

LIME SALES LIMITED

BRIDGETOWN DOLOMITE QUARRY DRIEHEUVELS QUARRY

MINING OF DOLOMITE OVER THE REMAINDER OF PORTION 7, 8, 9 OF THE FARM VLEDERMUISDRIFT NO 398, PORTION 2 OF THE FARM VOGELSTRUISDRIFT NO 335, AND PORTION 1 (REMAINING EXTENT) OF THE FARM DRIEHEUVELS NO 399, MOORREESBURG, WESTERN CAPE PROVINCE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT



DEPARTMENTAL REFERENCE NUMBER: WC 30/5/1/2/2/233 MR

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EXECUTIVE SUMMARY

Lime Sales Limited intends submitting a Section 102 (“S102”) amendment application to add 13.0949 ha (hereinafter referred to as “Drieheuvels Quarry” (“DQ”)), over Portion 1 of the farm Drieheuvels 399, to the current 168.5502 ha mining footprint of the Bridgetown Dolomite Quarry (“BDQ”). The S102 application necessitates an application for a Part 2 amendment of the mine’s EMPR in terms of GNR 326 Section 31. The proposed S102 application does not constitute a listed or specified activity.

Bridgetown Dolomite Quarry

The mining right held by Lime Sales Limited extends over 168.5502 ha of the Remainder of Portion 7, 8 and 9 of the farm Vledermuisdrift No 398 and Portion 2 of the farm Vogelstruisdrift No 335 and allows for the mining of dolomite. Mining commenced on the southern section of the Bridgetown Dolomite Quarry during 1990. In 1992, a second small milling plant was erected elsewhere on site to crush limestone derived from PPC near Piketberg to produce calcitic Ag-lime. The calcitic Ag-lime plant closed down in about 1999 and the quarry on the southern section was filled up and rehabilitated by the end of 2014. During 1995/96 Lime Sales Ltd and Iscor Ltd formed a Joint Venture to exploit the dolomite deposit and successfully tendered to supply the then “Saldanha Steel Smelter” with metallurgical grade dolomite as a flux in the smelting process from a new quarry on the northern part of the property. Production of metallurgical grade dolomite commenced in 1998 at a new crushing, screening and washing plant erected close to the northern quarry for this purpose. At present the metallurgical dolomite is the main product produced on site. At present, mining takes place on the site under a converted mining right with reference number 86/2014 (WC 30/5/1/2/2/233 MR) and an environmental management programme (“EMPR”) (2009), initially approved in 1997 and updated in 2009. The project is operated and managed by an on-site contractor, SPH Kundalila (Pty) Ltd, under the general supervision of Lime Sales Limited.

Drieheuvels Quarry

In 2019, Lime Sales Ltd identified the need to extend the current BDQ mining footprint to include a 13.0949 ha area over Portion 1 of the farm Drieheuvels No. 399. Adding the proposed 13.1 ha to the current footprint of BDQ necessitates an application for the consent of the minister to amend the approved mining right and EMPR in terms of Section 102 of the MPRDA, 2002.

The proposed operation will entail the stripping of topsoil and overburden from the footprint area, upon which the mining area will be drilled and blasted to loosen the hard rock.

Eartmoving equipment will load the loosened material onto trucks that will transport it to the BDQ where it will be processed at the existing Ag-lime processing plant. No mining will take place within the 1:100 year floodline of the Berg River and due to the small scale of the mining footprint, the quarry depth will be limited to the groundwater level.

Alternatives:

Project/site alternatives does not apply to the current BDQ operation. The mine's EMPR (2009) notes that the only alternative high grade dolomite sites (Vredendal / Van Rhynsdorp) are at a considerable distance which results in twice the transport cost of delivery to the Arcelor Mittal steel plant. While these operations were originally considered in a tender process, they were discarded based on cost.

Site Alternative 1 was identified as the preferred site alternative for the DQ as the proposed footprint offers access to the dolomite resource; the layout of the proposed footprint excludes areas with natural occurring Swartland Shale Renosterveld of critical conservation importance; the existing farm road can be used to access the footprint area; and no listed activities (NEMA: EIA Regulations) will be trigger.

The use of the existing processing infrastructure at BDQ was identified as the preferred project alternative.

Public Participation Process:

Prior to the approval of the 1997 EMPR, a full public participation process was implemented and all I&AP's were personally invited to take part.

Regulation 32(1)(a)(aa) of the NEMA: EIA Regulations, 2017 stipulates that an applicant (for a Part 2 amendment) must submit a report reflecting the changes to the EMPR that has been subjected to a public participation process. In light of this, the stakeholders and I&AP's will be informed, of the S102 amendment application and proposed extension of the mining footprint, by means of a notification letter that informs them of the availability of the DEIAR and draft EMPR for their perusal, on-site notices and an advertisement in the Swartland Gazette. A 30-day commenting period will be allowed that ends on 31 January 2020.

Environmental Impact Assessment Report:

The environmental impact assessment report identifies the potential positive and negative impacts that the proposed activity will have on the environment and the community as well as the aspects that may impact on the socio-economic conditions of directly affected persons, and proposes possible mitigation measure that could be applied to modify / remedy / control / stop the identified impacts.

The key finding of the environmental impact assessment regarding the proposed DQ entail the following:

Topography:

- ❖ The DQ will cut into the eastern slope of the hill. Due to the nature of the activity, the topography of the hill will be altered in that the eastern facing rise will be mined out; to be rehabilitated with a stepped/sloped face along the western boundary of the proposed mining area.

Visual Characteristics:

- ❖ The proposed quarry will mainly be visible from the eastern and western banks of the Berg River within the short to medium distance (maximum 6 km) zone; however, as the distance between the proposed development and the observer increases the visual impact will decrease. To the north, north-west the visual impact will be negligible.

Air and Noise Quality:

- ❖ The proposed DQ does not trigger an application in terms of the NEM:AQA, 2004, and emissions to be generated is expected to entail dust due to the displacement of soil and transport of material on gravel roads. Should the right holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low-medium significance.
- ❖ The proposed activity will contribute noise generated because of blasting, as well as loading, and transporting of material. The nuisance value of noise generated by the proposed operation, to residence in the near vicinity is deemed to be of low-medium significance.

Geology and Soil:

- ❖ The LexRox report concluded that the laboratory results confirm that the dolomite samples collected from the 100 m due diligence RC drilling program on the Drieheuvels 399 property are generally comparable and almost certainly of better quality when compared to dolomite mined and processed into a saleable product at the SPH Bridgetown Quarry (LexRox 2017).

Hydrology:

- ❖ *Surface Water:* The NFEPA status of the study area is classified as a no priority area, and no wetlands or other drainage line were identified within the proposed footprint area. The proposed DQ does however fall within 500 m of the Berg River and therefore may require a Water Use Authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21(i). The right holder is in discussion with the DWS to determine the way forward.
- ❖ *Groundwater:* Due to the proximity of the DQ to the BDQ, the groundwater level is expected to be similar. The right holder indicated that the DQ mining footprint would only be mined up to the groundwater level; no mining will continue below the groundwater level.

Biodiversity Conservation Areas:

- ❖ Ground truthing confirmed that the proposed footprint of S1 has been altered by agricultural practices and no natural areas of conservation concern are left. The footprint proposed for S2 however, extends over a portion with natural occurring Swartland Shale Renosterveld that is classified as Critically Endangered.

Vegetation:

- ❖ No natural occurring Renosterveld remains within the proposed footprint. However, the proposed footprint of S2 includes an area with natural vegetation that has not been altered by agriculture.

Cultural and Heritage Environment:

- ❖ No sites of archaeological or cultural importance were identified during the site inspection. Consultation with the interested and affected parties did not identify any potential area of concern and the SAHRA palaeontological sensitivity map shows that the area is of Low

concern. The potential impact of the proposed mining activities on the cultural and/or heritage environment is therefore deemed insignificant.

Existing Infrastructure:

- ❖ As the proposed mining area will be developed on a wheat field, no infrastructure exists (on site) that will be impacted on.
- ❖ The existing farm road will be used to reach the mining area and the right holder will be responsible for the maintenance of the road for the duration of the operational phase.

Land Use:

- ❖ Mining will temporarily affect 13.1 ha of Portion 1 of the farm Drieheuvelds 399.
- ❖ Upon closure the excavation will be rehabilitated and once again be available for agricultural use.

During the environmental impact assessment process the feasibility of the proposed site was assessed to identify fatal flaws that are deemed as severe as to prevent the activity continuing, or warrant a site or project alternative. The outcome of the assessment showed that should the mitigation measures and monitoring programmes proposed in this document be implemented, no fatal flaws could be identified that prevents the activity continuing.

Environmental Management Programme (EMPR)

The EMPR provides a description of the impact management outcomes and closure objectives. It presents the impacts to be mitigated in their respective phases as well as stipulates the mitigation measures to be applied on site.

The financial provision amount that will be necessary for the rehabilitation of damages caused by the Bridgetown Dolomite Operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of R 2 646 803.74.

LIST OF ABBREVIATIONS

ADT	Articulated Dump Truck
Ag-Lime	Agricultural Lime
AIA	Archaeological Impact Assessment
BDQ	Bridgetown Dolomite Quarry
BGIS	Biodiversity GIS
BRD	Berg River Downstream
BRU	Berg River Upstream
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
CSIR	Council for Scientific and Industrial Research
CWCBR	Cape West Coast Biosphere Reserve
DAFF	Department of Agriculture, Forestry and Fisheries
DEA&DP	Department of Environmental Affairs and Development Planning
DEDT	Department of Economic Development and Tourism
DEIAR	Draft Environmental Impact Assessment Report
DMR	Department of Mineral and Resources
DOL	Department of Labour
DQ	Drieheuvels Quarry
DRDLR	Department of Rural Development and Land Reform
DSD	Department of Social Development
DTPW	Department of Transport and Public Works
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIA Regulations	Environmental Impact Assessment Regulations, 2014 (as amended 2017)
EMC	Environmental Management Committee
EMPR	Environmental Management Programme
ESA	Ecological Support Areas
FEIAR	Final Environmental Impact Assessment Report
FEL	Front-End-Loader
FRs9	Swartland Shale Renosterveld
GA	General Authorisation

GDPR	Gross Domestic Product
GNR	Government Notice
GS	Geological Survey
HWC	Heritage Western Cape
I&AP's	Interested and Affected Parties
MHSA	Mine Health and Safety Act, 1996 (Act No. 29 of 1996)
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MR	Mining Right
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Control Act, 2004 (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NRTA	National Road Traffic Act, 1996 (Act No. 93 of 1996)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PCB's	Polychlorinated Biphenyl
PCO	Pest Control Officer
PPE	Personal Protective Equipment
PPV	Peak Particle Velocity
PSM	Palaeontological Sensitivity Map
PWFZ	Portland-Wight Fault Zone
QW	Quarry Water
RE	Remaining Extent
ROM	Run of Mine
S1	Site Alternative 1
S2	Site Alternative 2
S102	Section 102 Amendment Application
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAMBE	South African Mining and Biodiversity Forum
SANBI	South African National Biodiversity Institute
SLP	Social and Labour Plan

TDS	Total Dissolved Solids
USBM	US Bureau of Mines
WBE	Water Borehole East
WBW	Water Borehole West
WC	Western Cape Province
WCBSP	West Coast Biosphere Spatial Plan
WCDM	West Coast District Municipality
WMA	Water Management Area
WULA	Water Use Licence Authorisation

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Appendix F2: BDQ Zoning Approval
Appendix F3: DQ Landowner Notification
Appendix G: BDQ Visual Impact Map
Appendix H1: BDQ Distance between Structures and Mine
Appendix H2: BDQ Dust, Noise and Blasting Results
Appendix I1: BDQ Geological Report 1994
Appendix I2: BDQ Geological Report 2008
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Appendix I4: DQ Preliminary Inspection and Due Diligence of Dolomite Quality

Appendix J1: BDQ Water Use Authorisations
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Appendix J3: BDQ Water Sampling Locations
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Appendix J5: Rehabilitation Agreement
Appendix J6: DQ 1:100 Year Floodline
Appendix K1: BDQ Vegetation Map
Appendix K2: BDQ Botanical Survey
Appendix K3: BDQ Search and Rescue Report
Appendix L: BDQ Archaeological Impact Assessment
Appendix M: Invasive Plant Species Management Plan
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Appendix P: Financial and Technical Ability
Appendix Q: Photographs of BDQ and DQ
Appendix R: CV and Experience of EAP



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
And
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 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:	Lime Sales Limited
TEL NO:	022 433 3008
FAX NO:	086 666 8610
POSTAL ADDRESS:	P.O. Box 160, Milnerton, 7435
PHYSICAL ADDRESS:	18 Marconi Road, Milnerton, Cape Town
FILE REFERENCE NUMBER SAMRAD:	WC 30/5/1/2/2/233 MR

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development act (Act 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 Authorization can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulation, 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 section 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 authorization 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 failure to meet the requirements of the Regulation and will lead to the Environmental Authorization 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 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.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

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

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) Details of Greenmined Environmental

In terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) the proponent must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental impact assessment (EIA) of any activities regulated in terms of the aforementioned Act. Lime Sales Limited (hereinafter referred to as the "Right Holder") appointed Greenmined Environmental (Pty) Ltd (hereinafter referred to as "Greenmined") to undertake the study needed. Greenmined Environmental has no vested interest in Lime Sales Limited or the proposed project and declares its independence as required by the EIA Regulations, 2014 (as amended 2017).

i) Details of the EAP

Name of the Practitioner: Ms Christine Fouche
Tel No: 021 850 8875 / 082 811 8514
Fax No: 086 546 0579
E-mail address: christine.f@greenmined.co.za

ii) Expertise of the EAP

(1) The qualifications of the EAP

(with evidence).

Ms Fouche has a Diploma in Nature Conservation and a B.Sc. in Botany and Zoology. Full curriculum vitae with evidence is attached as Appendix R.

(2) Summary of the EAP's past experience

(In carrying out the Environmental Impact Assessment Procedure)

Ms Fouche has fourteen years' experience in doing Environmental Impact Assessments and Mining Applications in South Africa. See Appendix R.

b) Description of the property

Table 1: Description of the property.

Farm Name:	Portion 7 (Remaining Extent) of the farm Vledermuisdrift No 398
	Portion 8 (Remaining Extent) of the farm Vledermuisdrift No 398
	Portion 9 (Remaining Extent) of the farm Vledermuisdrift No 398
	Portion 2 (Remaining Extent) of the farm Vogelstruisdrift 335
	Portion 1 (Remaining Extent) of the Drieheuvelds No 399
Application area (Ha)	181.6451 ha (168.5502 ha BDQ + 13.0949 ha DQ)
Magisterial district:	Moorreesburg
Distance and direction from nearest town	Bridgetown Quarry is located 20 km east of Moorreesburg on the western bank of the Berg River.
21 digit Surveyor General Code for each farm portion	C0460000000039800007
	C0460000000039800008
	C0460000000039800009
	C0460000000033500002
	C0460000000039900001

c) Locality map

(show nearest town, scale not smaller than 1:250000)

The requested maps are attached as Appendix B1 (BDQ) and B2 (DQ) respectively.

d) Description of the scope of the proposed overall activity

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1:10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site

Lime Sales Limited intends submitting a Section 102 ("S102") amendment application to add 13.0949 ha (hereinafter referred to as "Drieheuvelds Quarry" ("DQ")), over Portion 1 of the farm Drieheuvelds 399, to the current 168.5502 ha mining footprint of the Bridgetown Dolomite Quarry ("BDQ"). The S102 application necessitates an application for a Part 2 amendment of the mine's EMPR in terms of GNR 326 Section 31. The proposed S102 application does not constitute a

listed or specified activity. See attached as Appendix C1 & C2 maps showing the site activities layout of BDQ and the proposed DQ respectively.

i) Listed and specified activities

Table 2: Listed and specified activities triggered by the associated mining activities

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)
Section 102 amendment application to increase the current mining boundary.	181.6451 ha	X	GNR 326 Section 31 Amendments to be applied for in terms of Part 2: <i>An environmental authorisation may be amended by following the process prescribed in this Part if the amendment will result in a change to the scope of a valid environmental authorization where such change will result in and increased level or change in the nature of impact where such level or change in nature of impact was not:</i> <i>a) assessed and included in the initial application for environmental authorization; or</i> <i>b) taken into consideration in the initial environmental authorization;</i> <i>and the change does not, on its own, constitute a listed or specified activity.</i>

ii) Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

(Information obtained from the Bridgetown Dolomite Quarry Revised and Updated EMPR, 2009)

1. BACKGROUND INFORMATION (BDQ)

(Refer to Appendix F1: BDQ Mining Authorisations)

The mining right held by Lime Sales Limited extends over 168.5502 ha of the Remainder of Portion 7, 8 and 9 of the farm Vledermuisdrift No 398 and Portion 2 of the farm Vogelstruisdrift No 335 and allows for the mining of dolomite. The table below lists the GPS coordinates of the current mining footprint.

Table 3: GPS coordinates of the mining footprint of Bridgetown Dolomite Quarry.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
A	33°05'03.09"	18°49'24.10"	-33.084191°	18.823361°
B	33°05'04.72"	18°49'27.91"	-33.084644°	18.824419°
C	33°05'06.07"	18°49'36.58"	-33.085019°	18.826828°
D	33°05'10.72"	18°49'38.52"	-33.086311°	18.827367°
E	33°05'13.81"	18°49'38.39"	-33.087169°	18.827331°
F	33°05'17.72"	18°49'38.96"	-33.088256°	18.827489°
G	33°05'24.09"	18°49'41.18"	-33.090025°	18.828106°
H	33°05'25.86"	18°49'45.20"	-33.090517°	18.829222°
J	33°05'28.63"	18°49'45.65"	-33.091286°	18.829347°
K	33°05'31.13"	18°49'43.09"	-33.091981°	18.828636°
L	33°05'36.04"	18°49'42.55"	-33.093344°	18.828486°
M	33°05'31.47"	18°49'46.47"	-33.092075°	18.829575°
N	33°05'29.57"	18°49'48.74"	-33.091547°	18.830206°
P	33°05'24.41"	18°49'47.76"	-33.090114°	18.829933°
Q	33°05'22.27"	18°49'45.84"	-33.089519°	18.829400°
R	33°05'14.82"	18°49'45.36"	-33.087450°	18.829267°
S	33°05'14.17"	18°49'57.48"	-33.087269°	18.832633°
T	33°05'19.28"	18°49'59.81"	-33.088689°	18.833281°
U	33°05'27.30"	18°49'59.79"	-33.090917°	18.833275°
V	33°05'32.95"	18°50'01.45"	-33.092486°	18.833736°
W	33°05'40.21"	18°50'01.38"	-33.094503°	18.833717°
X	33°05'43.06"	18°49'59.64"	-33.095294°	18.833233°
Y	33°05'44.40"	18°50'00.02"	-33.095667°	18.833339°
Z	33°05'48.19"	18°50'02.57"	-33.096719°	18.834047°

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
1A	33°05'50.69"	18°50'06.02"	-33.097414°	18.835006°
1B	33°05'51.94"	18°50'08.60"	-33.097761°	18.835722°
1C	33°05'54.10"	18°50'13.04"	-33.098361°	18.836956°
1D	33°05'55.28"	18°50'15.31"	-33.098689°	18.837586°
1E	33°05'57.62"	18°50'23.57"	-33.099339°	18.839881°
1F	33°05'58.94"	18°50'24.72"	-33.099706°	18.840200°
1G	33°06'00.49"	18°50'26.24"	-33.100136°	18.840622°
1H	33°06'05.86"	18°50'20.24"	-33.101628°	18.838956°
1J	33°06'12.80"	18°50'18.61"	-33.103556°	18.838503°
1K	33°06'15.37"	18°50'19.01"	-33.104269°	18.838614°
1L	33°06'15.80"	18°50'16.17"	-33.104389°	18.837825°
1M	33°06'18.17"	18°50'11.36"	-33.105047°	18.836489°
1N	33°06'18.33"	18°50'01.19"	-33.105092°	18.833664°
1P	33°06'17.36"	18°49'56.05"	-33.104822°	18.832236°
1Q	33°05'44.08"	18°49'28.30"	-33.095578°	18.824528°
1R	33°05'29.69"	18°49'28.56"	-33.091581°	18.824600°

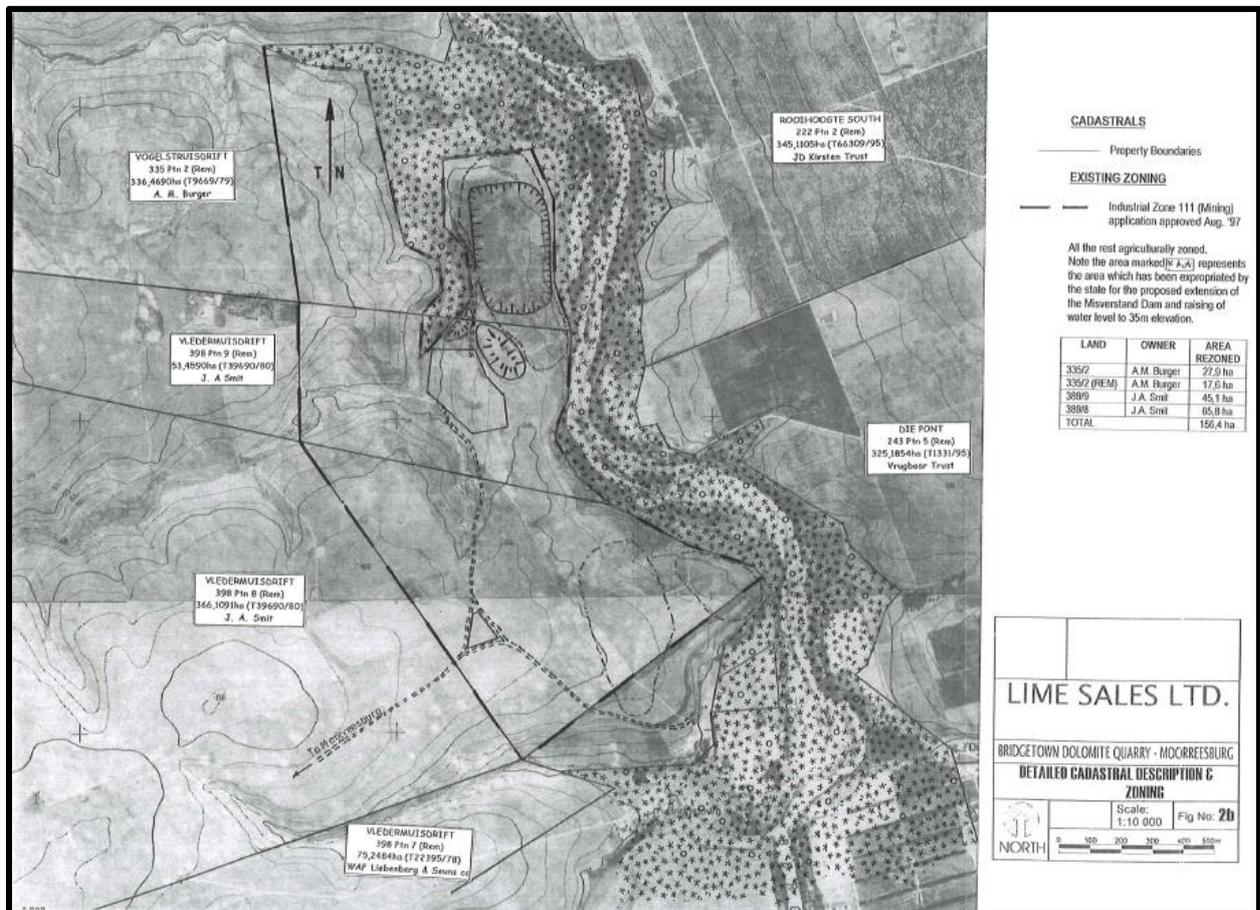


Figure 1: Cadastral map showing the current mining footprint of Bridgetown Quarry.

