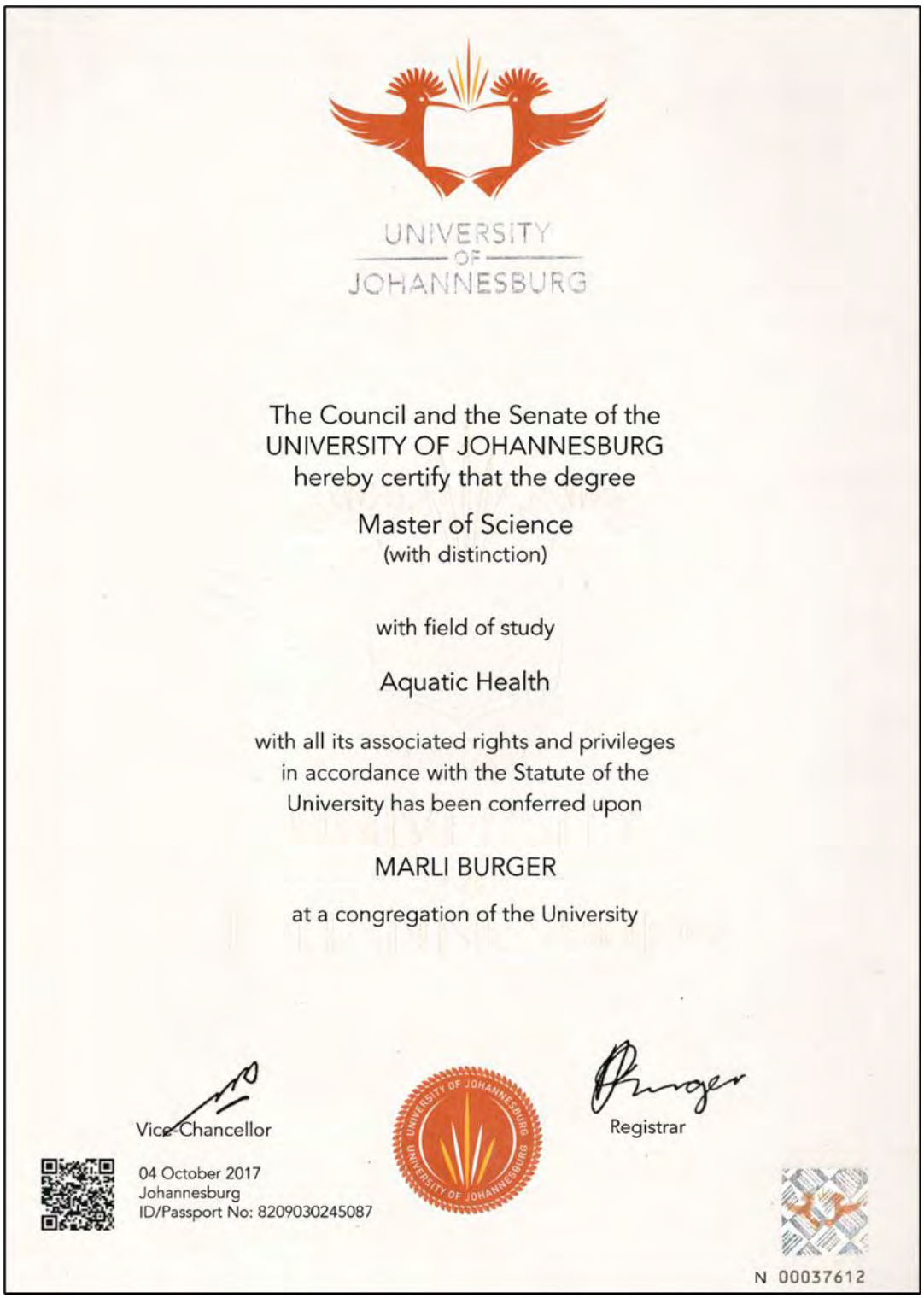
To be signed after undertaking the initial consultation process.

SIGNATURE OF THE EAP

DATE: XXXXX

APPENDICES

1. APPENDIX 1: EAP QUALIFICATIONS



UNIVERSITY
OF
JOHANNESBURG

The Council and the Senate of the
UNIVERSITY OF JOHANNESBURG
hereby certify that the degree

Master of Science
(with distinction)

with field of study

Aquatic Health

with all its associated rights and privileges
in accordance with the Statute of the
University has been conferred upon

MARLI BURGER

at a congregation of the University

Vice-Chancellor

Registrar

04 October 2017
Johannesburg
ID/Passport No: 8209030245087

N 00037612

Environmental Assessment Practitioners Association of South Africa

Registration No. 2019/220

Herewith certifies that

Marli Burger

is registered as an

Environmental Assessment Practitioner

Registered in accordance with the prescribed criteria of Regulation 15. (1) of the Section 24H Registration Authority Regulations (Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).

Effective: 01 March 2024

Expires: 28 February 2025

Chairperson

Registrar

SAQA

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Marli Burger

Registration Number: 115534

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Conservation Science (Professional Natural Scientist)

Effective **25 May 2016** Expires **31 March 2025**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

2. APPENDIX 2: CV OF EAP

CURRICULUM VITAE **Ms M BURGER**

Name	:	**BURGER, MARLI**
Date of Birth	:	3 September 1982
Profession/Specialisation	:	Environmental Assessment Practitioner
Nationality	:	South African
Years' experience	:	14 years environmental legal compliance

REGISTRATION

SACNASP Registration: Pr. Sci. Nat. Nature Conservation	Reg. no. 115534
EAPASA Registration: Environmental Assessment Practitioner	Reg. no. 2019/220

KEY QUALIFICATIONS

Marli Burger is a SACNASP[1] and EAPASA[2] Registered Environmental Consultant with 14 years of environmental legal compliance experience. She has a Master's degree in Science from the University of Johannesburg and specialises in Aquatic Health and Project Management. She has been involved in a variety of different types of Environmental Impact Assessments and Water Use License (WUL) Applications including applications for water supply projects, dams, transmission lines, roads, mining, agricultural activities, residential developments and a constructed wetland in South Africa. Marli has also been involved in the use of Geographic Information Systems, environmental status quo and audit reports, water quality assessments, legal compliance and open space planning. Relevant training includes, amongst others, the Environmental Management Inspector (EMI) training course during her employment at GDARD, the Department of Water and Sanitation (DWS) Instream Use training course and WUL Audit course.

Essential skills as an environmental assessment practitioner firstly includes her experience of translating site-specific conditions and relevant recommendations into a working document that is both scientifically accurate as well as fit for practical implementation by staff with limited training or experience. Secondly, her employment history includes public and private sector spheres where a broad knowledge of the National Environmental Management Act and specific environmental legislations, policies and guideline documents as well as excellent communication skills were vital.

Her knowledge of the environmental authorisation process and challenges in the industry is an asset to er project management skills and helps to align applications with requirements of various state departments and to avoid duplication of efforts, for a more efficient authorisation process. Her project management skills include managing project finances; reporting on departmental assessment and progress; correspondence with clients, specialists and departments; attending project meetings; compiling applications and submission documents, updating requirements for applications based on latest legislation; providing assistance on general environmental and water-related queries; researching latest waste management and water monitoring technology; maintaining and updating website and social media pages, public participation as well as auditing and consulting on implementation of authorisations.

Management of Specialist studies for the EIA and WULA processes have included amongst others, vegetation, fauna, social, geotechnical, heritage assessments, as well as hydrology, hydrogeology, geomorphology, hydropedology, water quality analyses, aquatic delineation and rehabilitation studies and risk assessments. The findings of the specialist studies are incorporated into the application and presented to the relevant commenting departments and competent authority as required for each application.

Marli has extensive experience in auditing EMPr conditions on construction sites while doing weekly or monthly ECO monitoring, including environmental training with contractors and finding ways to mitigate the impacts of

[1] South African Council for Natural Scientific Professions
[2] Environmental Assessment Practitioners Association of South Africa

development on the environment. She has also conducted several WUL audits, which includes providing practical measures towards full compliance.

EMPLOYMENT RECORD

2017 – Current AquaStrat Solutions
Director
Environmental Assessment Practitioner

2014 – Current Galago Environmental Consultants
Environmental Consultant

2013 – 2013 ThandaManzi Water Consultants
Project manager & application consultant

2012 – 2012 Centurion Academy
Lecturer (full-time): Dept. Nature Management
Tshwane University of Technology
Lecturer (part-time): Dept. Nature Conservation

2010 – 2011 Self-employed
Marketing

2008 – 2010 Gauteng Department of Agriculture and Rural Development
Chief Nature Conservator

2007 – 2008 Gauteng Department of Agriculture, Conservation and Environment
Senior Nature Conservator

2007 – 2007 Tshwane University of Technology
Student Assistant: Dept. Nature Conservation

2006 – 2006 Rietvlei Nature Reserve
Experiential training part time

2006 – 2006 South African National Parks
Student Research Post – water quality & river profile monitoring

2005 – 2005 Lion Park
Part time – adaptive management plan

2005 – 2005 Manyane Game Farm & Mangwa Valley Lodge
Part time – adaptive management plans

2004 – 2004 Monate Game Lodge
Part time – vegetation monitoring

ENVIRONMENTAL IMPACT ASSESSMENT APPLICATIONS

Storage on 82, Portion 214 of the Farm Hartzenbergfontein 335 IQ, Walkerville, Gauteng.
Environmental practitioner. Compiling the BA Report taking heritage, socio-economic, storm water and vegetation sensitivities into account and conducting the public participation process.

St Peter's College Wetland Rehabilitation (St Peter's College). Woodmead.
Environmental practitioner. Compiling the BA Report taking storm water and wetland sensitivities into account and conducting the public participation process.

Kibler Park Mountain Luge (Mountain Fun Park, 2021). Portion 38 of the Farm Olifantsvlei 327 I.Q.
Environmental practitioner. Compiling the BA Report taking heritage, socio-economic, storm water and wetland sensitivities into account and conducting the public participation process.

Naledi 1 Housing Development on the Remainder of the Farm Soweto 387 IQ, Gauteng.
Report compiler. Compiling the BA Report taking socio-economic, storm water and wetland sensitivities into account.

Mofolo North Housing Development on the Remainder of the Farm Soweto 387 IQ, Gauteng.
Report compiler. Compiling the BA Report taking socio-economic, storm water and wetland sensitivities into account.

Dalpark x 18 (City of Ekurhuleni, 2021). Portion 461 of the Farm Witpoortjie 117 IR.
Environmental practitioner. Compiling the Scoping and EIA Reports taking heritage, socio-economic, storm water and wetland sensitivities into account and conducting the public participation process.

Mayfield x 52 (City of Ekurhuleni, 2021). Portions 124 & 132 of the Farm Putfontein 26 IR.
Environmental practitioner. Compiling the BA Report taking heritage, socio-economic, storm water and wetland sensitivities into account and conducting the public participation process.

Grootvlei x 3. (Mpumalanga Province Human Settlements Department, 2021). Portion 24 of the Farm Grootvlei 604 IR. *Environmental practitioner.* Compiling the BA Report taking heritage, socio-economic, storm water and wetland sensitivities into account and conducting the public participation process.

Alpine Heath (Alpine Heath Body Corporate). On the Farm Akkerman 5679 GS, KZN Province.
Environmental practitioner. Compiling the Environmental application reports Reports taking heritage, socio-economic, storm water and wetland sensitivities into account and conducting the public participation process**.**

Germiston South Pedestrian Bridge (City of Ekurhuleni, Human Settlements) on Portions 861 and 114 of the Farm Elandsfontein 90 IR. *Environmental Assessment Practitioner*, 2019. Conducting public participation and administrating GDARD requirements.

Java Crescent Pedestrian Bridge (Ekurhuleni Metropolitan Municipality). Portion 443 of the Farm Elandsfontein 108, IQ. *Environmental Assessment Practitioner*, 2018. Compiling and submitting the Basic Assessment Report and EMP with hydrological, storm water and wetland rehabilitation considerations.

Albert's Farm Dam upgrade. (Johburg Roads Agency, 2019). Remainder of the Farm Waterval 211 IQ.
Environmental practitioner. Compiling the BA Report taking heritage, socio-economic, storm water and wetland sensitivities into account and conducting the public participation process.

Jan van Riebeeck Park Dams upgrade. (Johburg Roads Agency, 2019). Portion 53 of the Farm Braamfontein 53 IR. *Environmental practitioner.* Compiling the BA Report taking heritage, socio-economic, storm water and wetland sensitivities into account and conducting the public participation process.

Mackenzie Park x 3 Housing Development (Ekurhuleni Metropolitan Municipality). Remaining Extent of the Farm Benoni 77 I.R. *Environmental practitioner.* Compiling the EIR and conducting the public participation process taking heritage, socio-economic, storm water, wetland sensitivities & service capacities into account.

New Modder x 6 Light Industrial Development. (New Modder Township Pty Ltd). Remainder of Portion 1 of the Farm Modderfontein 76 IR. *Environmental practitioner.* Compiling the BA Report and conducting the public participation process taking heritage, socio-economic, storm water and wetland sensitivities, as well as services alternatives into account.

Minnebron x 1 Mixed Use Development (Ekurhuleni Metropolitan Municipality). Portions 64 – 65, 165 and the remainder of Portion 3 of the farm Witpoortje 117 IR. *Environmental practitioner.* Compiling the EIR and conducting the public participation process taking heritage, socio-economic, storm water, wetland sensitivities and service capacities into account.

Leachville x 2 Residential Development (Ekurhuleni Metropolitan Municipality). Portion 148 of the Farm Rietfontein 115 IR. *Environmental practitioner.* Compiling the BA Report and conducting the public participation process taking heritage, socio-economic, storm water, wetland sensitivities and land use alternatives into account.

Chartwell Wetland Rehabilitation (Chartwell Conservancy), Section of an unnamed wetland feeding into the Klein Jukskei River – S30A Emergency Application and Environmental Management Programme (EMPr), 2017. Compiling the application and report and correspondence with GDARD and DWS.

Apex Mixed Use Development (Ekurhuleni Metropolitan Municipality), Portion 46 of the farm Rietfontein 115-IR, Benoni. *Environmental practitioner.* Compiling the EIR and conducting the public participation process taking heritage, socio-economic, storm water and wetland sensitivities into account.

Holgatfontein Development (Ekurhuleni Metropolitan Municipality), Portion 102 of the farm Holgatfontein 326-IR, Springs. *Environmental practitioner.* Compiling EIR and public participation with heritage, socio-economic, storm water and wetland considerations**.**

WATER USE LICENCE APPLICATIONS

Dullstroom Waste Water Treatment works, (Emakhazeni Local Municipality), Mpumalanga.
Water use authorisation consultant, 2022. Compiling the WULA for the works and upgrades.
External Environmental Impact Auditor, 2022. Compiling an impact identification report in response to a S28 Directive of the Mpumalanga Department of Agriculture, Rural Development, Land & Environmental Affairs.

CoE Botanical Gardens (City of Ekurhuleni), Gilloolys Farm, Gauteng.
Water use authorisation consultant, 2022. Registration of the activities under the General Authorisation 509 of 2016.

Wilgeheuwel x 72 Residential Development (Ptn 351 Wilgespruit Pty Ltd), Roodepoort, Gauteng.
Water use authorisation consultant, 2022. Compiling the WULA with services, storm water and wetland considerations.

Dallas Taxi Holding Facility on Erf 51, Menlyn x 10, Pretoria, Gauteng.
Water use authorisation consultant, 2022. Registration of the activities under the General Authorisation 509 of 2016.

Bryanston x 4610 Residential development. *Water use authorisation consultant*, 2022. Compiling the WULA with services, storm water and wetland considerations.

Afrisam Verulam IWULA & IWWMP (Afrisam). *Water use authorisation consultant*, 2021. Compiling the IWULA and IWWMP with water uses including groundwater abstraction, impeding a watercourse, altering watercourse characteristics, disposing of waste that could impact the resource, discharging of water containing waste.

Helderwyk Phases 2 - 3 Mixed Use Housing Development (Purple Moss) on Witpoortje 117 IR. *Water use authorisation consultant*, 2021. Compiling the WULA with storm water and wetland considerations.

The Banks (Reflection Time Pty Ltd). Kromdraai, Gauteng. *Water use authorisation consultant*, 2021. Compiling the WULA for groundwater abstraction, stormwater and package plant discharge with ecological considerations.

St Peter's College Wetland Rehabilitation (St Peter's College). Woodmead.
Water use authorisation consultant, 2021. Registration of the activities under the General Authorisation 509 of 2016 and conducting public participation process.

Kibler Park Mountain Luge (Mountain Fun Park, 2021). Portion 38 of the Farm Olifantsvlei 327 I.Q.
Water use authorisation consultant, 2021. Registration of the activities under the General Authorisation 509 of 2016 and conducting public participation process.

Alpine Heath (Alpine Heath Body Corporate) IWULA & IWWMP. On the Farm Akkerman 5679 GS, KZN Province.
Water use authorisation consultant, 2020. Compiling the WULA for surface and groundwater abstraction and oxidation pond system, with ecological considerations.

Entokozweni Water Treatment Works (Emakhazeni Local Municipality) on Portion 34 of the Farm Geluk 348 JT. *Water use authorisation consultant*, 2020. Compiling the WULA, declaration of ELU with ecological considerations.

Moratiwa Crossing, Monsterlus. (Vukile Property Fund). *Water use authorisation consultant*, 2021. Compiling the WULA with groundwater abstraction.

Giyani Plaza, Giyani. (Vukile Property Fund). *Water use authorisation consultant*, 2021. Compiling the WULA with groundwater abstraction.

Nzhelele Valley, Makhado. (Vukile Property Fund). *Water use authorisation consultant*, 2021. Compiling the WULA with groundwater abstraction.

Germiston South Pedestrian Bridge (City of Ekurhuleni, Human Settlements) on Portions 861 and 114 of the Farm Elandsfontein 90 IR. *Water use authorisation consultant*, 2020. Registration of the activities under the General Authorisation 509 of 2016 and conducting public participation process.

Roelan Platinum Mine (Roelan Trading) IWULA and IWWMP. Portion 10 of the Farm Welgevonden 343 KR, Limpopo Province. *Water use authorisation consultant*, 2020. Compiling the WULA with groundwater abstraction, storm water and ecological considerations.

Albert's Farm Dam upgrade. (Johburg Roads Agency, 2019). Remainder of the Farm Waterval 211 IQ.
Water use authorisation consultant, 2019. Administration of the GA registration with storm water and wetland considerations.

Jan van Riebeeck Park Dams upgrade. (Johburg Roads Agency, 2019). Portion 53 of the Farm Braamfontein 53 IR. *Water use authorisation consultant*, 2019. Administration of the GA registration with storm water and wetland considerations.

Helderwyk x 8 Phase 1 Mixed Use Housing Development (Purple Moss) on on Portion 472 (a Portion of the Remainder of Portion 62) of Witpoortje 117 IR. *Water use authorisation consultant*, 2019. Compiling the WULA with storm water and wetland considerations.

Elim Hubyeni Mall, Louis Trichardt. (Vukile Property Fund). *Water use authorisation consultant*, 2019. Compiling the WULA with groundwater abstraction, storm water and ecological considerations.

Greengate x 92 Residential Development. (PS Trust). Portions 13, 22 & 32 of the Farm Van Wyks Restant 182 IQ. *Water use authorisation consultant*, 2019. Compiling the WULA with storm water and wetland considerations.

South Germiston Housing Developments. (Kiron Developments Pty Ltd). Portions 25, 504 & 530 of the Farm Driefontein 85, Portion 79 & the Remainder of the Farm Driefontein 87 and Potions 6, 7 & the Remainder of the farm Driefontein 682. *Water use authorisation consultant*, 2019. Compiling the WULA with hydrological, storm water and socio-economic considerations.

Greengate x 86 Business Park and Residential Development. (PVB Rietvallei Pty Ltd). Portions 31 and 176 of the Farm Rietvallei 180, IQ. *Water use authorisation consultant*, 2019. Compiling the WULA with groundwater abstraction, storm water and ecological considerations.

Goudrand x 4 and Bulk Sewer Pipeline. (Dino Properties Pty Ltd). Roodepoort 237-IQ and Vogelstruisfontein 231-IQ. *Water use authorisation consultant*, 2019. Compiling the WULA with storm water and buffer zone considerations.
Brakpan x 13 (Ekurhuleni Housing Department). Part of the Remainder and Portion 13 of the farm Weltevreden 118 IR. *Water use authorisation consultant*, 2019. Compiling the WULA with storm water and services upgrade considerations.

Bartlett x 86 (Juanfany CC). Portion 978 (a portion of portion 240) of the Farm Klipfontein No 83 IR. *Water use authorisation consultant*, 2019. Compiling the WULA with storm water and wetland rehabilitation considerations.

Alfa Sand Mine (Verlesha Pty Ltd / Raumix) IWULA & IWWMP. Remainder of Portions 3 and 5 and Portion 20 of the Farm Rietvlei 518 JR, Gauteng. *Water use authorisation consultant*, 2018. Compiling the WULA with hydrological, groundwater, storm water and wetland rehabilitation considerations.

Java Crescent Pedestrian Bridge (Ekurhuleni Metropolitan Municipality). Portion 443 of the Farm Elandsfontein 108, IQ. *Water use authorisation consultant*, 2018. Compiling the WULA with hydrological, storm water and wetland rehabilitation considerations.

Ambegeto Electrical Line (Murostar Pty Ltd). Portions 103 and 104 of the Farm 400, IP. *Water use authorisation consultant*, 2018. Compiling the application for General Authorisation registration with wetland considerations.

Casalinga Restaurant (Illyria Pty Ltd). Portions 328 and 505 of the Farm Rietfontein 189, IQ. *Water use authorisation consultant*, 2018. Compiling the WUL application for abstraction from a borehole with hydrogeological considerations.

New Modder x 6 Light Industrial Development. Portion 1 of the Farm Modderfontein 76, IR. *Water use authorisation consultant*, 2018. Compiling the WUL application with watercourse and storm water considerations.

Eldoraigne x 81 & 82 Mixed Use Residential Development. Portion 279 of the Farm Zwartkop 356, JR. *Water use authorisation consultant*, 2018. Compiling the WUL application with watercourse and storm water considerations.

Tembisa x 25 Housing Project. Portions of the Remainder and Portions 98, 99, 100, R/101, 102 and 115 of the Farm Olifantsfontein 402, JR. *Water use authorisation consultant*, 2018. Compiling the WUL application with watercourse and storm water considerations.

Palm Ridge x 10 & 12 Storm water attenuation (Greenfield Gardens). Portion 96 of the Farm Rietfontein 153, IR. *Water authorisation consultant*. Compiling the application for General Authorisation registration with stormwater and wetland considerations.

Doornkom Existing Water Use Right Registration (Vrey Konstruksie). Portions of the Farm Doornkom 376 KR. *Water authorisation consultant*. Administration of the EU ownership registration changes.

Apex Bulk Sewerline (Ekurhuleni Metropolitan Municipality), Portions of the farm Rietfontein 115-IR,

Benoni - Water use license, 2017. *Water authorisation consultant*. Compiling the WUL application.

K97 road construction (Gauteng Department of Roads and Transport), wetland crossings – WULA, 2017. *Water authorisation consultant.* Compiling the WUL application with hydrological, storm water and wetland rehabilitation considerations.

Kaalspruit Wetland Rehabilitation (Ekurhuleni Metropolitan Municipality), Section of Kaalspruit between R562 and Olifanstfontein WWTW outfall - Water use license, 2017. *Water authorisation consultant*. Compiling the WUL application for the rehabilitation of the Kaalspruit by means of a Free Water Surface constructed wetland. Collating and presenting information on project and design principles that address ecosystem drivers and responses.

Viscgat Adesite Mine (Prime Spot Development Pty Ltd), on Portion 1 (Portion 59) of the Farm Vischgat 467 IR - Water use license, 2017 - submitted. *Water authorisation consultant*. Compiling the WUL application for an aggregate mine. Collating and presenting information on geohydrological findings, legal- and monitoring implications of the abstraction of water from a borehole, discharge of water and removal of underground water for mining.

The Village x 14 Integrated Development (Blue Age Properties 60 (Pty) Ltd), Portions 2, 4, 36, 37, 38, 65 & the Remainder of Portion 55 of the Farm Van Wyk's Restant 182 IQ - Water use license, 2017. *Water authorisation consultant*. Compiling the WUL application for a mixed use residential and business park with retail warehouses, retail centers, office and residential development, hotel and private open space. Presentation of collated information to the Environment and Recreation specialists of DWS for Water Use License Application (WULA) purposes.

Tambo Springs Inland Port (Tambo Springs Development Company) - Water use license of various construction activities, Gauteng, 2017. *Water authorisation consultant*. Compiling the WUL application with hydrological, storm water and wetland rehabilitation considerations.

Springs Mall (Flanagan & Gerard) – Water use license, Gauteng, 2017. *Water authorisation consultant*. Compiling the WUL application with geohydrological, storm water and wetland rehabilitation considerations.

Spookmill mine (Da-Xa Sand CC), on the farm Spookmill No. 4273, KZN – Water use license, Gauteng, 2017. *Water authorisation consultant*. Compiling the WUL application for a sand mine with considerations of fluvial geomorphology and Instream Flow Requirements. Interpretation of water quality-, flow determination-, biota (SASS5 and FRAI, IHAS) findings and data.

Homes Haven Residential Development, (Paxograph Pty Ltd), on Portion 320 (a portion of portion 76) of the Farm Roodekrans 183 IQ - Water use license, 2017. *Water authorisation consultant*. Compiling the WUL application for a housing development. Provided consultation to the project engineers on storm water design principles.

Daveyton Housing Development (Ekurhuleni Metropolitan Municipality), the Remainder of the Farm Daveyton 73 IR and portion 266 of the Farm Putfontein 26 IR - Water use license, 2017. *Water authorisation consultant*. Compiling the WUL application for a housing development with various densities and storm water discharge into pans on site. Presentation of collated information to the Environment and Recreation specialists of DWS for Water Use License Application (WULA) purposes.

Apex Mixed Use Development (Ekurhuleni Metropolitan Municipality), Portion 46 of the farm Rietfontein 115-IR, Benoni - Water use license, 2017. *Water authorisation consultant*. Compiling the WUL application for a housing development with school, business stands, community facilities, public open space. Presentation of collated information to the Environment and Recreation specialists of DWS for Water Use License Application (WULA) purposes.

Elandsfontein Mixed Use Development (Crimson King Properties Pty Ltd), Portion 1 & 7 of the Farm Elandsfontein 346 IQ, Westonaria – Water use license, 2016. *Water authorisation consultant*. Compiling

the WUL application for a housing development with school and commercial stands. Presentation of collated information to the Environment and Recreation specialists of DWS for Water Use License Application (WULA) purposes.

President Park Residential Development (JFS Properties No 20 Pty Ltd), Holdings 78 – 80 and the Remainder of Holding 81 of President Park A.H, Gauteng - Water use license, 2016. *Water authorisation consultant*. Compiling the WUL application for a residential development. Presentation of collated information to the Environment and Recreation specialists of DWS for Water Use License Application (WULA) purposes.

Priontex Borehole Abstraction (Priontex Microclean Gauteng (Pty) Ltd), Corporate Park North, 313 Roan Crescent, Erf 493, Randjiesfontein Ext 121, Gauteng - Water use license, 2016. *Water authorisation consultant*. Compiling the WUL application for abstraction from a borehole.

Daxa Sand (Da-Xa Sand CC) Buffelsriver, Remainder of Portion 19 of the Farm Reserve No. 18 No. 15838, KZN – Water use license, Gauteng, 2015. *Water authorisation consultant*. Compiling the WUL application for a sand mine with considerations of fluvial geomorphology and Instream Flow Requirements. Interpretation of water quality-, flow determination-, biota (SASS5 and FRAI, IHAS) findings and data.

Westdene dam (Johannesburg City Parks), Portion 33 of the farm Braamfontein 53 IR, Westdene - Water use license, Gauteng, 2015. *Water authorisation consultant*. Compiling the WUL application for the upgrading of ecological, recreational and functional aspects of the dam. Assisted with SASS5, water quality sampling, depth profiling, secchi disk (turbidity) measurements and layout planning.

Vogelstruisfontein Sand Mine (Lengeo (Pty) Ltd), on Portion 1 and a portion of portion 6 of the farm Vogelstruisfontein 263 IQ, Randfontein Local Municipality, - Water use license, Gauteng, 2015. *Water authorisation consultant*. Compiling the WUL application for a sand mine. Collating information on wetland delineation and –condition, geohydrological findings, legal- and monitoring implications of the abstraction of water from a borehole.

Paardeplaats / Curro School (Curro Holdings), on portion 402 of the farm Paardeplaats 177 IQ, Krugersdorp - Water use license, Gauteng, 2015. *Water authorisation consultant*. Compiling the WUL application for a school with sports fields. Presentation of collated information to the Environment and Recreation specialists of DWS for Water Use License Application (WULA) purposes.

Ngagane Railway Siding (Osho SA Steel), on portions 3 & 5 of the farm MacAlman 4254 HS, Newcastle - Water use license, Gauteng, 2015. *Water authorisation consultant*. Compiling the WUL application for the upgrading of an existing coal siding from specialist studies including wetland delineation- and storm water management reports. Monthly water quality data provided to DWS.