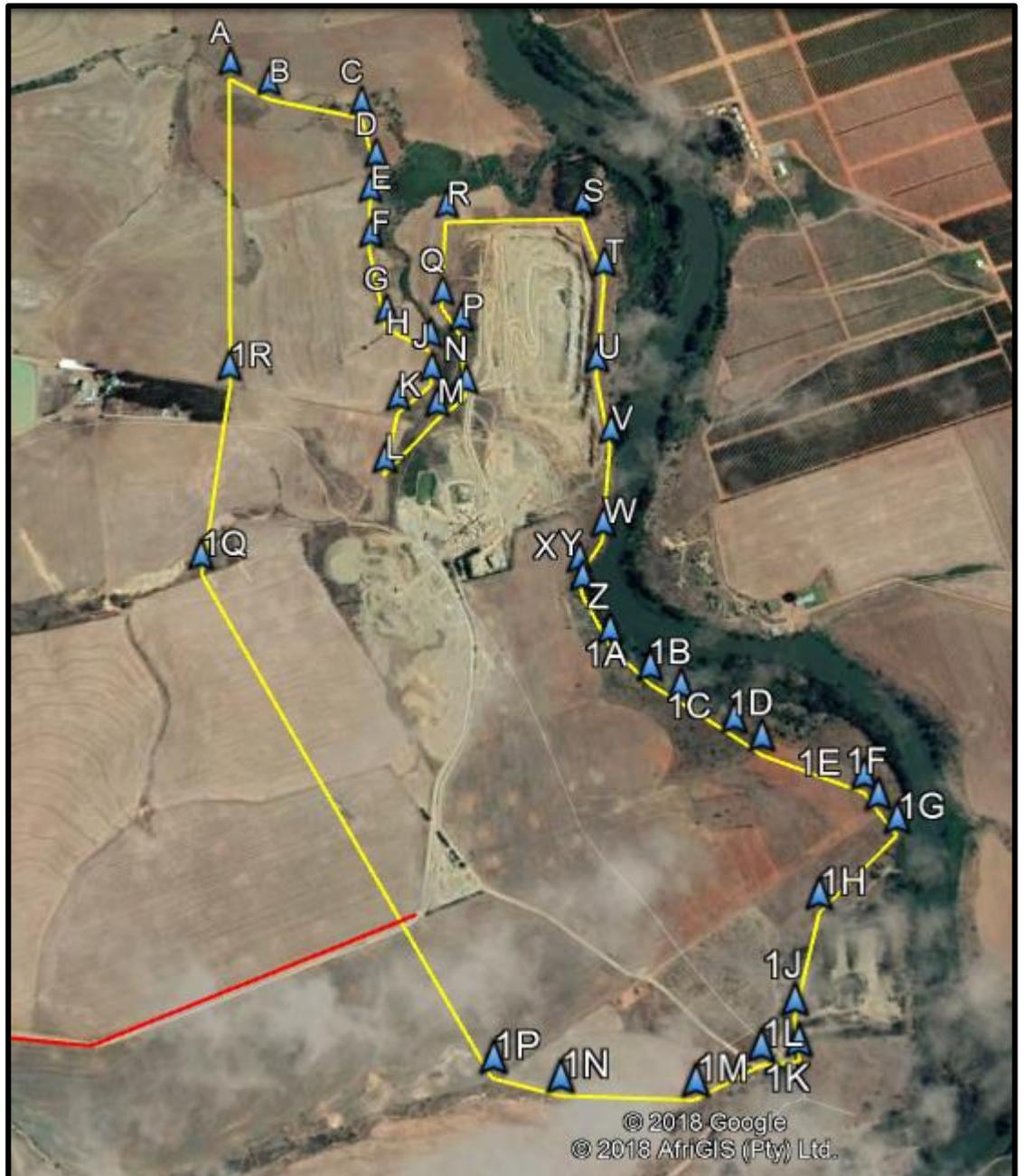


Figure 2: Satellite view of the current mining footprint of Bridgetown Quarry. (Image obtained from Google Earth)

Mining commenced on the southern section of the Bridgetown Dolomite Quarry during 1990, in a drilling, blasting, crushing and milling operation to produce dolomitic agricultural lime (“Ag-lime”) at an annual production rate of $\pm 50\,000$ tons per year. In 1992, a second small milling plant was erected elsewhere on site to crush limestone derived from PPC near Piketberg to produce calcitic Ag-lime. The calcitic Ag-lime plant closed down in about 1999 and the quarry on the southern section was filled up and rehabilitated by the end of 2014.

During 1995/96 Lime Sales Ltd and Iscor Ltd formed a Joint Venture to exploit the dolomite deposit and successfully tendered to supply the then “Saldanha Steel Smelter” with metallurgical grade dolomite as a flux in the smelting process from a new quarry on the northern part of the property. Production of metallurgical grade dolomite commenced in 1998 at a new crushing, screening and washing plant erected close to the northern quarry for this purpose. At present the metallurgical dolomite is the main product produced on site.

When mining commenced in the northern quarry, the original small Ag-lime dolomite quarry which commenced in 1990 ceased production. Dolomitic Ag-lime has subsequently been produced from the waste screenings derived from the production of the metallurgical grade dolomite.

At present, mining takes place on the site under a converted mining right with reference number 86/2014 (WC 30/5/1/2/2/233 MR) and an environmental management programme (“EMPR”) (2009), initially approved in 1997 and updated in 2009. The project is operated and managed by an on-site contractor, SPH Kundalila (Pty) Ltd, under the general supervision of Lime Sales Limited.

1.1 Construction Phase

The construction phase of the BDQ, completed in 1998, consisted of the following:

- ❖ Opening a new quarry on partly outcropping dolomite;
- ❖ Designing and constructing a crushing, screening and wash screening plant to produce metallurgical grade dolomite together with the ancillary civil and electrical works;
- ❖ Constructing settling ponds to contain the wash water together with associated pipe works, pumps and water storage reservoirs;
- ❖ Constructing a workshop for maintenance of plant and quarry vehicles;
- ❖ Erecting an elementary aggregate plant to screen stock-piled dolomite screenings;
- ❖ Surfacing 8 km of the roads DR1161 and DR1170 in order to reduce dust emissions and maintain good relations with the neighboring farmers and other road users.

1.2 Developments and Improvements Since 2009

- ❖ The old Ag-lime plant situated adjacent to the Berg River at the extreme southern end of the project area has been demolished and the structures and foundations removed. This event has removed an environmental problem for the inhabitants of the Smuts farm and the Bridgetown camping site particularly with regard to dust and noise. In addition, the demolition of the Ag-lime plant has positively reduced the dust generated on many of the haul roads and has enabled better centralization and control of the operations.
- ❖ A new and modern Ag-lime plant has been constructed (2013) adjacent to the dolomite processing plant.
- ❖ A new weighbridge has been constructed adjacent to the old aggregate plant and the old weighbridge has been demolished.
- ❖ The old Ag-lime quarry, situated in the extreme southern part of the site, which commenced operations in 1990, has been re-filled with waste rock derived from the northern quarry and was leveled with topsoil for future wheat farming.
- ❖ An authorization from the Department of Water and Sanitation has been granted to Lime Sales Ltd to pump phreatic seepage water from the quarry to a side-stream of the Berg River (see Appendix J1).
- ❖ A new dolomite screenings stockpile and a waste dump have been commenced in the close proximity of the dolomite production plant because the original dumping sites has filled up.
- ❖ The Eskom 350 kVA power-line feeding into the dolomite production complex from the eastern side of the Berg River has been re-routed well to the south of its old position to avoid damage to the power line during blasting at the quarry.
- ❖ The quarry is being development west- and southwards to widen the pit and access the further dolomite reserves inside the resource area. In addition the quarry sump is being deepened to the 6 mamsl elevation to better control the seepage phreatic water.

- ❖ The changes in the operating area have necessitated the re-positioning of the dust-watch collection points to affectively monitor the dust generated at the working sites.
- ❖ The prime consumer of the dolomite product produced on site (Arcelor Mittal in Saldanha Bay) has indicated that their demand for the processed dolomite will increase by about 30% for the near future.

2. PRESENT MINING OPERATIONS / OPERATIONAL PHASE (BDQ)

Current operations entail mining dolomite from the (northern) quarry situated on Portion 2 (RE) of the farm Vogelstruisdrift No. 335 and Portion 9 (RE) of the farm Vledermuisdrift No. 398 at a present average run of mine rate of 500 000 “in situ” tons per year. The mined dolomite is processed to produce metallurgical grade dolomite for the Arcelor Mittal Plant (ex-Saldanha Steel) situated near Saldanha Bay. In addition to this product, the by-products of dolomitic agricultural lime (Ag-lime) and aggregate are also produced on the site. Given the present “in situ” proved and indicated ore reserves of 26.08 Mt (calculated April 2018) in the total resource area, and a run of mine production rate of 500 000 tons of in situ dolomite per year, the site has an estimated further life of ±52 years.

The primary mining processes involve the production of metallurgical dolomite:

1. Drilling, blasting and hauling dolomite rock from the quarry;
2. Crushing, screening and washing the metallurgical grade dolomite (+13 mm to -40 mm sized product);
3. Further crushing, milling and screening the -13 mm dolomite for Ag-lime;
4. Screening the -13 mm material and crushing and screening run of mine (“ROM”) rock for aggregate and dolomitic sand production;
5. Pumping water from the Berg River for washing the metallurgical dolomite and pumping phreatic water out of the northern quarry;
6. Abstracting excess phreatic ground water from the quarry; and
7. Recovery of all the slimes generated in the washing process in (2) above as additional feed material for Ag-lime production.

2.1 Zoning

In terms of the Land Use Planning Ordinance 15 of 1985 the land use rights of Portion 7, 8 and 9 of the farm Vledermuisdrift 398 and Portion 2 of the farm Vogelstruisdrift 335 were zoned Agriculture 1 prior to the commencement of mining. An application to amend the previous zoning of the above mentioned properties, to Industry 3, was granted on 18 August 1997 (see Appendix F2).

2.2 Existing Infrastructure

The figure below shows the layout of the BDQ mining area consisting of:

1. Buildings and infrastructure of the office and workshop complex;
2. Salvage yard;
3. Explosive magazine;
4. Metallurgical dolomite processing plant;
5. Aggregate plant and Ag-lime production plant;
6. Settling ponds and water abstraction equipment;
7. Weighbridge and control centre; and
8. Access and haul roads.



Figure 3: Satellite view showing the layout of Bridgetown Dolomite Quarry (image obtained from Google Earth).

Access to the site is obtained via the DR1170 road that branches off the DR1161, which runs between Moorreesburg and Gouda. The nearest rail access is at Moorreesburg (20 km west of BDQ). The metallurgical dolomite is trucked by road to Moorreesburg where it is reloaded into railway carts for dispatch to Arcelor Mittal's Steel Plant at Saldanha Bay. The Ag-lime and aggregate is dispatched by road from the quarry to the customers.

Power to BDQ is provided by a 350 kVA Eskom powerline feeding the site from the eastern bank of the Berg River. In 2013 the Eskom power line feeding to the complex from the eastern side of Berg River was re-routed well to the south of its old position to avoid damage to the power line from blasting operations in the quarry.

No housing or recreational facilities are provided at the quarry. A change house with ablution and washing facilities for employees is provided with rest-rooms at the metallurgical plant. Employees travel to and from site by means of company vehicles and mini-busses.

2.3 Factors Informing the Mine Plan

2.3.1 Chemistry and Geology

The main criterion controlling the success of the operation is the chemical consistency of the dolomite rock. The chemical specifications for the Arcelor Mittal Steel Plant are exacting and this company is the principal customer. Consequently, the main emphasis in the quarry is the layout of the production faces to ensure that dolomite of the correct chemical quality is always available for production and that the workings operate as close as possible to the average grade of the deposit. This is chiefly achieved by sampling the blast holes prior to blasting. Weathered fractured zones and slumped formations in the upper 15 metres of the dolomite rock mass frequently contain clay and silt which seriously dilute the grade resulting in excessive screening and washing to upgrade the final product.

2.3.2 Prospecting

Phased prospect drilling using reverse circulation drilling techniques has been an integral function of the operations since mining commenced. This has enhanced the geological knowledge of the deposit, clarified the chemistry of dolomite and expedited the quarry development.

2.3.3 Location, Extent and Depth of Surface Subsidence

No surface subsidence has occurred at the project and no cavities have been intersected in prospecting work or in the mining operations. Three clay and silt filled “sinkholes” or large karsts with a surface extent of ± 30 m x 20 m have been encountered in the quarry. The “sinkholes” each had “floors” and were found to be up to 18 m deep when excavated.

2.3.4 Property Boundary

The quarry is constrained northwards, eastwards and westwards by land belonging to the Department of Land Affairs who purchased the land in the 1970's with the aim of owning land which could be flooded in the event of the future raising the height of the Misverstand Dam wall. Southwards, the northern quarry is constrained by siliceous dolomite which does not meet specification requirements.

2.3.5 Retention of Cliffs

In the interest of the visual impact on the users of the upper reaches of the Misverstand Dam and farmsteads on the opposite bank, the cliffs forming the western bank of the dam will be retained.

2.4 Mine Plan

Dolomite mining presently only takes place in the northern section of the dolomite deposit (phase 1) where a quarry has been established which is expected to continue until ±2071. The northern and southern sections are separated by a zone of lower grade dolomite rock comprising high silica dolomite which is not suitable for the production of metallurgical grade dolomite. In due course, once the northern section quarry is approaching closure, mining in the southern section will commence (phase 2).

The current products produced at BDQ comprise:

- ❖ Metallurgical grade dolomite (main product)
- ❖ Dolomitic Ag-lime (by-product)
- ❖ Aggregate products (byproduct)

2.4.1 Phase 1 – Northern Section (Operational)

2.4.1.1 Botanical Investigation

Two botanical walkthroughs have been conducted by a qualified botanist that covered the entire earmarked area. The rare and endangered species and bulbs were rescued and replanted in a safe environment on top of the dolomite cliff lying to the south-

east of the mining area above the Berg River (see Appendix K2 & K3).

Also refer to *Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – Vegetation.*

2.4.1.2 Overburden

Topsoil and overburden is removed ± 20 m ahead of the advancing top production benches. Due to the dolomite karst topography, up to 40% of the “overburden” is recovered as dolomite product. The topsoil is placed in berms away from but surrounding the mining area. Overburden is trucked to the overburden dumps.

2.4.1.3 Mining

The northern section quarry now covers an area of ± 13 hectare and the present average depth is ± 6 mamsl below land surface. The quarry production benches are 9 m high and accessed by a 1:11 sloping haul road situated on the western side of the deposit. The deposit has been thoroughly prospected to below the +7 amsl elevation, and dolomite reserves for a further 52 years have been proved at this deposit. The ROM dolomite is brecciated and friable and this results in excessive “fines” (i.e. - 13 mm size) being generated in the blasting and crushing process. This material is not suitable for metallurgical dolomite and comprises up to 40% of the ROM rock. Consequently, a large dolomite screenings stockpile has been built up on the site during the past years. The screenings are utilized to produce Ag-lime, fine aggregate and sand.

It is planned to mine the northern section quarry to the +7 m elevation (i.e. an average depth of ± 40 m below land surface) over its full extent. At that stage further proved dolomite resources will still be available in the quarry floor. A decision will then be taken whether to continue mining this deposit or whether to start opening up the southern section. The decision will

depend on the amount of ground water seeping into the quarry and the stability of the quarry, sidewalls.

Access to the quarry production benches entails deepening the existing western haul road in a northerly and then an easterly direction to completion of the resources.

Mining will only be conducted within the dolomite body to avoid the soft phyllite rock on the western hanging-wall side. The pillar width between the eastern side of the excavation and the dam (Berg River) will continue to be monitored in terms of water seepage and permeability, especially with respect to possible voids or fissures. To date no seepage from the eastern side-wall has been encountered and the dolomite rock is competent.

2.4.1.4 Groundwater

Seepage ground water is collected in a sump presently situated at the +16 m elevation being the present lowest point in the quarry. The water is very brackish and emanates essentially from phyllite rock to the west of the quarry. The ground water is pumped from the quarry sump to surface at a average rate of 104 kL/day.

Groundwater Considerations:

Planning

The phreatic water table within the orebody was originally intersected at 26 mamsl during the drilling of prospecting boreholes in the northern ore block. East of the orebody the Berg River has a maximum 1:50 year flood level of 26.139 mamsl. Current mine development plans involve extracting the orebodies to a final depth of 40 to 50 meters below natural ground level. Given an average topographic elevation for the site of 45 mamsl, this entails mining the orebody to an average depth of 19 meters below the phreatic water table. The relevance at this stage of the mine planning is to determine the

probable rates of groundwater influx into the mine workings, and establish the impact of groundwater on the mining programme.

Defining a Ground Water Model

The orebody comprises a series of fault bounded blocks. Primary porosity within the orebody has been destroyed by diagenesis and subsequent metamorphism. Secondary permeability is accommodated by the development of a series of predominantly east to west striking joints, and a sympathetic conjugate joint pattern striking N060°E and N120°E. Secondary permeability is also enhanced by the development of low angle internal thrust planes within the dolomite, as well as secondary solution cavities. The database for their distribution and development is poorly defined, however, they are likely to be preferentially developed in close proximity to fault boundaries where enhanced ground water flow and hence corrosion of the dolomite may be expected to occur. The daily monitoring of the pumping rate from the quarry sump was initiated to give advance warning of possible increasing seepage rates into the quarry as it is gradually deepened. To date there is some evidence that the seepage rate has increased. Run-off water in winter does however cause “spikes” to occur.

Recommendations

In the event of a serious increase in seepage water, the following tests will be undertaken:

- ❖ The sinking of a ground water test borehole to the finite quarry depth below NGL of 12” diameter.
- ❖ The sinking of up to four piezometric monitoring wells to a depth of 50 metres in association with the test well to monitor 3D-isotropy in the drawdown cone of depression during aquifer characteristics testing.
- ❖ A series of stepped tests performed on the test well(s) to determine fracture flow regime and a constant drawdown test.

- ❖ A 72-hour constant drawdown test performed on the test well(s) to determine boundary affects.

Also refer to *Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – Groundwater.*

2.4.1.5 Life Span

Assuming that the metallurgical dolomite product demand remains at the average production rate of 250 000 tons (ROM 500 000 t/a), then the remaining life span of the northern section quarry is theoretically 52 years (until 2071).

2.4.2 Phase 2 – Southern Section (Future Mining)

2.4.2.1 Prospecting

The southern deposit has not yet been thoroughly prospected and this dolomite resource at present can only be described as an indicated reserve. The deposit contains high-grade dolomite together with transgressing greenstone dykes and sills and silicious dolomite zones. This makes delineation of this ore-block problematical at this stage, and the area still requires more intensive exploration drilling. However, one borehole proved good grade dolomite to 80 m below the land surface. To date the prospecting has indicated a potential dolomite reserve of 3,8 million tons which would meet specifications on two adjacent sections of land that together cover an area of 19 hectare.

Four prospecting programmes have explored this deposit, but it would be inappropriate at this stage to draw up a realistic mine plan until further prospecting has clarified the geology. The two designated southern mining areas are in wheat lands and also close to the Berg River. The overburden is deeper than in the northern section quarry and this will eventually afford the opportunity of partly back-filling the Northern Quarry with overburden from the Southern Quarry. It is planned to resume intensive prospect drilling in the southern dolomite section in

±2022 so that the mine plan can be designed and mining commence before the northern section quarry is mined out.

2.4.2.2 Life Span

The life of the southern section can only be estimated as the reserves are only indicated at 3.8 million tons but not proven. Assuming the same constraints apply to the southern section, the life of this section is estimated at 10 years. If for practical reasons, the proposed life span is reduced to 8 years then the whole deposit will be mined out by ±2033.

2.5 Topsoil Management

The northern mining section presently occupies an area of ±17 ha, characterized by shallow soils and general karst outcrops which given the shallow soils and rocky conditions was never ploughed even for wheat farming. The production plant and overburden dump area covers 10 to 15 hectare of Swartland farm soils overlying phyllites and silicious dolomite resulting in a loss of arable soil until the plant is demolished at eventual closure. When the southern section is eventually mined a further 10 hectare of deep Hutton soil which is presently used for wheat and canolla farming will be altered.

With regard to the re-use of these agricultural soils, all topsoil encountered as mining progresses is removed and stockpiled for later rehabilitation purposes. Because the topsoil is stockpiled for a lengthy period, stockpile depths for seed bank preservation is irrelevant but 3 m is not exceeded. When re-used, the material will require re-nitrification either by legume planting or fertilization during replacement.

2.6 Blasting Vibrations

(Refer to Appendix H1: BDQ Distance between Structures and Mine & Appendix H2: BDQ Dust, Noise and Blasting Results)

The following table reflects vibration levels in solid hornfels rock, compared to levels measured on site. As expected, levels in the dolomite are much lower given the fractured (brecciated) nature of the rock body. Vibration levels outside the dolomite body is negligible given the poor transmissivity of the phyllites.

Table 4: Blast transmissivity in solid hornfels.

SOURCE	DISTANCE FROM BLAST (m)	PPV (mm/s)
Blast transmissivity in solid hornfels	200	20
	500	3.6
Blast transmissivity on site	150	3.5

(PPV: Peak Particle Velocity)

When compared to the recommended maximum vibration levels as per the table below, it is clear that even in solid rock conditions, no damage to surrounding farmsteads will occur as the result of blast vibration, nor will it be necessary to implement special blasting practice or blast design to reduce blast vibration.

Table 5: Maximum vibration levels.

SITUATION	MAXIMUM PPV (mm/s)
Heavily reinforced concrete	120
Property owned by concern performing blasting (i.e. minor plaster cracks acceptable)	84
Private property in reasonable repair, where public concern is not an important consideration.	50
Private property where maximum level of public concern is taken into account.	25
Private property: Maximum level if blasting regularly and public concern is taken into account.	12

As blast design is flexible, maximum change per delay is maintained at levels, which ensure these low vibration levels (maximum change per delay determines the shock wave, which, where employing the use of delays between holes, divorces the vibration-level from the total size of the blast). Private structures on the eastern bank of the Berg River are situated 350 m from the present blasting operations and some of the company's structures are situated 150 m away. For the past 15 years, the PPV has been measured at every blast following on complaints from the farm Die Pont (550 m away from the blasts) that some windows and walls were cracked due to blasting.

Subsequent investigations revealed that the blasting was not responsible (see Appendix H2). No other complaints regarding structural damage caused by blasting vibrations have been received and there is no evidence that any damage has been caused by vibrations due to blasting.

2.7 Mineral Processing

2.7.1 Metallurgical Ore Process

Drilling, blasting and hauling are conducted as a normal operation. Grizzly screening is a necessity in the overburden removal phase to recover fresh dolomite that occurs as pinnacles or boulders in the otherwise overburden soil waste for crushing. The crushing and screening phase of the metallurgical plant with integration of the Ag-lime milling is shown in the following diagram.

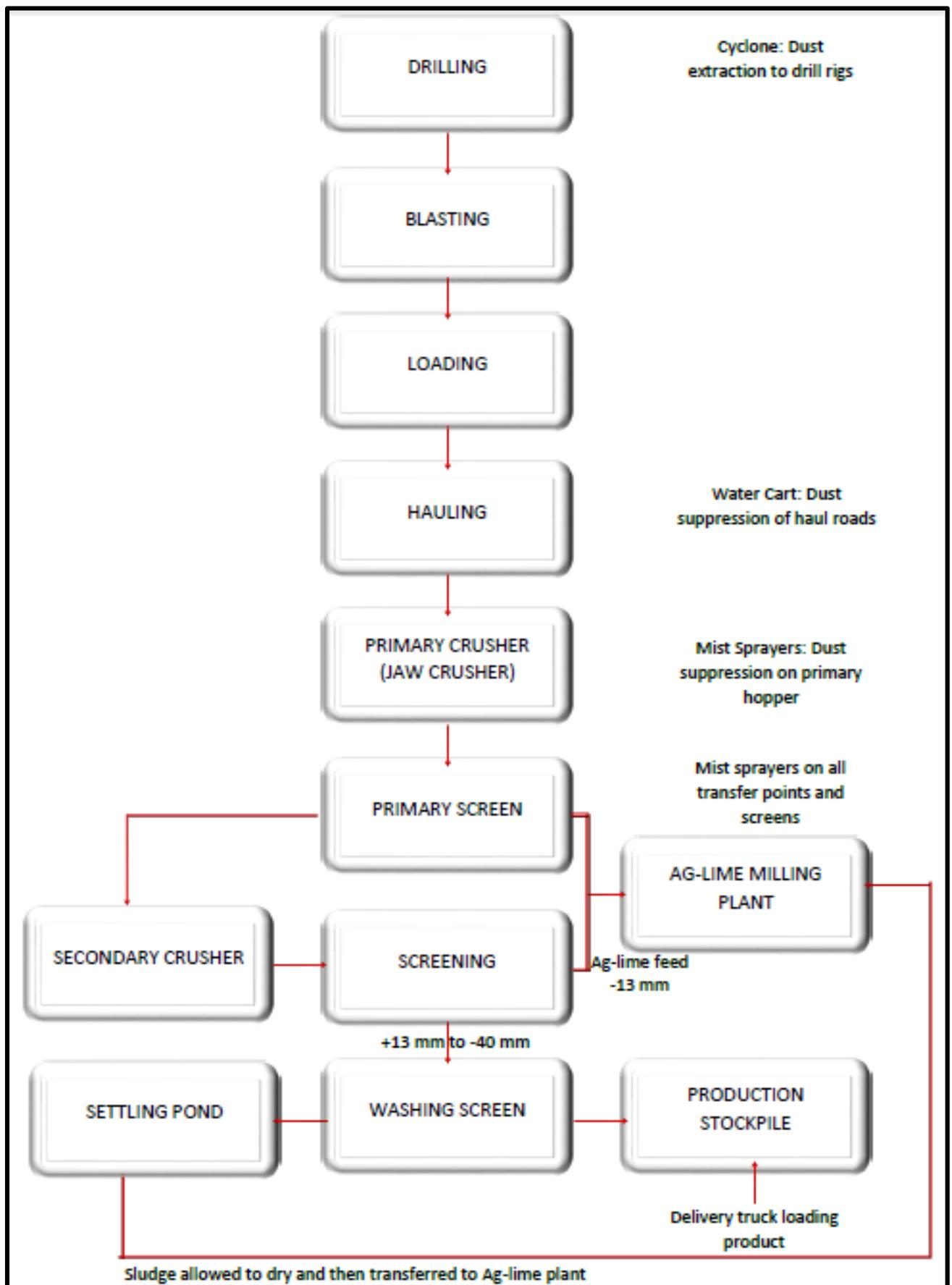


Figure 4: Flow diagram of the metallurgical ore process.

While the above diagram shows slimes handling schematically as a settling pond, slimes management entails the following:

- ❖ Collection of slimes from washing screens and dewatering screen in sludge troughs to thickener tank.
- ❖ Pumping from thickener tank underflow to slimes dam for final settling.
- ❖ Provision for the following in slimes dam:
 - Clear water overflow to pumping sump for return as clear plant water.
 - Access for FEL or excavator to recover dried slimes as feed material to Ag-lime plant.

Given that the slimes only constitute the dust washed off the coarse metallurgical grade 13 mm to 40 mm after removal of -13 mm fines in the primary dry screen, these slimes constitute less than 1% of production.

2.7.2 Ag-lime Production Process

The Ag-lime production process is schematically shown in the figure below.

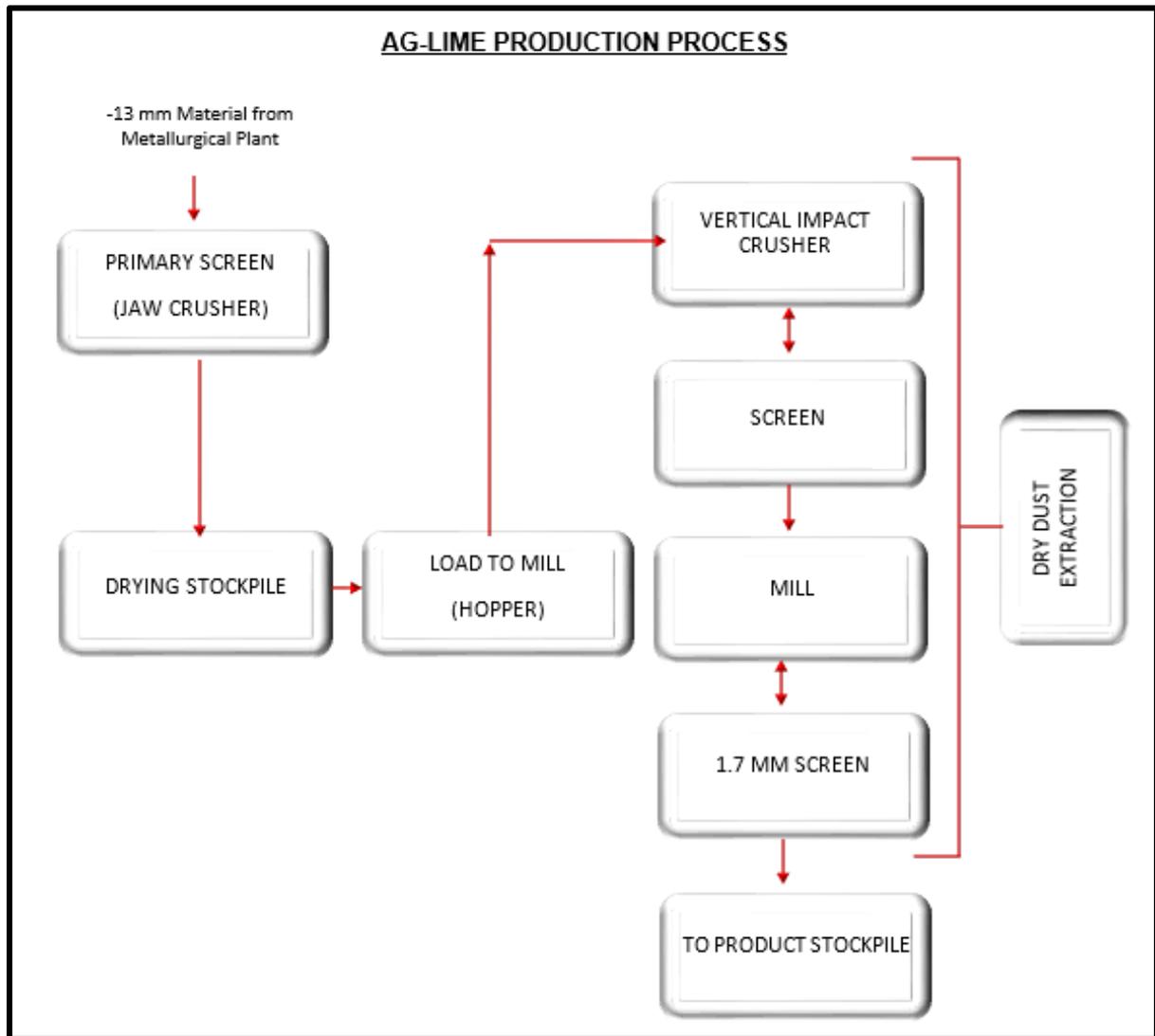


Figure 5: Flow diagram of the Ag-lime production process.

2.7.3 Aggregate Production Process

Dolomite aggregate is produced essentially from the -13 mm screenings that are rejected at the metallurgical plant.

The range of aggregate products are:

- ❖ -22 to +14 mm (nominally 19 mm aggregate)
- ❖ -14 to +10 mm (aggregate)
- ❖ -20 mm to dust (nominally waste screenings)
- ❖ -10 to +5 mm (aggregate)
- ❖ -5 to +2 mm (nominally grit)
- ❖ -5 mm to dust (nominally sand)

2.8 Waste Management Programme

Solid industrial waste generated from scrap metal, old conveyor belts and tyres is collected in designated areas and either sold as scrap or transported to the Moorreesburg Municipality's waste disposal site.

Any liquid industrial waste generated by fuel and lubrication spills at the refueling bay and/or workshops are caught in a concrete apron and drained to an oil trap which is regularly cleaned. The waste contents are collected by the company Oilcol for safe disposal. Similarly, fuel or any oil spillage from vehicles operating in the quarry or during emergency repairs is scraped together and placed in holding canisters for disposal by Enviroserve. When any equipment is serviced or repaired elsewhere on the mine site, drip trays are used so as not to spill oil into the soil and ground.

Domestic waste from workshops, change rooms and offices is also transported by the mine staff to Moorreesburg Municipality's waste disposal site for safe disposal.

Waste water from ablution and toilet facilities at the mine "change house" and offices is drained into approved septic tanks which are regularly maintained and pumped when needed by the Moorreesburg Municipality.

2.9 Mine Residue Disposal Sites

2.9.1 Settling Ponds

Water pumped from the Berg River is utilized for washing the crushed and screened metallurgical dolomite to remove fines and beneficiate the product. The water from the washing process is contained in two settling ponds to allow the fines to sink and the supernatant water is re-used. The fines and slime in the dams is allowed to dry out and is used to manufacture Ag-lime.

2.9.2 Topsoil

There is very little topsoil overlying the northern dolomite deposit because the dolomite frequently outcrops on surface. Where possible the topsoil is removed and stockpiled for later use in covering over areas disturbed by mining activities.

2.9.3 Overburden

Overburden at the project is defined as clay overlying the dolomite deposit, silt and clay mixed with dolomite boulders in karsts. This overburden has been used to refill the old Ag-lime quarry during the past few years, and is now stockpiled at a designated area on site.

2.9.4 Screenings

Dolomite screenings derived from the crushing and screening process are dumped in separate areas and used to produce Ag-lime and aggregate. Waste screenings frequently comprises 40% of the material mined.

2.9.5 Waste Rock

Waste rock comprises low grade dolomite usually mixed with clay and silt. This material has no commercial value and has been dumped in the old Ag-lime quarry as back-fill material. A separate waste rock/overburden dump has been established in close proximity of the production site as the original dumping sites was filled up.

2.10 Water Management

2.10.1 Facilities

(Refer to Appendix J1: BDQ Water Use Authorisations)

Water is extracted from the Berg River at an average rate of ± 217 kL per working day (ie. 79 559 kL/year) for the purpose of washing and beneficiating the dolomite. This water is not potable and is also used in small quantities for toilet facilities and landscaping. Lime Sales Ltd has a valid water use licence (reference number 23/20/98 dated 18 August 1998) to extract 85 000 m³ per year from the Berg River (see Appendix J1).

The water used for washing the dolomite is drained as effluent to two settling ponds where the fines and sludge is separated from the water. This purified river water is immediately re-cycled into the washing process, and the dolomite fines and sludge tailings are used to manufacture Ag-lime after drying.

Lime Sales Ltd was also granted two water use registration certificates (No. 22064757 dated 04 September 2002, and No. 22038867 dated 11 October 2002) to store water and use the water at the project.

Table 6: Water use authorisations held by Lime Sales Ltd.

REFERENCE NUMBER	TYPE	USE	QUANTITY
22064757	Water use licence	Extraction of water from the Berg River.	13 000 m ³ /year
G10J	Water use licence	Extraction of water from the Berg River.	60 000 m ³ /year
22038867	Water use licence	Extraction of water from the Berg River.	12 000 m ³ /year
	Water use licence	Storage of water not containing waste.	1 200 m ³ /year
16/1/1/6/6/7	General Authorisation	Discharge of wastewater found underground into the Berg River Tributary.	53 945 m ³ /year
		Use wastewater for dust suppression on the property.	7 740 m ³ /year
		Remove water found under groundwater table to allow continuation of mining.	61 685 m ³ /year

2.10.2 Settling Ponds

In the production process the two settling ponds are used alternatively to allow the sludge tailings to settle. Once the sludge has settled, the “clean water” is pumped to a holding dam for recycling to the screen-wash plant. When the water in one of the sludge holding dams has evaporated and the tailings are dry they are loaded by FEL to the Ag-lime Plant for the production of Ag-lime.

2.10.3 Polluted Water Treatment Facility

The raw Berg River water is not considered suitable for human consumption and is only used for industrial purposes, and minor amounts for sewage flushing and landscaping.

Phreatic water which seeps into the quarry at the present average rate of ±104 kL per day is sub-standard. This water is contaminated by the phyllite rock types which surround the dolomite deposit, and cannot be

used for industrial purposes because it corrodes the pumps, screens and machinery. However, ±45 kL per day of this water is used, in the summer months, on the roads at the site to reduce dust emissions. The balance of the phreatic water is pumped to the dry side-stream to the west of the quarry where it soaks into the soft alluvium and evaporates before the side stream reaches the Berg River.

The quality of the Berg River is regularly monitored both upstream and downstream of the intersection of the side-stream and the results show that the quarry water has no influence on the quality of the Berg River. Bi-annual water monitoring takes place at the following five locations:

1. From the Berg River upstream of the quarry (sample ID: BRU);
2. From the Berg River downstream of the quarry (sample ID: BRD);
3. Phreatic water seeping into the quarry sump (sample ID: QW);
4. Unconfined groundwater in test borehole west of the quarry (sample ID: WBW); and
5. Unconfined groundwater in test borehole east of the quarry (sample ID: WBE).

The DWS granted Lime Sales Ltd a general authorization (see Appendix J1) to pump seepage water to the side-stream. When the northern section quarry has been mined to completion, the quarry pit will be ceded to the DWS. A signed agreement by both the surface rights owner (Mr A.M. Burger) and Lime Sales Ltd to this effect is included in Appendix J5.

2.10.4 Potable Water

Potable water is transported to the mine from Moorreesburg.

2.10.5 Process Water Supply System

Water from the adjacent Berg River is pumped to two 60 m³ holding concrete reservoirs on site for distribution to a vibrating wash screen where sprayers wash the metallurgical grade crushed dolomite free of clay and silt and thereby beneficiating the product. In addition, water is introduced by sprays on plant transfer points and chutes to prevent dust emissions.

2.10.6 Water Balance

The following data set out the process water consumption figures per normal working day on an 8-hour shift. At present two shifts/day are worked. Water consumption on a full production day is estimated as follows:

1. Metallurgical Dolomite Plant = Wash Water Consumption ± 105 l/ton:

Wash water for 1 000 ton metallurgical product per day at 500 l/ton = 500 000 l/day recycled from the slimes. Assuming water loss to:

- ❖ product of 25 l/ton;
- ❖ reclaimed slimes of 50 l/ton (ton of product); and
- ❖ evaporation and spillage of 30 l/ton.

In light of the above, the daily wash water loss (consumption) therefore = 105 000 litres, with the daily wash water reclamation being $\pm 77\%$.

Daily dust suppression on plant = 10 000 l/day

2. Roads

Roadway dust suppression is done on all roads on site with water reclaimed from the quarry sump at ± 45 000 l/day.

3. Ag-lime Plant

Ag-lime dust suppression equates to ± 15 000 l/day

4. Other

- ❖ Personnel amenities and workshop = ± 3 000 l/day
- ❖ Landscaping = ± 5 000 l/day in dry months

From the above, the total water consumption of BDQ is ± 262 000 l/day (217 000 l from Berg River and 45 000 l from the quarry sump). 262 000 l/day consumption equates to the water consumption of 2.3 ha of

maize under irrigation (assuming no summer rainfall and application of 1 000 mm irrigation over 100 days).

The total water circulation, including recycling of wash water from tailings, equates to 563 000 l/day.

The following figure illustrates the flow of water at the metallurgical dolomite plant.

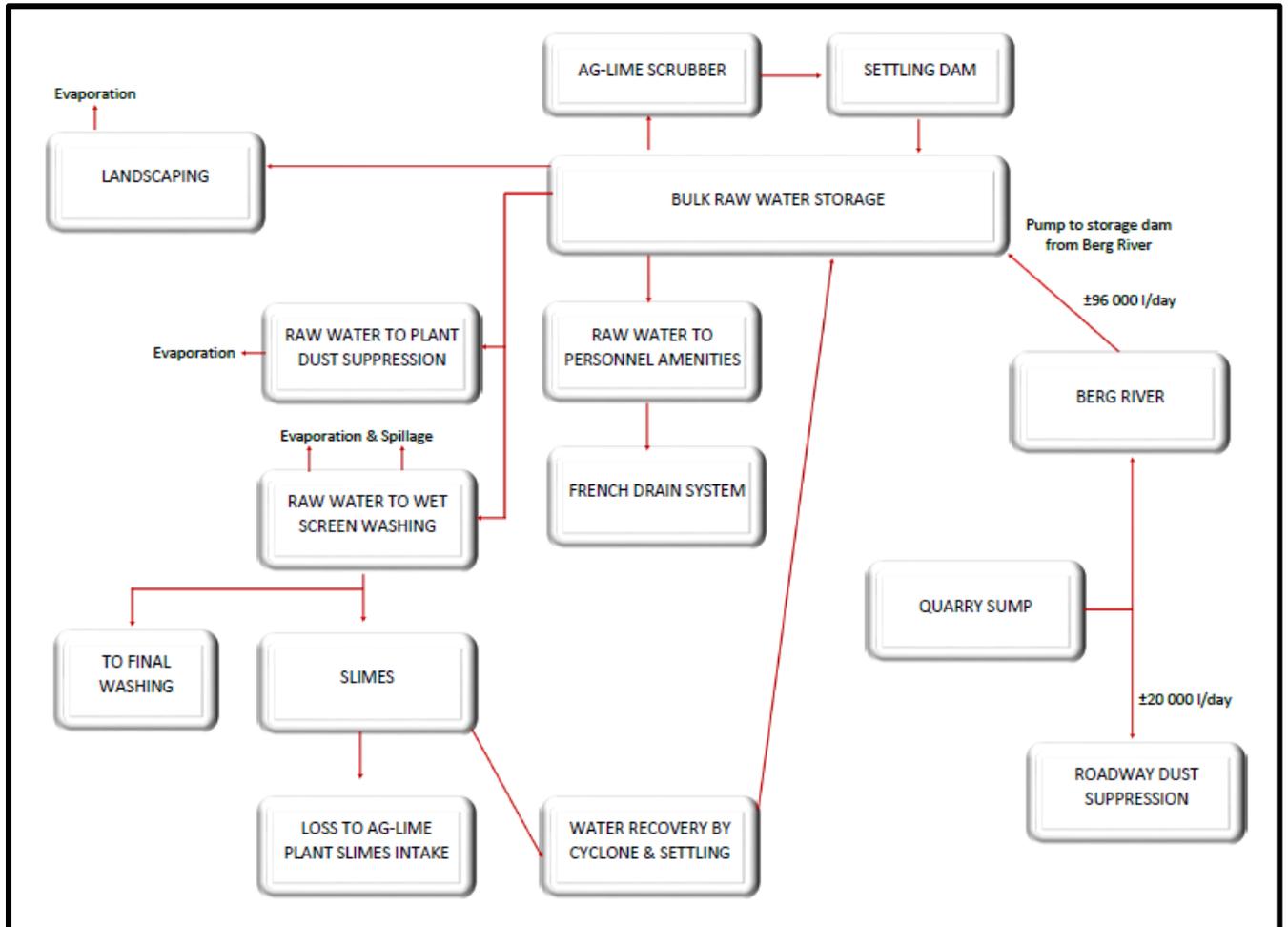


Figure 6: Water reticulation diagram.

2.10.7 Stormwater

Surface water is presently controlled on the surrounding wheat fields by contour trenches. The low average annual rainfall of 385 mm per year over the past 14 years and low intensity of rainfall (maximum recorded in 24 hr of 67 mm) storm water run-off is controlled by constantly ensuring that the roads are constructed and maintained with the correct camber and that run-off channels passing under the

roads are kept free of undergrowth. Where necessary stormwater cut-off trenches are provided around stockpiles and plants. The undulating terrain ensures that stormwater is not impounded and freely runs off to the drainage channels.

2.11 Rehabilitation

Once mining has been completed flooding of the excavations to increase the capacity of the Misverstand Dam has been proposed.

Also refer to *Part B(1)(d)(i) Determination of closure objectives.*

3. S102 AMENDMENT PROPOSAL (DQ)

3.1 Background Information

Blue Falcon 94 Trading (Pty) Ltd (“Blue Falcon”) was granted a dolomite prospecting right over Portion 1 of the farm Drieheuvels 399 and Portion 2 of the farm Honigfontein 233 in 2016.

In 2019, Lime Sales Ltd (same holding company than Blue Falcon) identified the need to extend the current BDQ mining footprint to include a 13.0949 ha area over Portion 1 of the farm Drieheuvels No. 399. Adding the proposed 13.1 ha to the current footprint of BDQ necessitates an application for the consent of the minister to amend the approved mining right and EMPR in terms of Section 102 of the MPRDA, 2002.

Also refer to *Part A(1)(f) Need and desirability of the proposed activities – Drieheuvels Quarry.*

3.2 Project Proposal

The proposed extension area (Drieheuvels Quarry) falls within the GPS coordinates as listed below.