Kendal Power Station (Eskom), on the farm Schoongezicht 218 IR, Kendal - Water use license audit report, Gauteng, 2014. *Water authorisation consultant*. Compiling the audit report of the existing river diversion as per license condition by collating historical data and the latest findings on functionality of the system.

Holgatfontein Development (Ekurhuleni Metropolitan Municipality), Portion 102 of the farm Holgatfontein 326-IR, Springs – Water use license, Gauteng, 2015. *Water authorisation consultant*. Compiling the WUL application for a housing development. Provided consultation to the project engineers on storm water design principles.

Glenway Cable (Space Development), Portions 2, 9, 15, 16 and 17 of the farm Nooitgedacht 333-JR and portion 69 and the Remainder of the farm Franspoort 332-JR, Mamelodi - Water use license, Gauteng, 2015. *Water authorisation consultant*. Compiling the WUL application for an electric cable installation beneath a watercourse. Provided consultation to engineers on the principles of maintaining ecological integrity in the riparian- and buffer zones, as well as within the 1:100 year flood line, with the inclusion of method statements. Presentation of collated information to the Environment and Recreation specialists of DWS for WULA purposes.

Driefontein/Vrysig X10 Residential Development (Driefontein Development Company), Portion 56 of the farm Driefontein 179 IQ, Muldersdrift – Water use license, Gauteng, 2015. ***Water authorisation consultant*****.** Compiling the WUL application for a residential development. Provided consultation to engineer on the principles of sustainable storm water design and consulted applicant on landowner permission for storm water disposal. Presentation of collated information to the Environment and Recreation- and Civil Design specialists of DWS for WULA purposes.

Linmed Hospital (Netcare Property Holdings (Pty) Ltd), Erf 2553 Rynfield Ext 27, Benoni – Water use license, ***Gauteng, 2013. Water authorisation consultant*****.**
Compiled the WULA for the expansion of the parking area and rehabilitation of the wetland of the Netcare Linmed Hospital in Benoni by interpreting specialist findings of the wetland delineation- and rehabilitation reports. Provided consultation to the engineer and applicant on the principles of Sustainable urban Drainage Systems. Presentation of collated information to the Environment and Recreation specialists of DWS.
Erand Gardens Development (Reeflords Property Development Pty Ltd), Portions 735, 764 and 765 of the farm Rantjesfontein 405-JR, Midrand – Water use license, Gauteng, 2013. ***Water authorisation consultant*****.** Compiling the WUL application for a residential development and consulting with applicant and engineer on DWS requirements for storm water disposal and -designs. Presentation of collated information to the Environment and Recreation- and Civil Design specialists of DWS for WULA purposes.

Vulcania Cemetery (Memorial Park Management Services), remaining extent of farm Vulcania 279-IR, Springs – Water use license, Gauteng, 2014. ***Water authorisation consultant*****.** Compiling the WUL application for a private cemetery. Environmental Control Officer for the duration of the construction phase for the protection of the adjacent wetland. Presentation of collated information to the Environment and Recreation specialists of DWS.

ABI bottling plant (Coca-cola), Hercules - Water use license. ***Gauteng, 2013. Water use consultant****.* Conducting the Public Participation process and Water Use License Application for new borehole abstraction to replace current municipal source.

Byl's Bridge Office park (M & T Development), Centurion –. Water use license. ***Gauteng, 2013. Water use consultant***. Conducting cooperative governance meetings with DWA, CoT and applicant in order to resolve Public Participation issues affecting the progress of WULA.

Groblersdal Regional shopping center - Water use license. ***Gauteng, 2013. Water use consultant.*** Conducting the WULA for a road crossing and decommissioning of existing irrigation dam for construction of the proposed Grobersdal Regional shopping center.

Coca-cola bottling plant (Coca-cola), Lagerspoort – Water use license amendment. ***Gauteng, 2013. Water use consultant.*** Conducting the amendment WULA for the abstraction from new boreholes.

Eco Park Attenuation Dam (M & T Development) – Water use license amendment. ***Gauteng 2013. Water use consultant.*** Conducting the amendment to the existing license for lowering existing dam wall.

K220 road (M & T Development) - Water use license amendment. ***Gauteng, 2013. Water use consultant.*** Conducting the amendment WULA for the proposed new K220 road connecting to the R21.

Kameeldrift Feedlot and Abattoir, Cullinan - Water use license amendment. ***Gauteng, 2013/4. Water use consultant.*** Conducting the WULA and responding to public participation issues for the abstraction and storage of water, irrigation with and discharge of waste water and abattoir effluent treatment.

Land Parcel 8 commercial development (Atterbury Properties), Midrand - Water use license. ***Gauteng, 2013. Water use consultant.*** Conducting the WULA for the construction of an Eskom substation, distribution warehouse park and associated dual carriageway to cross an area of wetland.

Land Parcel 21 commercial development (Atterbury Properties), Buccleugh, Midrand - Water use license. ***Gauteng, 2013. Water use consultant.*** Conducting the WULA for the construction of Cell C customer care service centre and associated widening of the K101 culverts.

Land Parcel 3 commercial development (Atterbury Properties), Midrand - Water use license. ***Gauteng, 2014. Water use consultant.*** Conducting the public participation process and WULA for the construction of a distribution warehouse park.

Mleki's Beef Feedlot (Department of Rural Development), Cullinan - Water use license. ***Gauteng, 2013. Water use consultant.*** Conducting the WULA for the abstraction and storage of water, irrigation with and discharge of waste water.

Newcastle Filling Station (Sasol), Newcastle - Water use license. ***Gauteng, 2013/4. Water use consultant.*** Conducting the WULA for construction of a Sasol petrol station within 1:100 year floodline.

Rietvlei Farm Village mixed residential development, Pretoria - Water use license. ***Gauteng, 2013/4. Water use consultant.*** Conducting the WULA for a large residential development with school, sports facilities, horse stables, small agricultural activities and own sewerage treatment plant.

Secunda mixed commercial/business development, Secunda - Water use license. ***Gauteng, 2013/4. Water use consultant.*** Conducting the WULA for a mixed use development in Secunda CBD for an access road crossing a stormwater channel and development within 1:100 year floodline.

Six Fountains mixed commercial/residential development (Uniqon Wonings), Hazeldean, Pretoria - Water use license. ***Gauteng, 2013/4. Water use consultant.*** Conducting the WULA for a large residential and business development within 500m from a wetland with a wetland road crossing.

Teak Place mixed commercial/residential development, Cradle of Humankind - Water use license. ***Gauteng, 2013/4. Water use consultant.*** Conducting the WULA for an environmentally friendly residential and business development with wetland road crossings and own sewerage treatment plants.

Lion Park, Lanseria. ***Gauteng 2006. Resource consultant.*** Adaptive Management Plan for tourism park reserve with specific focus on alien vegetation and fire regime.

Manyane Game Farm, Dinokeng. ***Gauteng 2005. Resource consultant.*** Adaptive Management Plan for private game farm with focus on stocking rates for hunting purposes.

Mangwa Valley Game Lodge, Dinokeng. ***Gauteng 2005. Resource consultant.*** Adaptive Management Plan for private game lodge with focus on stocking rates for tourism purposes.

Monate Game Lodge, Nylstroom, ***Limpopo 2004***. ***Resource consultant.*** Annual vegetation monitoring to update proposed stocking densities for tourism and hunting purposes.

ECOLOGICAL CONTROL OFFICER (ECO)

Brakpan x 13 ECO, 2022. *Conducting monthly surface water quality monitoring, annual habitat assessments and external audits according to the Water Use License.*

Entokozweni Water Treatment Works WUL ECO, 2021. *Conducting weekly in situ surface water quality monitoring for the rising main pipeline installation according to GA conditions.*

Bartlett x 86 WUL ECO and Water Quality 2020 – 2022. *Conducting monthly surface water quality monitoring, annual habitat assessments and audits according to the Water Use License.*

Springs Shopping Mall – WUL ECO and Water Quality, 2019 - 2022. *Conducting monthly surface water quality monitoring, monthly borehole level measurement, groundwater quality monitoring, annual habitat assessments and audits according to the Water Use License.*

Java Crescent Pedestrian Bridge construction – ECO and Water Quality, 2019. *Conducting weekly water quality monitoring, annual habitat assessments and audits according to the General Authorisation, weekly ECO audits as per Environmental Authorisation.*

Netcare Milpark Hospital expansion – ECO, 2017 – 2020. *Conducting monthly environmental audits of construction activities on site and compilation of a monthly audit report for Netcare.*

Celtisdal X65 and X66 residential development – ECO, 2014 - present. *Conducting bimonthly environmental audits of construction activities on site and compilation of a monthly audit report for Central Developments. Conducting quarterly water quality sampling for x 65 and bi-weekly for x 66 and compiling reports.*

Vulcania Cemetery - ECO, 2015. *Conducting bimonthly environmental audits of construction activities on site and compilation of a monthly audit report for* **the Memorial Park Services, Gauteng.**

Boardwalk x 18 residential development – ECO, 2014 - 2016. *Conducting bimonthly environmental audits of construction activities on site and compilation of a monthly audit report for Central Developments.*

Proclamation hill Sasol Filling station – ECO, 2015. *Conducting bimonthly environmental audits of construction activities on site and compilation of a monthly audit report for Mr Fahim Moosa.*

Heuweloord residential development – ECO, 2014-2015. *Conducting bimonthly environmental audits of construction activities on site and compilation of a monthly audit report for Central Developments.*

Equestria X250 retirement village development – ECO, 2014 - 2015. *Conducting monthly environmental audits of construction activities on site and compilation of a monthly audit report for Central Developments.*

Olivedale Retirement village – ECO, 2013-2015. *Conducting weekly environmental audits of construction activities on site and compilation of a monthly audit report for Central Development.*

WATER USE LICENCE AUDITS

- **PFG Glass Springs (PFG Springs),** New Era Erf 325 IR, Springs. **Annual External WUL Audits 2021 - 2022.**
- **Bundu Sand Mine (Gomes Sand, Mnandi),** Portion 15 Doornrandjie 386 JR. **Annual External WUL Audit 2021 - 2022.**

  Auditor for Bundu Mine for the DWS Audit 2022.
- **Sky Sands Mine (Sky Sands, Vereeniging),** Portion 7 of Panfontein 467 IR. **Annual External WUL Audit 2021.**

  Auditor for Sky Sands Mine for the DWS Audit 2022.
- **Modder East Gold One Mine (New Kleinfontein Gold Mine),** Remaining extent of the Farm Cloverfield 75 IR, Springs. **Annual External WUL Audits 2019 - 2021.**
- **Donkerhoek Quarry (Raumix),** Portions of the farm Donkerhoek 365 JR, Pretoria. **Annual External WUL Audit 2019.**
- **Springs Mall,** Portions 97 & 170 of the Farm Daggafontein 125 IR, Springs, Gauteng. **Bi-annual External WUL Audits 2019 – 2021; Annual External WUL Audit 2022.**
- **Bartlett x 86,** Portion 978 (a portion of portion 240) of the Farm Klipfontein No 83 IR. **Annual External WUL Audits 2020 - 2022.**
- **Linmed Hospital WUL (Netcare Property Holdings (Pty) Ltd),** Erf 2553 Rynfield Ext 27, Benoni. **Annual External WUL Audit 2018.**

- **University of Johannesburg, Doornfontein Campus, Auckland Park. Annual External WUL Audit 2018.**
- **Priontex Borehole WUL (Priontex Microclean Pty Ltd), Randjiesfontein**. **Annual External WUL Audits 2018, 2020 - 2022.**
- **Vogelstruisfontein Sand Mine (Lengeo (Pty) Ltd), Randfontein. Annual External WUL Audits 2019 - 2022.**

  Auditor for Vogelstruisfontein Mine for the DWS Audit 2022.
- **Celtisdal X65 and X66 residential development, Rooihuiskraal. External WUL audit 2018.**

WUL IMPLEMENTATION – UPDATING OF IWWMP & RSIP

Afrisam Rooikraal IWWMP, RSIP & WUL Amendment (Afrisam). *Water use administration consultant*, 2022. Updating of IWWMP and RSIP; amendment of specific license conditions to align administrative requirements with the site activities.

Afrisam Rheebok IWWMP, RSIP & WUL Amendment (Afrisam). *Water use administration consultant*, 2022. Updating of IWWMP and RSIP with water uses including disposing of waste that could impact the resource. Amendment of specific license conditions to align administrative requirements with the low impact on receiving resources.

Afrisam Jukskei IWWMP & RSIP (Afrisam). *Water use administration consultant*, 2022. Updating of IWWMP and RSIP with water uses surface water abstraction, impeding a watercourse, altering watercourse characteristics, disposing of waste that could impact the resource, discharging of water containing waste.

Afrimat Dundee, Hluhluwe, Ulundi & Vryheid GN 704 motivations. *Water use administration consultant*, 2022. Compiling the GN 704 (1999, in terms of the NWA, Act 36 of 1998) motivations for exemption from specific requirements relating to this regulation.

MeatMasters Abattoir (MeatMasters) IWWMP, *Water use administration consultant*, 2017. Portion 19 of Farm Dagbreek 786, Vryheid, Kwazulu-Natal.

SPECIALIST REPORTS

Ridge Report for the development of CoE Botanical Gardens, for City of Ekurhuleni Municipality, 2021.

Ridge Report for the S24G application for Lenasia x 29 on Portion 113 of the Farm Roodepoort 302, IQ, 2020.

Ridge Report for the Residential Development on Portion 443 of Rietvallei 180, IQ, Muldersdrift, 2018, 2019.

Ridge Ecology Assessment for the **Lanseria Open Space Plan**, for City of Johannesburg Municipality, 2019.

Constructed Wetland Plant Species Plan for Ekurhuleni Metropolitan Municipality, Kaalspruit, 2017.

Ridge Report for the Residential Development on Portion 16 of the farm Kraalkop 147 IQ, Fochville, 2017.

Ridge Report for the Trade Route 88 kV Power Line and Switching Station, 2016.

Ridge Report for the Discharge pipeline to the mine on the Remainder of the farm Louwsbaken 476-JR, 2016.

Ridge Report for the Refilwe WWTW on portions of the farm Doornkraal 420-JR, Kafferskraal 475-JR and Louwsbaken 476-JR, 2016.

Ridge Report for the Aloe Ridge Caravan Park on Portion 68 of the farm Leeuwkloof 285-JR, 2016.

EDUCATION

2015 – 2017 University of Johannesburg
MSc Aquatic Health
Cum Laude

2007 – 2008 Tshwane University of Technology
Baccalaureus Technologiae Nature Conservation
Cum Laude

2004 – 2006 Tshwane University of Technology
National Diploma Nature Conservation
Cum Laude

AFFILIATIONS

International Association of Impact Assessment South Africa member (IAIAsa)
Wetland Society of South Africa member (SAWS)
Water Institute of South Africa member (WISA)
Klipriviersberg Sustainability Association member (KlipSA)

ARTICLES

Peer review publication accepted by Springer Environmental Monitoring and Assessment.

- Burger, M, J.H.J van Vuren, L. de Wet and A. Nel. **A Comparison of Water Quality and Macro-invertebrate Community Structure in Endorheic Depression Wetlands and a Salt Pan in the Gauteng Province, South Africa.** *Department of Zoology, University of Johannesburg, Auckland Park, South Africa.*

Agricultural lifestyle journal – information provided on which the following articles were based:

- Bronberger, Nov 2016, Aan wie behoort die water?
- Bronberger, Mar 2017, Besproeiing kan jou in die tronk laat beland.

COURSES

2022 Surface Water Management in Mining (Ilanda Water Services & Water Business Academy (Pty) Ltd)

2018 Hydropedology and wetland functioning (Terrasoil & Water Business Academy)

2018 Water Use License Auditing DWS training (Department of Water & Sanitation)

2014 Instream Use DWS training (Department of Water & Sanitation)

2012 Conservation Medicine course (National Research Foundation)

2009 Peace officer training (GDARD)

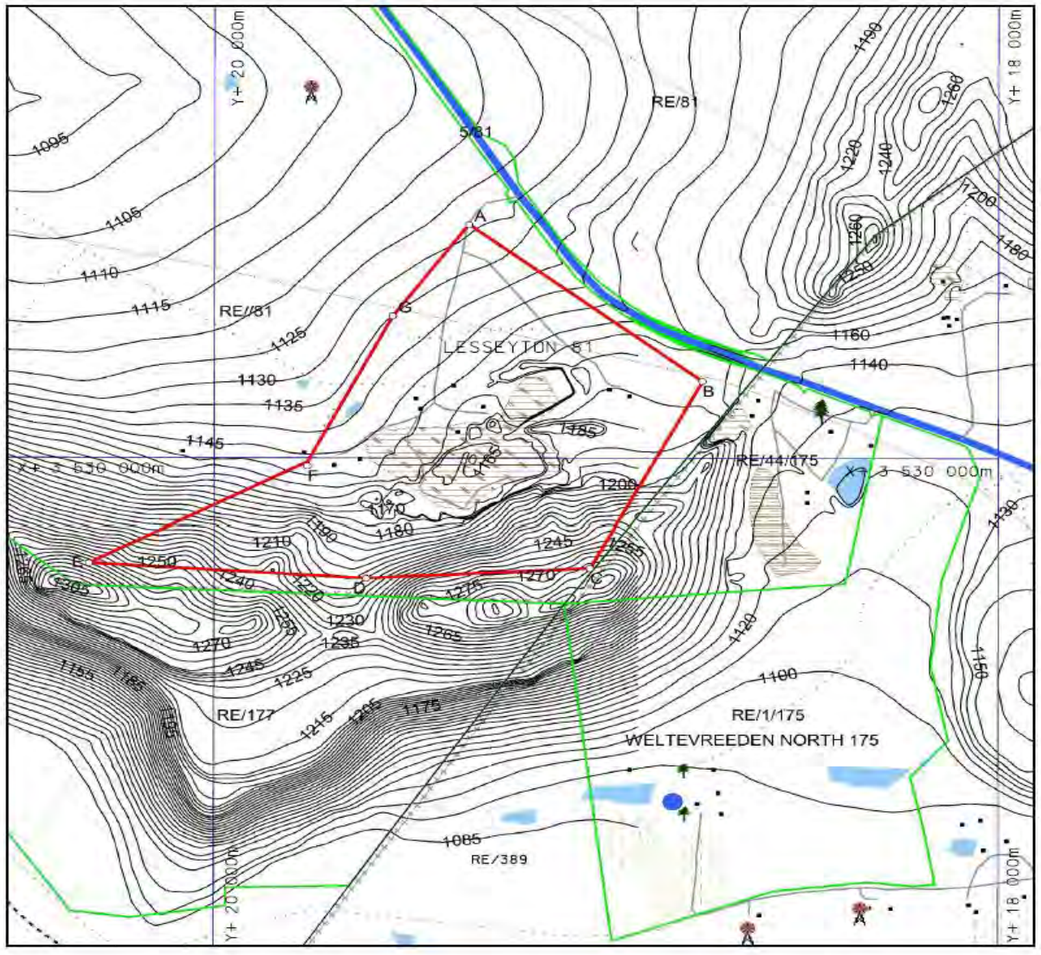
2008 Compliance and Control training course (GDARD)

2007 Environmental Management Inspectorate (EMI) training course (University of Pretoria & Department of Environmental Affairs

2001 Writing, editing, design seminar (Rhodes University)

1999 Basic Photography Course

3. APPENDIX 3: REGULATION 22 PLAN SHOWING THE LOCATION AND EXTENT OF THE APPICATION AREA.



Legend

Application Area

Farm & Portion Boundaries

Scale 1 : 15 000

REGULATION 2(2) PLAN EC 30/5/1/2/2 (.....) (MR)

Queenstown Quarry (Pty) Ltd
Co Reg No: 1996/006053/07

SIDES Meters		ANGLES OF DIRECTION	CO-ORDINATES WGS 84 WG 27		
				Y+	X+
AB	761.111	308:28:31	A	19350.504	3529294.995
BC	630.015	26:53:49	B	18754.648	3529768.540
CD	572.186	86:57:30	C	19039.660	3530330.400
DE	708.505	93:43:21	D	19611.040	3530360.760
EF	634.010	241:28:32	E	20318.050	3530314.760
FG	491.498	206:12:34	F	19761.000	3530012.000
GA	337.063	215:01:10	G	19543.929	3529571.035

IN EXTENT: 79.3270 Ha

LOCALITY PLAN

LEGEND

RIGHT DESCRIPTION

The figure lettered A,B,C,D,E,F,G,H,J,K,L,M,N and A, represents the remaining extent of the farm Lesseyton 81, within the Magisterial District of Queenstown, in respect of which application is made for a Mining Right to mine Aggregate in terms of Section 23 of the Minerals and Petroleum Resources Development Act (Act 28 of 2002),as amended.

Compiled by:Genpec Consulting (Pty) Ltd

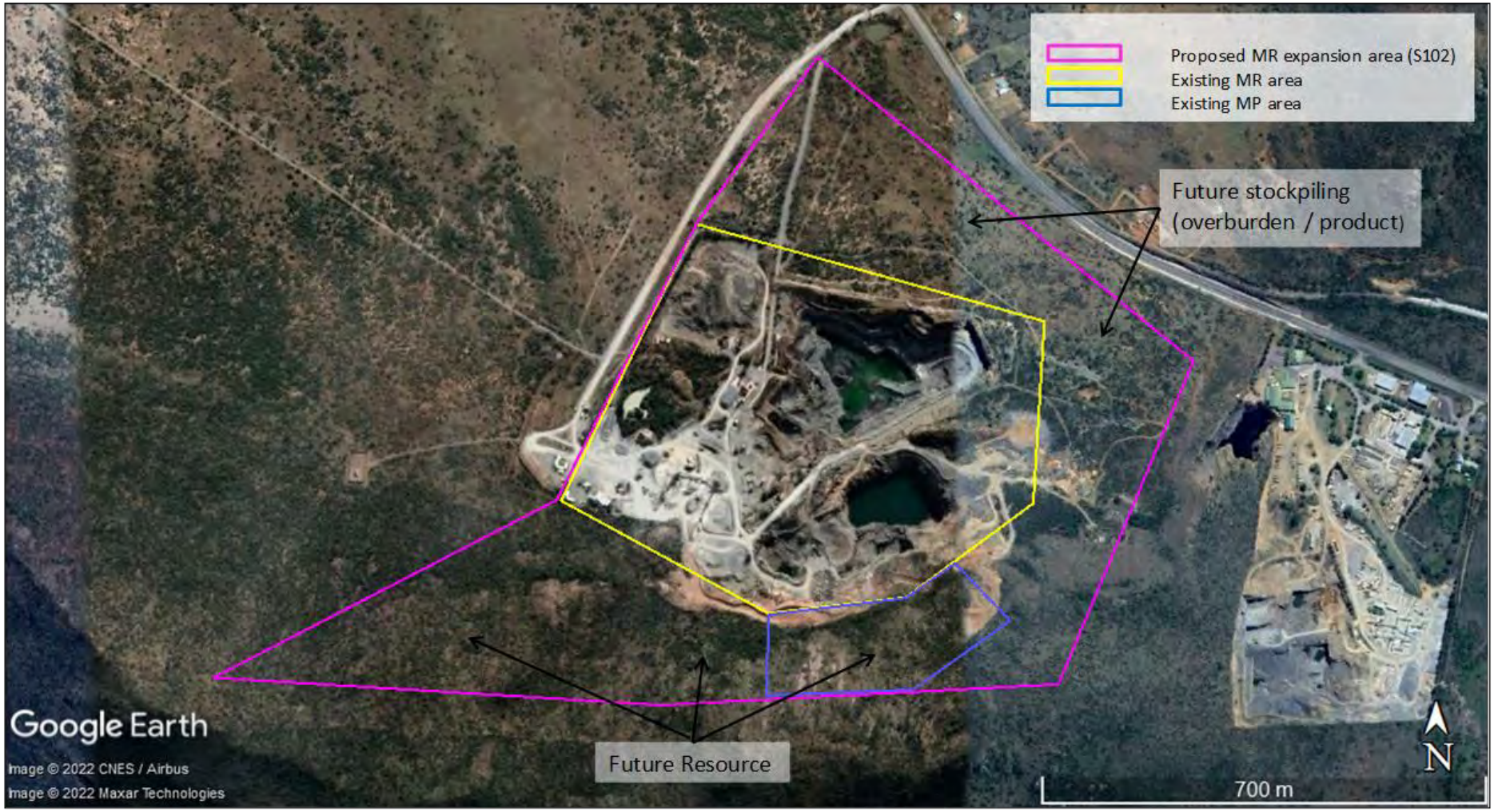
P O Box 603
Fochville
2515

Mobile: 0824664278
E-Mail: eddie@cfmcc.co.za

Date 5 June 2022

Signed Date:	
Approved Date:	

4. APPENDIX 4: MAP SHOWING THE LOCATION AND EXTENT OF THE EXISTING AND FUTURE ACTIVITIES.



5. APPENDIX 5: BIODIVERSITY SPECIALIST STUDY

Terrestrial Biodiversity and Plant Species Assessment

prepared in accordance with the
"Protocol for the Specialist Assessment and minimum report content requirements for environmental impacts on Terrestrial Plant Species and Terrestrial Biodiversity"

Mining Right Extension at Raumix Aggregates (Pty) Ltd – Queenstown Quarry site in the Eastern Cape Province

David Hoare Consulting (Pty) Ltd

David Hoare
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Lynnwood Manor
Pretoria

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david@davidhoareconsulting.co.za

Terrestrial Biodiversity and Plant Species Assessment Report for the Mining Right Extension at Raumix Aggregates (Pty) Ltd – Queenstown Quarry site in the Eastern Cape Province.

13 September 2022

TABLE OF CONTENTS

SPECIALIST DETAILS & DECLARATION

This report has been prepared in accordance with the "Protocol for the specialist assessment and minimum report content requirements for environmental impacts on **terrestrial biodiversity**" and "**plant species**", as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020. It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows –

Table 1: Details of Specialists

Specialist	Qualifications
Dr David Hoare	PhD Pr.Sci.Nat. 400221/05 (Ecological Science, Botanical Science)

Details of Author:
Dr David Hoare

PhD (Botany) – Nelson Mandela Metropolitan University, Port Elizabeth

Main areas of specialisation

- Vegetation and general ecology (grasslands, savanna, Albany thicket, fynbos, coastal systems, wetlands).
- Plant biodiversity and threatened plant species specialist.
- Alien plant identification and control / management plans.
- Remote sensing, analysis and mapping of vegetation.
- Specialist consultant for environmental management projects.

Professional Natural Scientist, South African Council for Natural Scientific Professions, Reg. no. 400221/05 (Ecology, Botany)
Member, International Association of Vegetation Scientists (IAVS)
Member, Ecological Society of America (ESA)
Member, International Association for Impact Assessment (IAIA)
Member, Herpetological Association of Africa (HAA)

Employment history

- 1 December 2004 – present, Director, David Hoare Consulting (Pty) Ltd. Consultant, specialist consultant contracted to various companies and organisations.
- 1January 2009 – 30 June 2009, Lecturer, University of Pretoria, Botany Dept.
- 1January 2013 – 30 June 2013, Lecturer, University of Pretoria, Botany Dept.
- 1 February 1998 – 30 November 2004, Researcher, Agricultural Research Council, Range and Forage Institute, Private Bag X05, Lynn East, 0039. Duties: project management, general vegetation ecology, remote sensing image processing.

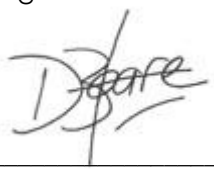
Declaration of independence:

David Hoare Consulting (Pty) Ltd in an independent consultant and hereby declare that it does not have any financial or other vested interest in the undertaking of the proposed activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998). In addition, remuneration for services provided by David Hoare Consulting (Pty) Ltd is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

Disclosure:

David Hoare Consulting (Pty) Ltd undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and will provide the competent authority with access to all information at its disposal regarding the application, whether such information is favourable to the applicant or not.

Based on information provided to David Hoare Consulting (Pty) Ltd by the client and in addition to information obtained during the course of this study, David Hoare Consulting (Pty) Ltd present the results and conclusion within the associated document to the best of the author's professional judgement and in accordance with best practise.



_____ 13 September 2022

Dr David Hoare Date

TERMS OF REFERENCE

The specialist study is required to follow the published Protocols, provided in full below for the assessment of impacts on Terrestrial Biodiversity and on Plant Species. Note that the Protocols require determination of the level of sensitivity, which then determines the level of assessment required, either a full assessment, or a Compliance Statement.

PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL BIODIVERSITY

This site sensitivity assessment follows the requirements of The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020.

General information

1.1. An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being of "**very high sensitivity**" for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment.

1.2. An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being "**low sensitivity**" for terrestrial biodiversity, must submit a Terrestrial Biodiversity Compliance Statement.

1.3. However, where the information gathered from the site sensitivity verification differs from the designation of "very high" terrestrial biodiversity sensitivity on the screening tool and it is found to be of a "low" sensitivity, then a Terrestrial Biodiversity Compliance Statement must be submitted.

1.4. Similarly, where the information gathered from the site sensitivity verification differs from that identified as having a "low" terrestrial biodiversity sensitivity on the screening tool, a Terrestrial Biodiversity Specialist Assessment must be conducted.

1.5. If any part of the proposed development footprint falls within an area of "very high" sensitivity, the assessment and reporting requirements prescribed for the "very high" sensitivity apply to the entire footprint, ***excluding linear activities*** *for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, can be returned to the current state within two years of the completion of the construction phase*, in which case a compliance statement applies. Development footprint in the context of this protocol means the area on which the proposed development will take place and includes any are that will be disturbed.

Terrestrial Biodiversity Specialist Assessment

2.1. The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with expertise in the field of terrestrial biodiversity.

2.2. The assessment must be undertaken on the preferred site and within the proposed development footprint.

2.3. The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:

> 2.3.1. a description of the ecological drivers or processes of the system and how the proposed development will impact these;

2.3.2. ecological functioning and ecological processes (e.g. fire, migration, pollination, etc.) that operate within the preferred site;

2.3.3. the ecological corridors that the proposed development would impede including migration and movement of flora and fauna;

2.3.4. the description of any significant terrestrial landscape features (including rare or important flora-faunal associations, presence of strategic water source areas (SWSAs) or freshwater ecosystem priority area (FEPA) sub catchments;

2.3.5. a description of terrestrial biodiversity and ecosystems on the preferred site, including:

(a) main vegetation types;

(b) threatened ecosystems, including listed ecosystems as well as locally important habitat types identified;

(c) ecologicalconnectivity,habitatfragmentation,ecologicalprocessesandfine-scale habitats; and

(d) species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified;

2.3.6. the assessment must identify any alternative development footprints within the preferred site which would be of a "low" sensitivity as identified by the screening tool and verified through the site sensitivity verification; and

2.3.7. the assessment must be based on the results of a site inspection undertaken on the preferred site and must identify:

2.3.7.1. terrestrial critical biodiversity areas (CBAs), including:

(a) the reasons why an area has been identified as a CBA;

(b) an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;

(c) the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to the remaining extent of the ecosystem type(s);

(d) the impact on ecosystem threat status;

(e) the impact on explicit subtypes in the vegetation;

(f) the impact on overall species and ecosystem diversity of the site; and

(g) the impact on any changes to threat status of populations of species of conservation concern in the CBA;

2.3.7.2. terrestrial ecological support areas (ESAs), including:

(a) the impact on the ecological processes that operate within or across the site;

(b) the extent the proposed development will impact on the functionality of the ESA; and

(c) loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna;

2.3.7.3. protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including-

(a) an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan;

2.3.7.4. priority areas for protected area expansion, including-

(a) the way in which in which the proposed development will compromise or contribute to the expansion of the protected area network;

2.3.7.5. SWSAsincluding:

(a) the impact(s) on the terrestrial habitat of a SWSA; and

(b) the impacts of the proposed development on the SWSA water quality and quantity (e.g. describing potential increased runoff leading to increased sediment load in water courses);

2.3.7.6. FEPAsubcatchments,including-

(a) theimpactsoftheproposeddevelopmentonhabitatconditionand species in the FEPA sub catchment;

2.3.7.7 indigenous forests, including:

(a) impact on the ecological integrity of the forest; and

(b) percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.

2.4. The findings of the assessment must be written up in a Terrestrial Biodiversity Specialist Assessment Report.

Terrestrial Biodiversity Specialist Assessment Report

3.1. The Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:

3.1.1. contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;

3.1.2. a signed statement of independence by the specialist;

3.1.3. a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;

3.1.4. a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;

3.1.5. a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;

3.1.6. a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);

3.1.7. additional environmental impacts expected from the proposed development;

3.1.8. any direct, indirect and cumulative impacts of the proposed development;

3.1.9. the degree to which impacts and risks can be mitigated;

3.1.10. the degree to which the impacts and risks can be reversed;

3.1.11. the degree to which the impacts and risks can cause loss of irreplaceable resources;

3.1.12. proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);

3.1.13. a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;

3.1.14. a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and

3.1.15. any conditions to which this statement is subjected.

3.2.The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.

3.3. A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL PLANT SPECIES

This site sensitivity assessment follows the requirements of The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020.

General information

1.1 An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "**very high**" or "**high**" sensitivity for terrestrial plant species, must submit a Terrestrial Plant Species Specialist Assessment Report.

1.2 An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "**medium** sensitivity" for terrestrial plant species, must submit either a Terrestrial Plant Species Specialist Assessment Report or a Terrestrial Plant Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.

1.3 An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "**low**" sensitivity for terrestrial plant species, must submit a Terrestrial Plant Species Compliance Statement.

1.4 Where the information gathered from the site sensitivity verification differs from the screening tool designation of "very high" or "high" for terrestrial plant species sensitivity on the screening tool, and it is found to be of a "low" sensitivity, then a Terrestrial Plant Species Compliance Statement must be submitted.

1.5 Where the information gathered from the site sensitivity verification differs from the screening tool designation of "low" terrestrial plant species sensitivity and it is found to be of a "very high" or "high" terrestrial plant species sensitivity, a Terrestrial Plant Species Specialist Assessment must be conducted.

1.6 If any part of the development falls within an area of confirmed "very high" or "high" sensitivity, the assessment and reporting requirements prescribed for the "very high" or "high" sensitivity, apply to the entire development footprint. Development footprint in the context of this protocol, means the area on which the proposed development will take place and includes the area that will be disturbed or impacted.

1.7 The Terrestrial Plant Species Specialist Assessment and the Terrestrial Plant Species Compliance Statement must be undertaken within the study area.

1.8 Where the nature of the activity is not expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.

1.9 Where the nature of the activity is expected to have an impact on SCC beyond boundary of the preferred site, the project areas of influence (PAOI) must be determined by the specialist in accordance with Species Environmental Assessment Guideline, and the study area must include the PAOI, as determined.

Terrestrial Plant Species Specialist Assessment

2.1 The assessment must be undertaken by a specialist registered with the South African Council for Natural Scientific Professions (SACNASP), within a field of practice relevant to the taxonomic groups ("taxa") for which the assessment is being undertaken.

2.2 The assessment must be undertaken within the study area.

2.3 The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline and must:

2.3.1 Identify the SCC which were found, observed or are likely to occur within the study area;

2.3.2 provide evidence (photographs) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);

2.3.3 identify the distribution, location, viability and detailed description of population size of the SCC identified within the study area;

2.3.4 identify the nature and the extent of the potential impact of the proposed development to the population of the SCC located within the study area;

2.3.5 determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases including the IUCN Red List of Threatened Species, Red List of South African Plants, and/or other relevant databases;

2.3.6 determine the potential impact of the proposed development on the habitat of the SCC located within the study area;

2.3.7 include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, a motivation for the deviation;

2.3.8 identify any dynamic ecological processes occurring within the broader landscape, that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems;

2.3.9 identify any potential impact on ecological connectivity within the broader landscape, and resulting impacts on the identified SCC and its long term viability;

2.3.10 determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC; and

2.3.11 discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species; and

2.3.12 identify any alternative development footprints within the preferred development site which would be of "low" sensitivity" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification.

2.4 The findings of the assessment must be written up in a Terrestrial Plant Species Specialist Assessment Report.

Terrestrial Plant Species Specialist Assessment Report

3.1 This report must include as a minimum the following information:

3.1.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;

3.1.2 a signed statement of independence by the specialist;

3.1.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;

3.1.4 a description of the methodology used to undertake the site sensitivity verification and impact assessment and site inspection, including equipment and modelling used where relevant;

3.1.5 a description of the assumptions made and any uncertainties or gaps in knowledge or data;

3.1.6 a description of the mean density of observations/number of samples sites per unit area of site inspection observations;

3.1.7 details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;

3.1.8 the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;

3.1.9 the location of areas not suitable for development and to be avoided during construction where relevant;

3.1.10 a discussion on the cumulative impacts;

3.1.11 impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);

3.1.12 a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not, of the development related to the specific theme considered, and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and

3.1.13 a motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having "low" or "medium" terrestrial plant species sensitivity and were not considered appropriate.

3.2 A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

Terrestrial plant species compliance statement

Where the sensitivity in the Screening Report from the web-based Online Screening Tool has been confirmed to be LOW, a Plant Species Compliance Statement is required, either (1) for areas where no natural habitat remains, or (2) in natural areas where there is no suspected occurrence of SCC.

The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Botanical Science or Ecological Science).

The compliance statement must:
1. be applicable within the study area
2. confirm that the study area is of "low" sensitivity for terrestrial plant species; and
3. indicate whether or not the proposed development will have any impact on SCC.

The compliance statement must contain, as a minimum, the following information:
1. contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;
2. a signed statement of independence by the specialist;
3. a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
4. a baseline profile description of biodiversity and ecosystems of the site;
5. the methodology used to verify the sensitivities of the terrestrial biodiversity and plant species features on the site including the equipment and modelling used where relevant;
6. in the case of a linear activity, confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;
7. where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;
8. a description of the assumptions made as well as any uncertainties or gaps in knowledge or data; and
9. any conditions to which this statement is subjected.

A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

LIMITATIONS, ASSUMPTIONS & UNCERTAINTIES

The following assumptions, limitations, uncertainties are listed regarding the ecological assessment of the site:

- The assessment is based on a field survey conducted on 28 March 2022. The current study is based on a detailed site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas. The seasons in which the fieldwork (peak summer flowering period) was conducted was ideal for assessing the composition and condition of the vegetation.
- The vegetation was in good condition for sampling at the time of the field assessment, and the species lists obtained are considered reliable and relatively comprehensive.
- Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. Due to time constraints inherent in the EIA process, this was not possible for this study. However the comprehensive field survey is sufficient for the purposes of this report and towards sufficiently informing the decision making process by the Competent Authority.

INTRODUCTION

Site location

The site is immediately to the west of Komani (Queenstown) in the Eastern Cape. Refer to Figure 1 below for the general location. A recent aerial image of the site is provided in Figure 2. It is located alongside the N6 national road from Bloemfontein / Aliwal North a few kilometres before Komani.

The total area of the site is approximately 183 ha. A full habitat assessment undertaken on site shows that natural habitat includes primarily thornveld and thicket vegetation. There is an existing operational quarry on site that occupies approximately 45 ha.

The scope of this report is the entire property, although only part is affected by the application.

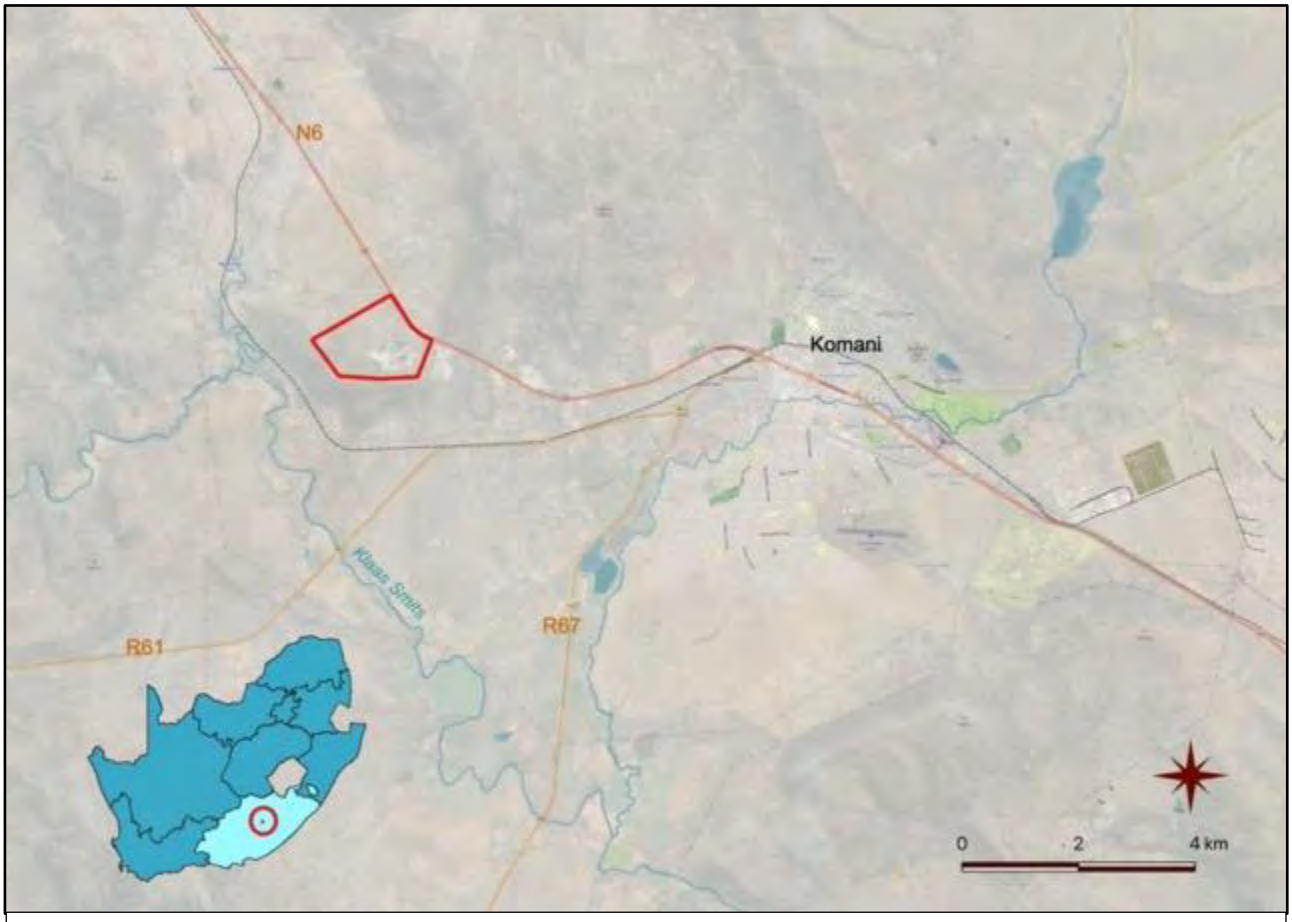


Figure 1: Location of the site.

Figure 2: Aerial image of the site and surrounding areas.

Identified Theme Sensitivity

A sensitivity screening report from the DFFE Online Screening Tool was requested in the application category: Mining|Mining Permit. The DFFE Screening Tool report for the area, dated 06/02/2022, indicates the following sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Terrestrial Biodiversity Theme	X			
Plant Theme			X	

Terrestrial Biodiversity theme

Sensitivity features are indicates as follows:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Critical biodiversity area 2

Figure 3: Screening Tool map of Terrestrial Biodiversity Theme sensitivity.

Plant Species theme

Sensitivity features are indicates as follows:

Sensitivity	Feature(s)
Medium	Indigofera ovina
Medium	Asparagus spinescens
Medium	Asclepias compressidens
Medium	Sensitive species 1248

The spatial extent of the sensitive features, as extracted from the DFFE Screening Tool report output, is shown in Figure 3 for Terrestrial Biodiversity Theme and Figure 4 for Plants Theme.

In accordance with GN 320 and GN 1150 (20 March 2020) of the NEMA EIA Regulations of 2014 (as amended), prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (i.e., Screening Tool).

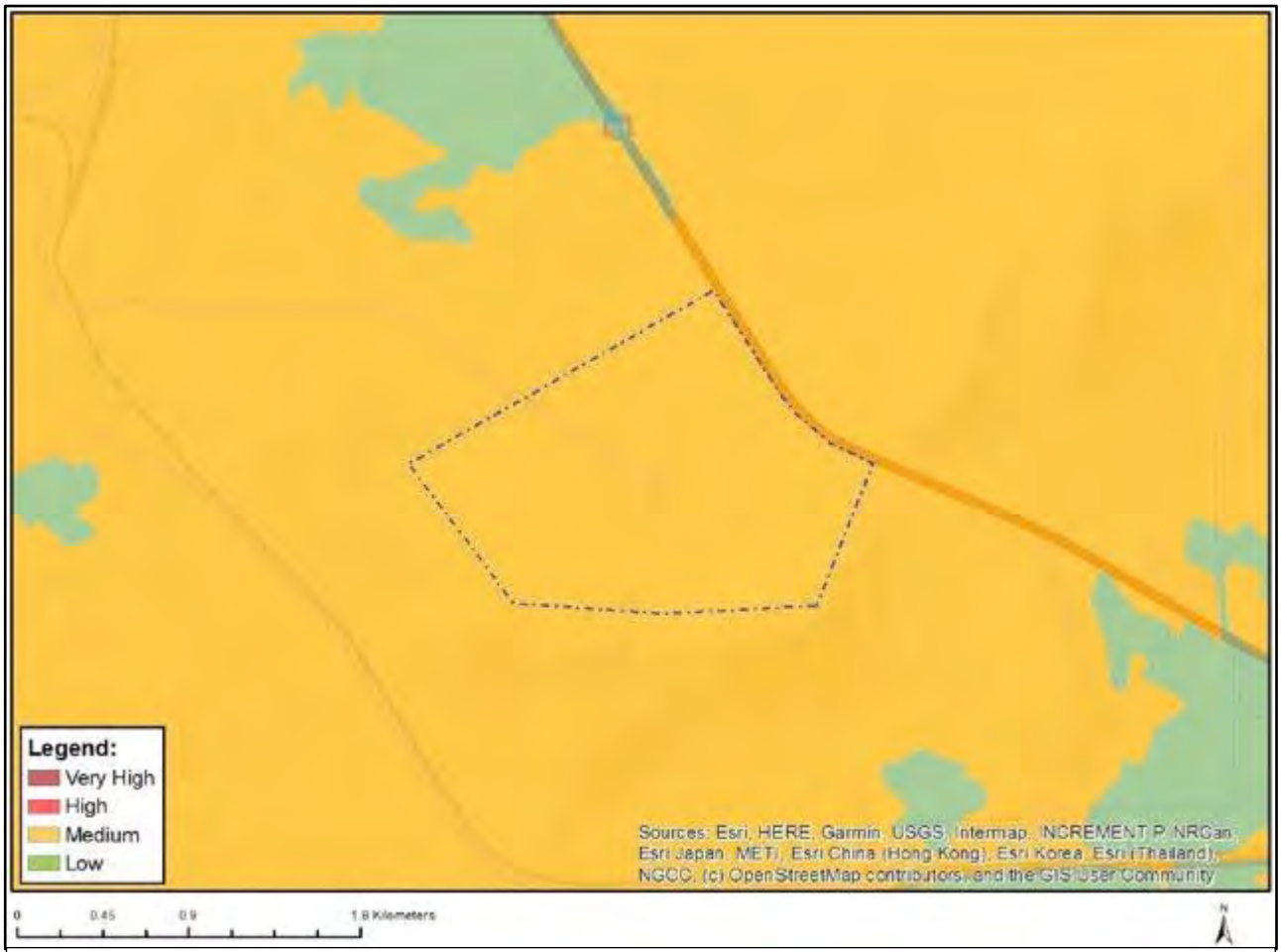


Figure 4: Screening Tool map of Plant Species Theme sensitivity.

ASSESSMENT METHODOLOGY

The detailed methodology followed as well as the sources of data and information used as part of this assessment is described below.

Project Area of Influence (PAOI)

The proposal is to expand the existing quarry within the boundaries of the study area. Anticipated impacts will occur during the construction and operation phases, with possible effects anticipated downslope of mining works. These impacts are not expected to extend beyond the boundaries of the study area. The PAOI is therefore treated here as the development footprint within which direct impacts will occur.

Survey timing

The study commenced as a desktop-study followed by site-specific field study on 28 March 2022. The site is within the Grassland Biome with a summer peak rainfall season and a strong dip in mid-winter (Figure 5). Rainfall seasonality drives most ecological processes. The timing of the survey in late summer is therefore optimal in terms of assessing the flora and vegetation of the site. The overall condition of the vegetation was possible to be determined with a high degree of confidence.

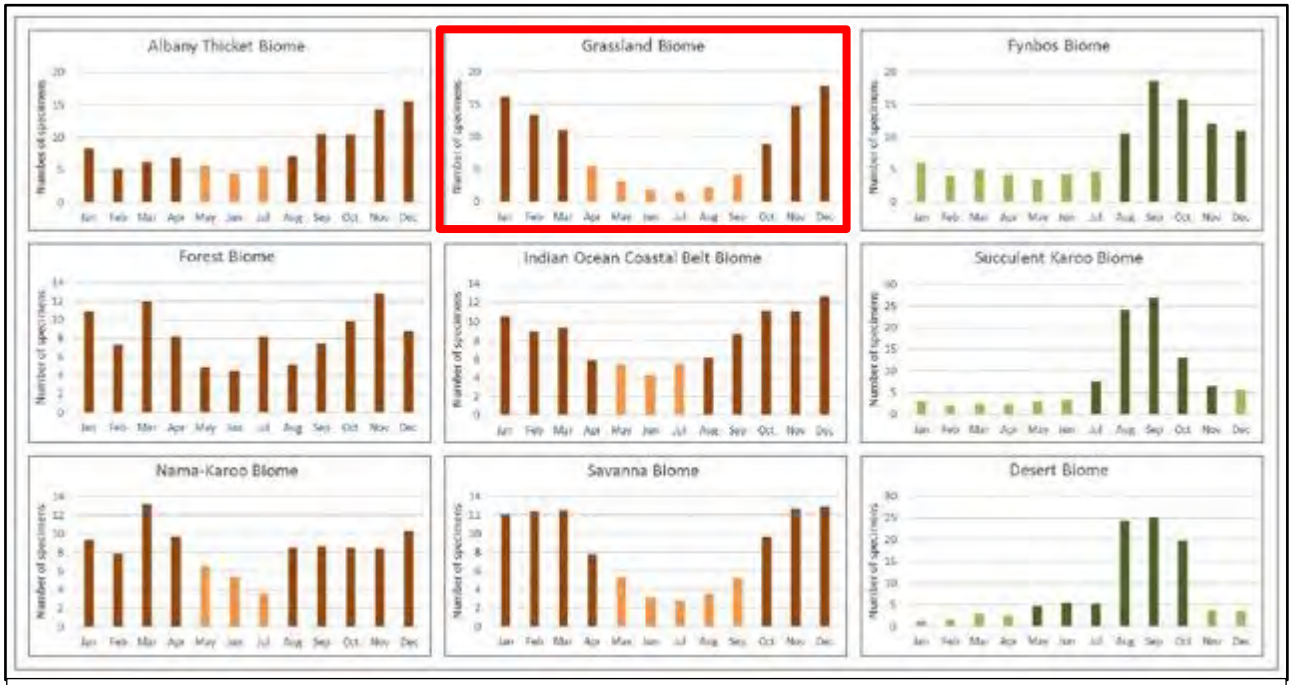


Figure 5: Recommended survey periods for different biomes (Species Environmental Assessment Guidelines).

Field survey approach

During the field survey, all major natural variation on site was assessed and select locations were traversed on foot. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made.

Aerial imagery from Google Earth was used to identify and assess habitats on site. Patterns identified from satellite imagery were verified on the ground. During the field survey, particular attention was paid to ensuring that all habitat variability was covered physically on the ground during the search for plant species. From this ground survey, as well as ad hoc observations on site, a checklist of plant species occurring on site was compiled (Appendix 1).

Digital photographs were taken of all plant species that were seen on site. All plant species recorded were uploaded to the iNaturalist website.

Aerial imagery from Google Earth was used to identify and assess habitats on site. This included historical imagery that may show information not visible in any single dated image. Patterns identified from satellite imagery were verified on the ground.

Sources of information

Regional Vegetation

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (http://bgis.sanbi.org), as follows:
    - Mucina, L. and Rutherford, M.C. (editors) 2006. Vegetation map of South Africa, Lesotho and Swaziland: an illustrated guide. Strelitzia 19, South African National Biodiversity Institute, Pretoria.
    - South African National Biodiversity Institute 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland [Vector] 2018. Available from the Biodiversity GIS website, downloaded on 23 September 2021.

Threatened Ecosystems

- The conservation status of the vegetation types were obtained from Mucina and Rutherford (2006) and the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004). Updates from the National Biodiversity Assessment 2018 were taken into consideration, although these have not yet been gazetted.
- The plant species checklist of species that could potentially occur on site was compiled from a plant species checklist extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grid 2821CA.
- The IUCN Red List Category for plant species, as well as supplementary information on habitats and distribution, was obtained from the SANBI Threatened Species Programme (Red List of South African Plants, http://redlist.sanbi.org).

Regional plans

- Information from the National Protected Areas Expansion Strategy (NPAES) was consulted for possible inclusion of the site into a protected area in future (available on http://bgis.sanbi.org).).
- The 2019 Eastern Cape Biodiversity Conservation Plan maps were used to determine inclusion of any parts of the site into any Critical Biodiversity Areas or Ecological Support Areas (ECBCP, 2019. Available from the Biodiversity GIS website (biodiversityadvisor.sanbi.org)).

Plant species

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (Error! Hyperlink reference not valid.). The description of each vegetation type includes a list of plant species that may be expected to occur within the particular vegetation type.
- Plant species that could potentially occur on in the general area was extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grids in which the site is located.
- The IUCN Red List status for plant species, as well as supplementary information on habitats and distribution, was obtained from the SANBI Threatened Species Programme (Red List of South African Plants, Error! Hyperlink reference not valid.).
- Lists were compiled specifically for any species at risk of extinction (Red List species) previously recorded in the area. Historical occurrences of threatened plant species were obtained from the South African National Biodiversity Institute (Error! Hyperlink reference not valid.) for the quarter degree grids within which the study area is situated. Habitat information for each species was obtained from various published sources. The probability of finding any of these species was then assessed by comparing the habitat requirements with those habitats that were found, during the field survey of the site, to occur there.
- Regulations published for the National Forests Act (Act 84 of 1998) (NFA) as amended, provide a list of protected tree species for South Africa. The species on this list were assessed in order to determine which protected tree species have a geographical distribution that coincides with the study area and habitat requirements that may be met by available habitat in the study area. The distribution of species on this list were obtained from published sources (e.g. van Wyk & van Wyk 1997) and from the SANBI database (www.newposa.sanbi.org) for quarter degree grids in which species have been previously recorded. Species that have been recorded anywhere in proximity to the site (within 50 km), or where it is considered possible that they could occur there, were listed and were considered as being at risk of occurring there.

RELEVANT LEGISLATIVE AND PERMIT REQUIREMENTS

Relevant legislation is provided in this section to provide a description of the key legal considerations of importance to the proposed project. The applicable legislation is listed below.

Convention on Biodiversity (CBD)

South Africa became a signatory to the United Nations Convention on Biological Diversity (CBD) in 1993, which was ratified in 1995. The CBD requires signatory states to implement objectives of the Convention, which are the conservation of biodiversity; the sustainable use of biological resources and the fair and equitable sharing of benefits arising from the use of genetic resources. According to Article 14 (a) of the CBD, each Contracting Party, as far as possible and as appropriate, must introduce appropriate procedures, such as environmental impact assessments of its proposed projects that are likely to have significant adverse effects on biological diversity, to avoid or minimize these effects and, where appropriate, to allow for public participation in such procedures.

National Environmental Management Act, Act No. 107 of 1998 (NEMA)

NEMA is the framework environmental management legislation, enacted as part of the government's mandate to ensure every person's constitutional right to an environment that is not harmful to his or her health or wellbeing. It is administered by DEA but several functions have been delegated to the provincial environment departments. One of the purposes of NEMA is to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment. The Act further aims to provide for institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state and to provide for the administration and enforcement of other environmental management laws.

NEMA requires, inter alia, that:

- "development must be socially, environmentally, and economically sustainable",
- "disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied." ,
- "a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions".

NEMA states that "the environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage."

This report considers the Environmental Impact Assessment (EIA) Regulations of 2014 (NEMA, 2014) as amended in 2017 (NEMA, 2017), under the National Environmental Management Act, (Act No. 107 of 1998). According to these Regulations under Listing Notice 1 (GRN No. 327), Listing Notice 2 (GRN No 325) and Listing Notice 3 (GRN No 324), the activities listed are identified as activities that may require Environmental Authorisation prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of the Act.

National Environmental Management: Biodiversity Act (Act No 10 of 2004)

As the principal national act regulating biodiversity protection, NEM:BA, which is administered by DEA, is concerned with the management and conservation of biological diversity, as well as the use of indigenous biological resources in a sustainable manner. The term biodiversity according to the Convention on Biodiversity (CBD) refers to the variability among living organisms from all sources including, inter alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity in genes, species and ecosystems.

In terms of the Biodiversity Act, the developer has a responsibility for:

- The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations).
- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

Chapter 4 of the Act relates to threatened or protected ecosystems or species. According to Section 57 of the Act, "Restricted activities involving listed threatened or protected species":

- (1) A person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7.

Such activities include any that are "of a nature that may negatively impact on the survival of a listed threatened or protected species".

Alien and Invasive Species

Chapter 5 of NEM:BA relates to species and organisms posing a potential threat to biodiversity. The Act defines alien species and provides lists of invasive species in regulations. The Alien and Invasive Species (AIS) Regulations, in terms of Section 97(1) of NEM:BA, was published in Government Notice R598 in Government Gazette 37885 in 2014 (NEM:BA, 2014). The Alien and Invasive Species (AIS) lists were subsequently published in Government Notice R 864 of 29 July 2016 (NEM:BA, 2016).

According to Section 75 of the Act, "Control and eradication of listed invasive species":

- (1) Control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs.
- (2) Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.
- (3) The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.