Table 7: GPS coordinates of the extension area.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
1S	33°07'13.28"	18°51'07.52"	-33.120355°	18.85209°
1T	33°07'19.47"	18°51'14.58"	-33.122075°	18.85405°
1U	33°07'23.14"	18°51'12.06"	-33.123095°	18.85335°
1V	33°07'20.51"	18°51'09.79"	-33.122365°	18.85272°
1W	33°07'20.80"	18°51'06.80"	-33.122444°	18.85189°
1X	33°07'21.76"	18°51'06.62"	-33.122712°	18.85184°
1Y	33°07'25.16"	18°51'08.86"	-33.123655°	18.85246°
1Z	33°07'25.77"	18°51'08.28"	-33.123825°	18.85230°
2A	33°07'23.85"	18°51'04.14"	-33.123293°	18.85115°
2B	33°07'25.53"	18°51'00.61"	-33.123757°	18.85017°
2C	33°07'16.29"	18°50'51.47"	-33.121192°	18.84763°
2D	33°07'14.04"	18°51'00.25"	-33.120568°	18.85007°

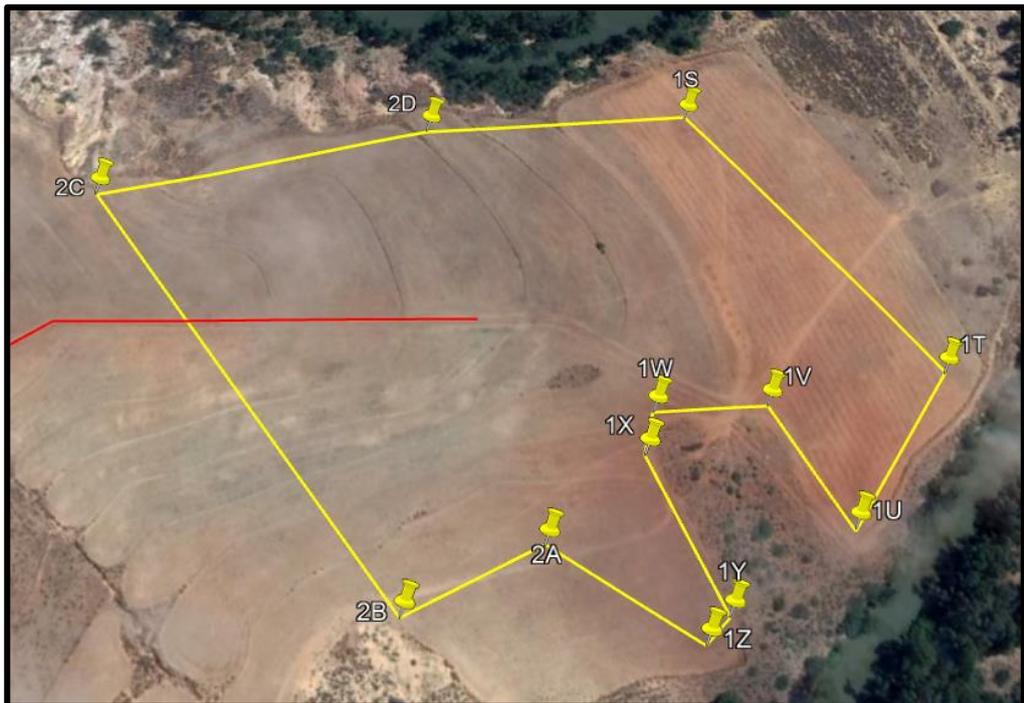


Figure 7: Satellite view of the proposed extension area on Portion 1 of the farm Drieheuvels 399. (Image obtained from Google Earth)

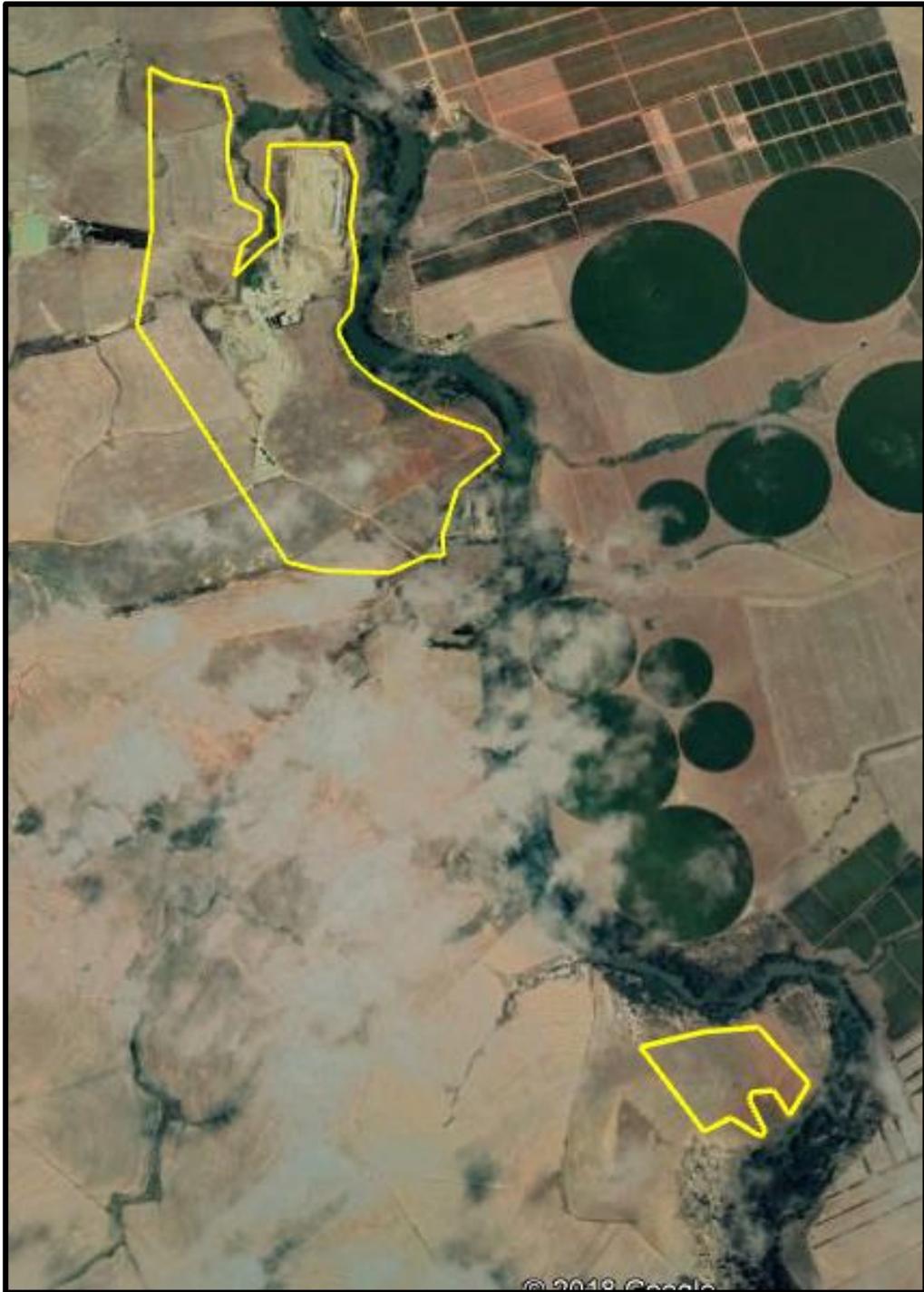


Figure 8: Satellite view of the proposed Drieheuvels Quarry extension area (lower polygon) in relation to the Bridgetown Dolomite Quarry (top polygon). (Image obtained from Google Earth)

Should the S102 application be approved the right holder will add the mining of the proposed 13.1 ha area to the present operations at BDQ. Mining of the DQ will comprise of activities that can be divided into three key phases (discussed in more detail below) namely the:

- (1) *Site establishment phase*, which will involve the demarcation of the DQ and required buffer no-go zones pertaining to areas of significant importance identified during the environmental impact assessment. Site establishment will necessitate the stripping and stockpiling of topsoil, and the introduction of the mining machinery.
- (2) *Operational phase* that will entail the mining of the dolomite resource at the earmarked footprint 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 BDQ where it will be processed and stockpiled, before it is sold and transported from site to clients.
- (3) *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 right holder will further be responsible for the seeding of all rehabilitated areas. Once the full mining area is rehabilitated, the right 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 also be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

3.3 Site Establishment Phase

The site establishment phase entails the demarcation of the DQ mining boundaries and identified sensitive areas, and stripping and stockpiling of topsoil to access the mineral as detailed below:

3.3.1 Demarcation of Mining Boundaries

Pursuant to receipt of the S102 approval, and prior to site establishment, the boundaries of the mining area has to be demarcated. Should the footprint of S1 be approved, no specific areas of concern were identified that requires special demarcation.

3.3.2 Clearing of Vegetation

No clearing of indigenous vegetation is needed as the study area was extensively altered to allow for wheat cultivation, and the footprint of the proposed extension area was restricted to the existing wheat field of the landowner.

Also refer to *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Groundcover.*

3.3.3 Topsoil Stripping

It is proposed that topsoil removal will be restricted to the exact footprint required during the operational phase of the activity. The topsoil will be stockpiled at a designated signposted area within the mining boundary, to be replaced during the rehabilitation of the area. It will be part of the obligations of site management to prevent the mixing of topsoil heaps with overburden/other soil heaps. The complete A-horizon (the top 110 – 200 mm of soil, which is generally darker coloured due to high organic matter content) will be removed. If it is unclear where the topsoil layer ends the top 300 mm of soil will be stripped. The topsoil berm will measure a maximum of 1.5 m in height in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. If possible, the topsoil (and overburden) berms must be stored along the north-western and north-eastern boundaries of the mining footprint to screen the operation from residents along the eastern bank of the river.

3.3.4 Access Road

The proposed DQ will be reached via the existing road from BDQ that links up with the Gouda road. From the Gouda road the existing access road to the farm will be used to reach the DQ (see figure below). Haul roads into the excavation will be extended as mining progresses. All haul roads to be established will be below the threshold of the NEMA, 1998 EIA Regulations, 2017.

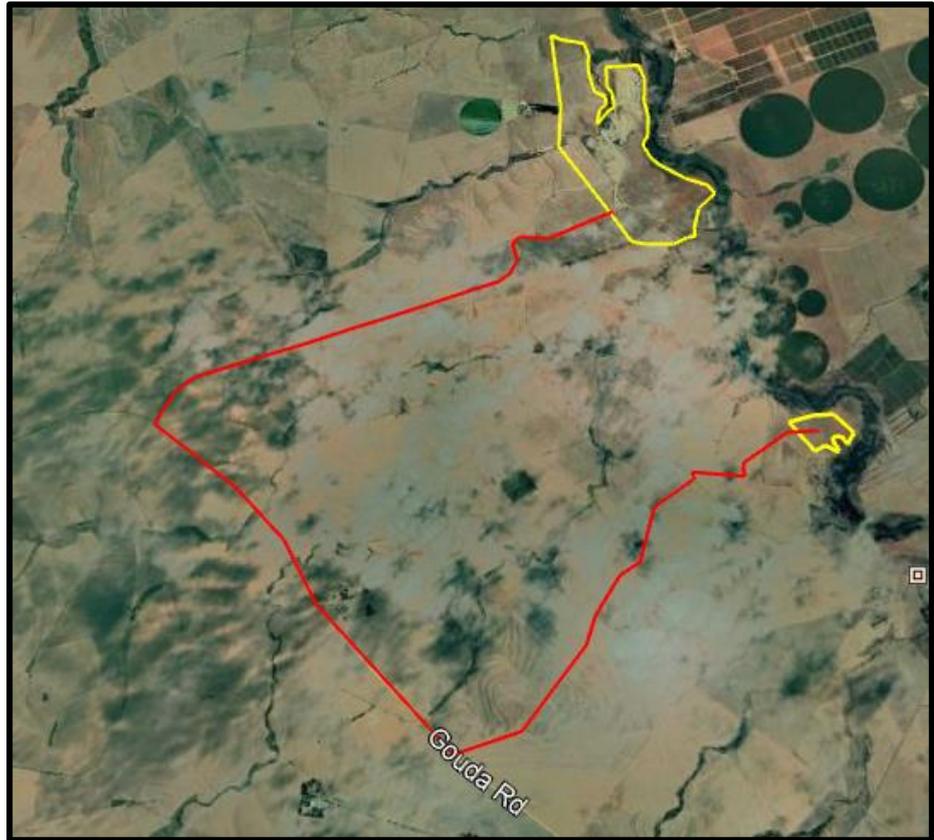


Figure 9: Satellite view showing the access road (red line) from Bridgetown Dolomite Quarry to the proposed Drieheuvels Quarry (image obtained from Google Earth).

3.3.5 Introduction of Mining Machinery

The infrastructure/equipment to be established/introduced at DQ, during the site establishment phase, will be of temporary nature and consist of:

- ❖ A chemical toilet;
- ❖ One excavator;
- ❖ One front-end loader;
- ❖ One 5 000 litre water cart (part time);
- ❖ Appropriate waste receptacles; and
- ❖ Approximately 2 ADT trucks.

3.4 Operational Phase

The hard rock, at the DQ, will be loosened by blasting, upon which it will be mechanically recovered with drilling-, excavation- and earthmoving

equipment that will load the ADT's. The rock will then be delivered to the existing crushing and screening plant of BDQ where it will be processed and stockpiled as part of the existing operations. The existing infrastructure and labour force of BDQ will be used for the duration of the DQ operational phase.

3.4.1 Mine Plan

Mining at the DQ will be restricted to daylight hours from Monday to Saturday. The proposed operation will entail the stripping of topsoil and overburden from the footprint area, upon which the mining area will be drilled and blasted to loosen the hard rock. Eartmoving equipment will load the loosened material onto trucks that will transport it to the BDQ where it will be processed at the existing Ag-lime processing plant.

At present the mine plan is to commence mining at the north-eastern boundary, cutting the excavating into the rise of the hill in a western direction. Mining the footprint in this manner will create a single face that will be stepped/sloped when the western boundary is reached.



Figure 10: Schematic representation of the proposed mining direction at the Drieheuvels Quarry.

No mining will take place within the 1:100 year floodline (see Appendix J6) of the Berg River and due to the small scale of the

mining footprint, the quarry depth will be limited to the groundwater level. In other words, mining will not continue below the groundwater depth.

3.4.2 Water Use

Water required for the proposed DQ operation will be transported to site from the BDQ. As the processing of the dolomite will take place at BDQ, the water requirements at the DQ will mainly consist of water needed for dust suppression on the haul roads.

Although no water will be abstracted from Portion 1 of the farm Drieheuvelds 399, the proposed DQ falls within 500 m of the Berg River and may require a Water Use Authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21(i). The right holder is in discussion with the DWS to determine the way forward.

Also, refer to *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.10 Water Management*.

3.4.3 Waste Management

Due to the nature of the project, and the fact that no permanent infrastructure will be established or maintenance work done within the earmarked footprint, very little to no general waste will be generated as a direct result of the mining activities. Any waste generated during the operational phase, will be contained in a sealable refuse bin that will be removed from site and incorporated in the existing waste disposal system of the BDQ.

Likewise, very little (if any) generation of hazardous waste is expected. Hazardous waste will mainly be the result of accidental spillages or breakdowns. Such contaminated areas will be cleaned up immediately (within two hours of the occurrence) and contaminated soil will be contained in designated hazardous waste containers to be removed daily to the hazardous waste storage area at the BDQ where it will be disposed of as part of the hazardous waste by a registered hazardous waste handling contractor.

The chemical toilet, to be placed on site, will be serviced by a registered contractor.

Also, refer to *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.8 Waste Management*.

3.4.4 Servicing and Maintenance

No workshop or servicing area will be established within the boundaries of the DQ. Any maintenance/services will be performed at the existing workshop of BDQ.

Also, refer to *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Existing Infrastructure*

3.5 Decommissioning Phase

Due to the nature of the project, no buildings/infrastructure will have to be demolished upon closure of the DQ. The closure objectives are for the excavation to be rendered safe, and to return the disturbed areas to agricultural use. Benches will be built (western boundary) with oversize rock and overburden, top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil (see Appendix O for the Rehabilitation Plan).

The Drieheuvels Quarry's decommissioning activities will consist of the following:

1. Sloping and landscaping the mining area;
2. Replacing the topsoil;
3. Vegetating the reinstated area; and
4. Controlling the invasive plant species.

The future land use of the proposed area will be agriculture. Upon the replacement of the topsoil, the area will once again be available for use by the landowner, and the planting of the cover crop (to protect the topsoil) will tie in with the proposed land use.

The right holder will comply with the minimum closure objectives as prescribed by the DMR and detailed below:

Rehabilitation of the excavated area:

The excavated area must serve as a final depositing area for the placement of overburden. Rocks and coarse material removed from the excavation must be dumped into the excavation.

No waste may be permitted to be deposited in the excavations.

Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.

The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within 6 months from closure of the site.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

Final rehabilitation:

Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required) and maintenance, and invasive plant species clearing.

All mining equipment, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).

Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.

The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site.

Final rehabilitation shall be completed within a period specified by the Regional Manager.

Once the entire mining area (BDQ and DQ) as rehabilitated the right holder is required to submit a closure application to the Department of Mineral Resources in accordance with section 43(4) of the MPRDA, 2002 that states: *“An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report”*. The Closure Application will also be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

Also refer to *Part B(1)(d)(i) Determination of closure objectives*.

e) Policy and Legislative Context

Table 8: Policy and legislative context.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);	(i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	(E.g. in terms of the National Water Act: Water use license has/has not been applied for).
Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) read together with applicable amendments and regulations thereto. ❖ Section 102 amendment application.	Part A1(d) Description of the scope of the proposed overall activity.	Application for a Section 102 amendment application submitted to DMR-WC. Ref No: WC 30/5/1/2/2/233 MR.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
<p>National Environmental Management Act,1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended by GNR 326 effective 7 April 2017)</p> <p>❖ GNR 326 Section 31 Amendments to be applied for in terms of Part 2</p>	<p>Part A1(d)(i) Listing and specified activities.</p>	<p>Application for a Part 2 amendment of the EMPR submitted to DMR-WC. Ref No: WC 30/5/1/2/2/233 MR.</p>
<p>National Environmental Management: Air Quality Control Act, 39 (Act No 39 of 2004) read together with applicable amendments and regulations thereto specifically the National Dust Control Regulations, GN No R827</p>	<p>Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Air and Noise Quality</i>.</p> <p>Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Air and Noise Quality</i>.</p>	<p>The mitigation measures proposed for the site take into account the NEM:AQA, 2004 and the National Dust Control Regulations.</p>
<p>National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) read together with applicable amendments and regulations thereto.</p>	<p>Part A1(g)(iv)(1)(a) Type of environment affected by the proposed activity - <i>Biological Environment</i></p> <p>Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Mining, Biodiversity and Vegetation</i>.</p>	<p>Should Site Alternative 1 be approved and the proposed mitigation measures be implemented no aspects of the project could be identified that triggers the NEM:BA, 2004.</p> <p>The mitigation measures proposed for the site includes specifications of the NEM:BA, 2004.</p>
<p>National Water Act, 36 (Act No 36 of 1998) read together with applicable amendments and regulations thereto.</p>	<p>Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Hydrology</i>.</p> <p>Part B(1)(d)(viii) Has a water use licence been applied for?</p>	<p>The mine holds varies water use authorisations issued by DWS (see Appendix J1). The mitigation measures proposed for the site take into account the NWA, 1998.</p> <p>The proposed DQ falls within 500 m of the Berg River and may require Water Use Authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21(i). The right holder is in discussion with the DWS to determine the way forward.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
<p>National Environmental Management: Waste Act, 59 (Act No 59 of 2008) read together with applicable amendments and regulations thereto.</p> <p>NEM:WA, 2008: National norms and standards for the storage of waste (GN 926)</p>	<p>Part A(ii) Description of the activities to be undertaken: <i>Operational phase – Waste Handling</i></p> <p>Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Waste Management.</i></p>	<p>The mitigation measures proposed for the site take into account the NEM:WA, 2008.</p>
<p>National Heritage Resources Act No 25 of 1999.</p>	<p>Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Human Environment.</i></p> <p>Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Cultural and Heritage Environment.</i></p>	<p>The mitigation measures proposed for the site includes specifications of the NHRA, 1999.</p>
<p>Mine Health and Safety Act, 1996 (Act No 29 of 1996) read together with applicable amendments and regulations thereto including relevant OHS regulations.</p>	<p>Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Management of Health and Safety Risks.</i></p>	<p>The mitigation measures proposed for the site includes specifications of the MHSA, 1996.</p> <p>An on-site Health and Safety Representative is responsible for the implementation and compliance of the mine with the requirements of the MHSA, 1996.</p>
<p>Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)</p>	<p>Part A(1)(g)(iv)(1)(b) Description of the current land uses.</p> <p>Part A(iv)(1)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Management of Invasive Plant Species.</i></p>	<p>The mitigation measures proposed for the site includes specifications of the CARA, 1983.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
Public Participation Guideline in terms of the NEMA EIA Regulations	Part A(1)(g)(ii) Details of the Public Participation Process Followed	Public participation was conducted in accordance with the guidelines published in terms of the NEMA EIA Regulations.
Swartland Municipality By-Law relating to Municipal Land Use Planning (PG 7741 of 3 March 2017)	Part A(1)(g)(iv)(1)(b) Description of current land uses.	<p>The application to amend the previous zoning (Agriculture 1) of Portions 7, 8 and 9 of Vledermuisdrift 398 and Portion 2 of Vogelstruisdrift 335 was granted in 1997 (see Appendix F2).</p> <p>Portion 1 of Drieheuvelds 399 is currently zoned for agricultural use and a rezoning application will be submitted.</p>
Swartland Local Authority Integrated Development Plan	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: <i>Human Environment – Socio-Economic Environment.</i>	Assessment of the socio economic profile of the community in which the project is situated.
Western Cape Biodiversity Spatial Plan	Part A(1)(g)(iv)(1)(b) Description of current land uses.	<p>The application to amend the previous zoning (Agriculture 1) of Portions 7, 8 and 9 of Vledermuisdrift 398 and Portion 2 of Vogelstruisdrift 335 was granted in 1997 (see Appendix F2).</p> <p>Portion 1 of Drieheuvelds 399 is currently zoned for agricultural use and a rezoning application will be submitted.</p>
Western Cape Noise Control Regulations (PN 200/2013), June 2013.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Air and Noise Quality.</i>	The mitigation measures proposed for the site take into account the Western Cape Noise Control Regulations, 2013.
Western Cape Land Use Planning Act, 2014 (Act No 3 of 2014)	Part A(1)(g)(iv)(1)(b) Description of current land uses.	<p>The application to amend the previous zoning (Agriculture 1) of Portions 7, 8 and 9 of Vledermuisdrift 398 and Portion 2 of Vogelstruisdrift 335 was granted in 1997 (see Appendix F2).</p> <p>Portion 1 of Drieheuvelds 399 is currently zoned for agricultural use and a rezoning application will be submitted.</p>

f) Need and desirability of the proposed activities.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

Bridgetown Dolomite Quarry:

Mining commenced in 1990 on the southern section of BDQ moving to the northern section in 1998. The project is operated and managed by an on-site contractor, SPH Kundalila (Pty) Ltd, under the general supervision of Lime Sales Limited. The Converted Mining Right of the quarry is valid until 13 October 2044 with the option to renew.

According to the mine's approved EMPR (2009) the project has the following benefits:

- ❖ The site's locational advantages for supply of dolomite flux to the Acelor Mittal Steel plant, offers a transport cost saving of half of that of the only alternative high-grade dolomite site at Vredendal / Van Rhynsdorp.
- ❖ Given that the steel plant uses only dolomite material in the size range +13 mm to -40 mm, while the Ag-lime size specification is -1.7 mm, the Ag-lime plant thus effectively uses the mine grit and dust waste production from the metallurgical plant to manufacture Ag-lime.
- ❖ In addition, the Ag-lime plant uses the slimes (recovered from the metallurgical plant's washing screens) which would otherwise represent a significant environmental impact.
- ❖ Dolomite aggregate and sand is required in the surrounding districts for civil engineering projects, road surfacing and decorative purposes.