The National Environmental Management: Biodiversity Act (NEMBA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Chapter 5 of the Act relates to species and organisms posing a potential threat to biodiversity. The purpose of Chapter 5 is:

a) to prevent the unauthorized introduction and spread of alien species and invasive species to ecosystems and habitats where they do not naturally occur;
b) to manage and control alien species and invasive species to prevent or minimize harm to the environment and to biodiversity in particular;
c) to eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats;

According to Section 65 of the Act, "Restricted activities involving alien species":

1) A person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7. Restricted activities include the following:
    a. Importing into the Republic, including introducing from the sea, any specimen of a listed invasive species.
    b. Having in possession or exercising physical control over any specimen of a listed invasive species.
    c. Growing, breeding or in any other way propagating any specimen of a listed invasive species, or causing it to multiply.
    d. Conveying, moving or otherwise translocating any specimen of a listed invasive species.
    e. Selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any other way acquiring or disposing of any specimen of a listed invasive species.
    f. Spreading or allowing the spread of any specimen of a listed invasive species.
    g. Releasing any specimen of a listed invasive species.
    h. Additional activities that apply to aquatic species.
2) A permit referred to in subsection (1) may be issued only after a prescribed assessment of risks and potential impacts on biodiversity is carried out.
3)

An "**alien species**" is defined in the Act as:

a) a species that is not an indigenous species; or
b) an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by means of migration or dispersal without human intervention.

According to Section 71 of the Act, "Restricted activities involving listed invasive species":

1) A person may not carry out a restricted activity involving a specimen of a listed invasive species without a permit issued in terms of Chapter 7.
2) A permit referred to in subsection (1) may be issued only after a prescribed assessment of risks and potential impacts on biodiversity is carried out.

An "**invasive species**" is defined in the Act as any species whose establishment and spread outside of its natural distribution range:

a) threaten ecosystems, habitats or other species or have demonstrable potential to threaten ecosystems, habitats or other species; and
b) may result in economic or environmental harm or harm to human health.

A "**listed invasive species**" is defined in the Act as any invasive species listed in terms of section 70(1).

According to Section 73 of the Act, "Duty of care relating to listed invasive species":

2) A person who is the owner of land on which a listed invasive species occurs must-
    a) notify any relevant competent authority, in writing, of the listed invasive species occurring on that land;
    b) take steps to control and eradicate the listed invasive species and to prevent it from spreading; and
    c) take all the required steps to prevent or minimize harm to biodiversity.

According to Section 75 of the Act, "Control and eradication of listed invasive species":

- (1) Control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs.
- (2) Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.

- (3) The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.

Government Notice No. 1002 of 2011: National List of Ecosystems that are Threatened and in need of protection

Published under Section 52(1)(a) of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). This Act provides for the listing of threatened or protected ecosystems based on national criteria. The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the National Spatial Biodiversity Assessment (2004).

The EIA Regulations (2014, as amended) include three lists of activities that require environmental authorisation:

- Listing Notice 1: activities that require a basic assessment (GNR. 327 of 2014, as amended),
- Listing Notice 2: activities that require a full environmental impact assessment report (EIR) (GNR. 325 of 2014, as amended),
- Listing Notice 3: activities that require a basic assessment in specific identified geographical areas only (GNR. 324 of 2014, as amended).

GNR 151: Critically Endangered, Endangered, Vulnerable and Protected Species List

Published under Section 56(1) of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004).

GNR 1187: Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List

Published under Section 56(1) of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004).

Government Notice No. 40733 of 2017: Draft National Biodiversity Offset Policy

Published under the National Environmental Management Act (Act No. 107 of 1998). The aim of the Policy is to ensure that significant residual impacts of developments are remedied as required by NEMA, thereby ensuring sustainable development as required by section 24 of the Constitution of the Republic of South Africa, 1996. This policy should be taken into consideration with every development application that still has significant residual impact after the Mitigation Sequence has been followed. The mitigation sequence entails the consecutive application of avoiding or preventing loss, then at minimizing or mitigating what cannot be avoided, rehabilitating where possible and, as a last resort, offsetting the residual impact. The Policy specifies that one impact that has come across consistently as unmitigatable is the rapid and consistent transformation of certain ecosystems and vegetation types, leading to the loss of ecosystems and extinction of species. The Policy specifically targets ecosystems where the ability to reach protected area targets is lost or close to being lost. However, the Policy states that "*[w]here ecosystems remain largely untransformed, intact and functional, an offset would not be required for developments that lead to transformation, provided they have not been identified as a biodiversity priority*". Biodivesity offsets should be considered to remedy residual negative impacts on biodiversity of 'medium' to 'high' significance. Residual impacts of 'very high' significance are a fatal flaw for development and residual biodiversity impacts of 'low' significance would usually not require

offsets. The Policy indicates that impacts should preferably be avoided in protected areas, CBAs, verified wetland and river features and areas earmarked for protected area expansion.

National Forests Act (Act no 84 of 1998)

Protected trees
According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any *protected tree*, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'.

Forests
Prohibits the destruction of indigenous trees in any natural forest without a licence.

National Water Act (Act 36 of 1998)

Wetlands, riparian zones and watercourses are defined in the Water Act as a water resource and any activities that are contemplated that could affect the wetlands requires authorisation (Section 21 of the National Water Act of 1998). A "watercourse" in terms of the National Water Act (Act 36 of 1998) means:

- River or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and

Any collection of water which the Minister may, by notice in the gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

Conservation of Agricultural Resources (Act No. 43 of 1983) as amended in 2001

Declared Weeds and Invaders in South Africa are categorised according to one of the following categories:

- Category 1 plants: are prohibited and must be controlled.
- Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands.

National Veld and Forest Fire Act (Act No. 101 of 1998)

Provides requirements for veldfire prevention through firebreaks and required measures for fire-fighting. Chapter 4 of the Act places a duty on landowners to prepare and maintain firebreaks. Chapter 5 of the Act places a duty on all landowners to acquire equipment and have available personnel to fight fires.

Nature and Environmental Conservation Ordinance, No. 19 of 1974

This Ordinance provides for the protection of nature and matters relating to environmental conservation. It originally covered the geographical areas of the Western Cape Province, Eastern Cape Province (excluding the former Ciskei and Transkei) and parts of North West Province (excluding the former Boputhatswana) but is being repealed by Provincial Acts. It is proposed in

the Western Cape Biodiversity Draft Bill, 2019, that the Ordinance is repealed in so far as it relates to the Western Cape Province. It is currently still in force and includes a list of protected species.

OUTCOME OF THE ASSESSMENT

Broad vegetation patterns

There are two regional vegetation types in the study area, namely Queenstown Thornveld Gs16 and Tarkastad Montane Shrubland Gs17 (distribution relative to the site shown in Figure 6). The national vegetation map is, however, not mapped at a fine scale and it is probable that local topography could support other habitat types, such as thicket or low forest. The vegetation type that occurs on site and nearby areas, according to the national map, is briefly described below (as taken from Rebelo et al. 2006, Mucina et al. 2006).

Queenstown Thornveld

Distribution

Eastern Cape Province: From the vicinity of Queenstown in the east to the vicinity of Tarkastad in the west, and Sterkstroom in the north. Altitude 980–1 500 m.

Vegetation & Landscape Features

Flat bottomlands of intramountain basins with adjacent slopes supporting a complex of Acacia natalitia thornveld and grassland dominated by Aristida congesta, Cymbopogon pospischilii, Eragrostis curvula and Tragus koelerioides, with scattered shrubs and low Acacia in places (Hoare 1997, Hoare & Bredenkamp 1999).

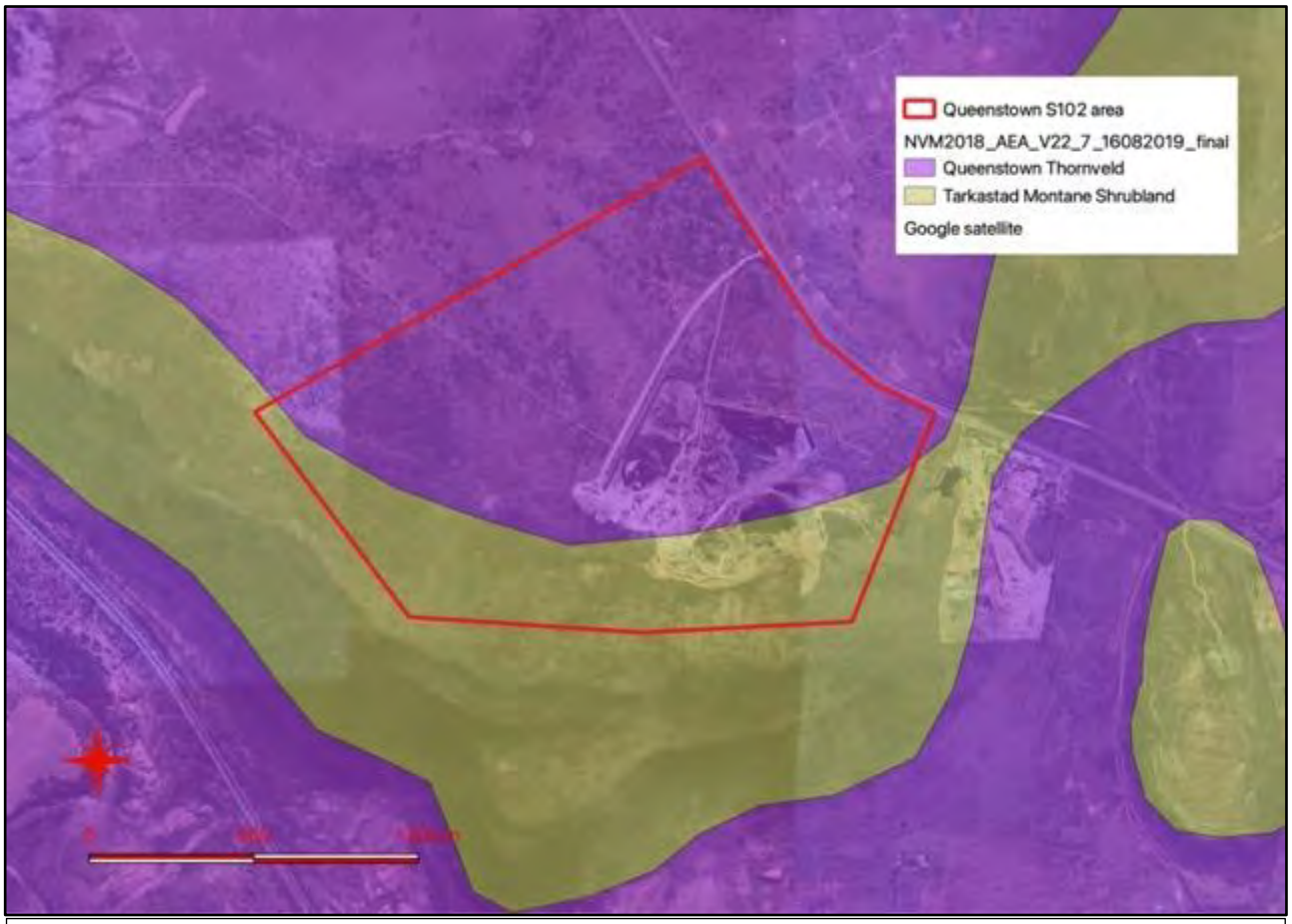


Figure 6: Regional vegetation types of the site and surrounding areas.

Geology & Soils

Sedimentary rocks of the Tarkastad Subgroup (Beaufort Group, Karoo Supergroup) overlain with clay-loam soils typical of Da and Fc land types.

Climate

Rainfall peaks in late summer. MAP mainly 380 mm in the west, increasing to 640 mm in the east. The coefficient of variation in MAP from 28–34% across the unit. Incidence of frost is 22–58 days, higher in the northwest than the southeast.

Important Taxa

Small Tree*: Acacia natalitia (d)*.
Tall Shrub*: Euryops floribundus (d)*.
Low Shrubs*: Asparagus laricinus, Atriplex semibaccata var. appendiculata, Felicia filifolia subsp. filifolia, F. muricata, Helichrysum asperum var. albidulum, H. dregeanum, Melolobium microphyllum, Pentzia globosa, Sutera pinnatifida, Tephrosia capensis var. acutifolia.*
Succulent Shrub*: Hertia pallens.*
Graminoids*: Aristida canescens (d), A. congesta (d), A. diffusa (d), Cymbopogon pospischilii (d), Cynodon incompletus (d), Digitaria argyrograpta (d), D. eriantha (d), Eragrostis chloromelas (d), E. curvula (d), E. lehmanniana (d), E. obtusa (d), E. trichophora (d), Heteropogon contortus (d), Microchloa caffra (d), Panicum stapfianum (d), Themeda triandra (d), Tragus koelerioides (d), Brachiaria serrata, Cynodon dactylon, Cyperus usitatus, Elionurus muticus, Eustachys paspaloides, Microchloa kunthii, Sporobolus fimbriatus, Tragus racemosus.*
Herbs*: Arctotis microcephala, Blepharis integrifolia var. clarkei, Commelina africana, Cyanotis speciosa, Gazania krebsiana subsp. krebsiana, Helichrysum pedunculatum, H. rugulosum, Hermannia depressa, Indigofera alternans, Salvia stenophylla, Senecio asperulus, Tribulus terrestris.*
Herbaceous Climber*: Rhynchosia totta.*
Geophytic Herbs*: Oxalis corniculata, O. depressa*.

Tarkastad Montane Shrubland

Distribution

Eastern Cape and marginally into Northern Cape Province: Noupoort, Middelburg and a point west of Cradock define the western extent of this unit and Cathcart, Queenstown and Sterkstroom the eastern extent. The unit falls within the area between the Great Escarpment in the north, marked by the Bamboesberg and Stormberg Mountains, and the minor escarpment, marked by the Winterberg and Amathole Mountains in the south. Altitude 1 020–1 780 m.

Vegetation & Landscape Features

Ridges, hills and isolated mountain slopes, characterised by high surface rock cover, this often consisting of large, round boulders. The vegetation is low, semi-open, mixed shrubland with 'white' grasses and dwarf shrubs forming a prominent component of the vegetation.

Geology & Soils

Sedimentary rocks of the Tarkastad Subgroup (Beaufort Group, Karoo Supergroup), widely affected by intrusions of Jurassic dolerites forming numerous dykes and sills. Soils typical of land types Ib, Fb and Fc.

Climate

Rainfall in late summer to autumn (peak in February–March). MAP 280–720 mm (overall MAP 470 mm), increasing from west to east. Coefficient of variation of MAP from 22–35% across the unit (31% overall APCV), decreasing with distance eastwards. Incidence of frost 7–68 days (average: 39 days), increasing with proximity to the Escarpment.

Important Taxa

Succulent Tree*: Aloe ferox (d)*.
Small Tree*: Acacia karroo complex.*
Tall Shrubs*: Diospyros austro-africana (d), Cadaba aphylla, Ehretia rigida, Rhus burchellii, Tarchonanthus minor.*
Woody Climbers*: Asparagus racemosus, A. retrofractus.*
Low Shrubs*: Euryops annae (d), Aptosimum elongatum, Asparagus striatus, Blepharis mitrata, B. villosa, Chrysocoma ciliata, Diospyros pallens, Eriocephalus ericoides, Felicia filifolia subsp. filifolia, F. muricata, Gymnosporia heterophylla, Helichrysum dregeanum, H. zeyheri, Hermannia filifolia, Indigofera sessilifolia, Lantana rugosa, Limeum aethiopicum, Melolobium microphyllum, Nenax*

microphylla, Pegolettia retro¬fracta, Pentzia globosa, Phymaspermum parvifolium, Rosenia humilis, Sutera pinnatifida, Wahlenbergia albens.
Succulent Shrubs*: Lycium schizocalyx, Pachypodium succulentum, Sarcocaulon camdeboense.*
Semiparasitic Shrub*: Thesium hystrix.*
Graminoids*: Aristida adscensionis (d), A. congesta (d), A. diffusa (d), Cynodon incompletus (d), Enneapogon scoparius (d), Eragrostis chloromelas (d), E. lehmanniana (d), E. obtusa (d), Heteropogon contortus (d), Tragus berteronianus (d), T. koelerio¬ides (d), Chloris virgata, Cymbopogon pospischilii, Digitaria eriantha, Eragrostis curvula, Eustachys paspaloides, Fingerhuthia africana, Sporobolus fimbriatus, Themeda triandra, Tragus racemosus.*
Herbs*: Commelina africana, Gazania krebsiana subsp. krebsiana, Hibiscus pusillus, Indigofera alternans, Lepidium africanum subsp. africanum, Tribulus terrestris.*
Geophytic Herbs*: Asplenium cordatum, Boophone disticha, Cheilanthes deltoidea, C. hirta, Oxalis depressa.*
Succulent Herb*: Crassula muscosa.*
Biogeographically Important Taxa ([SE]Sub-Escarpment Grassland endemic, [E]Eastern distribution limit)
Small Tree: *Encephalartos friderici-guilielmi*[SE].
Low Shrubs: *Eriocephalus africanus*[E]*, Senecio acutifolius*[E].

Conservation status of broad vegetation types

According to scientific literature (Driver *et al*., 2005; Mucina *et al*., 2006), as shown in Table 3, the vegetation types are listed as Least threatened.

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation. The vegetation types are not listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

Table 2: Conservation status of different vegetation types occurring in the study area.

Vegetation Type	Conservation status		
	Driver *et al*. 2005; Mucina *et al*., 2006	National Ecosystem List (NEMBA) (GN1002 of 2011)	NSBA 2018
Queenstown Thornveld	Least threatened	Least Concern	Least Concern
Tarkastad Montane Shrubland	Least threatened	Least Concern	Least Concern

It is therefore verified that the site does not occur within a Listed Ecosystem, as listed in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011) and therefore has LOW sensitivity with respect to this attribute.

Biodiversity Conservation Plans

The Eastern Cape Biodiversity Conservation Plan (ECBCP) classifies the habitats of the province according to conservation value in decreasing value, as follows:

1. Protected Areas (PA) = map category 6;
2. Critical Biodiversity Areas 1 (CBA1) = map category 5;
3. Critical Biodiversity Areas 2 (CBA2) = map category 4;
4. Ecological Support Area 1 (ESA1) = map category 3;
5. Ecological Support Area 2 (ESA2) = map category 2;

The ECBCP map for the site (ECBCP 2019) shows that significant parts of the site (all untransformed area) are within a CBA2 area (Figure 7). The CBA2 area continues beyond the boundaries of the site. According to the ECBCP Technical Report, CBA2 areas include best design sites from MARXAN analysis for meeting targets for vegetation types, species points and expert-defined areas, as well as selected cliffs buffered by 100 m, other forest patches, and Bearded and Cape Vulture home ranges. This indicates that the remaining vegetation on site is considered to be important for the conservation of biodiversity in the Province as well as for maintaining ecological patterns in the landscape.

This desktop description verifies that the site is included in conservation zones and that an on-site assessment is required to verify the sensitivity of the site with respect to this attribute.

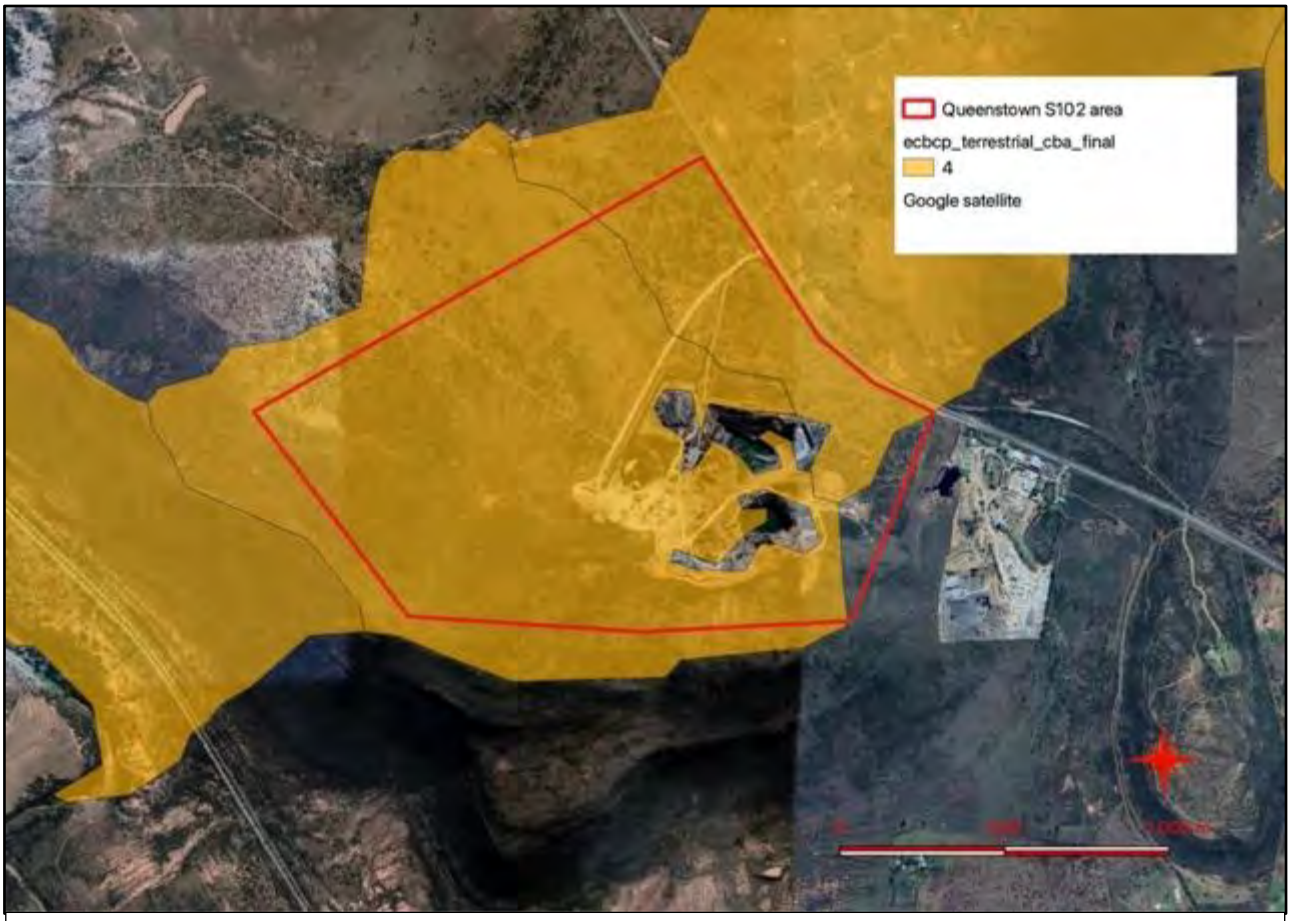


Figure 7: Eastern Cape Biodiversity Conservation Plan of the site and surrounding areas.

Proposed protected areas (NPAES Focus Areas)

According to the National Protected Areas Expansion Strategy 2008 (NPAES2008), there are no areas within the study area that have been identified as priority areas for inclusion in future protected areas. The study area is therefore **outside the NPAES focus area**. A draft updated National Protected Areas Expansion Strategy was published for public comment in 2018, but is deliberately not available as a spatial dataset. It does, however, indicate that each province is responsible for its own strategy. In practice, most provinces currently use the CBA map as a proposed protected area strategy.

Natural habitats on site

The natural habitats on site are determined by the presence of the ridge, which occurs along the southern boundary of the site and slopes down northwards. The main habitats on site largely follow the national vegetation types. The lowlands are covered with thornveld and the ridge has a relatively dense thicket interspersed with rocky outcrops. The various natural and transformed habitats that occur on site, shown in Figure 8. A panoramic view over the site from near the centre point of the southern boundary is shown in Figure 9.

The lowland plains areas are dominated by grasslands with thorn trees at differing densities (see

Figure 8: Map of habitats on site.

Figure 9: Panoramic view over the site from the ridge towards the north.

Figure 10). Typical species composition in these areas includes the following: the woody species, *Aloe ferox, Searsia pallens, Vachellia karroo and Ziziphus mucronate*, the grasses, *Aristida adscensionis, Cymbopogon pospischilii, Cynodon dactylon, Eragrostis obtusa, Microchloa caffra, Panicum coloratum, Tragus berteronianus, and Urochloa panicoides,* and the herbaceous species, *Berkheya heterophylla, Bidens bipinnata, Blepharis integrifolia, Commelina Africana, Crinum macowanii, Drimia capensis, Erigeron bonariensis, Falkia repens, Felicia muricata, Sida sp.,*

Glandularia aristigera, Hermannia depressa, Hibiscus pusillus, Kalanchoe rotundifolia, Monsonia angustifolia, Pseudognaphalium oligandrum, Schkuhria pinnata, Solanum incanum, Solanum tomentosum, Stapelia gigantea, Tagetes minuta, Tribulus terrestris and *Zinnia peruviana*.

The ridge has a higher diversity of woody species than the lowlands and is also a steeper landscape (see Figure 11). The species composition consists of the following: the woody species, *Aloe ferox, Celtis africana, Cussonia paniculata, Cussonia spicata, Diospyros scabrida, Ehretia rigida, Euclea crispa, Grewia occidentalis, Gymnosporia buxifolia, Lantana rugosa, Osyris lanceolata, Rhoicissus tridentata, Scolopia zeyheri, Searsia dentata, Searsia pallens, Viscum rotundifolium*, and *Ziziphus mucronata*, the herbaceous species, *Boophone disticha, Cheilanthes eckloniana, Cheilanthes viridis, Cotyledon orbiculata, Crystallopollen angustifolium, Datura stramonium, Dicliptera cernua, Euphorbia pulvinata, Berkheya sp., Euryops sp., Hypoxis sp., Lotononis sp., Helichrysum nudifolium, Ipomoea crassipes, Pellaea calomelanos, Rhynchosia totta*, and *Stachys aethiopica*, and the grasses, *Eustachys paspaloides, Fimbristylis ovata, Melinis nerviglumis*, and *Themeda triandra*. It also includes the spiny shrub, *Asparagus spinescens*, listed as Rare, and flagged as a species of concern for the site. In addition, a species of cycad occurs within this habitat.

There are some rocky outcrops on site, consisting of massive rounded boulders near the summit of the ridge (see Figure 12). These form crevices and rock-sheets, as well as areas where there is water seepage from the base of large rocks. These conditions create microhabitats that contain a number of species that occur nowhere else on site, including the following: *Albuca bracteata, Anacampseros arachnoides, Arctotis arctotoides, Asparagus spinescens, Cineraria deltoidea, Clausena anisata, Cliffortia linearifolia, Crassula dependens, Crassula lanuginosa, Crassula perfoliata, Cussonia paniculata, Cyphostemma cirrhosum, Diospyros scabrida, Euphorbia nutans,*

Figure 11: Typical ridge vegetation.

Euphorbia pulvinata, Ledebouria sp., Pelargonium sp., Polygala sp., Maytenus undata, Ophioglossum polyphyllum, Sansevieria hyacinthoides and *Zantedeschia albomaculata*.

Plant species flagged for the study area

According to the National Web-Based Environmental screening tool, three plant species have been flagged as of concern for the area the current project is in, these are listed below. A description of each species is provided.

Indigofera ovina

Vulnerable B1ab(iii)

This species is endemic to the Eastern Cape, where it occurs between Queenstown, Cathcart and Hogsback, where it occurs on the summits of rocky hills. It has been recorded from Fincham's Nek just south of Queenstown, as well as several times in the Amathola Mountains. The specific localities all have strong similarities to the current site. It therefore has a moderate chance of occurring on the site, where it is likely to occur within the ridge vegetation.

Asparagus spinescens

Rare

This is an Eastern Cape endemic distributed from Uitenhage to Queenstown, where it is found in thicket and grassland on mountain slopes and in valleys. It has only been observed a few times across it's range, but may have been overlooked due to being similar to other species of the genus Asparagus, of which there are 45 species in the Eastern Cape alone (Bredenkamp 2019). It was recorded twice on site, on the ridge and in the rocky outcrops (Figure 13). It is likely to be more widespread on site within the ridge habitat than what was observed.

Figure 12: Rock outcrops on site.

Asclepias compressidens

Rare

This is an Eastern Cape endemic distributed from Cradock to Queenstown and down towards Alexandria near the coast. It is found in grasslands in sparsely wooded thornveld. The closest historical record is approximately 10km from the site. It has a moderate to low chance of occurring on the site.

Sensitive species 1248

Vulnerable A2ad

Distributed from Eastern Cape to Limpopo Province. Widespread elsewhere in southern and eastern Africa. Found at low and medium altitudes, usually along mountain ranges and in thickly vegetated river valleys, often under bush clumps and in boulder screes, sometimes found scrambling at the margins of karroid, succulent bush in the Eastern Cape. Occurs in bushy kloofs at the coast and inland in KwaZulu-Natal. In Gauteng, Mpumalanga and North West Province it is often found in open woodland or on steep rocky hills usually in well-shaded situations. It tolerates wet and dry conditions, growing predominantly in summer rainfall areas with an annual rainfall of 200-800 mm. Previously recorded a number of times between Adelaid and Cofimvaba. It has a MODERATE chance of occurring on the site.

Figure 13: The Rare species, *Asparagus spinescens*, found on site on ridge and rocky outcrop.

SITE ECOLOGICAL IMPORTANCE

The Species Environmental Assessment Guidelines require that a Site Ecological Importance is calculated for each habitat on site, and provides methodology for making this calculation.

As per the Species Environmental Assessment Guidelines, Site Ecological Importance (SEI) is calculated as a function of the Biodiversity Importance (BI) of the receptor and its resilience to impacts (SEI = BI + RR). The Biodiversity Importance (BI) in turn is a function of Conservation Importance (CI) and Functional Integrity (FI), i.e. BI = CI + FI.

Mostly minor current negative ecological impacts with some major impacts (mining) and a few signs of minor past disturbance. Moderate rehabilitation potential.

Table 3: Site ecological importance for habitats found on site.

Habitat	Conservation importance	Functional integrity	Receptor resilience	Site Ecological Importance (BI)
Plains	Low No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species.	Medium Mostly minor current negative ecological impacts with some major impacts (mining) and a few signs of minor past disturbance. Moderate rehabilitation potential.	Low Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality	Medium (BI = Low)
Ridge	Medium Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only. Presence of range-restricted species.	Medium Mostly minor current negative ecological impacts with some major impacts (mining) and a few signs of minor past disturbance. Moderate rehabilitation potential.	Very low Habitat that is unable to recover from major impacts	High (BI = Medium)
Rock outcrops	Medium Presence of range-restricted species.	Medium Mostly minor current negative ecological impacts with some major impacts (mining) and a few signs of minor past disturbance. Moderate rehabilitation potential.	Very low Habitat that is unable to recover from major impacts	High (BI = Medium)
Transformed	Very low	Very low	Very high	Very low

	No natural habitat remaining.	Several major current negative ecological impacts.	Habitat that can recover rapidly	(BI = Very low)

Guidelines for development activities within different importance levels are given in the Table below.

Table 2: Guidelines for interpreting SEI in the context of the proposed development activities.

Site ecological importance	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/ not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities
Very low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

Habitat sensitivity

To determine ecological sensitivity in the study area, site-specific, local and regional factors were taken into account. A summary of sensitivities that occur on site and that may be vulnerable to damage from the proposed project are as follows:

1. CBA2 areas: All remaining natural habitat on site falls within this zone.

2. Plant species of concern: There is one species, *Asparagus spinescens*, listed as Rare, that was found twice on site (ridge and rocky outcrop). A Near Threatened sensitive species was also found on site near the base of the ridge. Two other listed plant species that potentially occur on site, *Indigofera ovina* and Sensitive species 1248. The key habitats are the ridge and the rocky outcrops on the ridge.

This information was used in conjunction with methodology to calculate Site Ecological Importance, described above. A map of habitat sensitivity on site is provided in Figure 14.

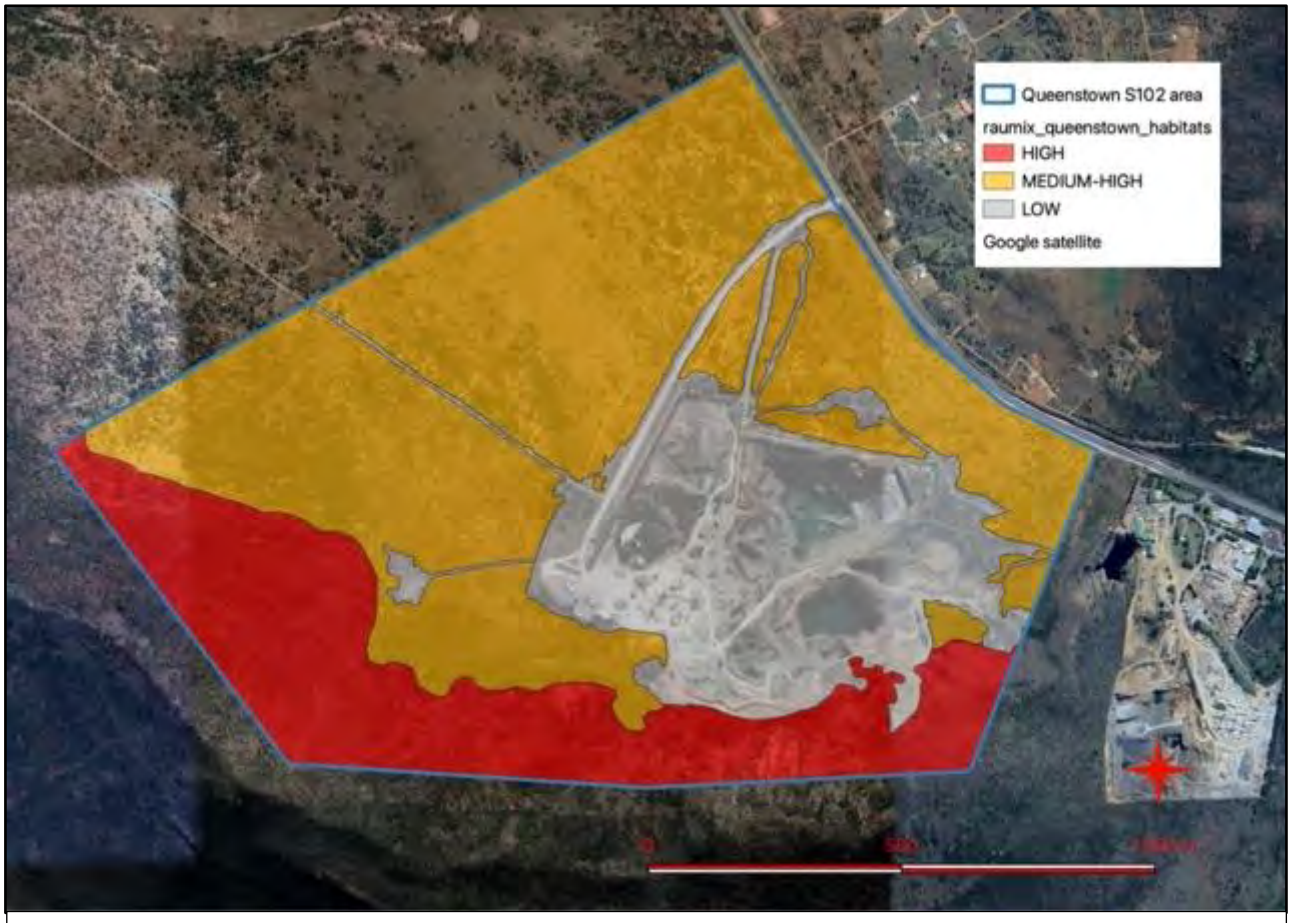


Figure 14: Habitat sensitivity on site.

IMPACT ASSESSMENT

Proposed development

The proposal is to extend the existing quarry upslope (towards the east). This will be towards the adjacent quarry. A small area of ridge habitat will be affected, as well as some degraded lowland areas. Approximately 5 ha of the ridge to the east of the rocky outcrops is expected to be impacted. Possible impacts are on natural habitat (ridge), which also constitutes CBA2 area, and on plant species of concern.

The amount of natural habitat potentially affected is relatively small compared to the extent of the site, and will also be in an area that is between the current quarry and the neighbouring one to the east. The amount of habitat affected is negligible relative to the extent of the vegetation type. It is also insignificant relative to the size of the CBA2 area.

In terms of plant species of concern, it is not expected that either of the two plant species that are confirmed to occur on site will be affected by the proposed activities. The location of the one sensitive plant species, listed as Near Threatened, is known to the mine manager. The proposed expansion avoids this species. The other species, *Asparagus spinescens*, will also not be directly affected and will persist on site.

The only impact assessed here is therefore as follows:

1. LOSS OF NATURAL HABITAT AS A RESULT OF CLEARING FOR MINE EXPANSION.

Loss of habitat

Extent of impact
The impact will occur at the local scale. It is estimated, based on the development plan and the habitat mapping, that a total of approximately 5 hectares of habitat is within the proposed development footprint. The total area of the vegetation type is measured in square kilometres.

Probability of occurrence
Based on the proposed development plan and the known location of the habitats found on site, the impact will be DEFINITE.

Reversibility of impact
Loss of habitat on site is probably IRREVERSIBLE - secondary vegetation seldom recovers to its original species composition. However, the affected habitat has already been impacted and is not in good condition.

Degree to which resources will be irreplaceably lost
The resource assessed here is the two vegetation types, both listed as Least Concern. In terms of the known extent of this habitat type, the loss of 5 ha is a MARGINAL loss of resources at a global scale. The other resource is the CBA2 area, which is similarly extensive relative to the amount of habitat that would be lost here, and for which there are extensive available areas for conservation planning to replace any significant lost areas.

Duration of impact
Loss of the habitat on site is assessed as being permanent.

Intensity or magnitude of impact
At a global scale, the impact is of LOW magnitude, since it would affect the global extent of the vegetation type imperceptibly.

Significance of impact
The calculation of the significance of an impact uses the following formula:

Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.

On this basis, the impact is calculated as [(Extent = 1) + (Probability = 5) + (Reversibility = 2) + (Irreplaceability = 2) + (Duration = 5)] x (Intensity = 2)

Score = 30 = MEDIUM significance

Possible mitigation measures
Possible mitigation measures that can be applied are as follows:

1. Ensure all possible steps are taken to limit erosion of surfaces, including proper management of storm-water runoff, so that downslope areas are protected from mine spillover.
2. For any additional expansion, undertake a walk-through surbvey to detect any plant species of concern that may possibly be affected. Where necessary, a permit may be required for plants lost to development.
3. No additional clearing of vegetation should take place without a proper assessment of the environmental impacts, unless for maintenance purposes, in which case all reasonable steps should be taken to limit damage to natural areas.
4. Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control.
5. Undertake regular monitoring to detect alien invasions early so that they can be controlled, as per the Alien Management Plan.

Due to the relatively small area of habitat proposed to be affected, no further measures are proposed here, with the overall biodiversity value of the site expected to remain stable.

CONCLUSION

The following conclusions can be made regarding the outcomes of the Terrestrial Biodiversity Assessment and Plant Species Assessment on site:

1. Parts of the site are in a natural state and have Very High sensitivity, according to the DFFE Screening Tool criteria. These are areas that have been included in a conservation planning zone, designated as CBA2, which are least cost areas for conserving representative areas of the vegetation types that occur on site. These two vegetation types are both assessed as being Least Concern and are therefore not threatened. In terms of the CBA2 area, the amount of habitat expected to be lost to the mine expansion is considered to be negligible relative to the extent of the CBA2 area.
2. There are two flagged plant species that occur on site, one a Near Threatened sensitive species, and the other a Rare species. Due to the location of these two species on site, neither is expected to be affected by the proposed mine expansion. Any future mine expansion may have to take these two species into account, but they are currently not affected.
3. The potential impact on natural habitat on site was assessed as having moderate significance. The level of this significance is due to the fact that the impact will definitely happen and will be permanent. However, the extent of the impact is very small (estimated to be about 5 ha) and is therefore negligible relative to the overall availablity of habitat within the particular vegetation types.
4. On the basis of the assessment here, the project is deemed acceptable from terrestrial biodiversity and plant species perspectives and it is recommended the Environmental Authorisation be granted. The author is of the opinion that the impacts associated with the project can be mitigated to acceptable levels provided the recommended mitigation measures identified are implemented.

REFERENCES

Bredenkamp, C.L. 2019. A Flora of the Eastern Cape Province. Strelitzia 41. Volume 1-3. South African National Biodiversity Institute, Pretoria.

CapeNature. 2017 WCBSP Bitou [Vector] 2017. Available from the Biodiversity GIS website, downloaded on 03 June 2022

ECBCP (2019) Eastern Cape Biodiversity Conservation Plan Handbook. Department of Economic Development and Environmental Affairs (King Williams Town). Compiled by G. Hawley, P. Desmet and D. Berliner.

Germishuizen, G., Meyer, N.L., Steenkamp, Y And Keith, M. (eds.) (2006). A checklist of South African plants. Southern African Botanical Diversity Network Report No. 41, SABONET, Pretoria.

Hoare, D.B. 1997. Syntaxonomy and synecology of the grasslands of the southern parts of the Eastern Cape. Submitted in partial fulfilment of the degree of Master of Science, University of Pretoria, Pretoria.

Hoare, D.B. 2009. Patterns and determinents of species richness in mesic, temperate grasslands of South Africa. PhD thesis, Nelson Mandela Metropolitan University, Port Elizabeth.

Hoare, D.B. & Bredenkamp, G.J. 1999. Grassland communities of the Amatola / Winterberg mountain region of the Eastern Cape, South Africa. South African Journal of Botany 64: 44-61.

Hoare, D.B. & Bredenkamp, G.J. 2001. Syntaxonomy and environmental gradients of the grasslands of the Stormberg / Drakensberg mountain region of the Eastern Cape, South Africa. South African Journal of Botany 67: 595 – 608.

IUCN (2001). *IUCN Red Data List categories and criteria: Version 3.1*. IUCN Species Survival Commission: Gland, Switzerland.

Mucina, L. And Rutherford, M.C. (editors) 2006. Vegetation map of South Africa, Lesotho and Swaziland: an illustrated guide. *Strelitzia* 19, South African National Biodiversity Institute, Pretoria.

National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. Synthesis Report. South African National Biodiversity Institute.

Rebelo, A.G., Boucher, C., Helme, N., Mucina, L., Rutherford, M.C., Smit, W.J., Powrie, L.W., Ellis, F., Lambrechts, J.J., Scott, L., Radloff, F.G.T., Johnson, S.D., Richardson, D.M., Ward, R.A., Procheş, S.M., Oliver, E.G.H., Manning, J.C., Jürgens, N., McDonald, D.J., Janssen, J.A.M., Walton, B.A., Le Roux, A., Skowno, A.L., Todd, S.W. & Hoare, D.B. 2006. Fynbos Biome. In: Mucina, L. & Rutherford, M.C. (eds), The vegetation of South Africa, Lesotho and Swaziland: 52-219. SANBI, Pretoria.

Skowno AL, Matlala M, Slingsby J, Kirkwood D, Raimondo DC, von Staden L, Holness SD, Lotter M, Pence G, Daniels F, Driver A, Desmet PG, Dayaram A (2019). Terrestrial ecosystem threat status assessment 2018 - comparison with 2011 assessment for provincial agencies. National Biodiversity Assessment 2018 Technical Report. South African National Biodiversity Institute, Pretoria.

Van Wyk, A.E. And Smith, G.F. (Eds) 2001. Regions of Floristic Endemism in Southern Africa: A review with emphasis on succulents, pp. 1-199. Umdaus Press, Pretoria.

APPENDICES:

Appendix 1: Plant species recorded on site.

Albuca bracteata
Aloe ferox
Anacampseros arachnoides
Arctotis arctotoides
Aristida adscensionis
Asparagus spinescens RARE
Berkheya heterophylla
Bidens bipinnata*
Blepharis integrifolia
Boophone disticha
Celtis africana
Cheilanthes eckloniana
Cheilanthes viridis
Cineraria deltoidea
Clausena anisata
Cliffortia linearifolia
Commelina africana
Cotyledon orbiculata
Crassula dependens
Crassula lanuginosa
Crassula perfoliata
Crinum macowanii
Crystallopollen angustifolium
Cussonia paniculata
Cussonia spicata
Cymbopogon pospischilii
Cynodon dactylon
Cyphostemma cirrhosum
Datura stramonium* (Category 1b)
Dicliptera cernua
Diospyros scabrida
Drimia capensis
Ehretia rigida
Eragrostis obtusa
Erigeron bonariensis*
Euclea crispa
Euphorbia nutans
Euphorbia pulvinata
Euryops sp
Eustachys paspaloides
Falkia repens
Felicia muricata
Fimbristylis ovata
Glandularia aristigera
Grewia occidentalis
Gymnosporia buxifolia
Helichrysum nudifolium
Hermannia depressa
Hibiscus pusillus
Hypoxis sp

Ipomoea crassipes
Kalanchoe rotundifolia
Lantana rugosa* (Category 1b)
Ledebouria sp
Lotononis sp
Maytenus undata
Melinis nerviglumis
Microchloa caffra
Monsonia angustifolia
Nidorella podocephala
Ophioglossum polyphyllum
Opuntia ficus-indica* (Category 1b)
Osyris lanceolata
Panicum coloratum
Pelargonium sp
Pellaea calomelanos
Polygala sp
Pseudognaphalium oligandrum
Rhoicissus tridentata
Rhynchosia totta
Sansevieria hyacinthoides
Schkuhria pinnata*
Scolopia zeyheri
Searsia dentata
Searsia pallens
Sida sp
Solanum incanum*
Solanum tomentosum
Stachys aethiopica
Stapelia gigantea
Tagetes minuta*
Themeda triandra
Tragus berteronianus
Tribulus terrestris
Urochloa panicoides
Vachellia karroo
Viscum rotundifolium
Zantedeschia albomaculata
Zinnia peruviana* (Category 1b)
Ziziphus mucronata

6. APPENDIX 6: CULTURAL HERITAGE IMPACT ASSESSMENT

Cultural Heritage Impact Assessment:

Phase 1 Investigation for the Proposed Mining on a Portion of the Farm Lesseyton 81, Queenstown (Komani), Enoch Mgijima Local Municipality, Chris Hani District Municipality, Eastern Cape Province

For

Project Applicant	**Environmental Consultant**
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1 (Draft Report)	**April 2022**
2 (Final Report)	**July 2022**
3 (Final Revised)	**August 2022**

Executive Summary

This report contains a comprehensive heritage impact assessment investigation in accordance with the provisions of Sections 38(1) and 38(3) of the *National Heritage Resources Act* (Act No. 25 of 1999) (NHRA) and focuses on the survey results from a cultural heritage survey as requested by Umhlaba Environmental Consulting CC. Umhlaba Environmental Consulting CC was contracted by Raumix Aggregates (Pty) Ltd as the independent environmental consultant to undertake the BAR process for an application for environmental authorisation to expand the existing dolerite quarry, at the Queenstown Quarry on a portion of Lesseyton Farm 81, Queenstown, Eastern Cape Province. The property is situated approximately 9 kilometres west of Queenstown. The BAR process for environmental authorisation for the proposed mining expansion is conducted in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment (EIA) Regulations 2014 (as amended 2017).

No archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint. It is well known that Iron Age, especially Late Iron Age stone-walled settlements do not usually occur on steep mountainous slopes.

It is therefore recommended, from a cultural heritage perspective that the proposed mining activities may proceed.

Also, please note:

Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place **(*cf*. NHRA (Act No. 25 of 1999)**, Section 36 (6)).

Definitions and abbreviations

Midden:	Refuse that accumulates in a concentrated heap.
Stone Age:	An archaeological term used to define a period of stone tool use and manufacture
Iron Age:	An archaeological term used to define a period associated with domesticated livestock and grains, metal working and ceramic manufacture
LIA:	Late Iron Age sites are usually demarcated by stone-walled enclosures
NHRA:	National Heritage Resources Act (Act No. 25 of 1999)
SAHRA:	South African Heritage Resources Agency
SAHRIS:	South African Heritage Resources Information System
PHRA-G:	Provincial Heritage Resources Authority - Gauteng
GDARD:	Gauteng Department of Agriculture and Rural Development
HIA:	Heritage Impact Assessment
BAR:	Basic Assessment Report
EMPr:	Environmental Management Programme report
DMR:	Department of Mineral Resources
I&APs:	Interested and Affected Parties

I, Francois Coetzee, hereby confirm my independence as a cultural heritage specialist and declare that I do not have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of the listed environmental processes, other than fair remuneration for work performed on this project.

_____

Francois P Coetzee
Cultural Heritage Consultant
Accredited Archaeologist for the SADC Region
Professional Member of ASAPA (CRM Section) Reg no: 28

Contents

Figures

Tables

1. Introduction and Terms of Reference

Umhlaba Environmental Consulting CC was contracted by Raumix Aggregates (Pty) Ltd) as the independent environmental consultant to undertake the BAR process for a BAR process for an application for environmental authorisation to expand the existing dolerite quarry at Queenstown Quarry on a portion of Lesseyton Farm 81, Queenstown, Eastern Cape Province. The property is situated approximately 9 kilometres west of Queenstown. The BAR application process for Environmental Authorisation for the proposed mining activities is conducted in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). A Cultural Heritage Impact Assessment (HIA) was requested by Umhlaba Environmental Consulting CC on behalf of the client to evaluate the potential impact on heritage remains by the proposed mining activities.

2. Objectives

The general objective of the cultural heritage survey is to record and document cultural heritage remains consisting of both tangible and intangible archaeological and historical artefacts, structures (including graves), settlements and oral traditions of cultural significance.

As such the terms of reference of this survey are as follows:

- Identify and provide a detailed description of all artefacts, assemblages, settlements and structures of an archaeological or historical nature (cultural heritage sites) located on the study area,
- Estimate the level of significance/importance of these remains in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value,
- Assess any impact on the archaeological and historical remains within the area emanating from the mining activities, and
- Propose recommendations to mitigate heritage resources where complete or partial conservation may not be possible and thereby limit or prevent any further impact.

3. Description of Physical Environment of Study Area

The heritage survey focussed on an area situated approximately 9 kilometres west from the town of Queenstown (Komani). Queenstown is roughly halfway between the smaller towns of Cathcart and Sterkstroom on the N6. The N6 forms the north eastern boundary of the survey area and a mountain range marks the south and eastern periphery. Informal settlements are located to the north and west of the survey footprint. Another quarry is situated on the eastern side of the mountain range.

Farm Name(s) and Portions	The following portions and farms: • Lesseyton 81 ○ Remaining extent (Portion)
Size of Survey Area	185 Ha
Magisterial District	Enoch Mgijima Local Municipality Chris Hani District Municipality,
1:50 000 Map Sheet	3126DD
1:250 0000 Map Sheet	3126
Central Coordinates of the Development	31.890465°S 26.794328°E

Table 1: Physical Environment

The northern section of the survey area falls within the Grassland Biome, particularly the Sub-Escarpment Grassland Bioregion and more specifically the Queenstown Thornveld (Gs 16) and the southern section (along the mountain range) falls within the Tarkastad Montane Shrubland (Gs 17). Queenstown Thornveld extends from the vicinity of Queenstown in the east to the vicinity of Tarkastad in the west, and Sterkstroom in the north. Tarkastad Montane Shrubland extends towards Noupoort, Middelburg and a point west of Cradock defines the western extent of this unit and Cathcart, Queenstown and Sterkstroom the eastern extent. The unit falls within the area between the Great Escarpment in the north, marked by the Bamboesberg and Stormberg Mountains, and the minor escarpment, marked by the Winterberg and Amathole Mountains in the south (Mucina & Rutherford 2006).

The western section of the survey footprint is characterised as an open and flat area dominated by clay soils covered mostly in grasses and sporadic tree clusters. The eastern and southern sections are demarcated by a mountain range rising approximately 100 metres from the surrounding plains. The landscape is dominated by extensive mining activities such as old shaft headgear, workshops, processing plants, administration buildings, dumps, dams and explosives magazine. Infrastructure includes dirt tracks, tar roads, fences, power lines and office and workshop buildings.

Queenstown (Komani) normally receives about 399 mm of rain per year, with most rainfall occuring mainly during summer. It receives the lowest rainfall (3 mm) in July and the highest (67 mm) in March. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Queenstown range from 16.8°C in June to 27.6°C in January. The region is the coldest during July when the mercury drops to 2°C on average during the night (SAExplorer 2022).

Current Zoning	Mining
Economic activities	Mining
Soil and basic geology	The geology of the study area comprises mostly sedimentary rock intersected by dolerite and overlain by a veneer of colluvial and alluvial soils. The main sedimentary units consist of red, purple, grey and bluegreen mudstone with subordinate sandstone in areas of high cut. The mudstone forms part of the Adelaide Subgroup, Beaufort Group, Karoo Sequence. This group of rocks forms part of the Katberg Formation, Tarkastad Subgroup, Beaufort Group, Karoo Sequence. The geological units everywhere are overlain by a veneer of clayey and silty colluvial and alluvial deposits. The soils of the study area consist: • mainly of soils of the Swartland-Adelaide soil form; and • of shallow to absent Mispah-Camavon soil form.
Prior activities	Livestock farming and agriculture
Socio Economic Environment	The proposed mining area is located on the border of ward 10 and 18 of the Enoch Mgijima Local Municipality (EMLM). The Enoch Mgijima local municipality is a Category B municipality located within the Chris Hani district in the Eastern Cape Province. The total population of the region is 245 975 of which 32% is younger than 14, 61% is aged between 15 and 64 and the elderly (65+) totals 21.6%. Of the total of 245 975 people, 91% is black, 5% is coloured, and 4% is white. The population is predominantly female dominated at 51% with males constituting 49% of the population. Approximately 28% of the combined population is employed, whilst 16% is unemployed, and 47% is not actively involved in any job search as they have either lost hope and/or are unemployable. The GDP (gross domestic product) contribution of the EMLM to the Chris Hani District Municipality's GDP was at R 5 072 million in 2011.

Evaluation of Impact	An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits NHRA (Act No. 25 of 1999, Section 38(3d)): **Positive**

Table 2: Socio-economic environment

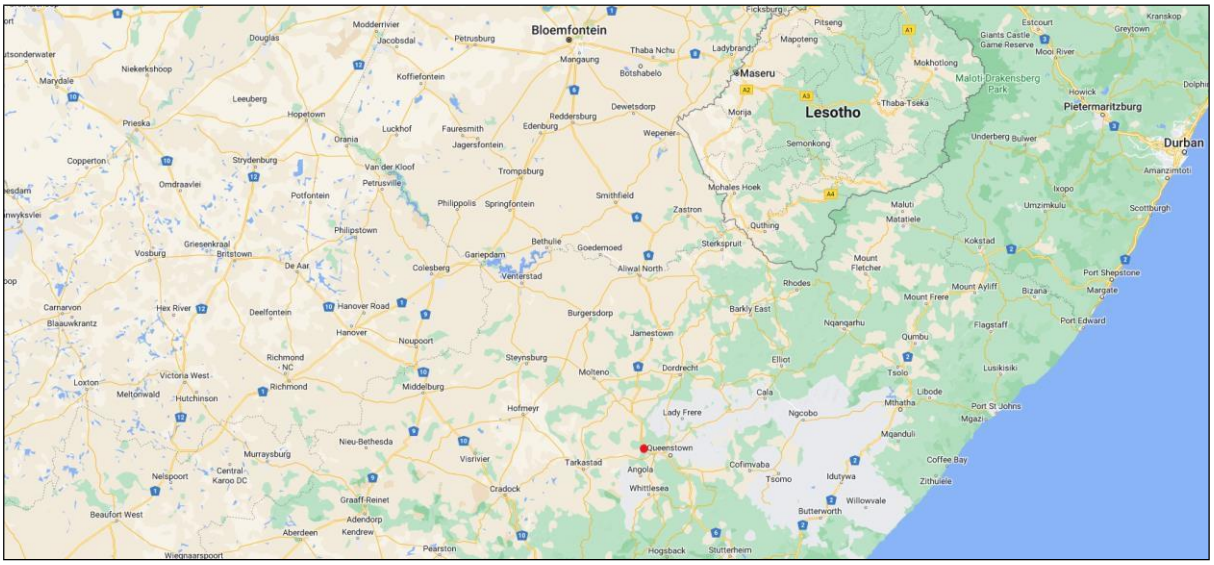


Figure 1: Regional context of the survey footprint located west of Queenstown (indicated by the red area)

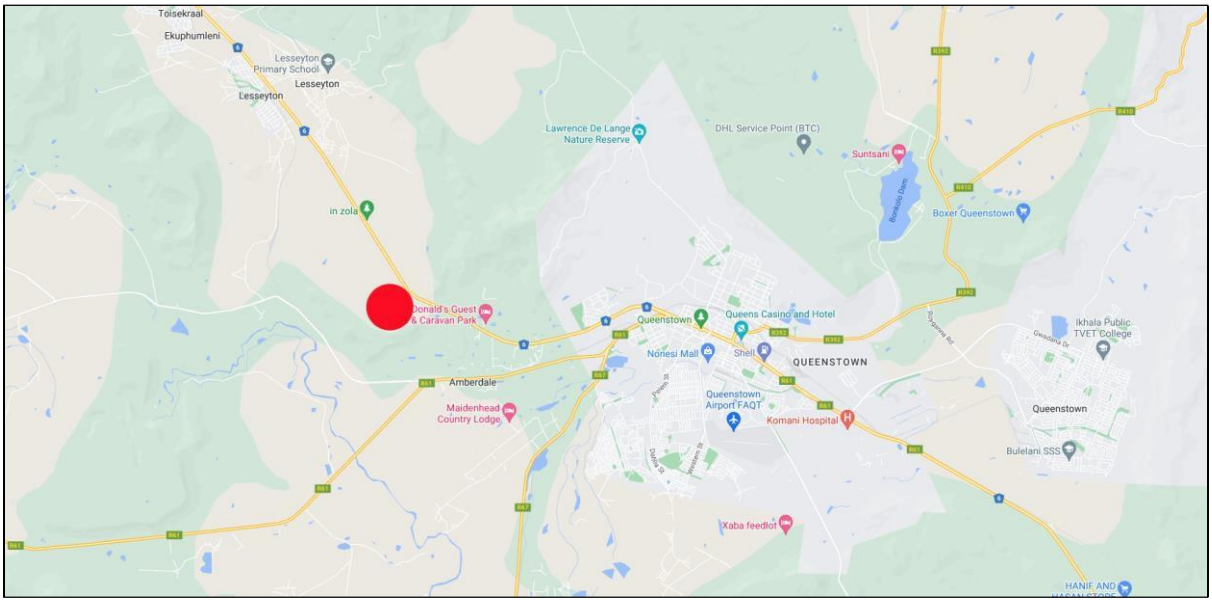


Figure 2: Local context of the survey area located west of Queenstown (indicated by the red area)