This document, the amended EIAR and EMPR, entails the third revision of Bridgetown Quarry's approved EMPR, with the purpose of aligning the mining documentation with the Section 102 amendment application. As mentioned, the amended EIAR & EMPR accompanies a Section 102 amendment application to add a 13.1 ha area over Portion 1 of the farm Drieheuvels 399 to the current 168.5502 ha mining footprint of BDQ.

Drieheuvels Quarry:

Exploration for sulphide ores associated with the dolomite/greenstone assemblage of the Bridgetown Formation on the Drieheuvels farm extend back many years. In 1966, Cape Lime Ltd purchased mineral rights on the farm after prospecting of the area. In 1979, the Council of GeoScience (RS Hill) conducted an assessment of the dolomite deposit on a portion of Drieheuvels 399 that found the basal contact of the dolomite to be well defined with ± 11.8 ha of the 21.5 ha mineral rights underlain by dolomite. The assessment concluded that:

- ❖ except for dolomite, no other minerals with economic potential are known to occur on the property.
- ❖ the Misverstand scheme sterilizes practically no dolomite on the property since its full supply level coincides with the normal river level at Drieheuvels and flood levels are raised only marginally.
- ❖ the reserves of dolomite on the property seem to have been rather low.
- ❖ a favourable factor for establishing a quarry at Drieheuvels, viz closeness to a market for agricultural lime, does not seem to outweigh other considerations like a fairly large capital outlay for rather limited reserves. The situation might change if additional reserves of dolomite in adjacent areas could be secured.

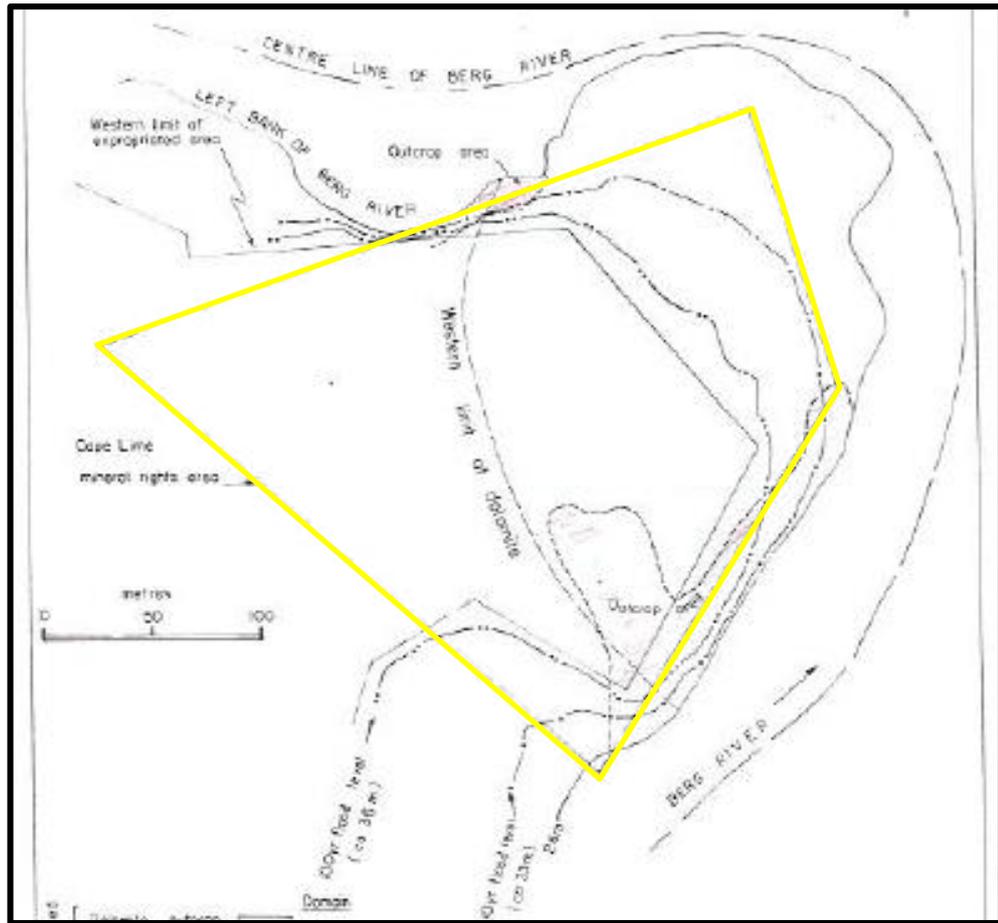


Figure 11: Extract from the Council of GeoScience's 1979 assessment of the dolomite deposit on the farm Drieheuvels 399, where the yellow polygon shows the Cape Lime Ltd lease area.

In 2016, Blue Falcon 94 Trading (Pty) Ltd obtained a prospecting right for dolomite over Portion 1 of the farm Drieheuvels 399 and Portion 2 of the farm Honigfontein 233. The preliminary inspection and due diligence report (Pepler 2017) of the prospecting right confirmed the presence of high quality dolomite on the Drieheuvels property.

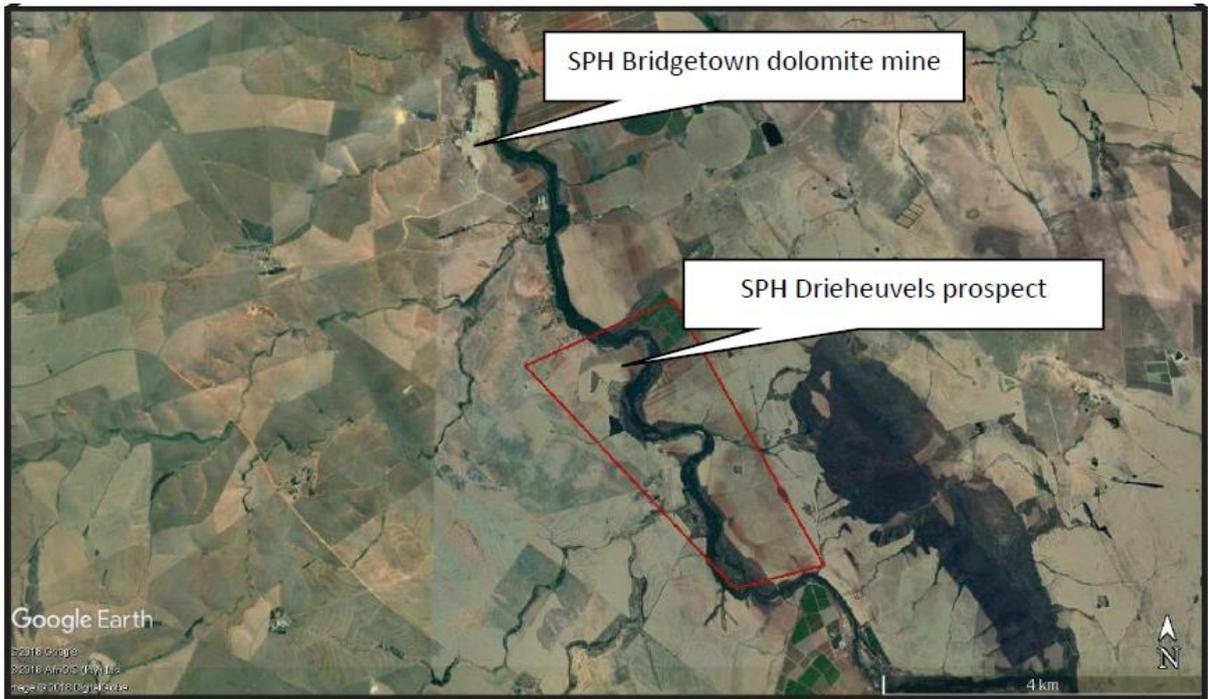


Figure 12: Satellite view of the project area where the red polygon indicates the original prospective area of interest in relation to the current Bridgetown Dolomite Quarry (Pepler 2017).

In 2019, Lime Sales Ltd identified the need to add the earmarked 13.1 ha area on Portion 1 of Drieheuvels 399 to the current mining right of BDQ based on the prospecting outcome (Blue Falcon prospecting right) and the proximity of the Drieheuvels resource to the current operations. Mining of the Drieheuvels dolomite resource can easily be incorporated into the current operations at Bridgetown Quarry, as it does not require any extensive infrastructure layout. The proposed 13.1 ha DQ footprint was chosen over an area historically altered for wheat cultivation, to ensure the conservation of a small patch of remaining Swartland Shale Renosterveld along the western bank of the Berg River.

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

Bridgetown Dolomite Quarry:

Not applicable.

Drieheuvels Quarry:

The environmental assessment considered two site alternatives that would allow the extension of the existing BDQ footprint. The footprint of S2 extends over an area with Swartland Shale Renosterveld that is classified as Critically Endangered, and even though the layout of this footprint allows a simpler mine design the footprint of S1 was identified as the preferred alternative. The following matters contributed to the identification of the preferred development footprint:

1. **Visual Characteristics** – Upon rehabilitation of the mining area and the replacement of the topsoil, the residual visual impact is expected to be of Low significance.
2. **Geology** – The preliminary inspection and due diligence of the dolomite quality (Appendix I4) within the proposed footprint confirmed the presence of high quality dolomite.
3. **Hydrology** – Surface Water: The NFEPA status of the study area is classified as a no priority area, and no wetlands or other drainage line crosses the study area. Mining will be kept above the 1:100 year floodline of the Berg River (Appendix J6). The right holder will confirm whether the proposed DQ footprint requires water use authorisation from the DWS.

Groundwater: The depth of the DQ will be restricted to the groundwater level, and the impact of the proposed operation on the groundwater of the study area can be mitigated to be of low significance.

4. **Biodiversity, Conservation, and Groundcover** – Ground truthing confirmed that the proposed footprint of S1 has been altered by agricultural practices and no natural areas of conservation concern remains.

i) Details of the development footprint alternatives considered.

With reference to the site plan provided as 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;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Bridgetown Dolomite Quarry:

Project/site alternatives does not apply to the current BDQ operation. The mine’s EMPR (2009) notes that the only alternative high grade dolomite sites (Vredendal / Van Rhynsdorp) are at a considerable distance which results in twice the transport cost of delivery to the Arcelor Mittal steel plant. While these operations were originally considered in a tender process, they were discarded based on cost.

Drieheuvels Quarry:

The project team identified two possible site alternatives during the EIA process that are discussed below.

Site Alternative 1 (S1) (Preferred Site Alternative): Site Alternative 1 entails the extension of the existing BDQ with 13.1 ha that falls within the GPS coordinates as listed in the table below.

Table 9: GPS Coordinates of Site Alternative 1 (preferred site alternative)

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
1S	33°07'13.28"	18°51'07.52"	-33.120355°	18.85209°
1T	33°07'19.47"	18°51'14.58"	-33.122075°	18.85405°
1U	33°07'23.14"	18°51'12.06"	-33.123095°	18.85335°
1V	33°07'20.51"	18°51'09.79"	-33.122365°	18.85272°
1W	33°07'20.80"	18°51'06.80"	-33.122444°	18.85189°
1X	33°07'21.76"	18°51'06.62"	-33.122712°	18.85184°
1Y	33°07'25.16"	18°51'08.86"	-33.123655°	18.85246°
1Z	33°07'25.77"	18°51'08.28"	-33.123825°	18.85230°
2A	33°07'23.85"	18°51'04.14"	-33.123293°	18.85115°
2B	33°07'25.53"	18°51'00.61"	-33.123757°	18.85017°
2C	33°07'16.29"	18°50'51.47"	-33.121192°	18.84763°

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
2D	33°07'14.04"	18°51'00.25"	-33.120568°	18.85007°

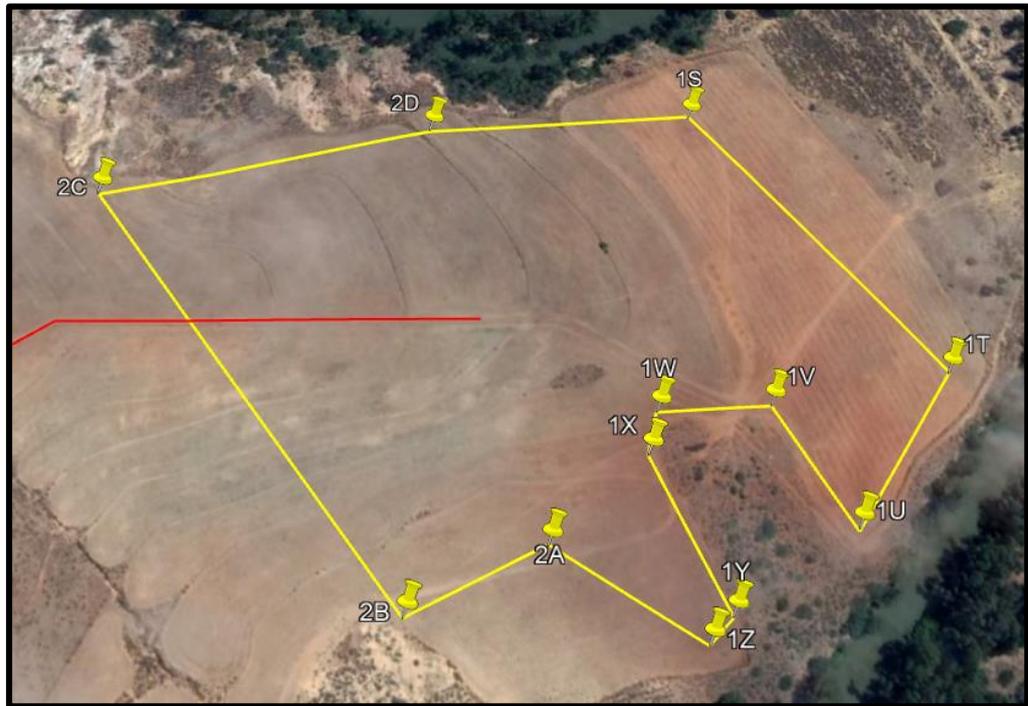


Figure 13: Satellite view of the footprint of Site Alternative 1 (yellow polygon) showing the existing access road (red line) (image obtained from Google Earth)

The right holder and project team identified Site Alternative 1, during the assessment phase of the environmental impact assessment, as the preferred site alternative due to the following:

- ❖ The proposed footprint area offers the right holder access to the dolomite resource on the property, as determined through extensive prospecting.
- ❖ The layout of the proposed footprint excludes areas with natural occurring Swartland Shale Renosterveld of critical conservation importance.
- ❖ The existing farm road can be used to access the footprint area; therefore, no road construction is need.
- ❖ The proposed site alternative does not trigger listed activities in terms of the NEMA: EIA Regulations, 2017.

Negative aspects associated with Site Alternative 1 entails:

- ❖ Approximately 13.1 ha will be lost to agriculture for the duration of the mining operation. This area will however return to agricultural use upon closure.
- ❖ During the operational phase, the mining activity will affect the visual characteristics, air quality and noise levels of the surrounding environment as well as contribute the impact of mining within an area mainly designated for agricultural purposes.

However, should the mitigation measures and monitoring programs proposed in this document be implemented on site, no fatal flaws could be identified that were deemed as severe as to prevent the authorization of this proposed site alternative.

Site Alternative 2 (S2): Site Alternative 2 entails the extension of the existing BDQ with 13.46 ha that falls within the GPS coordinates as listed in the table below.

Table 10: GPS Coordinates of Site Alternative 2

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
1S	33°07'13.61"	18°51'07.38"	-33.120447°	18.852049°
1T	33°07'19.51"	18°51'14.08"	-33.122086°	18.853911°
1U	33°07'25.98"	18°51'09.60"	-33.123884°	18.852667°
1V	33°07'23.41"	18°51'04.16"	-33.123170°	18.851156°
1W	33°07'25.24"	18°51'00.42"	-33.123677°	18.850117°
1X	33°07'16.29"	18°50'51.46"	-33.121192°	18.847629°
1Y	33°07'14.05"	18°51'00.24"	-33.120570°	18.850068°

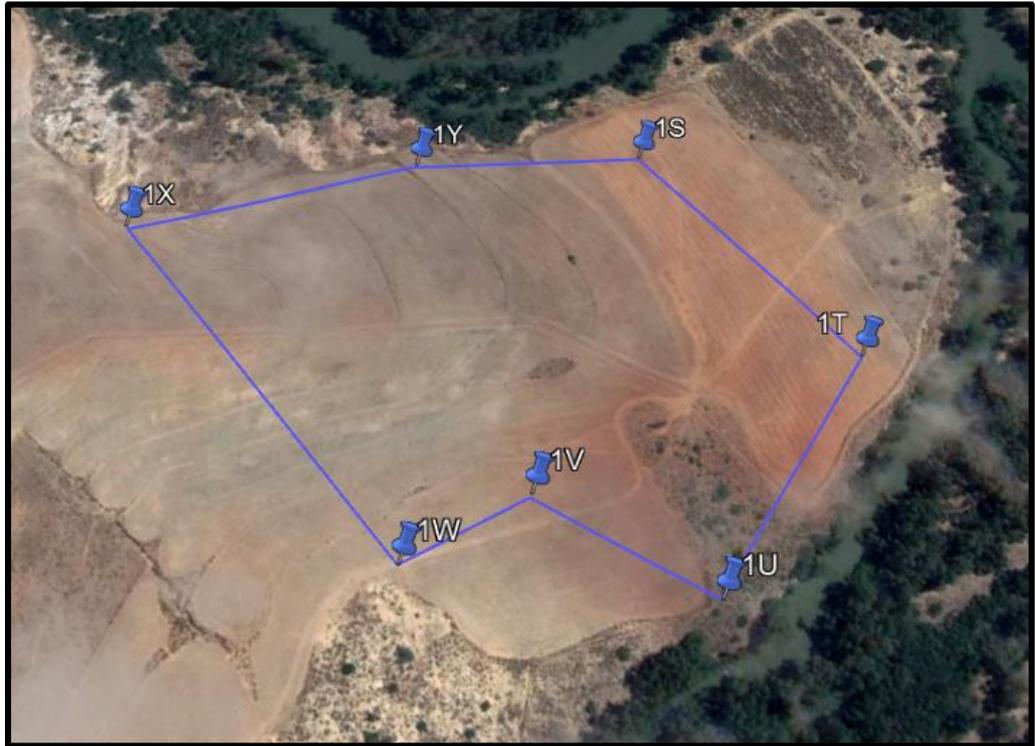


Figure 14: Satellite view of the footprint area of Site Alternative 2 (blue polygon). (Image obtained from Google Earth)

This alternative was investigated as it will provide the right holder with a larger mining area (13.46 ha) that will technically be simpler to mine than the layout proposed for S1. The following matters were considered regarding Site Alternative 2:

Positive aspects associated with Site Alternative 2 include:

- ❖ The layout of this footprint allows a simpler mine design.
- ❖ The proposed footprint area offers the right holder access to the dolomite resource on the property, as determined through extensive prospecting.
- ❖ No road construction is needed as the existing farm road can be used to access the footprint area.

Negative aspects associated with Site Alternative 2 entails:

- ❖ The footprint extends over an area with Swartland Shale Renosterveld that is classified as Critically Endangered;
- ❖ This site alternative triggers listed activities in terms of the NEMA: EIA Regulations, 2017.

- ❖ Approximately 13.46 ha will be lost to agriculture for the duration of the mining operation. This area will however return to agricultural use upon closure.
- ❖ During the operational phase, the mining activity will affect the visual characteristics, air quality and noise levels of the surrounding environment as well as contribute the impact of mining within an area mainly designated for agricultural purposes.

In light of the above, and the review of the potential impacts associated with S1, site alternative 2 is not deemed the preferred option as this alternative will have a higher ecological significance without the need or motivation justifying it.

Project Alternative: The use of the existing processing infrastructure at BDQ was considered to establishing crushing and screening infrastructure at the DQ. The use of the existing BDQ processing plant will result in the following positive aspects:

- ❖ It will lower the initial DQ setup- and production cost;
- ❖ Present the right holder with a larger footprint for the mining of dolomite, as no area will be lost to infrastructure development;
- ❖ Lessen the impact on the environment both directly (e.g. dust and noise generation, risk of pollution, visual impact), and indirectly (e.g. need for electricity, water and maintenance services); and
- ❖ Without the need to decommission mining/processing related infrastructure, the rehabilitation of the DQ footprint will be less expansive.

In light of the above, the use of the existing crushing and screening infrastructure of BDQ is deemed the most viable and preferred project alternative.

The **no-go alternative** entails no change to the *status quo* and is therefore a real alternative to be considered. The following matters were considered regarding the no-go alternative:

- ❖ Should the no-go option be implemented Lime Sales Ltd would not be able to exploit the dolomite source on the property, resulting in a loss of income.

- ❖ The landowner will not receive compensation for the use of the earmarked footprint on his property.
- ❖ Should the DQ not commence the present situation will persist, and no potential impacts on the visual characteristics, air quality, and/or noise ambiance of the surrounding area, will be applicable.

ii) Details of the Public Participation Process Followed

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attend public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land).

Prior to the approval of the 1997 EMPR, a full public participation process was implemented and all I&AP's were personally invited to take part. The first public meeting was held in the Moorreesburg Town Hall on 24 February 1997. Public participation included consultation with the surface right owners of the various surrounding properties as listed in the table below.

Table 11: List of previous public participation with surface right landowners.

PREVIOUS PUBLIC PARTICIPATION	
PROPERTY	SURFACE OWNER
Portion 7 (Remaining Extent) of Vledermuisdrift 398	HW Liebenberg
Portion 8 (Remaining Extent) of Vledermuisdrift 398	JA Smit
Portion 9 (Remaining Extent) of Vledermuisdrift 398	
Portion 20 of Vledermuisdrift 398	Department of Land Affairs
Portion 2 of Vogelstruisdrift 335	AM Burger

DMR approved the mining right with the provision that the Joint Venture establish an Environmental Monitoring Committee to oversee the impacts of the project. The committee was established, and is chaired by the Swartland District Municipality. The committee originally met at four monthly intervals, and any complaints by I&AP's, concerning the project were raised, discussed and addressed at the meetings. These meetings ceased in ±2009 because the participants no longer had serious complaints. Subsequently, the site manager at BDQ dealt with any complaints/problems. Since early 2014, the present

manager re-instituted impromptu meetings for I&AP's to discuss concerns they may have.

Regulation 32(1)(a)(aa) of the NEMA: EIA Regulations, 2017 stipulates that an applicant (for a Part 2 amendment) must submit a report reflecting the changes to the EMPR that has been subjected to a public participation process. In light of this, the stakeholders and I&AP's will be informed, of the S102 amendment application and proposed extension of the mining footprint, by means of a notification letter that informs them of the availability of the DEIAR and draft EMPR for their perusal, on-site notices and an advertisement in the Swartland Gazette. A 30-day commenting period will be allowed that ends on 31 January 2020. The following I&AP's and stakeholders will be informed of the project:

Table 12: List of the I&AP's and stakeholders that will be notified of the S102 amendment application to be submitted by Lime Sales Ltd.