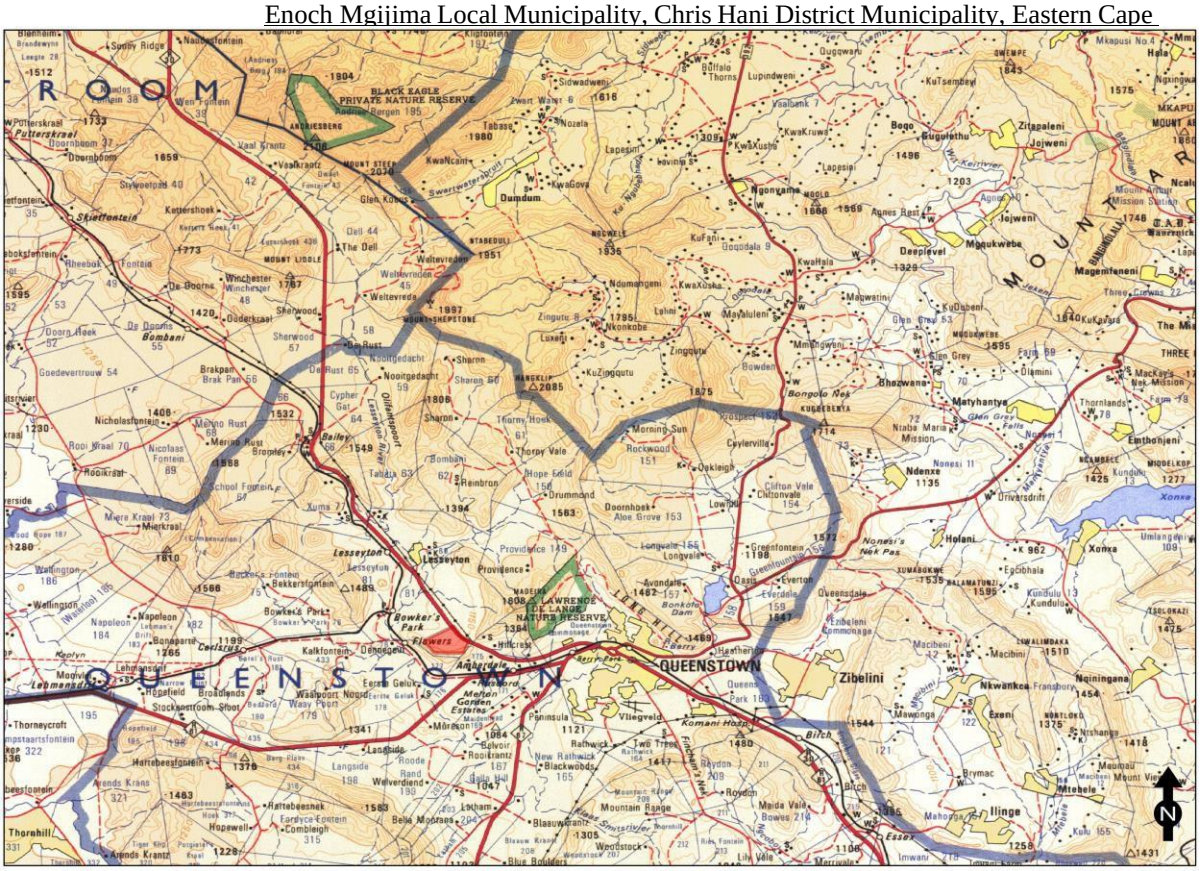


Figure 3: Local context of the survey footprint (1:250 000 Topographical Map 3126)

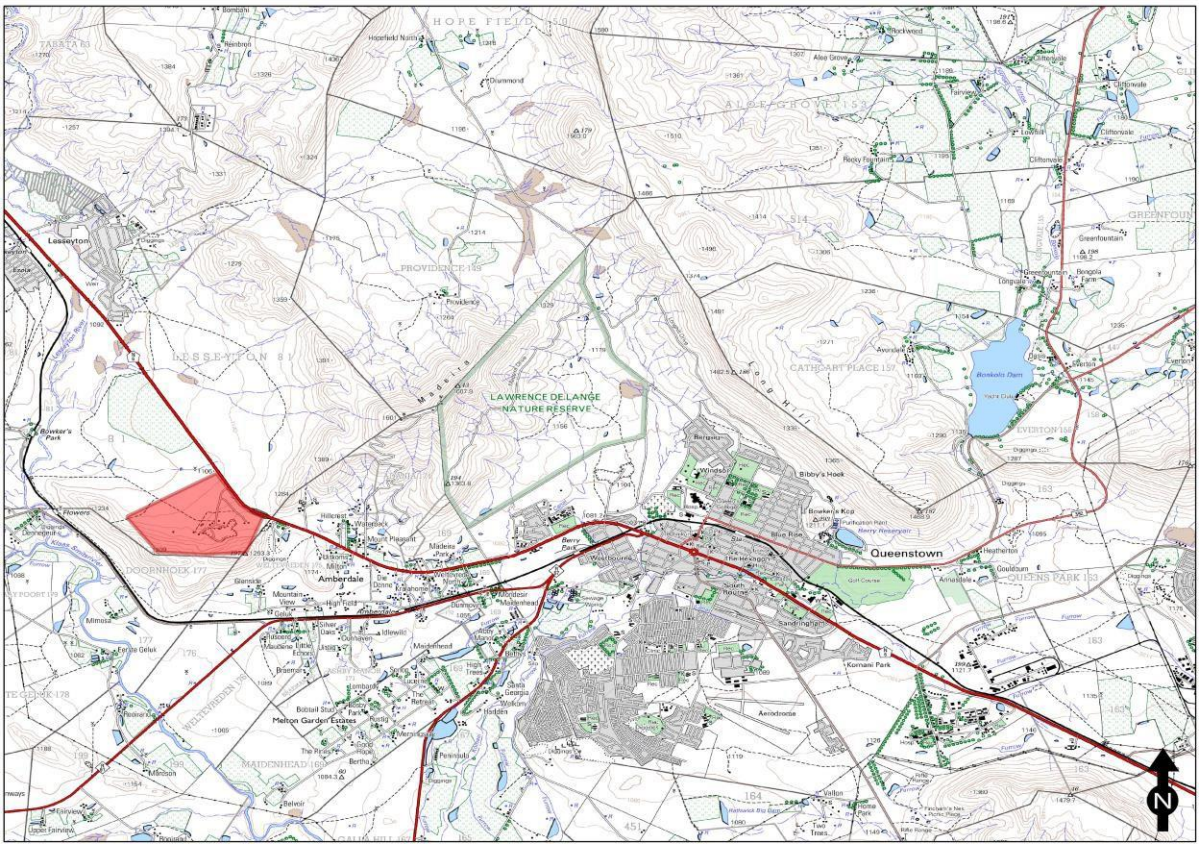


Figure 4: The regional context of the survey area as indicated on the 1:50 000 topographic map 3126DD (2001)

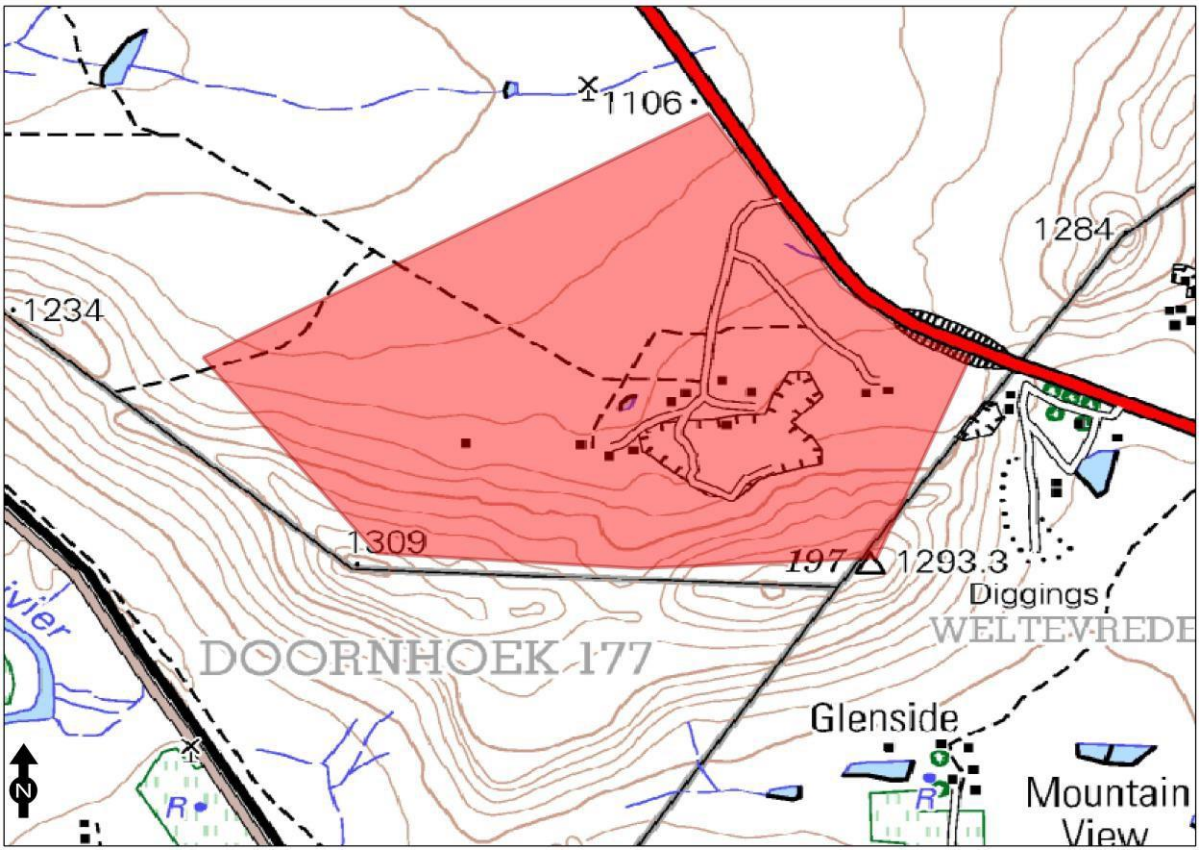


Figure 5: The survey area as indicated on the 1:50 000 topographic map 3126DD (2001)

Figure 6: Survey area within general context (Google Earth Pro 2022)

Figure 7: Survey area within local context (Google Earth Pro 2018)

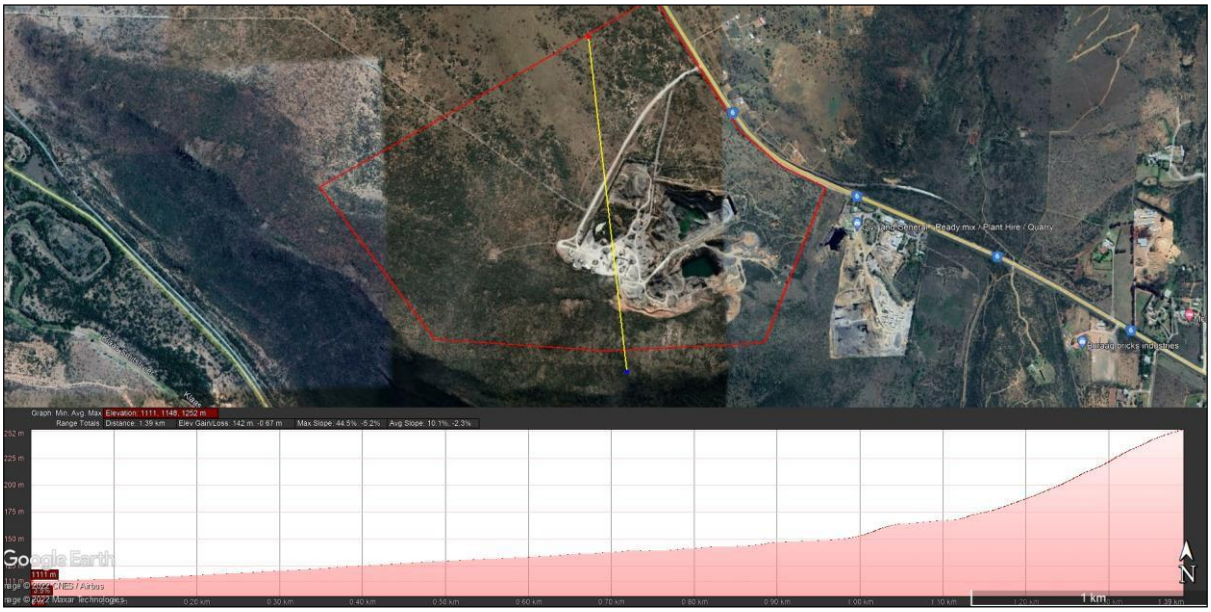


Figure 8: Survey area indicating the elevation (Google Earth Pro 2018)

Figure 9: General view of the main active quarry to the east of the survey footprint

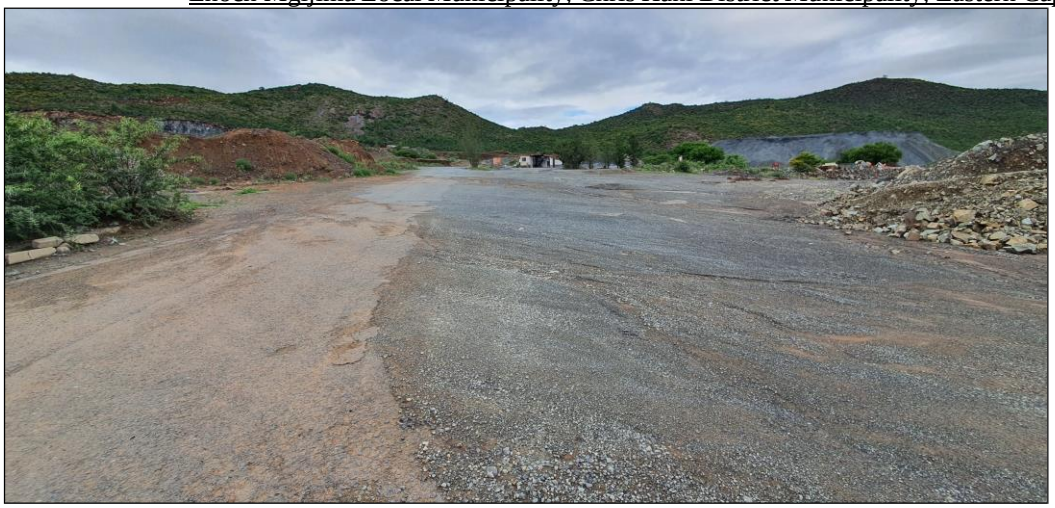


Figure 10: General view of one of the access roads to the quarry

Figure 11: General view of the processing area and central section of the mine

Figure 12: General view of the offices and associated infrastructure

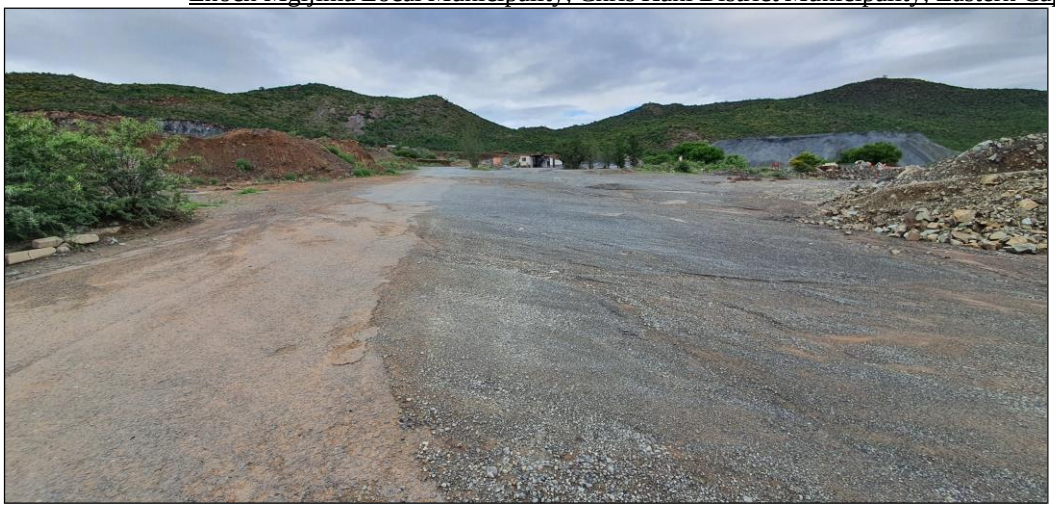


Figure 13: General view of the older quarry pit to be reactivated

Figure 14: General view of the mine footprint on the north-eastern slope of the mountain range

Figure 15: General view of the edge of the stockpiles in the mining footprint

Figure 16: General view of the magazine housing the explosives

Figure 17: General view of the southern slopes of the survey footprint

Figure 18: General view of the southern section of the survey footprint

Figure 19: General view of the southern section of the survey footprint

Figure 20: General view of the north western section of the survey footprint

Figure 21: General view of the section of the survey footprint (indicating surface disturbances)

Figure 22: General view of the central section of the survey footprint (access roads)

Figure 23: General view of the northern section of the survey footprint

Figure 24: General view of the western section of the survey footprint

Figure 25: General view of the eastern slopes of the survey footprint (access roads)

Figure 26: General view of the north eastern section of the survey footprint

Figure 27: General view of the north eastern section of the survey footprint

4. Proposed Project Description

The proposed mining area was identified along the south, south-eastern boundary of the current mining right (EC 30/5/1/2/2/009 MR) on the same property. The mining permit (MP)

footprint lies outside the mining right (MR) area, but will allow the applicant to expand the existing dolerite quarry on the property.

Should the MP be granted and the mining of dolerite be allowed, the Komani Quarry project will comprise of activities that can be divided into three key phases namely the:

- Site establishment/construction phase which will involve the demarcation of the permitted mining area and required buffer no-go zones pertaining to areas of significant importance identified during the environmental impact assessment.
- Operational phase that is presently expected to entail the mining of dolerite from the approved footprint area via conventional open cast mining methods. The mining method will make use of blasting in order to loosen the hard rock; upon which the loosened material will be transported to the existing crushing and screening processing plant of Queenstown Quarry where it will be screened to various sized stockpiles, before it is sold and transported from site to clients.
- Decommissioning phase which entails the rehabilitation of the affected environment prior to the submission of a closure application to the Department of Mineral Resources (DMR). The permit holder will further be responsible for the seeding of all rehabilitated areas. Once the full mining area is rehabilitated, the mining permit holder will be required to submit a closure application to the DMR in accordance with section 43(4) of the MPRDA, 2002. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

5. Legal Framework

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE APPLIED
The Constitution of the Republic of South Africa (Act No. 108 of 1996)	
The National Environmental Management Act (Act No. 107 of 1998)	Section 24(1) Section 28(1)
The National Water Act (Act No. 36 of 1998)	Section 21 (a)(b)
Air Quality Act (Act No. 39 of 2004)	Section 21
National Forests Act, Act of 84 of 1998	-
The National Heritage Resources Act (Act No. 25 of 1999)	Section 38, 34, 35, 36
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	Section 43(4)
The National Water Act (Act No. 36 of 1998);	
Mine Health and Safety Act (Act No. 29 of 1996) (MHSA)	
Biodiversity Act (Act 10 of 2004)	
Enoch Mgijima Local Municipality Integrated Development Plan (IDP)	

Table 3: Legal framework

Name of Activity (E.g. For prospecting – drill site, site camp, ablution facilities, accommodation, equipment storage, sample storage, site office, access route etc... etc... etc E.g. for mining – excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	**Aerial extent of the activity** Ha or m^2	**Listed Activity** Mark with an X where applicable or affected	**Applicable Listing Notice** (GNR 324, GNR 325, GNR 326 OR GNR 327)
Demarcation of site with visible beacons.	4.9 ha	N/A	Not listed
Stripping and stockpiling of topsoil from the proposed mining area.	±3.7 ha	X	GNR 327 LN 1 Activity 27, 28.
Drilling and blasting.	±3.7 ha	X	GNR 327 LN 1 Activity 21, 28.
Excavation, loading and hauling to the existing Queenstown Quarry processing area.	±3.7 ha	X	GNR 327 LN 1 Activity 21, 28.
Sloping and landscaping upon closure of the mining area.	±3.7 ha	X	GNR 327 LN 1 Activity 22
Replacing the topsoil and vegetating the disturbed area.	±3.7 ha	X	GNR 327 LN 1 Activity 22

Table 4: Listing activities

- Section 38 of the NHRA (Act No. 25 of 1999) stipulates that the following activities trigger a heritage survey:

Development criteria in terms of Section 38(1a-e) of the NHRA (Act No. 25 of 1999)	**Yes/No**
Construction of road, wall, powerline, pipeline, canal or other linear form of development or barrier exceeding 300m in length	No
Construction of bridge or similar structure exceeding 50m in length	No
Development exceeding 5000 m^2 in extent	Yes
Development involving three or more existing erven or subdivisions	No
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 m^2	No
Any other development category, public open space, squares, parks, recreation grounds	No

Table 5: Activities that trigger Section 38 of the NHRA

- Field rating system as recommended by SAHRA:

Field Rating	Grade	Significance	Recommended Mitigation
National Significance	Grade I	High significance	Conservation by SAHRA, national site nomination, mention any relevant international ranking. No alteration whatsoever without permit from SAHRA.
Provincial Significance	Grade II	High significance	Conservation by provincial heritage authority, provincial site nomination. No alteration whatsoever without permit from provincial heritage authority.
Local Significance	Grade III-A	High significance	Conservation by local authority, no alteration whatsoever without permit from provincial heritage authority. Mitigation as part of development process not advised.
Local Significance	Grade III-B	High significance	Conservation by local authority, no external alteration without permit from provincial heritage authority. Could be mitigated and (part) retained as heritage register site.

Generally Protected A	Grade IV-A	High/medium significance	Conservation by local authority. Site should be mitigated before destruction. Destruction permit required from provincial heritage authority.
Generally Protected B	Grade IV-B	Medium significance	Conservation by local authority. Site should be recorded before destruction. Destruction permit required from provincial heritage authority.
Generally Protected C	Grade IV-C	Low significance	Conservation by local authority. Site has been sufficiently recorded in the Phase 1 HIA. It requires no further recording before destruction. Destruction permit required from provincial heritage authority.

Table 6: Field rating system to determine site significance

- Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and they are valuable, finite, non-renewable and irreplaceable.

- All archaeological remains, features, structures and artefacts older than 100 years and historic structures older than 60 years are protected by the relevant legislation, in this case the **National Heritage Resources Act (NHRA) (Act No. 25 of 1999, Section 34 & 35)**. The Act makes an archaeological impact assessment as part of an EIA and EMPR mandatory (see **Section 38**). No archaeological artefact, assemblage or settlement (site) may be moved or destroyed without the necessary approval from the **South African Heritage Resources Agency (SAHRA)**. Full cognisance is taken of this Act in making recommendations in this report.

- Cognisance will also be taken of the Mineral and Petroleum Resources Development Act (Act No 28 of 2002) and the National Environmental Management Act (Act No 107 of 1998) when making any recommendations.

- Human remains older than 60 years are protected by the NHRA, with reference to Section 36. Human remains that are less than 60 years old are protected by the Regulations Relating to the Management of Human Remains (GNR 363 of 22 May 2013) made in terms of the National Health Act No. 61 of 2003 as well as local Ordinances and regulations.

- With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise.
- The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3, and the Australian ICOMOS (International Council on Monuments and Sites) Charter (also known as the Burra Charter) are used when determining the cultural significance or other special value of archaeological or historical sites.

- A copy of this report will be submitted on SAHRIS as stipulated by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), Section 38 (especially subsection 4) and the relevant Provincial Heritage Resources Authority (PHRA).

- Note that the final decision for the approval of permits, or the removal or destruction of sites, structures and artefacts identified in this report, rests with the SAHRA (or relevant PHRA).

6. Study Approach/Methodology

Geographical information (KML shapefiles) on the proposed prospecting activities was supplied by Umhlaba Environmental Consulting CC. The most up-to-date Google Earth images and topographic maps were used to indicate the survey area. Topographic maps were sources from the Surveyor General. Please note that all maps are orientated with north facing upwards (unless stated otherwise).

The strategy during this survey was to survey most of the footprint that form part of the application. However, certain areas were restricted by active mining and some areas were surveyed by detailed pedestrian (foot) survey techniques. The southern and eastern sections are characterised by extreme slopes that form part of the mountain range that form part of the periphery of the survey footprint.

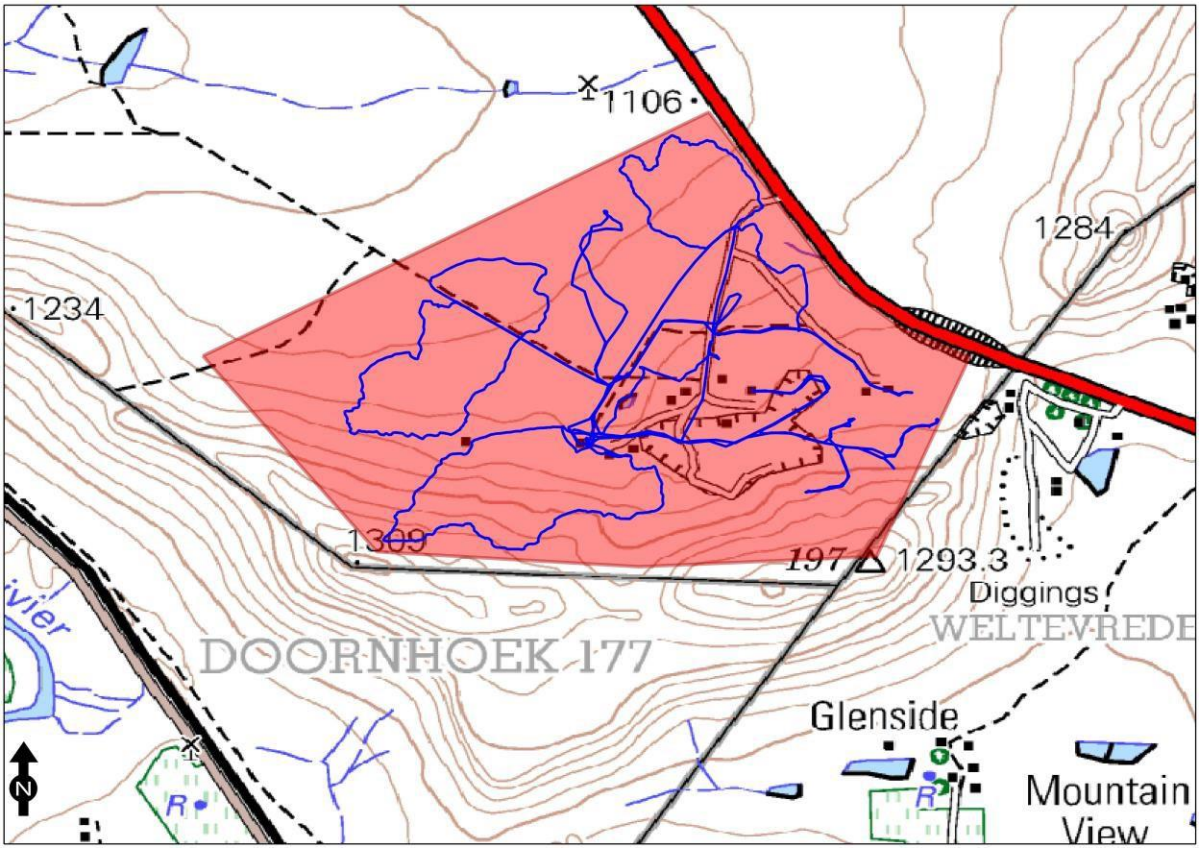


Figure 28: Recorded survey tracks for the project

6.1 Review of existing information/data

Additional information on the cultural heritage of the area was sourced from the following records:

- National Mapping Project by SAHRA (which lists heritage impact assessment reports submitted for South Africa);
- Environmental Potential Atlas (ENPAT);
- Online SAHRIS database;
- National Automated Archival Information retrieval System (NAAIRS);
- Maps and information documents supplied by the client; and
- Several heritage surveys have been conducted in the vicinity of the survey area (published and unpublished).

No archaeological Cultural Resources Management (CRM) reports are recorded in the SAHRA 2009 Mapping Project Database (MPD) situated near or within the survey footprint. Although several heritage surveys and research projects have been completed in the general vicinity of the project footprint during the last few years (registered on the SAHRIS database), no cultural heritage sites were recorded inside the current survey footprint (Booth 2012; Derricourt 1977; Dreyer & Loock 2014; Huffman 2011; Van Ryneveld 2011a, 2011b, 2012, 2014, 2015, 2016).