STAKEHOLDERS		
<ul style="list-style-type: none"> ❖ CapeNature, ❖ Cape West Coast Biosphere Reserve, ❖ Department of Agriculture, Forestry and Fisheries, ❖ Department of Economic Development and Tourism, ❖ Department of Environmental Affairs and Development Planning, ❖ Department of Labour, ❖ Department of Rural Development and Land Reform, ❖ Department of Social Development, ❖ Department of Transport and Public Works, ❖ Eskom Ltd ❖ Department of Water and Sanitation, ❖ Heritage Western Cape, ❖ South African Heritage Resources Agency, ❖ Swartland Local Municipality, ❖ Swartland Local Municipality: Ward Councillor (Ward 3), ❖ West Coast District Municipality. 		
SURROUNDING LANDOWNERS & INTERESTED AND AFFECTED PARTIES		
<u>Landowners:</u>		
❖	Bridgetown Trust	- Portion 7 (RE) of Vledermuisdrift 398
❖	Tweevlei Trust	- Portion 8 & 9 (RE) of Vledermuisdrift 398
❖	Burger Trust	- Portion 2 (RE) of Vogelstruisdrift 335
❖	Cudi Trust	- Portion 1 (RE) of Drieheuvels 399
<u>Surrounding Landowners and Lawful Occupiers:</u>		
❖	Department of Land Affairs	- Portion 6 of Drieheuvels 399

		Portion 7 of Drieheuvels 399
		Portion 22 of Vledermuisdrift 398
		Portion 7 of Die Pont Annex 225
		Portion 8 of Die Pont Annex 225
		Portion 11 of Honigfontein 233
		Portion 12 of Honigfontein 233
		Portion 13 of Honigfontein 233
		Portion 3 of Vogelstruisdrift 335
		Portion 4 of Vogelstruisdrift 335
		Portion 3 (RE) of Vledermuisdrift 398
		Portion 16 of Vledermuisdrift 398
		Portion 17 of Vledermuisdrift 398
		Portion 18 of Vledermuisdrift 398
		Portion 20 of Vledermuisdrift 398
		Portion 21 of Vledermuisdrift 398
❖	Bridgetown Trust	- Portion 0 (RE) of Vledermuisdrift 398
		Portion 1 (RE) of Vledermuisdrift 398
❖	Cudi Trust	- Portion 2 (RE) of Drieheuvels 399
		- Portion 3 of Drieheuvels 399
		- Portion 0 (RE) of Drieheuvels 399
❖	Swartrug Trust	- Portion 4 of Zandfontyn 407
		- Portion 10 of Vledermuisdrift 398
		- Portion 12 of Vledermuisdrift 398
❖	Mr AB van der Merwe	- Portion 1 (RE) of Vogelstruisdrift 335
		- Portion 0 (RE) of Vogelstruisdrift 335
❖	Andre Serdyn Trust	- Portion 13 of Vledermuisdrift 398
❖	Gousblom Trust	- Portion 13 of Hollerivier 336
❖	Blue Falcon Trading 94 (Pty) Ltd	

The comments received on the DEIAR and draft EMPR will be incorporated into the final EIAR and EMPR to be submitted to the DMR for decision-making.

iii) Summary of issues raised by I&AP's

(Complete the table summarizing comments and issues raised, and reaction to those responses)

Table 13: Summary of issues raised by I&AP's.

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
<u>AFFECTED PARTIES</u>				
Landowner/s				
Bridgetown Trust Portion 7 (RE) of Vledermuisdrift 398	X	-	Any comments received from the landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.	
Tweevlei Trust Portion 8 & 9 (RE) of Vledermuisdrift 398	X	-	Any comments received from the landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.	
Burger Trust Portion 2 (RE) of Vogelstruisdrift 335	X	-	Any comments received from the landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.	
Cudi Trust Portion 1 (RE) of Drieheuvels 399	X	-	Mr Bester representing Cudi Trust signed a landowner notification regarding the proposed extension over Portion 1 (Remaining Extent) of Drieheuvels 399.	Appendix F3
<u>Lawful occupiers/s of the land</u>				
Blue Falcon 94 Trading (Pty) Ltd	X	-	Any comments received from Blue Falcon 94 Trading (Pty) Ltd (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.	

Interested and Affected Parties		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
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.					
Landowners or lawful occupiers on adjacent properties	X				
Department of Land Affairs	X	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Bridgetown Trust	X	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Cudi Trust	X	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Swartrug Trust	X	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Mr AB van der Merwe	X	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Andre Serdyn Trust	X	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		

Interested and Affected Parties		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
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.					
Gousblom Trust	X	-	Any comments received from the surrounding landowner (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Municipal councillor	X	-	Any comments received from the municipal councillor (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Municipality	X	-	Any comments received from the district and/or local municipality (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA, etc	X				
Department of Transport and Public Works (DTPW)	X	-	Any comments received from the DTPW (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Department of Water and Sanitation (DWS)	X	-	Any comments received from the DWS (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Eskom Ltd	X	-	Any comments received from Eskom (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Communities	N/A	-	-		

Interested and Affected Parties		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
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.					
Dep. Land Affairs	X	-	Any comments received from the Department of Land Affairs (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Traditional Leaders	N/A	-	-		
Dept. Environmental Affairs (DEA&DP)	X	-	Any comments received from the DEA&DP (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Other Competent Authorities affected	X				
CapeNature	X	-	Any comments received from CapeNature (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Cape West Coast Biosphere Reserve (CWCBR)	X	-	Any comments received from CWCBR (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Department of Agriculture, Forestry and Fisheries (DAFF)	X	-	Any comments received from DAFF (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Department of Economic Development and Tourism (DEDT)	X	-	Any comments received from DEDT (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Department of Labour (DoL)	X	-	Any comments received from DoL (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Department of Rural Development and Land Reform (DRDLR)	X	-	Any comments received from DRDLR (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		

Interested and Affected Parties		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
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.					
Department of Social Development (DSD)	X	-	Any comments received from DSD (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
Heritage Western Cape (HWC)	X	-	Any comments received from HWC (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
South African Heritage Resources Agency (SAHRA)	X	-	Any comments received from SAHRA (on the DEIAR and draft EMPR) will be incorporated into the final EIAR and EMPR.		
<u>OTHER AFFECTED PARTIES</u>					
<u>INTERESTED PARTIES</u>					

iv) The Environmental attributes associated with the development footprint alternatives.

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) Baseline Environment

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

(Its current geographical, physical, biological socio-economic, and cultural character).

(Information extracted from the Bridgetown Dolomite Quarry Revised and Updated EMPR, 2009)

This section describes the pre-mining (in terms of the DQ) biophysical-, cultural- and socio-economic environment of the larger study area. It is important to note that BDQ has been operational since 1990, and through the years developed into a landscape feature. The following discussion of the type of environment to be affected therefore includes the *status quo* associated with the operating BDQ.

PHYSICAL ENVIRONMENT

CLIMATE

According to saexplorer, Moorreesburg normally receives ± 315 mm of rain per year and because it receives most of its rainfall during winter, it has a Mediterranean climate. The chart below (lower left) shows the average rainfall values for Moorreesburg per month. It receives the lowest rainfall (4 mm) in February and the highest (55 mm) in June. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Moorreesburg range from 17°C in July to 29.2°C in February. The region is the coldest during July when the mercury drops to 6.6°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures

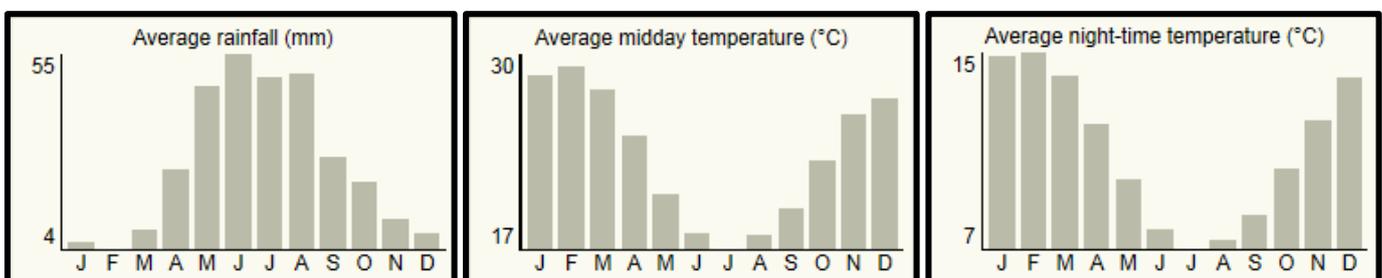


Figure 15: Chart indicating the climatic averages of the Moorreesburg (www.saexplorer.co.za/south-africa/climate/moorreesburg_climate.asp)

According to the wind statistics of Porterville, the nearest wind station (Windfinder) to BDQ, the wind patterns of the area are highly influenced by seasonal variations. The prevalent wind direction distribution of Porterville is in a south to south-western direction during the summer months. From May to August north to north-western winds are common in the area. The wind gradually returns to its south/south-western trend from September. The figures below presents the wind direction distribution in percentage for the greater Porterville area.

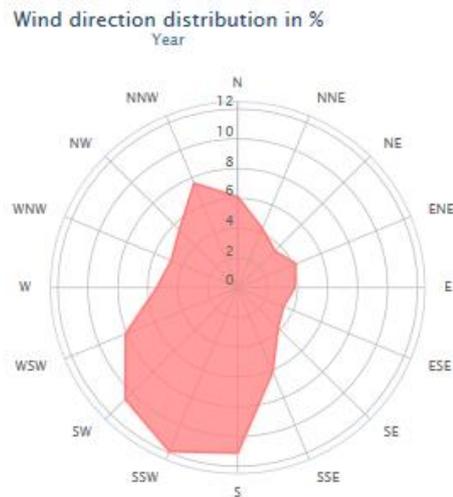


Figure 16: Annual wind direction distribution in % for the Porterville area, where the furthest point to the south-south-west indicates 11.9%/year, the furthest point to the south 11.1%, and the furthest point to the south-west 10.6%/year. The north-north-west point represents 7.6%/year. (Image obtained from www.windfinder.com/windstatistics/porterville)

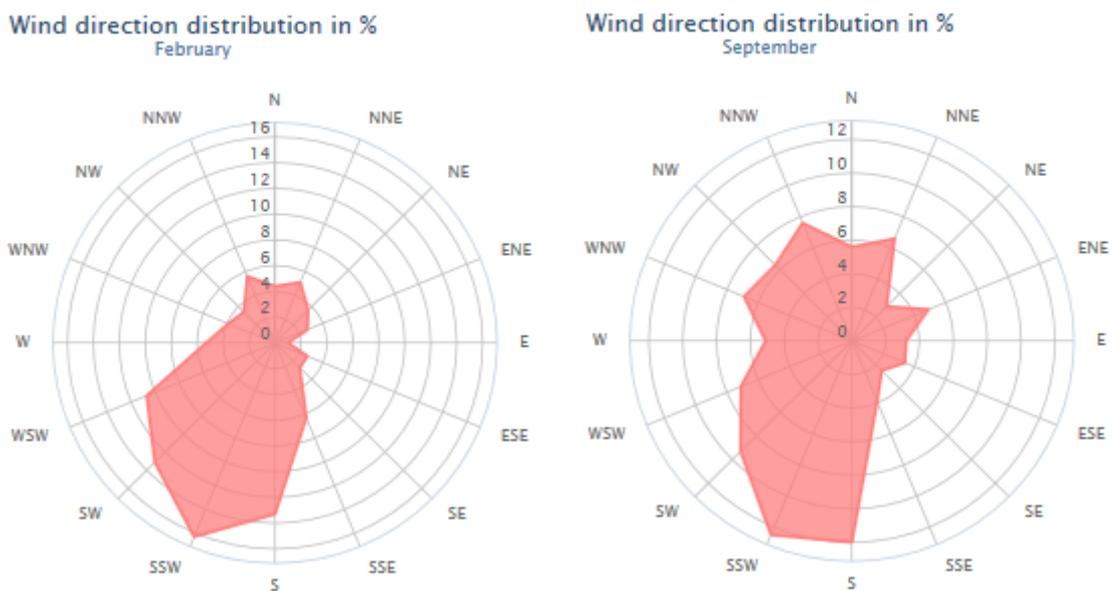
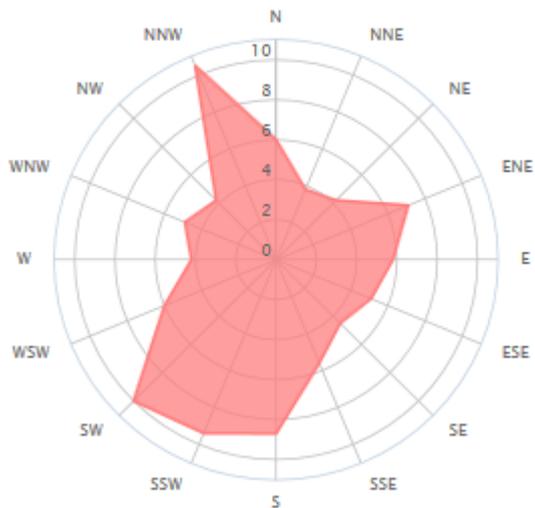


Figure 17: Wind direction distribution in % for the Porterville area, where the first wind rose shows the data for the month of February (SSW 16.3%) and the second frame shows the data for September (SSW 12.5%; S 12%; NNW 7.6%; NNE 6.6%). (Image obtained from www.windfinder.com/windstatistics/porterville)

Wind direction distribution in %
May



Wind direction distribution in %
July

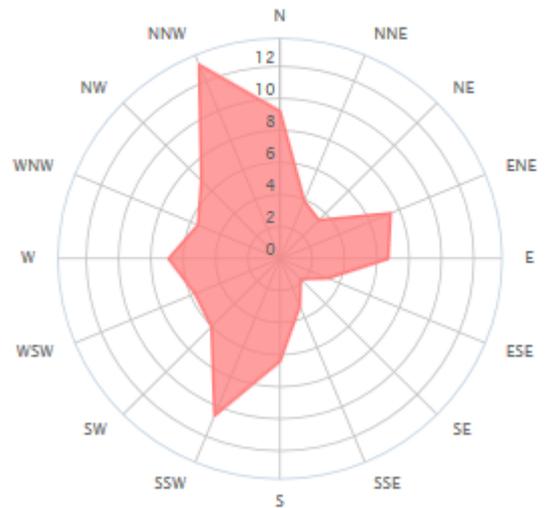


Figure 18: Wind direction distribution in percentage for the Porterville area, where the first wind rose shows the data for the month of May (NNW 10.5%; SW 10%; SSW 9.4%; S 8.7% ENE 7.1%) and the second frame shows the data for July (NNW 13.1%; SSW 10.6%; ENE 7.4%). (Image obtained from www.windfinder.com/windstatistics/porterville)

TOPOGRAPHY

The study area is characterized as a rolling hill landscape into which the Berg River is incised with cliff faces formed where the dolomite offers greater resistance to erosion. While the riverbed is at 24 m mamsl adjacent to the site, the river is impounded by the Misverstand Dam to a full supply level at 26 m elevation.

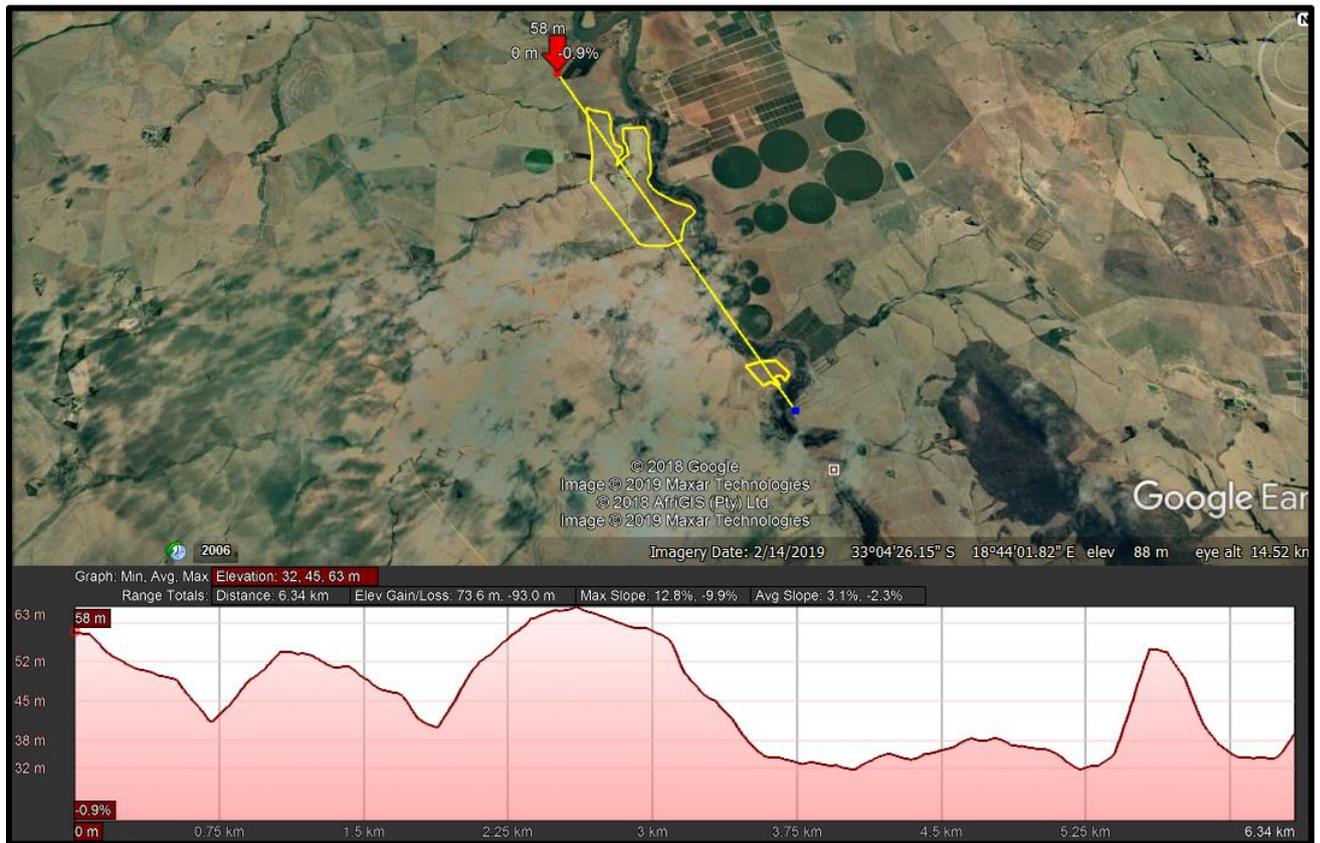


Figure 19: Elevation profile of the general study area (image obtained from Google Earth).

The topography of BDQ (existing operation) varies between ± 71 mamsl in the south-west (being the highest point) and ± 37 mamsl in the south-east (the lowest point being near the Berg River). The current topography of BDQ is largely unnatural due to the mining activities that resulted in steep gradients; most obvious on the sides of the pit. While the higher watersheds of the site rise to 65 m, the excavations were developed on the lower lying spurs at between 40 and 50 m in the southern section and 40 and 55 m in the northern section with the full preservation of the cliffs. The expropriation area for a raised dam wall impoundment follows the ± 36 m contour allowing for an assumed increase of the dam level from 26 m to ± 35 m. (Refer to Appendix J2: BDQ Topography and Surface Drainage).

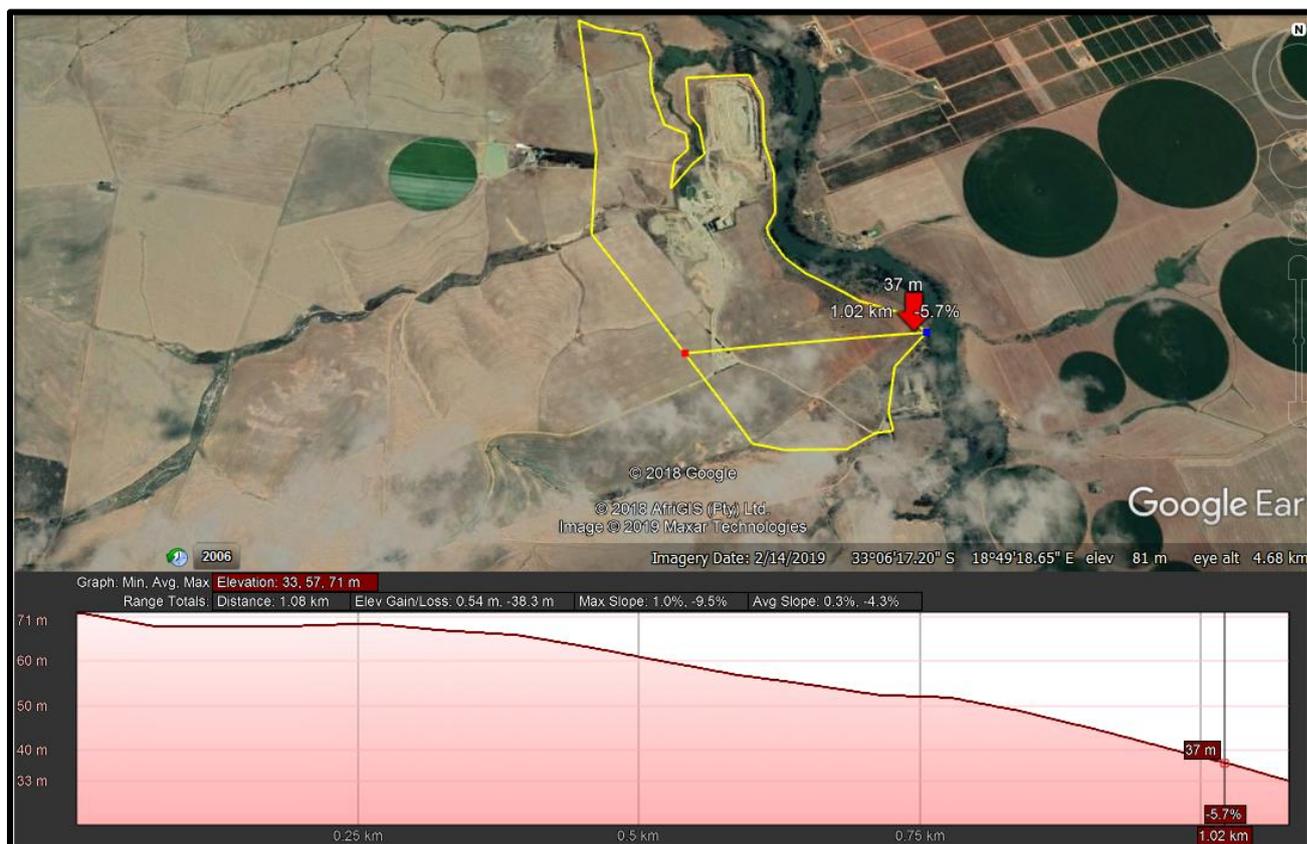


Figure 20: Elevation profile from the highest elevation at Bridgetown Dolomite Quarry to the lowest (image obtained from Google Earth).

VISUAL CHARACTERISTICS

The visual character of the surrounding areas mainly comprises of an agricultural setting, intersected by the Berg River, road- and electricity infrastructure. The area west of the Berg River is known for its rolling wheat fields, while to the east of the river the landowners established centre pivot irrigated fields and vineyards.

The rolling landscape hides the Bridgetown Dolomite Operation from public roads, and the metallurgical plant was placed in the valley south-west of the northern mining section to avoid high visual impacts. (Refer to Appendix G: BDQ Visual Impact Map).

AIR AND NOISE QUALITY

(Refer to Appendix H1: BDQ Distance between Structures and Appendix H2, as well as Mine: BDQ Dust, Noise and Blasting Results)

The air and noise ambiance of the study area was historically representative of an agricultural environment in which farming equipment operates with occasional high dust emissions from denuded areas. The surrounding area has since been transformed with the introduction of dolomite mining.

The EMPR of BDQ states that the present natural ambient dust levels are high during ploughing and high wind conditions during dry summer months. These dust levels are augmented by the following operations at the mine:

- ❖ Blasting: Given the fact that blasts are conducted in the overburden horizon, which contains red soil cover and soil fill in cavities. As mining progressed in depth, blast dust reduces significantly and once blasting regularly takes place below the phreatic surface in moist rock blast dust is further reduced;
- ❖ Crushing and Milling;
- ❖ Loading; and
- ❖ Delivery vehicles driving on delivery routes.

The present noise sources, apart from those associated with the agricultural operations of the surrounding environment, are:

- ❖ Drilling and blasting;
- ❖ Loading of haul trucks;
- ❖ Crushing, screening and washing;
- ❖ Dispatch vehicles on delivery routes.

Despite relative proximity to surrounding farmsteads from the present operation as shown in the table below, noise complaints have, in the past, been reported from Die Pont relating to blast noise, vehicle traffic and loading at the Ag-lime plant (before it was demolished), cracks in walls and windows. Blast noise measurements conducted in 1994 by the DMR recorded a noise level of 124 dB at a distance of 150 m from the blast. This is 10 dB lower than the maximum recommended air blast level of 134 dB. Noise levels at the complainant's house, ±1.7 km from the blast, were therefore deemed well below the limits. The 2009 EMPR notes that at 1.8 km distance blast noise is the same as that of a car door being closed 5 m away from the listener.

Table 14: Proximity to surrounding farmsteads from the present mining operations.

NAME	TYPE	DISTANCE (METER)	DIRECTION
Vrugbaar	Labourers Cottages	350	South-East
Rooihoogte	Cottage and School	400	North-East
Vrugbaar	Farm House	550	South-East
Tweevlei	Farm House	600	West

NAME	TYPE	DISTANCE (METER)	DIRECTION
Bridgetown	Camping Resort	1 400	South
Die Pont	Farm House	1 700	South-East
Vogelstruisdrift	Farm House	1 800	North-West

The average noise levels generated at the processing plant are as listed in the table below.

Table 15: Average noise levels generated at the processing plant of Bridgetown Dolomite Quarry.

PROXIMITY	NOISE LEVEL (dB)
At the plant	95
150 m away	75
250 m away	60
400 m away	55
700 m away	45
900 m away	40

Given the location of the plant 500 m from most of the surrounding facility, noise levels are below the recommended 55 dBA for residential areas and in light of the location of the plant in a valley, noise levels of ± 40 dBA are within 5 dBA of the recommended after hours noise levels of rural areas at 35 dBA.

Given the proximity of Bluegum trees to all residences, it is worth noting that when wind of 15 m/s blows through the trees, a noise level on the ground below the trees of 70-80 dBA is generated, drowning all other distant noise.

To improve the situation a 6 m high earth berm, around the demolished Ag-lime Plant, has reduced vehicle and loading noise to acceptable limits and blasting operations are only conducted when climatic conditions are suitable.

GEOLOGY AND SOIL

(Refer to the Geological Report: Bridgetown Dolomite Quarry – March 2008 attached as Appendix I2, as well as Appendix I3: BDQ Geological Maps)

The Malmesbury Group constitute three disparate tectonostratigraphic terranes juxtaposed by major structural discontinuities. From the south-west to the north-east, these comprise the Tygerberg Formation, the Swartland Subgroup, and the Boland Subgroup, separated by the Saldanha- Franschoek and Piketberg-Wellington Fault zones. The Bridgetown Formation in which the dolomite ore body occurs, is constituted by a structurally bound unit within the Piketberg-Wellington Fault zone, and probably comprises a distinct exotic unit. The age of the Malmesbury Group is not well constrained, however, it probably lies within the age range 718 Ma – 630 Ma, but older than the Cape Granite Suite (500 – 630 Ma) which intrudes the Group.

The Bridgetown Formation is constituted by three members, easily distinguishable by their lithotypes.

1. The basal member comprises the BDQ, which forms the exploitable ore body. In places, this dolomite unit contains dykes of intercalated andesitic basaltic tuffs, which have now regressed to greenschists.
2. This unit is in turn overlain by the Bridgetown Greenstone Member, consisting of a series of andesitic tuffs and lava flows, which have been metamorphosed and deformed to greenschists and;
3. The uppermost member consisting of a fine grained chert unit, probably of sedimentary origin.

Four phases of deformation have affected the Bridgetown Formation. The two earliest phases D1 and D2 are associated with syntectonic Pan African (circa 550 Ma) greenschist facies metamorphism, producing distinct axial planar cleavages. The third phase of deformation (D3) to affect the Bridgetown Formation is inferred to be coeval with the Permo-Triassic Cape Fold Belt orogen (circa 260 Ma). The fourth phase of deformation recorded by the Bridgetown Formation comprises a series of high crustal level brittle fractures and joints, predominantly striking northwest associated with inversion and reactivation of the PWFZ during Upper Jurassic – Lower Cretaceous extension.

The Bridgetown Formation is currently juxtaposed west of the PWFZ for approximately 19 km as a fault bounded southerly plunging antiformal trace. To the west and south, the dolomite body is juxtaposed to a muscovite phyllitic schist, with minor interbedded

pssamitic horizons. This unit is partially decomposed, yielding a ripple depth of 5 m. The structural disposition of the dolomite ore body is difficult to unravel due to the lack of suitable marker horizons. However, the earliest phase of deformation recorded by the unit appears to be related by a period of isoclinal folding about a vertically dipping north south striking axis. This phase of folding appears to have substantially tectonically thickened the dolomite. The second main phase of deformation recorded within the dolomite is characterized by close folding along a vertical north northwest vertically dipping axial plane, refolding the earlier cleavage.

To the east of the dolomite, the phyllitic units dip consistently to the west at approximately 60° west, whilst there is evidence along the scarp slope of the Berg River that the main foliation dips 19° to the east. The dolomite body therefore appears to occupy the core of an antiformal trace, striking N160°E. The third phase of folding to have affected the dolomite unit appears associated with the Permo-Triassic Cape Fold Belt origin. Two prominent joint sets occur within the dolomite unit, with a subordinate third joint set. The main jointing within the dolomite comprises a normal east west striking jointing, combined with a coeval conjugate shear joint set striking approximately N044°E and N135°E. The northern and southern dolomite ore bodies may be dislocated from each other along a conjectural fault striking approximately N135°E. Field evidence for this conjectural fault is present by the formation of a series of ilmenite gossans along the inferred trace of the fault. Given the rheological contrast between the dolomite and the surrounding phyllitic schists, it is probable that the margins of the dolomite ore body are in sheared contact with the phyllites.

Geological investigations have comprised geological mapping combined with phased drilling programs and supported by geochemical analyses of the ore body. Two ore blocks have been defined, comprising a northern and a southern ore body. The southern ore block was exposed in the old Ag-lime quarry and the northern ore block out-crops along the western bank of the Berg River, forming a prominent scarp face. Where the top of the dolomite unit is exposed, a prominent karst surface has developed, with solution cavities extending up to 18 m below the palaeo-surface, although most of these structures are in the order of a few meters deep, and are infilled by an iron rich partially consolidated late Tertiary sandy loam and clay containing alluvial quartz pebbles and cobbles. The dolomite is of biogenic origin, with stromatolitic linkages being visible within the massive algal bioherms. Minor grit and sand horizons are interbedded within the dolomite, and are laterally impersistent. Relict volcanics are also present within the dolomite, which are now rendered to

greenstones and greenschists. These appear to have been andestic in origin, and are disposed as a series of minor dikes and sills.

In the northern orebody, a prominent greenstone dyke has been identified, striking northwards and concave to the east. In the southern orebody, greenstone intrusives are apparent in surface outcrop and have been recorded in boreholes.

To the north of the old Ag-lime quarry, greenstone was encountered in borehole BH-1 at a depth of 14 m below natural ground level, dipping at approximately 25°. The apparent recorded thickness of this unit is 7 m, which suggests that a portion of the southern ore body is underlain by a 7 m thick sill.

The southern dolomite ore body has been proven to a depth of 80 m below natural ground level during the drilling of borehole BH-1, whilst the northern ore body has been proven to a depth of 50 m.

While the soils overlying the phyllites and psammities are typically Swartland soils, deep red Hutton and Oakdale soils developed in places over the Southern dolomite body where two centre pivot irrigation systems previously stood. These soils derive from palaeo-weathering surfaces remnants of which exist on the high lying ground west and mostly east of the Berg River. The Northern dolomite body however, shows no soil profile as the fresh dolomite is exposed in a typical karst landscape.

HYDROLOGY

Surface Water:

(Refer to Appendix J2: BDQ Topography and Surface Drainage)

The study area is situated in the Upper Berg sub-water management area that forms part of the greater Berg Water Management Area (ID 18). According to the National Freshwater Ecosystem Priority Areas (NFEPAs) map as presented by SANBI, the NFEPAs status of the study area is classified as a no priority area.

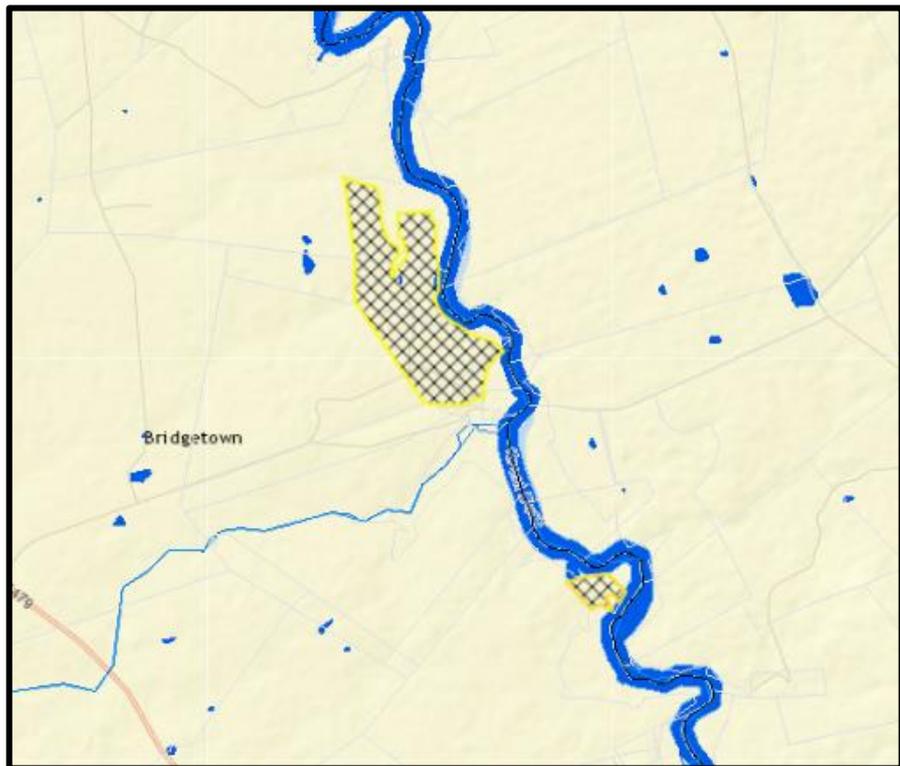


Figure 21: Map showing the position of known wetlands (blue polygons), rivers and streams (blue lines) in relation to the footprint of Bridgetown Dolomite Quarry and the proposed Drieheuvelds Quarry (yellow polygons). The Berg River is shown to the east of the mining areas. (Image obtained from the BGIS Map Viewer: Mining Guidelines)

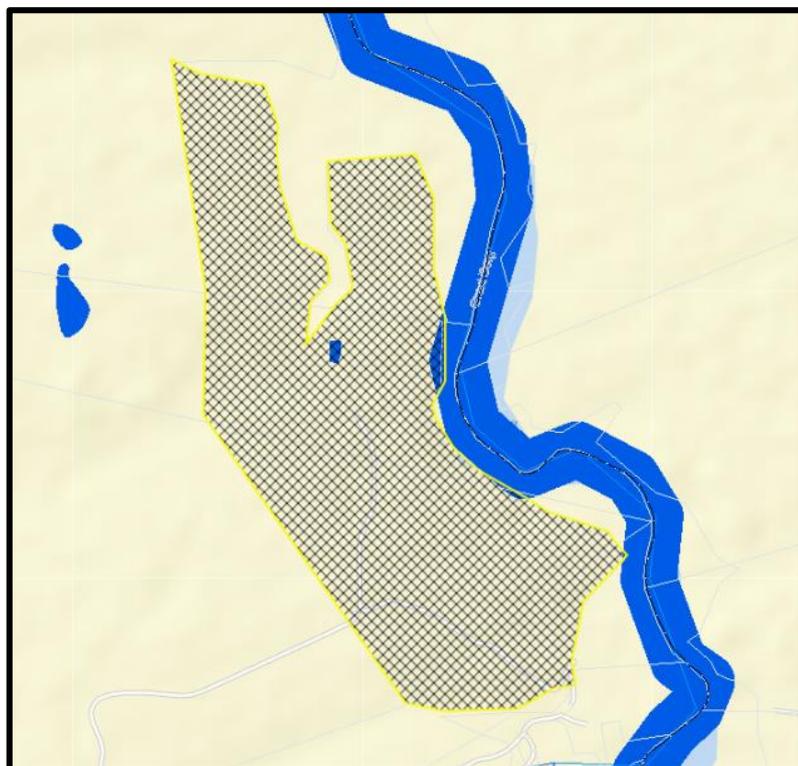


Figure 22: Map showing the Bridgetown Dolomite Quarry (yellow polygon) in relation to the Berg River (blue line). The blue polygon in the mine's footprint shows an artificial wetland classified as an unchannelled valley-bottom wetland. (Image obtained from the BGIS Map Viewer: National Wetlands and NFEPA).

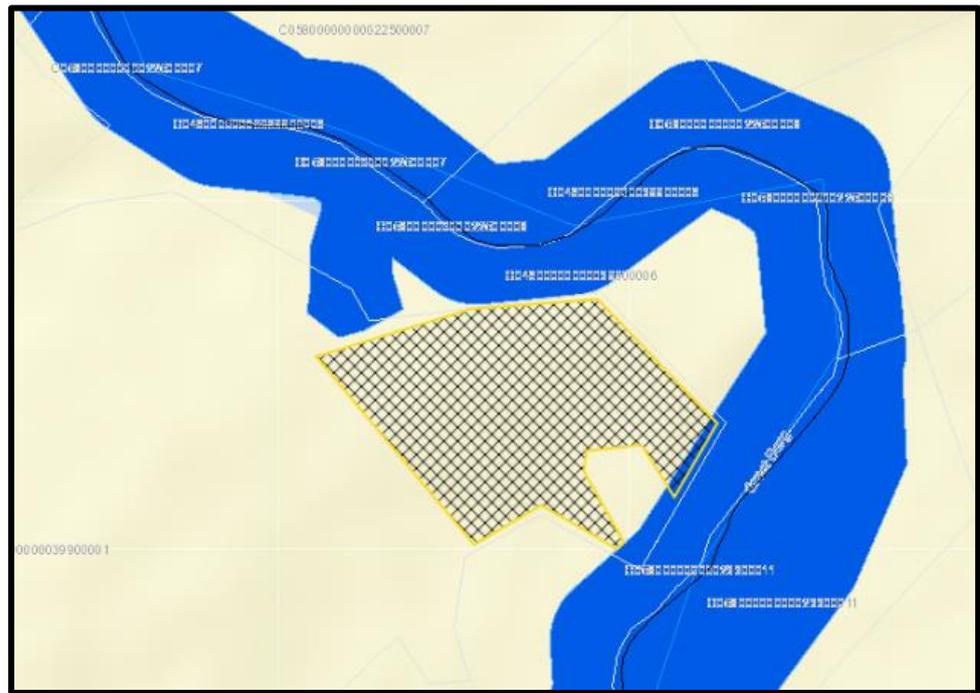


Figure 23: Map showing the proposed Drieheuvels Quarry (yellow polygon) in relation to the Berg River (blue line). (Image obtained from the BGIS Map Viewer: National Wetlands and NFEPA).

BDQ was established directly adjacent to the Berg River (western bank of the river). The most prominent surface water resources of the study area comprise of the:

- ❖ Berg River;
- ❖ Misverstand Dam impoundment area of the Berg River; and
- ❖ Two main drainage channels generally forming the northern and southern boundaries of the overall site.

The water quality of the Berg River / Misverstand Dam is regularly monitored both upstream and down- of the mining operations. The results showed virtually no difference in the quality of up-, and downstream samples.

The two drainage channels are characterized by:

- ❖ high levels of siltation of the stream beds given high levels of erosion of the steep wheat farming slopes on neighbouring farms;
- ❖ erosion dongas, down to bedrock in places, within the stream beds;
- ❖ very high TDS levels of between 11 200 and 7 400 mg/l and chlorides of between 5 400 and 3500 mg/l have been measured in these streams (2005).

In comparison, the following table sets out typical chemical results of up-stream and down-stream samples taken from the adjacent Berg River in 2008 and 2019 (also refer to Appendix J3: BDQ Water Sampling Locations & J4: BDQ Water Quality Results).

Table 16: Chemical analysis of water in the Berg River.

SAMPLE LOCATION	TDS (mg/l)	CONDUCTIVITY (mg/m)	CHLORIDE (mg/l)
Up-stream (25/06/2008)	74	11.5	20
Down-stream (25/06/2008)	90	14	25
Up-stream (22/12/2008)	128	20	35
Down-stream (22/12/2008)	128	20	42
Up-stream (20/05/2019)	128	20	40
Down-stream (20/05/2019)	147	23	56

It is evident that the chemical results of samples taken during winter, immediately after heavy rains compared with summer conditions differ substantially. This is due to contamination by water introduced into the Berg River by many side-streams which flow across weathered phyllite bedrocks and which also frequently contain white salt deposits.

Groundwater:

A possible restriction to mining the dolomite at the BDQ to the -40 m elevation is the possibility of excessive inflows of groundwater. When the mine's EMPR was originally compiled in 1997 it was considered that the quarry may be mined to the -40 m elevation with a total *in situ* dolomite resource in both the northern and southern ore bodies of 14,9 million tons. This scenario has now been discarded until data regarding the permeability and hydraulic conductivity of the dolomite has been determined.

The water table to the west of the quarry is 2 m higher than to the east of the quarry. (viz. 28 mamsl and 26 mamsl respectively). It is expected that the initial ground water flow rates into the quarry may gradually decrease over time due to prolonged pumping thereby effectively reducing the hydraulic gradient and the natural water storage of the surrounding dolomite. Therefore, the mining model, which evaluates the proved reserves, has been designed to incorporate only four benches, each 9 m high down the +7 m elevation.

Groundwater Monitoring:

Two water-monitoring boreholes were installed on the land surface to the west and east of the northern quarry in 2006 and are monitored at bi-annual intervals. Since the boreholes were installed, the water table in both boreholes have remained reasonably steady at 10.67 m and 11.09 m below the land surface at the western and eastern boreholes respectively.

Since January 2005, the volumes of water utilized at the operations and water pumped from the quarry was recorded daily in the following categories:-

- ❖ Water extracted from the Berg River for the processing plant;
- ❖ Water pumped from the quarry sump;
- ❖ Quarry water released to the “side stream”; and
- ❖ Quarry water used for dust suppression on roads.

The purpose of the water sampling and monitoring was to assemble sufficient data for the DWS to take a decision on whether to grant the company either a general authorization to abstract the water or alternatively request that a water use license should be applied for. The DWS granted a general authorization to Lime Sales Ltd (20 June 2013) to pump 61 685 m³ of seepage water from the quarry. The following tables set out the volumes of water managed at the project for three separate periods from January 2005 to December 2008, January 2009 to May 2013 and January – December 2019.

Table 17: Volumes of water managed at the project for 2005 – 2008.

PERIOD	PUMPED FROM BERG RIVER (kL)	PUMPED FROM QUARRY SUMP (kL)	DISCHARGED TO SIDE STREAM (kL)	QUARRY WATER USED ON ROADS (kL)
Jan – Dec 2005	36 930	67 991	60 896	7 231
2005 Daily Average	94	186	167	20
Jan – Dec 2006	31 533	65 202	57 939	7 534
2006 Daily Average	86	179	159	21
Jan – Dec 2007	34 516	79 936	72 779	7 161
2007 Daily Average	93	215	196	21
Jan – Dec 2008	37 181	62 050	55 580	7 740

PERIOD	PUMPED FROM BERG RIVER (kL)	PUMPED FROM QUARRY SUMP (kL)	DISCHARGED TO SIDE STREAM (kL)	QUARRY WATER USED ON ROADS (kL)
2008 Daily Average	102	170	152	21

The above results showed a very steady extraction rate from the Berg River of around 96 kL/day. This extraction rate is directly related to the production rate of processed metallurgical grade dolomite of $\pm 157\,000$ t/p/a for this particular period. Since January 2009, water usage of the Berg River and quarry sump increased as set out below.

Table 18: Volumes of water managed at the project for 2009 – 2013, and 2019.

PERIOD	PUMPED FROM BERG RIVER (kL)	PUMPED FROM QUARRY SUMP (kL)	DISCHARGED TO SIDE STREAM (kL)	QUARRY WATER USED ON ROADS (kL)
Jan – Dec 2009	36 619	86 268	81 542	4 726
2009 Daily Average	100	236	223	13
Jan – Dec 2010	47 366	142 675	134 956	7 719
2010 Daily Average	130	391	368	21
Jan – Dec 2011	60 308	90 473	87 554	2 919
2011 Daily Average	165	248	240	8
Jan – Dec 2012	55 075	75 436	71 631	3 805
2012 Daily Average	151	207	196	10
Jan – Dec 2013	22 669	19 612	18 310	1 302
2013 Daily Average	150	163	152	11
Jan – Dec 2019	79 559	38 228	32 828	5 400

To date there does not seem to have been a “draw-down” of the surrounding water table. Four slightly inclined drainage boreholes have been drilled into the quarry sidewalls at the lowest level in the quarry (2 holes drilled to the west and 2 holes drilled to the east). All the boreholes were ± 40 deep but no water was intersected. This tends to indicate that there is very poor hydraulic conductivity in the horizontal direction in the rock mass.