Five declared Provincial Heritage Sites (PHS) are recorded on the SAHRA online database for Queenstown in the Eastern Cape (SAHRIS 2022) which include the following:

- PHS 133 : SAHRA Identifier 9/2/077/0003 - Hexagon, Queenstown
- PHS 134 : SAHRA Identifier 9/2/077/0008 - Old municipal market, 5 Hexagon Str., Queenstown
- PHS 135 : SAHRA Identifier 9/2/077/0005 - Town Hall, Cathcart Rd., Queenstown
- PHS 136 : SAHRA Identifier 9/2/077/0008 - Museum, Naude Str., Queenstown
- PHS 137 : SAHRA Identifier 9/2/077/0009 - Queens College, Berry Str., Queenstown

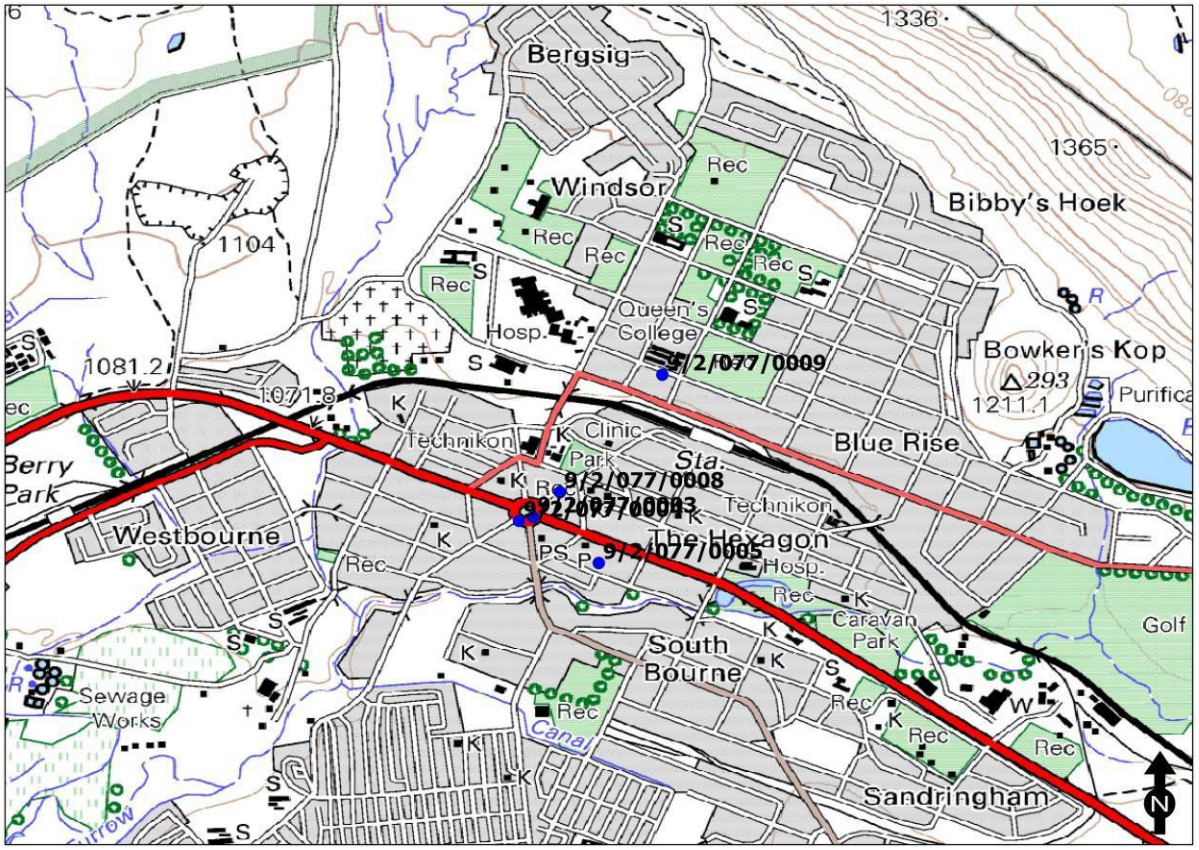


Figure 29: The location of the five declared Provincial Heritage Sites (PHS) in central Queenstown

All the surveys conducted in the region seem to confirm that no Early Stone Age (ESA) sites occur in the general area of the survey footprint. Middle Stone Age (MSA) sites to a lesser extent and Later Stone Age (LSA) deposits seem to dominate, and are characteristic of the greater Queenstown area at sites such as Rathwick in Queenstown. MSA and LSA artefacts were also identified along proposed bulk service lines, but with these in poorer contexts than at the Rathwick site itself. In Queenstown and surrounds significant MSA deposits were reported on from Xashimba. A number of MSA and LSA lithic occurrences, of varying

significance were identified during the Penhoek Pass survey. A LSA lithic occurrence was reported on from the Dubeni area MSA deposits in proximity to the Lesseyton mining application site. Recorded Iron Age deposits are much scarcer with sites reported on from the Dubeni area.

An extensive archaeological survey was conducted by Derricourt focussing on the erstwhile homelands known as the Transkei and Ciskei in the Eastern Cape in the early 1970s. He recorded a number of open sites and caves associated with Early, Middle and Later Stone deposits as well as rock art. Paintings do not occur in the coastward side of the Amathole Range and is mainly located in the midlands and along the Kei River. Also paintings are known along the lower Fish River. Almost no rock art is recorded in the Tsolo and Umtata districts (Derricourt 1975:59).

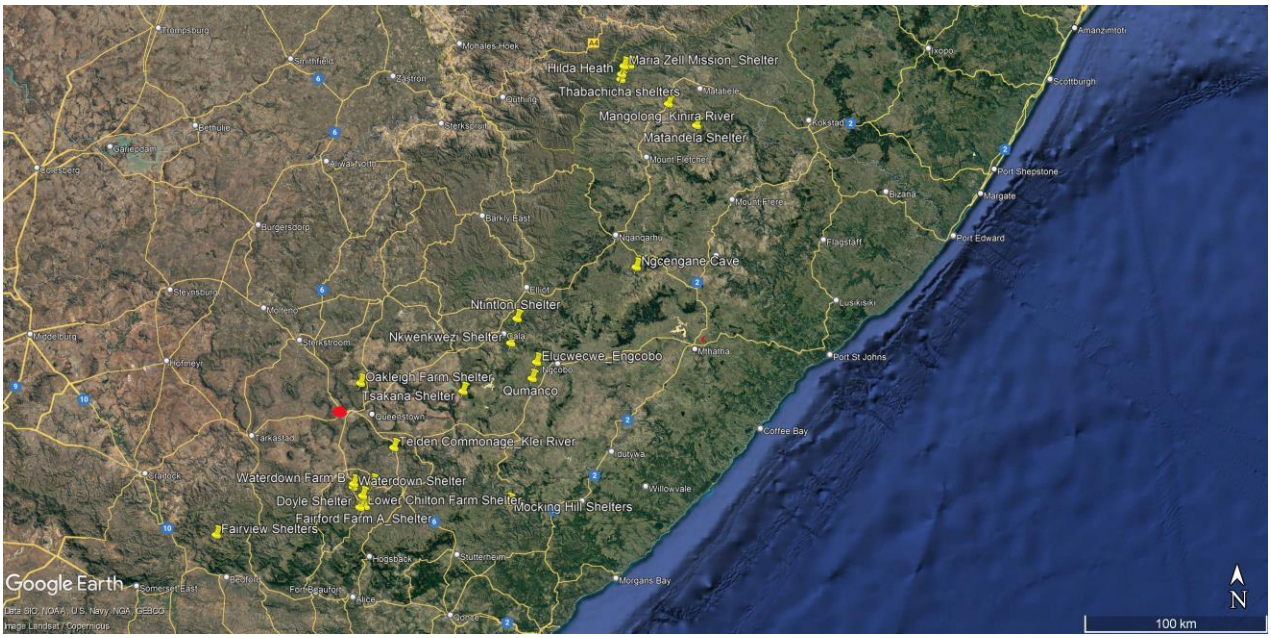


Figure 30: Archaeological sites as recorded by Derricourt (1975)

Queenstown (Komani) was established in 1853 and is currently the commercial, administrative, and educational centre of the surrounding farming district. Queenstown was founded in early 1853 under the direction of Sir George Cathcart, who named the settlement, and then fort, after Queen Victoria. Work on its railway connection to East London on the coast was begun by the Cape government of John Molteno in 1876, and the line was officially opened on 19 May 1880. Also note that farms in the area were already surveyed by the Surveyor General's Office in 1856 (see Addendum 3).

Ethnography

The term Xhosa has often been erroneously used to refer to all the so-called Cape Nguni groups. Although often used as a linguistic term Xhosa also include groups such as Gcaleke, Rarabe, Mpondo, Mpondomise, Thembu, Cwera, Xesibe, Qwathi, Mpinge, Fingo, Nhlangwini and Hlangwini (and others) (see Jackson 1975). It would seem that the region around Queenstown is historically been settled by the amaThembu people (Van Warmelo 1935).

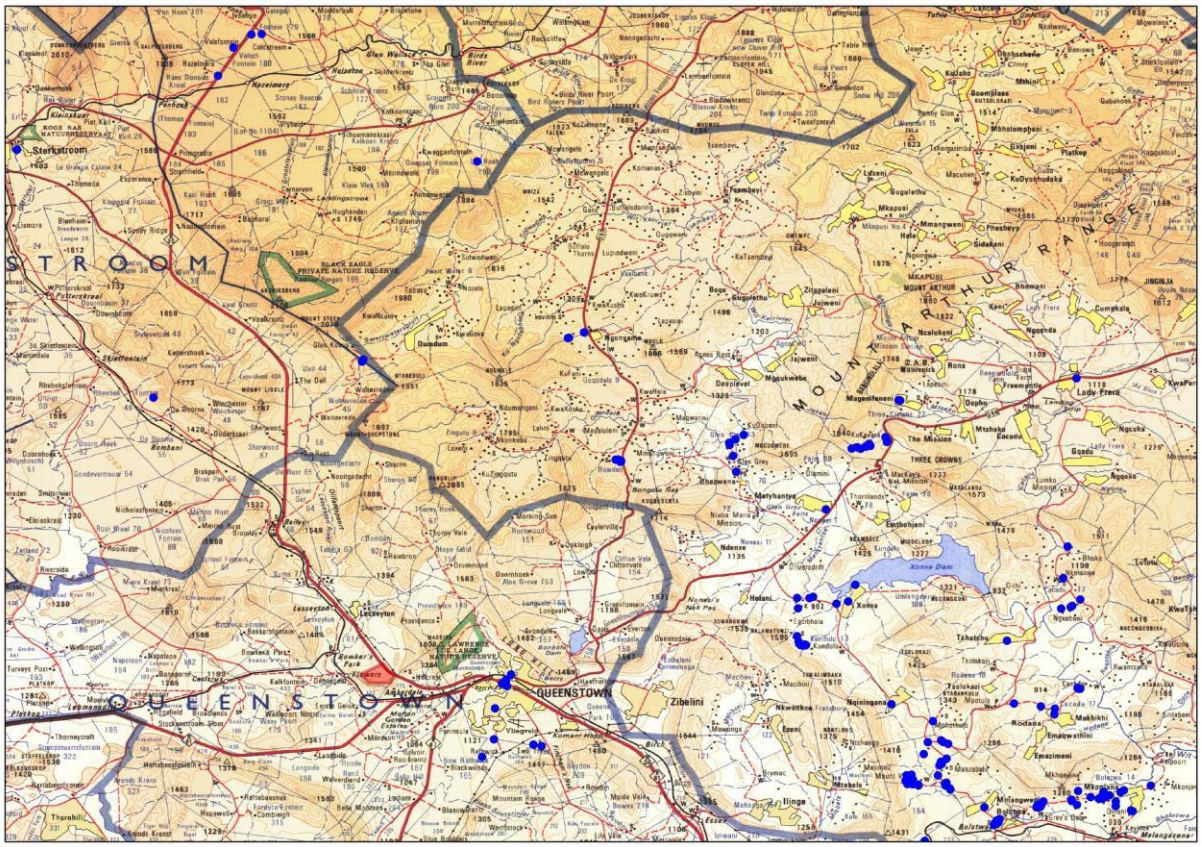


Figure 31: Recorded sites near the survey footprint as recorded on SAHRIS (as at April 2022)

Figure 32: Intelligence map of the general survey (Lesseyton) location east of Queenstown in 1901 (after Casgrain)

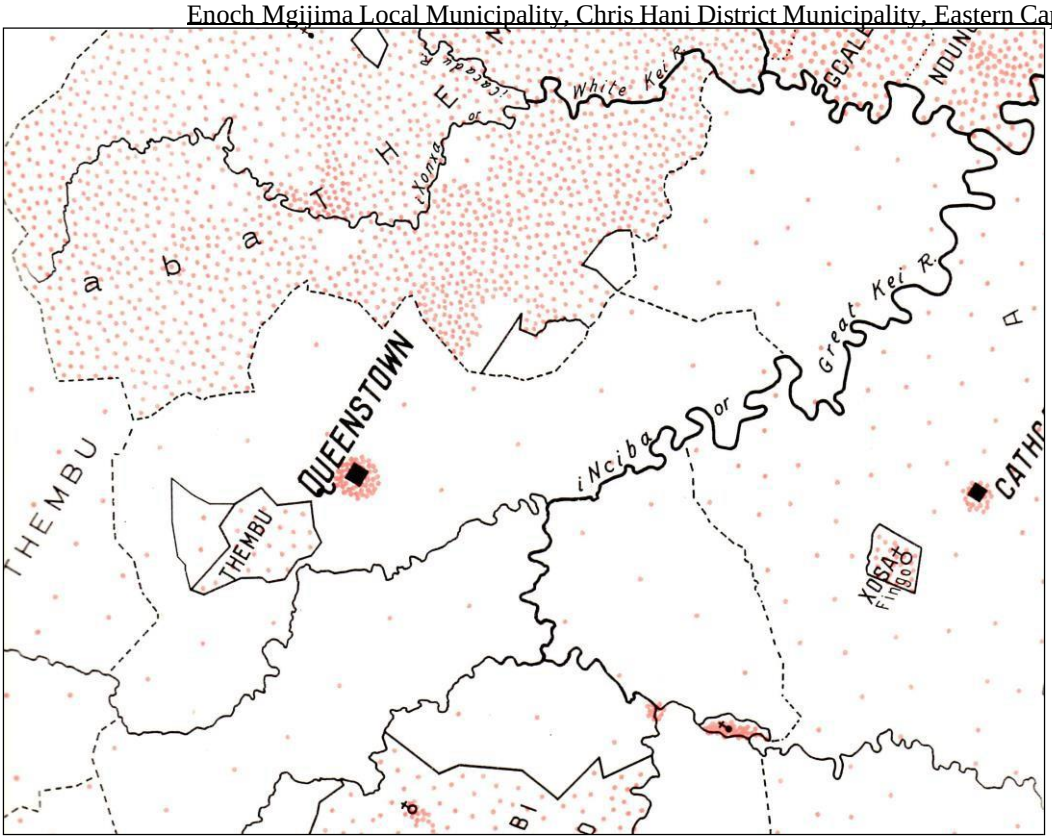


Figure 33: Ethnographic map representing the various amaThembu groups living in the survey area (after Van Warmelo 1935)

6.2 Palaeontological sensitivity

Figure 34: Palaeontological sensitivity zones as indicated for the survey footprint (SAHRIS 2022)

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	Will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

The palaeontological sensitivity map was extracted from the SAHRIS database and indicates a grey (Insignificant/zero) sensitivity. As a result a desktop palaeontological study will be required for the survey footprint.

6.3 Site visits

The field survey was conducted on 14 December 2021.

6.4 Social interaction and current inhabitants

The mine manager and other employees were consulted during the survey to locate known heritage sites in the region.

6.5 Public Consultation and Stakeholder Engagement

During the initial public participation process the stakeholders and I&AP's were informed of the project by means of background information documents/pamphlets that were sent directly to the contact persons. An advertisement was placed in The Rep, and three (two English and one Xhosa) on-site notices were placed at conspicuous places. A 30-days commenting period was allowed which expired on 12 April 2019. In accordance with the timeframes stipulated in the EIA Regulations, 2014 (as amended by GNR 326 effective 7 April 2017) the Draft Basic Assessment Report was compiled and distributed for perusal by the I&AP's and stakeholders. A 30-day commenting period, ending 20 May 2019, was allowed for perusal of the documentation and submission of comments. No additional comments were received on the DBAR that could be incorporated into the Final Basic Assessment Report (FBAR).

6.6 Assumptions, restrictions, gaps and limitations

No severe physical restrictions were encountered as the survey area was generally accessible. However, some of the mining areas were inaccessible and were therefore excluded from the survey. Also note that

6.7 Methodology for assessment of potential impacts

All impacts identified during the EIA stage of the study will be classified in terms of their significance. Issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;

- The **physical extent**, wherein it is indicated whether:
  - 1 - the impact will be limited to the site;
  - 2 - the impact will be limited to the local area;
  - 3 - the impact will be limited to the region;
  - 4 - the impact will be national; or
  - 5 - the impact will be international.
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
  - 1 - of a very short duration (0–1 years);
  - 2 - of a short duration (2-5 years);
  - 3 - of a medium-term (5–15 years);
  - 4 - of a long term (> 15 years); or
  - 5 - permanent.
- The **magnitude** of impact, quantified on a scale from 0-10, where a score is assigned:
  - 0 - small and will have no effect;
  - 2 - minor and will not result in an impact;
  - 4 - low and will cause a slight impact;
  - 6 - moderate and will result in processes continuing but in a modified way;
  - 8 - high, (processes are altered to the extent that they temporarily cease); or
  - 10 - very high and results in complete destruction of patterns and permanent cessation of processes;
- The **probability** of occurrence, which describes the likelihood of the impact actually occurring and is estimated on a scale where:
  - 1 - very improbable (probably will not happen);
  - 2 - improbable (some possibility, but low likelihood);
  - 3 - probable (distinct possibility);
  - 4 - highly probable (most likely); or
  - 5 - definite (impact will occur regardless of any prevention measures);
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- The **status**, which is described as either positive, negative or neutral;
  - 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 significance is determined by combining the criteria in the following formula:

S = (E+D+M) x P; where:
S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

Points	Significance Weighting	Discussion
< 30 points	Low	Where this impact would not have a direct influence on the decision to develop in the area.
31-60 point	Medium	Where the impact could influence the decision to develop in the area unless it is effectively mitigated.
> 60 points	High	Where the impact must have an influence on the decision process to develop in the area.

7. The Cultural Heritage Sites

7.1. Isolated occurrences

Isolated occurrences are artefacts or small features recorded on the surface with no contextual information. No other associated material culture (in the form of structures or deposits) was noted that might provide any further context. This can be the result of various impacts and environmental factors such as erosion and modern developments. By contrast archaeological sites are often complex sites with evidence of archaeological deposit and various interrelated features such as complex deposits, stone walls and middens. However, these isolated occurrences are seen as remains of erstwhile complex or larger sites and they therefore provide a broad indication of possible types of sites or structures that might be expected to occur or have occurred in the survey footprint.

Throughout the survey footprint no isolated finds were recorded.

7.2 Heritage sites

No heritage sites, structures, features or artefacts (both Stone Age and Iron Age) were recorded during the survey.

8. Locations and Evaluation of Sites

None

9. Management Measures

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

9.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these

specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).

9.2 Control

In order to achieve this, the following should be in place:
- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

10. Recommendations and Conclusions

No archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint. It is well known that Iron Age, especially Late Iron Age stone-walled settlements do not usually occur on steep mountainous slopes.

It is therefore recommended, from a cultural heritage perspective that the proposed mining activities may proceed.

Also, please note:

Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place **(*cf*. NHRA (Act No. 25 of 1999)**, Section 36 (6)).

11. References

Booth, C. 2012. (Albany Museum). Phase 1 Archaeological Impact Assessment for Five Proposed Borrow Pits, Whittlesea area near Queenstown, Enoch Mgijima Local Municipality, Eastern Cape

Casgrain, P.H. Du P. 1901. Field Intelligence Division, Department of the British Army in Cape Town. Queenstown Region.

Derricourt, R.M. 1977. Prehistoric Man in the Ciskei & Transkei. Pretoria: C. Struik.

Dreyer, C. & Loock, J.C. 2014. Archaeological, Palaeontological and Geological Investigation of the Proposed Mining Application on a Portion of the Farm Lesseyton 81, Queenstown, South Eastern Cape.

Huffman, T. N. 2007. *Handbook to the Iron Age: the Archaeology of Pre-Colonial Farming Societies in Southern Africa*. University of KZN Press: Pietermaritzburg.

Huffman, T.N. 2011. Heritage Assessment of the Queenstown Shopping Mall.

Jackson, A.O. 1975. The Ethnic composition of the Ciskei and Transkei. Pretoria. Government Printer.

Jeppe, F. 1899. Jeppe's Map of the Transvaal. London: Edward Stanford.

Lombard, M., Wadley, L., Deacon, J., Wurz, S., Parsons, I., Mohapi, M., Swart, J. & Mitchell, P. 2012. South African and Lesotho Stone Age Sequence Update (I). *The South African Archaeological Bulletin*. Vol 67 (195): 123-144.

Mucina, L. & Rutherford, M.C. 2010. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia 19*. Pretoria: South African National Biodiversity Institute.

National Heritage Resources Act. Act No. 25 of 1999. Government Printer: Pretoria.

Office of the President. 27 November 1998. National Environmental Management Act (Act No. 107 of 1998). Government Gazette Vol 401 (19519). Pretoria: Government Printer.

SAHRA, 2005. Minimum Standards for the Archaeological and the Palaeontological Components of Impact Assessment Reports, Draft version 1.4.

South African Heritage Resources Agency (SAHRA). Report Mapping Project. Version 1.0, 2009.

Van Ryneveld, K. 2011a. Phase 1 Archaeological Impact Assessment – The Xashimba Abattoir, near Queenstown, Eastern Cape, South Africa.

Van Ryneveld, K. 2011b. Phase 1 Archaeological Impact Assessment – Bulk Services for the Proposed Rathwick Development, Queenstown, Eastern Cape, South Africa.

Van Ryneveld, K. 2012. Phase 1 Archaeological Impact Assessment – Penhoek Pass: Upgrade of
the N6-4 [km52-km66.2] between Queenstown and Jamestown, Eastern Cape, South Africa.

Van Ryneveld, K. 2014. Phase 1 Archaeological Impact Assessment – The Silver Stream-Dubeni Stream Crossing, Dubeni (near Queenstown), Chris Hani District Municipality, Eastern Cape, South Arica.

Van Ryneveld, K. 2015. Phase 1 Archaeological Impact Assessment – Spectra Foods Broiler Houses and Abattoir, Farms 170 and 171, Queenstown, Enoch Mgijima Municipality, Eastern Cape.

Van Ryneveld, K. 2016. Phase 1 Archaeological Impact Assessment – Galla Hills Quarry, Farm Roode Krantz RE/203, Queenstown, Enoch Mgijima Local Municipality, Eastern Cape.

Van Warmelo, N.J. 1935. A Preliminary Survey of the Bantu Tribes of South Africa. Ethnological Publication Vol 5. Government Printer. Pretoria.

Other Sources

Google Earth Pro 2022 (Images: 2022)

http://samilitaryhistory.org/vol041dp.html (Accessed: April 2022)

National Archives (NAAIRS) (Accessed: April 2022)

SAHRIS Database. http://www.sahra.org.za/sahris (Accessed: April 2022)

www.saexplorer.co.za (Accessed: April 2022)

https://www.cwgc.org [Commonwealth War Grace Commission] (Accessed: April 2022)

Addendum 1: Archaeological and Historical Sequence

The table provides a general overview of the chronological sequence of the archaeological periods in South Africa.

PERIOD	APPROXIMATE DATES
Earlier Stone Age	more than 2 million years ago to >200 000 years ago
Middle Stone Age	<300 000 years ago to >20 000 years ago
Later Stone Age (Includes hunter-gatherer rock art)	<40 000 years ago up to historical times in certain areas
Early Iron Age	c. AD 200 - c. AD 900
Middle Iron Age	c. AD 900 – c. AD 1300
Late Iron Age (Stonewalled sites)	c. AD 1300 - c. AD 1840 (c. AD 1640 - c. AD 1840)

< = less than; > = greater than

Archaeological Context

Stone Age Sequence

Concentrations of Early Stone Age (ESA) sites are usually present on the flood-plains of perennial rivers and may date to over 2 million years ago. These ESA open sites may contain scatters of stone tools and manufacturing debris and secondly, large concentrated deposits ranging from pebble tool choppers to core tools such as handaxes and cleavers. The earliest hominins who made these stone tools, probably not always actively hunted, instead relying on the opportunistic scavenging of meat from carnivore fill sites.

Middle Stone Age (MSA) sites also occur on flood plains, but are also associated with caves and rock shelters (overhangs). Sites usually consist of large concentrations of knapped stone flakes such as scrapers, points and blades and associated manufacturing debris. Tools may have been hafted but organic materials, such as those used in hafting, seldom preserve. Limited drive-hunting activities are also associated with this period.

Sites dating to the Later Stone Age (LSA) are better preserved in rock shelters, although open sites with scatters of mainly stone tools can occur. Well-protected deposits in shelters allow for stable conditions that result in the preservation of organic materials such as wood, bone, hearths, ostrich eggshell beads and even bedding material. By using San (Bushman) ethnographic data a better understanding of this period is possible. South African rock art is also associated with the LSA.

The following chronological sequence was recently established by prominent Stone Age archaeologists (Lombard et al 2012):

Later Stone Age

- Age Range: recent to 20-40 thousand years ago

- General characteristics: expect variability between assemblages, a wide range of formal tools, particularly scrapers (microlithic and macrolithic), backed artefacts, evidence of hafted stone and bone tools, borers, bored stones, upper and lower grindstones, grooved stones, ostrich eggshell (OES) beads and other orna ments, undecorated/decorated OES fragments, flasks/flask fragments, bone tools (sometimes with decoration), fishing equipment, rock art, and ceramics in the final phase.

    - **Ceramic or Final Later Stone Age**
        - Generally < 2 thousand years ago
        - MIS 1
        - Contemporaneous with, and broadly similar to, final Later Stone Age, but includes ceramics
        - Economy may be associated with hunter-gatherers or herders

      Technological characteristics
        - Stone tool assemblages are often microlithic
        - In some areas they are dominated by long end scrapers and few backed microliths; in others formal tools are absent or rare
        - Grindstones are common, ground stone artefacts, stone bowls and boat-shaped grinding grooves may occur
        - Includes grit- or grass-tempered pottery
        - Ceramics can be coarse, or well-fired and thin-walled; some times with lugs, spouts and conical bases; sometimes with decoration; sometimes shaped as bowls
        - Ochre is common
        - Ostrich eggshell (OES) is common
        - Metal objects, glass beads and glass artefacts also occur

    - **Final Later Stone Age**
        - 100 – 4000 years ago
        - MIS 1
        - Hunter-gatherer economy

      Technological characteristics
        - Much variability can be expected
        - Variants include macrolithic (similar to Smithfield [Sampson 1974]) and/or microlithic (similar to Wilton) assemblages
        - Assemblages are mostly informal (Smithfield)
        - Often characterised by large untrimmed flakes (Smithfield)
        - Sometimes microlithic with scrapers, blades and bladelets, backed tools and adzes (Wilton-like)
        - Worked bone is common
        - OES is common
        - Ochre is common
        - Iron objects are rare
        - Ceramics are absent

    - **Wilton**
        - 4000 – 8000 years ago
        - MIS 1

- At some sites continues into the final Later Stone Age as regional variants (e.g. Wilton Large Rock Shelter and Cave James)

Technological characteristics

- Fully developed microlithic tradition with numerous formal tools
- Highly standardised backed microliths and small convex scrapers (for definition
- of standardisation see Eerkens & Bettinger 2001)
- OES is common
- Ochre is common
- Bone, shell and wooden artefacts occur

- **Oakhurst**
  - 7000 – 12 000 years ago
  - MIS 1
  - Includes Albany, Lockshoek and Kuruman as regional variants

Technological characteristics

- Flake based industry
- Characterised by round, end, and D-shaped scrapers and adzes
- Wide range of polished bone tools
- Few or no microliths

- **Robberg**
  - 12 000 to 18 000 years ago
  - MIS 2

Technological characteristics

- Characterised by systematic bladelet (<26mm) production and the occurance of outils ecailles or scaled pieces
- Significant numbers of unretouched bladelets and bladelet cores
- Few formal tools
- Some sites have significant macrolithic elements

- **Early Late Stone Age**
  - 18 000 – 40 000 years ago
  - MIS 2-3
  - Informal designation
  - Also known as transitional MSA-LSA
  - Overlapping in time with final Middle Stone Age

Technological Characteristics

- Characterised by unstandardised, often microlithic, pieces and includes the bipolar technique
- Described at some sites, but not always clear whether assemblages represent a real archaeological phase or a mixture of LSA/MSA artefacts

Middle Stone Age

- Age Range: 20 000 – 30 000 years ago

- General characteristics: Levallois or prepared core techniques (for definitions see Van Peer 1992; Boeda 1995; Pleurdeau 2005) occur in which triangular flakes with convergent dorsal scars, often with faceted striking platforms, are produced. Discoidal systems (for definition see Inizan et al. 1999) and intentional blade production from volumetric cores (for definition see Pleurdeau 2005) also occur; formal tools may include unifacially and bifacially retouched points, backed artefacts, scrapers, and denticulates (for definition see Bisson 2000); evidence of hafted tools; occasionally includes marine shell beads, bone points, engraved ochre nodules, engraved OES fragments, engraved bone fragments, and grindstones.
- In the sequence below we highlight differences or characteristics that may be used to refine interpretations depending on context.

- **Final Middle Stone Age**
  - 20 000 – 40 000 years ago
  - MIS 3
  - Informal designation partly based on the Sibudu sequence

Technological characteristics

- Characterised by high regional variability that may include, e.g. bifacial tools, bifacially retouched points, hollow-based points
- Triangular flake and blade industries (similar to Strathalan and Melikane)
- Small bifacial and unifacial points (similar to Sibudu and Rose Cottage Cave)
- Sibudu point characteristics: short, stout, lighter in mass com pared to points from the Sibudu technocomplex, but heavier than those from the Still Bay
- Can be microlithic
- Can include bipolar technology
- Could include backed geometric shapes such as segments, as well as side scrapers

Sibudu

- 45 000 – 58 000 years ago
- MIS 3
- Previously published as informal late Middle Stone Age and post-Howieson's Poort at Sibudu
- Formerly known post-Howieson's Poort, MSA 3 generally, and MSA III at Klasies River

Technological characteristics

- Most points are produced using Levallois technique
- Most formal retouch aimed at producing unifacial points
- Sibudu unifacial point (type fossil) characteristics: faceted platform; shape is somewhat elongated with a mean length of 43.9 mm), a mean breadth of 26.8 mm and mean thickness of 8.8 mm (L/B ratio 1.7); their mean mass is 11.8 g (Mohapi, 2012)
- Some plain butts
- Rare bifacially retouched points
- Some side scrapers are present
- Backed pieces are rare

- **Howieson’s Poort**
- 58 000 – 66 000 years ago
- MIS 3-4

Technological characteristics

- Characterised by blade technology
- Includes small (<4 cm) backed tools, e.g. segments, scrapers, trapezes and backed blades
- Some denticulate blades
- Pointed forms are rare or absent

- **Still Bay**
  - 70 000 – 77 000 years ago
  - MIS 4-5a

Technological characteristics

- Characterised by thin (<10 mm), bifacially worked foliate or lanceolate points
- Semi-circular or wide-angled pointed butts
- Could include blades and finely serrated points (Lombard et al. 2010)

- **Pre-Still Bay**
  - 72 000 – 96 000 years ago
  - MIS 4-5

Technological characteristics

- Characteristics currently being determined / studied

- **Mossel Bay**
  - 77 000 to —105 000 years ago
  - MIS 5a-4
  - Also known as MSA II at Klasies River or MSA 2b generally

Technological characteristics

- Characterised by recurrent unipolar Levallois point and blade reduction
- Products have straight profiles; percussion bulbs are prominent and often splintered or ring-cracked
- Formal retouch is infrequent and restricted to sharpening the tip orshaping the butt

- **Klasies River**
  - 105 000 to —130 000 years ago
  - MIS 5d-5e
  - Also referred to as MSA I at Klasies River or MSA 2a generally

Technological characteristics

- Recurrent blade and convergent flake production
- End products are elongated and relatively thin, often with curved profiles
- Platforms are often small with diffused bulbs
- Low frequencies of retouch
- Denticulate pieces

- **Early Middle Stone Age**
  - Suggested age MIS 6 to MIS 8 (130 000 to —300 000 years ago)
  - Informal designation

Technological characteristics

- This phase needs future clarification regarding the designation of cultural material and sequencing
- Includes discoidal and Levallois flake technologies, blades from volumetric cores and a generalised toolkit

- **Earlier Stone Age**
  - Age range: >200 000 to 2 000 000 years ago
  - General characteristics: early stages include simple flakes struck from cobbles, core and pebble tools; later stages include intentionally shaped handaxes, cleavers and picks; final or transitional stages have tools that are smaller than the preceding stages and include large blades.
  - In the sequence below we highlight differences or characteristics that may be used to refine interpretations depending on context.

- **ESA-MSA transition**
- 200 to —600 thousand years ago
- MIS 7-15

Technological characteristics

- Described at some sites as Fauresmith or Sangoan
- Relationships, descriptions, issues of mixing and ages yet to be clarified
- Fauresmith assemblages have large blades, points, Levallois technology, and the remaining ESA components have small bifaces
- The Sangoan contains small bifaces (<100 mm), picks, heavy and light-duty denticulated and notched scrapers
- The Sangoan is less well described than the Fauresmith

- **Acheulean**
  - 300 thousand to —1.5 million years ago
  - MIS 8-50

Technological characteristics

- Bifacially worked handaxes and cleavers, large flakes > 10 cm
- Some flakes with deliberate retouch, sometimes classifiedas scrapers
- Gives impression of being deliberately shaped, but could indicate result of knapping strategy
- Sometimes shows core preparation
- Generally found in disturbed open-air locations

- **Oldowan**
  - 1.5 to >2 million years ago
  - MIS 50-75

Technological characteristics

- Cobble, core or flake tools with little retouch and no flaking to predetermined patterns
- Hammerstones, manuports, cores
- Polished bone fragments/tools

Iron Age Sequence

In the northern regions of South Africa at least three settlement phases have been distinguished for early prehistoric agropastoralist settlements during the **Early Iron Age** (EIA). Diagnostic pottery assemblages can be used to infer group identities and to trace movements across the landscape. The first phase of the Early Iron Age, known as **Happy Rest** (named after the site where the ceramics were first identified), is representative of the Western Stream of migrations, and dates to AD 400 - AD 600. The second phase of **Diamant** is dated to AD 600 - AD 900 and was first recognized at the eponymous site of Diamant in the western Waterberg. The third phase, characterised by herringbone-decorated pottery of the **Eiland** tradition, is regarded as the final expression of the Early Iron Age (EIA) and occurs over large parts of the North West Province, Northern Province, Gauteng and Mpumalanga. This phase has been dated to about AD 900 - AD 1200. These sites are usually located on low-lying spurs close to water.

Diagnostic pottery assemblages are mainly used to construct a temporal-spatial framework which can be used to infer group identities and to trace movements across the landscape. In the eastern coastal regions of South Africa at least three settlement phases have been distinguished for early prehistoric agropastoralist settlements during the **Early Iron Age** (EIA). The first phase of the Early Iron Age, known as **Msuluzi** (named after the site where the ceramics were first identified). The second phase namely, **Ndondondwane** developed from Msuluzi. The third phase is called **Ntshekane** and is regarded as the final expression of the Early Iron Age (EIA) in the area. This phase has been dated to about AD 900 - AD 1200. These sites are usually located on low-lying spurs close to water.

The **Late Iron Age** (LIA) settlements are classified as Blackburn (c. AD 1050) and later Moor Park (c. AD 1350) typify this period. Later sites (such as Umgazana c. AD 1700) are characterised by stone-walled enclosures situated on defensive hilltops. This occupation phase has been linked to the arrival of ancestral Zulu and Xhosa (Nguni-speaking) people in the region. These settlements can in many instances be correlated with oral traditions and population movements.

The Late Iron Age (LIA) settlements are characterised by stone-walled enclosures situated on defensive hilltops c. AD 1640 - AD 1830). This occupation phase has been linked to the arrival of ancestral Northern Sotho, Tswana and Ndebele (Nguni–speakers) in the central regions of South Africa with associated sites dating between the sixteenth and seventeenth centuries AD.

Addendum 2: Description of the Recorded Sites

A system for grading the significance of heritage sites was established by the NHRA (Act No. 25 of 1999) and further developed by the South African Heritage Resources Agency (SAHRA 2007) and has been approved by ASAPA for use in southern Africa and was utilised during this assessment.

Example of site recording form

A. GENERAL SITE DESCRIPTION				
Site type				
Site Period				
Physical description				
Integrity of deposits or structures				
Site extent				
B. SITE EVALUATION				
B1. HERITAGE VALUE			**Yes**	**No**
Historic Value				
It has importance to the community or pattern of South Africa's history or precolonial history.				
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.				
It has significance relating to the history of slavery in South Africa.				
Aesthetic Value				
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.				
Scientific Value				
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.				
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.				
It has importance to the wider understanding of the temporal change of cultural landscapes, settlement patterns and human occupation.				
Social Value				
It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).				
Tourism Value				
It has significance through its contribution towards the promotion of a local sociocultural identity and can be developed as tourist destination.				
Rarity Value				
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.				
Representative Value				
It is importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.				
B2. REGIONAL CONTEXT				
Other similar sites in the regional landscape.				
C. SPHERE OF SIGNIFICANCE	**High**	**Medium**	**Low**	
International				
National				
Provincial				
Local				
Specific community				
D. FIELD REGISTER RATING				
National/Grade 1 [should be registered, retained]				
Provincial/Grade 2 [should be registered, retained]				
Local/Grade 3A [should be registered, mitigation not advised]				
Local/Grade 3B [High significance; mitigation, partly retained]				

Generally Protected A [High/Medium significance, mitigation]	
Generally protected B [Medium significance, to be recorded]	
Generally Protected C [Low significance, no further action]	
E. GENERAL STATEMENT OF SITE SIGNIFICANCE	
Low	
Medium	
High	
F. RATING OF POTENTIAL IMPACT OF DEVELOPMENT	
None	
Peripheral	
Destruction	
Uncertain	
G. RECOMMENDED MITIGATION	
•	
H. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS	
•	
I. PHOTOGRAPHS	

Addendum 3: Surveyor General Farm Diagram

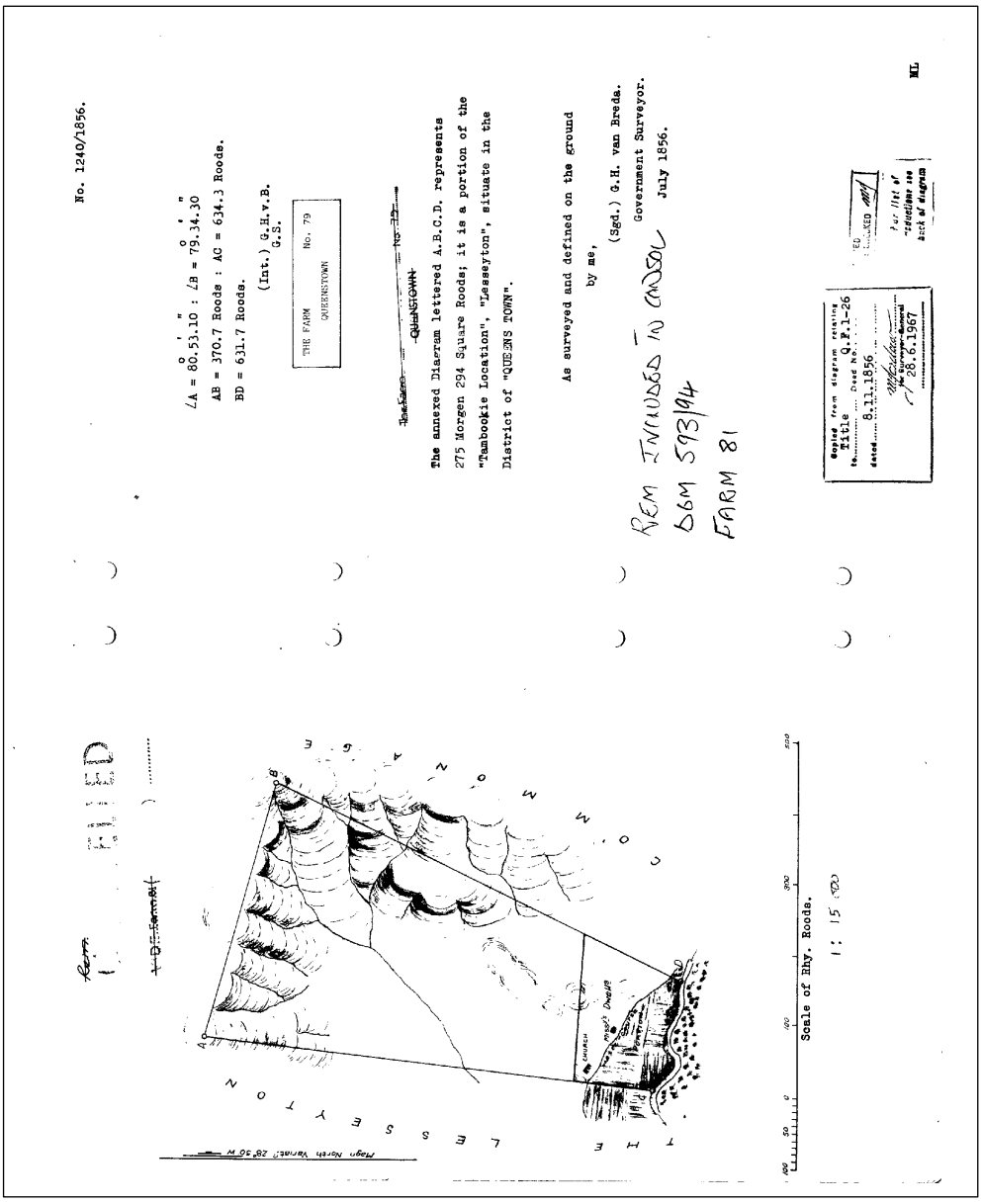


Figure 35: The surveyor General's map of the area indicating the farm Lesseyton were already surveyed by 1856

Addendum 4: Relocation of Graves

Marked graves younger than 60 years do not fall under the protection of the NHRA (Act No. 25 of 1999) with the result that exhumation, relocation and reburial can be conducted by an undertaker. This will include logistical aspects such as social consultation, purchasing of plots in cemeteries, procurement of coffins, etc. Other legislative measures which may be pertinent include the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), Regulations Relating to the Management of Human Remains (GNR 363 of 22 May 2013) made in terms of the National Health Act No. 61 of 2003, Ordinance on Exhumations (Ordinance No. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Marked graves older than 60 years are protected by the NHRA (Act No. 25 of 1999) an as a result an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. Note that unmarked graves are by default regarded as older than 60 years and therefore also falls under the NHRA (Act No. 25 of 1999, Section 36).

The relocation of graves entails the following procedure:

- Notices of intent to relocate the graves must be put up at the burial site for a period of 60 days. This should contain contact information where communities and family members can register as interested and affected parties. All information pertaining to the identification of the graves must be documented for the application of a SAHRA permit. All notices must be in at least 3 languages, of which English is one. This is a requirement by law.
- These notices of intention must also be placed in at least two local newspapers and have the same information as above.
- Local radio stations can also be used to try contact family members. This is not required by law, but can be helpful.
- During this time (60 days) a suitable cemetery must be identified near to the development or otherwise one specified by the family of the deceased.
- An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The developer needs to take the families requirements into account.
- Once the 60 days have passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.
- Once the permit has been issued, the graves may be exhumed and relocated.
- All headstones must be relocated with the graves as well as any remains and any additional objects found in the grave.

Information needed for the SAHRA permit application

- The permit application must be done by an archaeologist.
- A map of the area where the graves have been located.
- A survey report of the area prepared by an archaeologist.
- All the information on the families that have identified graves.
- A letter of permission from the landowner granting permission to the developer to exhume and relocate the graves.

- A letter (or proof of purchase of the plots) from the new cemetery confirming that the graves will be reburied there.
- Details of the farm name and number, magisterial district and GPS coordinates of the gravesite.

Graves are generally be classified into four categories. These are:

- Graves younger than 60 years;
- Graves older than 60 years, but younger than 100 years;
- Graves older than 100 years; and
- Graves of victims of conflict or of individuals of royal descent.

Addendum 5: Palaeontological Review

Exemption Letter – Proposed Application to change the Queenstown Quarry Mining Right Area

Heidi Fourie – Palaeontological Impact Assessment

Enoch Mgijma Local Municipality, Chris Hani District Municipality, Eastern Cape Province.
Farm: Lesseyton 81.

Protocol for a Chance Fossil Find is included.
The applicant, Raumix Aggregates (Pty) Ltd has identified additional resources adjacent to the current mining right area for their Queenstown Quarry operation (Komani Quarry (Pty) Ltd.). They intend to expand the mining right area to include this additional resource and extend the Life of Mine. Only the dolerite will be mined for stone aggregate.

Landowners: Raumix Aggregates (Pty) Ltd.

Summary
This letter serves as a Letter of Exemption. It is in compliance with The Minimum Standards for Palaeontological Components of Heritage Impact Assessment Reports, SAHRA APMHOB, Guidelines 2012. The development is underlain by the rocks of the Karoo Supergroup, Jurassic, Early Triassic, Permian in age, with a **VERY HIGH** Palaeontological Sensitivity (Almond *et al.* 2009*). This development will take place on igneous rocks, therefore, the impact will be **VERY LOW.**

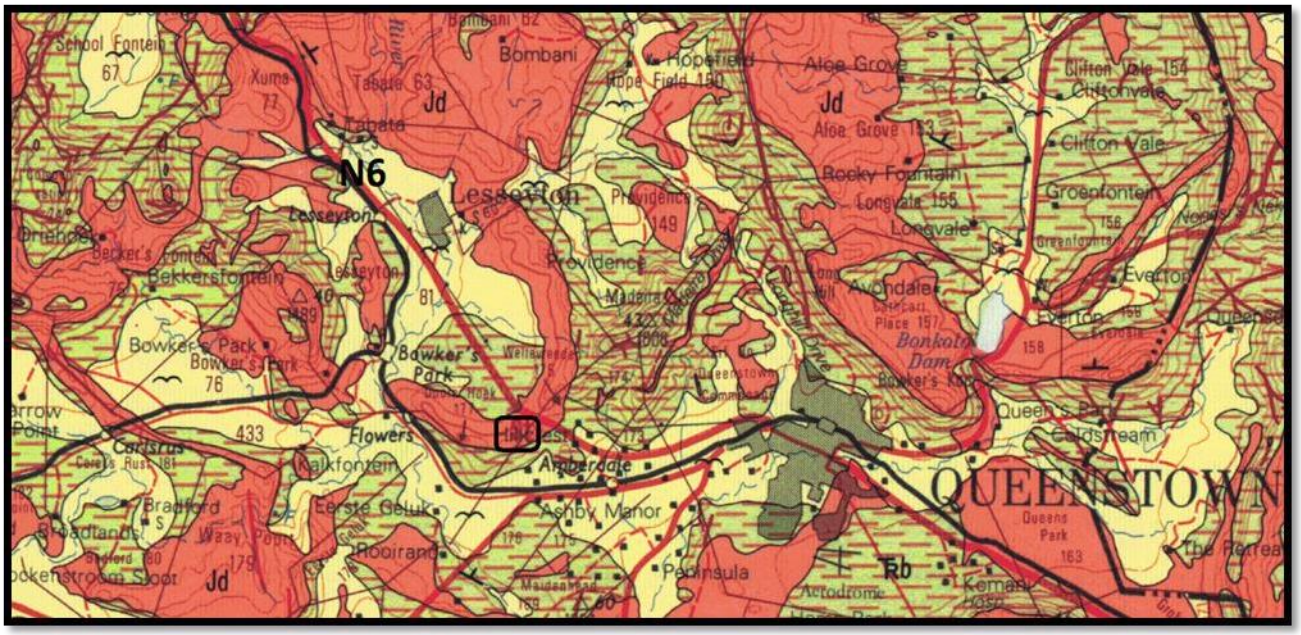


Figure 1: Geology of area (1:250 000 3322 Queenstown).
Legend to Figure:
M – Alluvial valley deposits (yellow). Quaternary.
Jd – Karoo Dolerite suite (pink). Jurassic.
TRb – Brownish-red and grey mudstone, sandstone (khaki ---). Burgersdorp Formation, Tarkastad Subgroup, Karoo Supergroup. Early Triassic.
Pa – Grey and brownish-red mudstone, sandstone (green). Abrahamskraal Formation, Adelaide Subgroup, Karoo Supergroup. Permian.

- ------- Concealed geological boundary.
----f----- Fault
⊥ 2˚ - Strike and dip.
□ – Approximate position of mine.
Mining in area
St – Stone aggregate.

Dolerite dykes (Jd) occur throughout the Karoo Supergroup. Structural geological features such as dykes and faults can have a measurable influence on ground water flow and mass transport. Permian sediments are extensively intruded and thermally metamorphosed (baked) by sub-horizontal sills and steeply inclined dykes of the Karoo Dolerite Suite. These early Jurassic (183 Ma) basic intrusions baked the adjacent mudrocks and sandstones to form splintery hornfels and quartzites respectively. Thermal metamorphism by dolerite intrusions tends to reduce the palaeontological heritage potential of the adjacent sediments.

The Tarkastad Subgroup of the Beaufort Group consists of a lower predominantly arenaceous Katberg Sandstone Formation and a predominantly upper argillaceous Burgersdorp Formation (Cole *et al*. 2004, Kent 1980). It is Early Triassic in age. This Subgroup is absent in the west of the basin. A maximum thickness of 900 m can be measured for the Katberg sandstone Formation (Cole *et al*. 2004). This Subgroup marks the boundary of the Palaeozoic and the Mesozoic (Snyman 1996, Visser 1998). Fossil mammal-like reptiles are present (Norman and Whitfield 2006).

The Adelaide Subgroup consists of up to three formations (Koonap, Middleton, Balfour in the east). Mudrock predominates with subordinate sandstone and is Upper Permian in age. It overlies the Ecca Group conformably and is overlain by the Katberg Formation of the Tarkastad Subgroup (Cole *et al.* 2004). The Koonap Formation is the lowermost unit of the Beaufort Group and reaches a thickness of 1 300 m. (Kent 1980). The Balfour Formation is distinguished from the Middleton Formation by the lack of 'red' mudstone and is ±2 150 m. thick, whereas the Middleton Formation is ±1 600 m. thick (sheet info, Kent 1980). The Adelaide Subgroup has a maximum thickness of 1750 m. in the south (Visser 1989).

Figure 2: Location map to show palaeontological sensitivity (SAHRIS).

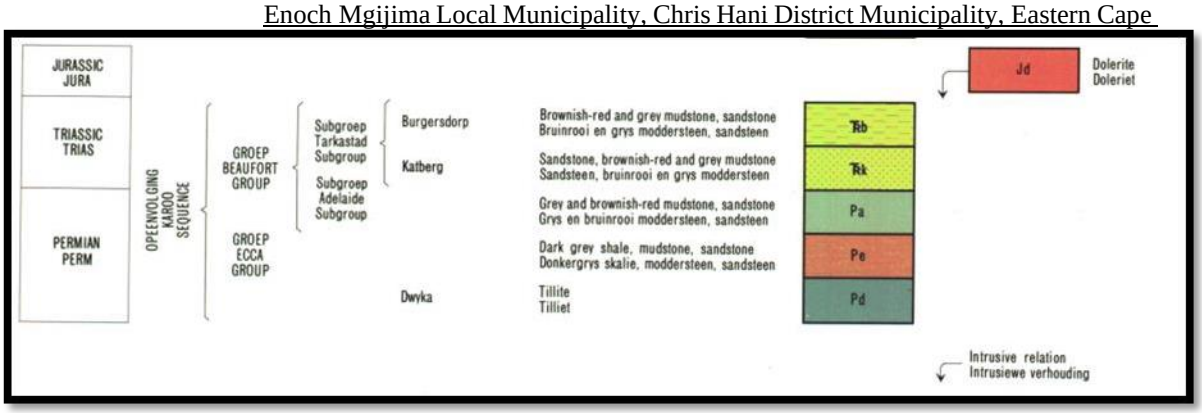


Figure 3: Lithostratigraphy (3128 Umtata).

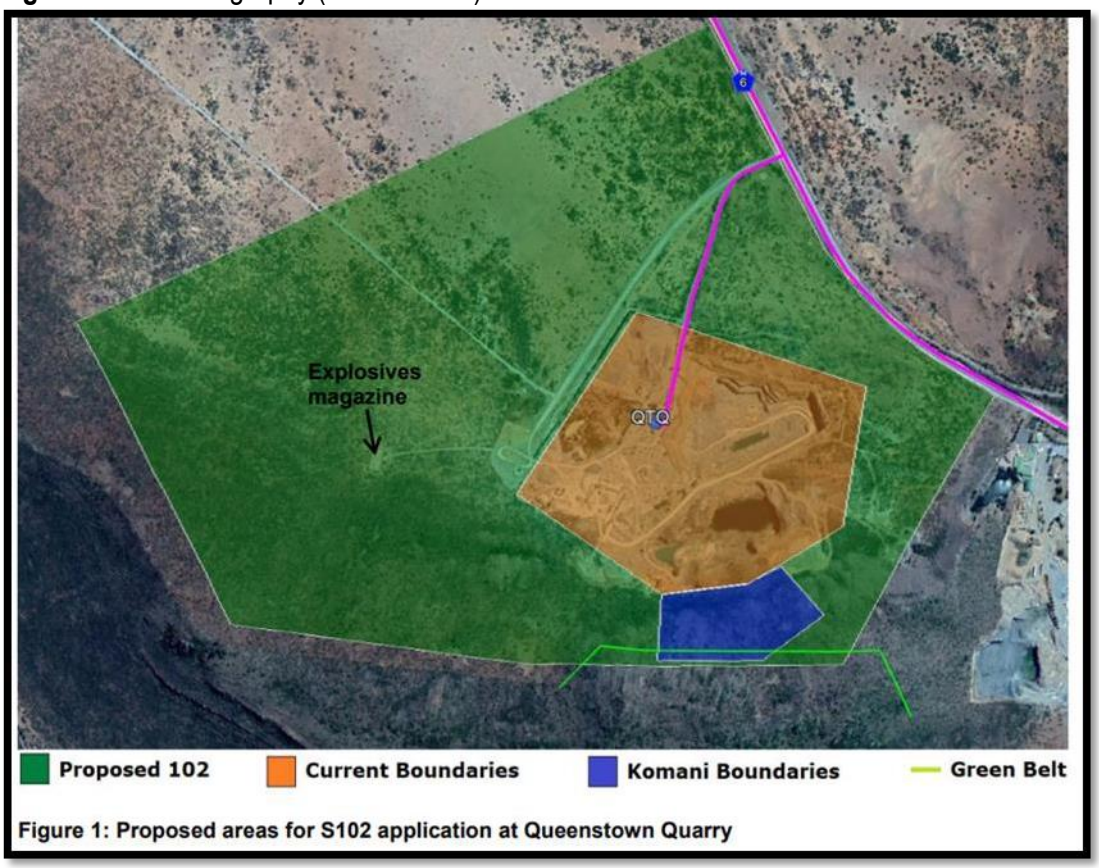


Figure 4: Google Earth location and mine boundaries.

Palaeontological Sensitivity

KAROO DOLERITE SUITE (Jd)	intrusive dolerites Early Jurassic 182 Ma	NO fossils in dolerites

*Almond, J., de Klerk, B and Gess, R. 2009. SAHRA Palaeotechnical Report: Palaeontological Heritage of the Eastern Cape Province (Pp 51), South African Heritage Resources Agency.

No fossils recorded due to the igneous nature.

Recommendation

That Exemption from a Phase 1: Field Assessment Study for the proposed Queenstown Quarry be granted to the applicant taking into consideration all the above stated information.

Declaration (disclaimer)

I, Heidi Fourie, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development project for which I was appointed to do a palaeontological assessment. There are no circumstances that compromise the objectivity of me performing such work.

I accept no liability, and the client, by receiving this document, indemnifies me against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the use of the information contained in this document.

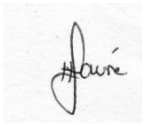
It may be possible that the Exemption Letter may have missed palaeontological resources in the project area as outcrops are not always present or visible on geological maps while others may lie below the overburden of earth and may only be present once development commences.

This report may not be altered in any way and any parts drawn from this report must make reference to this letter.

POPI Act 2013 Statement

It provides that everyone has the right to privacy and includes a right to protection against the unlawful collection, retention dissemination and use of personal information contained in this document and pertains to the phone and contact details, signature and contents.

As per the Declaration Section none of the information may be shared without the permission of the author.



Heidi Fourie
2022/08/12

Protocol for Chance Finds and Management plan

This section covers the recommended protocol for a Phase 2 Mitigation process as well as for reports where the Palaeontological Sensitivity is **LOW**; this process guides the palaeontologist / palaeobotanist / ECO on site and should not be attempted by the layman / developer.

- As part of the Environmental Authorisation conditions, an Environmental Control Officer (ECO) will be appointed to oversee the construction/prospecting/mining activities in line with the legally binding Environmental Management Programme (EMPr) so that when a fossil is unearthed they can notify the relevant department and specialist to further investigate.
- All fossil finds must be placed in a safe place for further investigation.
- The ECO should familiarise him- or herself with the applicable formations and its fossils.
- Most Universities and Museums have good examples of fossils.
- The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction/prospecting/mining activities. For a chance fossil find, the protocol is to cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation.
- It is recommended that the EMPr be updated to include the involvement of a palaeontologist when necessary, either for pre-construction training of ECO or for pre-determined site visits. The ECO must visit the site after clearing, drilling, excavations and blasting and keep a photographic record.

- The developer may be asked to survey the areas affected by the development and indicate on plan where the construction / development / mining will take place. Trenches may have to be dug to ascertain how deep the sediments are above the bedrock (can be a few hundred metres). This will give an indication of the depth of the topsoil, subsoil, and overburden, if need be trenches should be dug deeper to expose the interburden.

The palaeontological impact assessment process presents an opportunity for identification, access and possibly salvage of fossils and add to the few good localities. Mitigation can provide valuable onsite research that can benefit both the community and the palaeontological fraternity. A Phase 2 study is very often the last opportunity we will ever have to record the fossil heritage within the development area. Fossils excavated will be stored at a National Repository.