Water Chemistry:

Water samples from the Berg River, quarry sump and the two monitoring boreholes are taken at intervals and analysed by an accredited laboratory to determine the water chemistry and whether the discharged quarry water pollutes the Berg River. The following has been established:

- ❖ The discharged quarry water does not reach the Berg River during the dry months. The water evaporates and sinks into the bed of the side stream. The water only reaches the Berg River after heavy rains when the stream flows. However, the quality of the water in the side stream is worse than that of the quarry water. In fact, the quarry water dilutes and improves the quality of the side stream's water. There is to date no evidence that the quarry water pollutes the Berg River.
- ❖ Since January 2009, the chloride content of the quarry sump water varied between 938 and 2 450 mg/l depending on dilution by rain, and the conductivity varied between 410 and 720 msS/m.
- ❖ Since January 2009, the chloride content of the western monitoring borehole averaged 926 mg/l and the eastern borehole 140 mg/l. The reason for this is that the western borehole is partly located in phyllite rock whereas the eastern borehole is entirely situated in dolomite. Similarly, the conductivity of the two boreholes average is 111 and 390 mS/m respectively.
- ❖ Regarding the Berg River, samples are taken up-stream and down-stream of the side stream. No pollution due to quarry water being pumped into the side stream has been established. The quality of the Berg River has been consistent since sampling the river commenced in 2004.
- ❖ The phyllite rock mass lying to the west of the quarry is clearly the source of the brackish water seeping into the quarry. This is unlikely to change through the life of the quarry.
- ❖ Groundwater in intact dolomite has a satisfactory quality.

The detailed chemical analysis of the water samples is attached as Appendix J4.

BIOLOGICAL ENVIRONMENT

MINING AND BIODIVERSITY

(Information extracted from the Mining and Biodiversity Guideline: Mainstreaming Biodiversity into the Mining Sector, Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, 2013).

The Mining and Biodiversity Guideline, compiled by the South African Mining and Biodiversity Forum (SAMBF) provides the mining sector with a practical, user-friendly manual for integrating biodiversity considerations into planning processes and managing biodiversity during the developmental and operational phases of a mine, from exploration through to closure. When the footprint of the BDQ and the proposed footprint of the DQ are layered over the Mining and Biodiversity Map, as shown in the figures below, the areas extend over an area of highest biodiversity importance with a corresponding rating of highest risk for mining. The Mining and Biodiversity Guideline's definition for areas of high biodiversity importance stipulates that: *“these areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being”*. The guideline notes that environmental screening, the EIA and specialists should focus on confirming the presence and significance of biodiversity features, and provide a site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making.

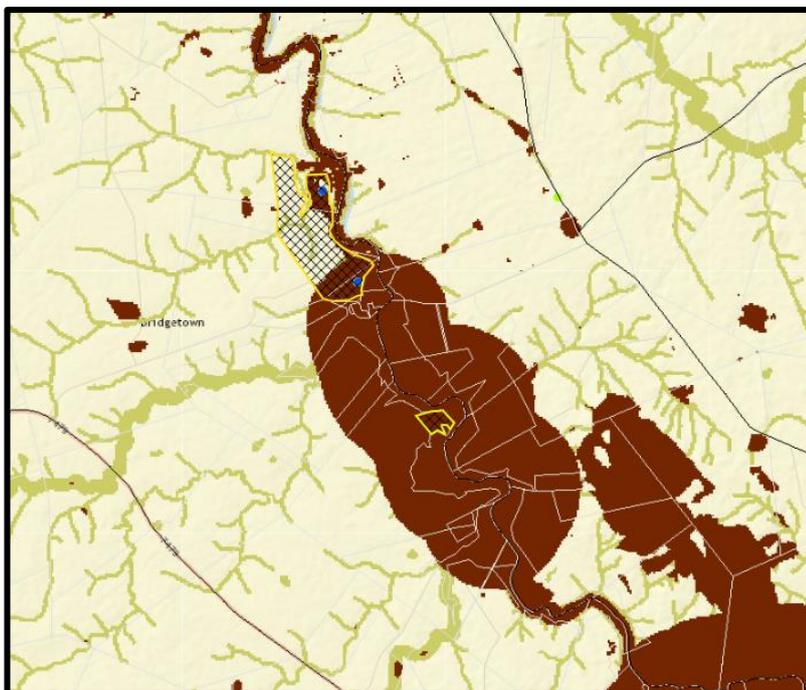


Figure 24: The Mining and Biodiversity importance map showing the Bridgetown Dolomite Quarry (larger yellow polygon) and the Drieheuvelds Quarry footprint (smaller yellow polygon) where the Dark Brown areas represent areas of highest biodiversity importance, highest risk of mining. The blue dots indicate “active and abandoned mines” in the study area. (Image obtained from the BGIS Map Viewer: Mining Guidelines)

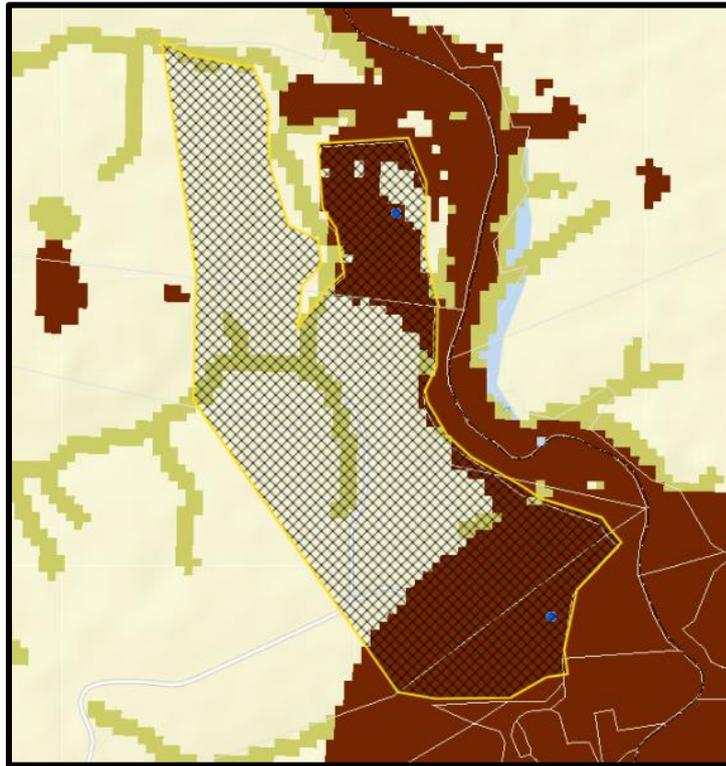


Figure 25: The Mining and Biodiversity importance map showing Bridgetown Dolomite Quarry (yellow polygon) extending over an area of highest biodiversity importance, highest risk of mining (dark brown). The blue dots indicate “active and abandoned mines” in the study area. (Image obtained from the BGIS Map Viewer: Mining Guidelines)

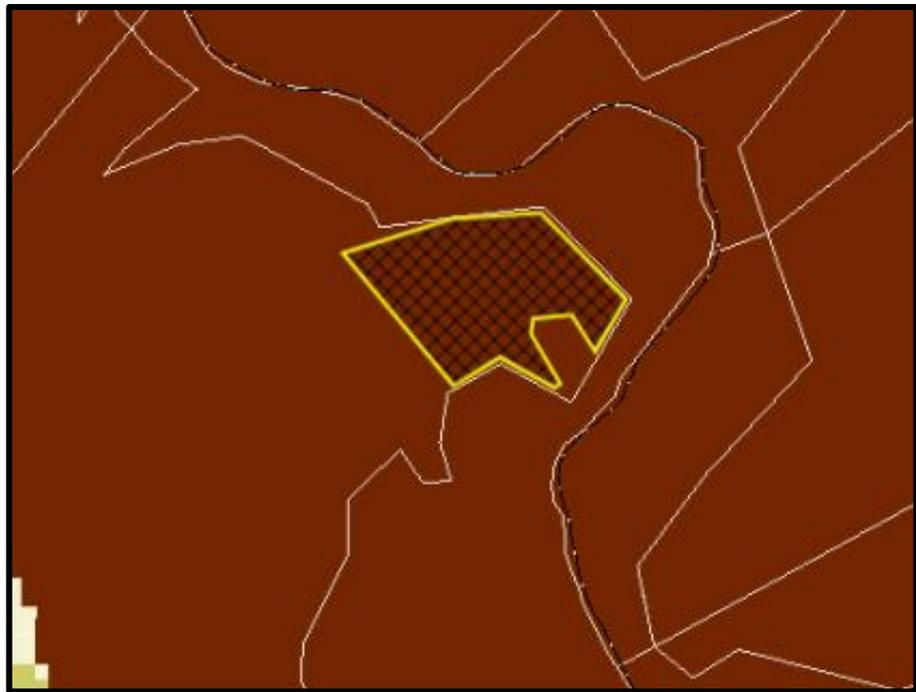


Figure 26: The Mining and Biodiversity importance map showing the footprint of the Drieheuvels Quarry (yellow polygon) extending over an area of highest biodiversity importance, highest risk of mining (dark brown). (Image obtained from the BGIS Map Viewer: Mining Guidelines)

BIODIVERSITY CONSERVATION AREAS

The 2017 Western Cape Biodiversity Spatial Plan (WCBSP) shows the following areas of importance occurring within/near the study area (see figures below):

- ❖ Bergrivier CBA1: Aquatic (blue)
- ❖ Swartland CBA1: Terrestrial (green)
- ❖ Swartland ESA2: Restore (yellow)

The WCBSP provides the following information regarding these areas:

- ❖ Critical Biodiversity Area (CBA):

Definition: “Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.”

Management Objective: “Maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.”

- ❖ Ecological Support Area (ESA):

Definition: “Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.”

Management Objectives: “Restore and/or manage to minimize impact on ecological processes and ecological infrastructure functioning, especially soil and water-related services, and to allow for faunal movement.”

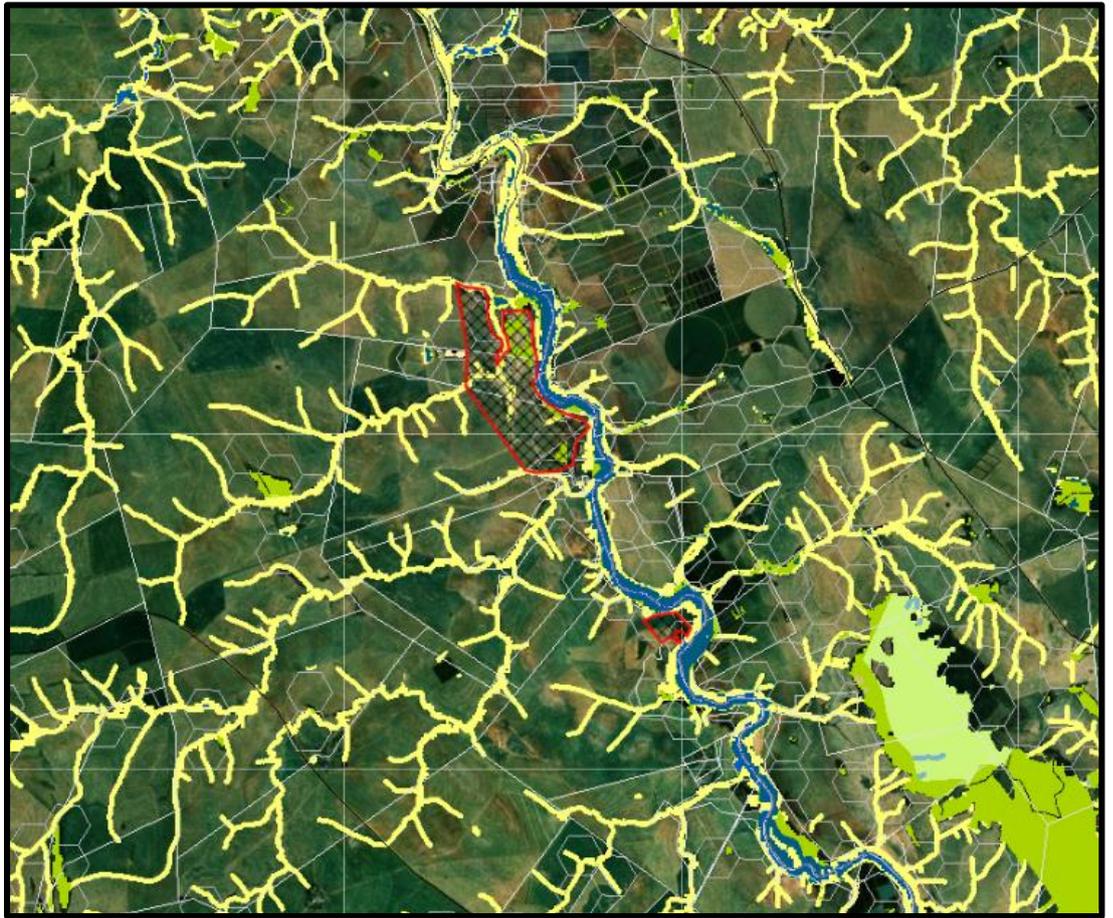


Figure 27: 2017 Western Cape Biodiversity Spatial Plan showing the Bridgetown Dolomite Quarry (larger red polygon) as well as the Drieheuvels Quarry (smaller red polygon) in relation to the surrounding areas of biodiversity importance (image obtained from the BGIS Map Viewer: 2017 Western Cape Biodiversity Spatial Plan).

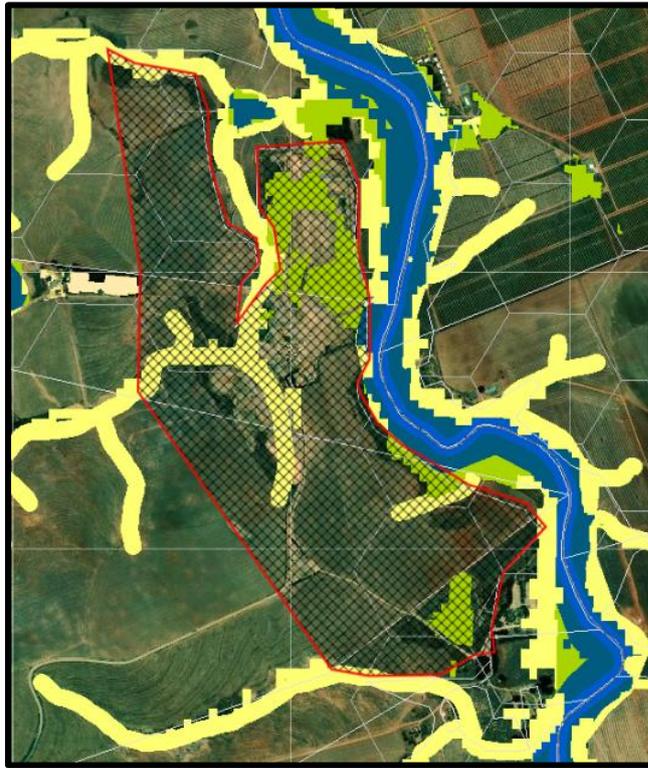


Figure 28: 2017 Western Cape Biodiversity Spatial Plan showing the Bridgetown Dolomite Quarry (red polygon) in relation to the Bergrivier CBA (blue), Swartland CBA (green) and the Swartland ESA (yellow). (Image obtained from the BGIS Map Viewer: 2017 Western Cape Biodiversity Spatial Plan).

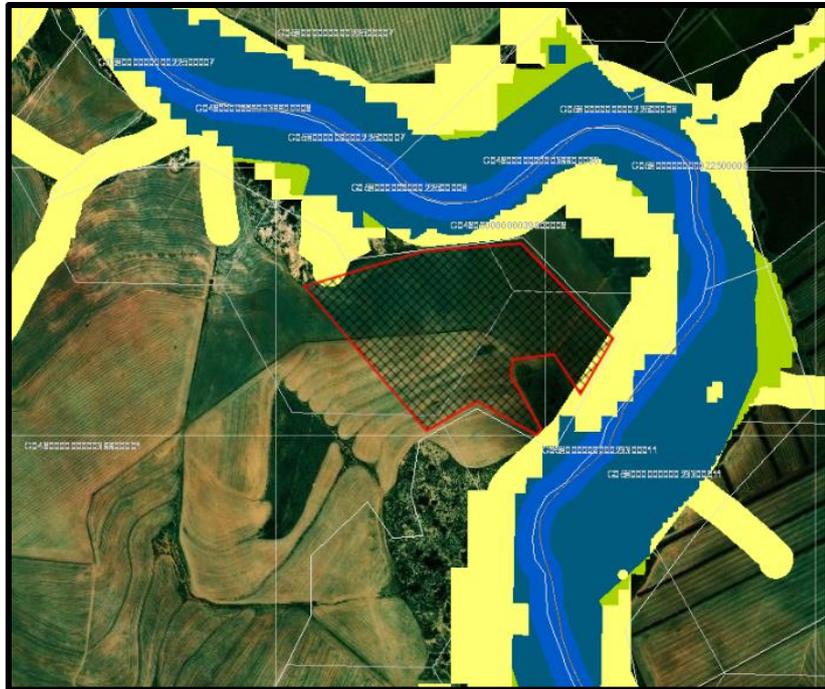


Figure 29: 2017 Western Cape Biodiversity Spatial Plan showing the footprint of the Drieheuvels Quarry (red polygon) in relation to the Bergrivier CBA (blue), Swartland CBA (green) and the Swartland ESA (yellow). (Image obtained from the BGIS Map Viewer: 2017 Western Cape Biodiversity Spatial Plan).

VEGETATION

(Refer to the Botanical Survey of the Proposed Northern Section of the Bridgetown Dolomite Quarry – August 1997 attached as Appendix K2)

According to the national vegetation cover map, the footprint of BDQ and the proposed footprint of the DQ falls within the Swartland Shale Renosterveld vegetation type (FRs9) as classified by Mucina and Rutherford (2012). The vegetation and landscape features of this vegetation type is described as “*moderately undulating plans and valleys supporting low to moderately tall leptophyllous shrubland of varying canopy cover as well as low, open shrubland dominated by renosterbos. Heuweltjies are a very prominent local feature of the environment, forming ‘hummockveld’ near Piketberg and giving the Tygerberg Hills their name. Stunted trees and thicket are often associated with the heuweltjies. Disturbed areas are dominated by Athanasia trifurcata and Otholobium hirtum. Patches of Cynodon dactylon ‘grazing lawns’ also occur in abundance*” (Mucina and Rutherford 2012).

The vegetation type is classified as Critically Endangered with 90% of natural areas transformed. Remnants of the vegetation type are found in isolated pockets, usually on steeper ground not used for cropland. Only a few patches have been included in conservation schemes such as Elandsberg and Paardenberg.

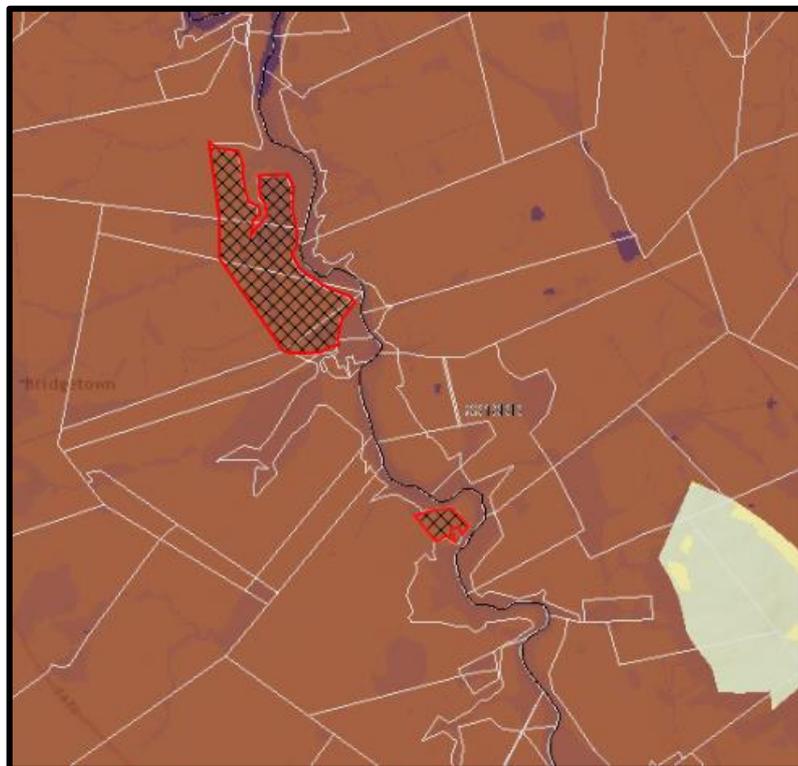


Figure 30: National threatened ecosystems and indigenous forests map showing the mining areas in the Swartland Shale Renosterveld vegetation type (FRs9) (brown). (Image obtained from the BGIS Map Viewer: National Threatened Ecosystems and Indigenous Forests).

During the application phase (1996) for the mining authorisation of the BDQ, a detailed vegetation survey was done of the footprint area. The study revealed the following:

- ❖ Over the largest portion of the site wheat farming has destroyed all natural vegetation, particularly in the southern section mining area where only remnants of the mixed Renosterveld vegetation remains on the dolomite outcrops in the cliffed edge of the site (to be retained in terms of the existing EMPR).
- ❖ Of conservation worthy status in the southern section are the mature wild fig trees growing on the cliffs (*Ficus thonningii*).
- ❖ No disturbance of the riverine vegetation will take place.
- ❖ The area of natural vegetation to be lost to mining of the northern section comprises a mix of Renosterveld and Succulent Karoo characterized by *Euphorbia* (Melkbos). Given the vegetation mix and its clear distinction from the other Renosterveld of the area, it appears to be controlled by a combination of the dolomite substrate on the local Berg River valley micro-climate or a combination of both elements. As the vegetation has been preserved only due to its rocky substrate, which precluded ploughing for wheat farming, it coincides exactly with the extent of the proposed northern section mining area and will consequently be 90% lost upon final development of the northern quarry pit.

Dough Jeffery Environmental Consulting and Facilitation Services:

Doug Jeffery Environmental Consulting and Facilitation Services conducted a botanical survey of the northern section of the BDQ (see Appendix K3). The study identified two vegetation types within the mine's footprint called the Succulent Karoo of the dolomite substrate and the Floodplain vegetation along the Berg River.

Succulent Karoo:

The botanist reported that the vegetation on the dolomite areas with heavy, red clay soils supports an unusual subset of Succulent Karoo vegetation. The conservation value of this vegetation type was given as high. The dominant plants in the vegetation type were *Asparagus capensis*, *Eriocephalus paniculatus* and *Lampranthus montaguensis* and a possible *Salvia* spp. A high proportion of succulent plants, particularly in the vygie family (Mesembryanthemaceae), and the euphorbia family (Euphorbiaceae), typical of the Succulent Karoo, were identified. Of the plants collected on the site it was thought that, two of the vygie species (*Lampranthus* spp. and *Antimima* spp.) were extremely rare. Although the identification of geophytes

(bulbs) was not possible at the time of the study (out of season), there were indications that a large number of geophyte species may be present in the vegetation.

Aliens recorded on the Succulent Karoo site were the following: *Acacia saligna* (Port Jackson Willow), *Schinus molle* (Pepper Tree), and *Secale* spp. (cultivated oats). In general, however, alien vegetation presence was not significant and has had little effect on the natural vegetation of the area.

Floodplain Vegetation:

The report found that the banks of the Berg River in the study area consist of two floodplain areas separated by a section of steep dolomite cliffs. The northern floodplain is significantly invaded by alien vegetation such as *Sesbania punicea* and *Acacia saligna*. The southern floodplain supports a thicket community composed of *Buddleia salviifolia* and *Podocarpus elongates* (Yellowwood) amongst others. *Salix mucronata* is common along the immediate riverbank.

The understory of the floodplain area has been heavily trampled by livestock, resulting in a limited number of species still surviving. The dominant plants were mainly *Oxalis pes-caprae*, with scattered *Hebenstreitia* spp.

Recommendation:

The botanical study noted that the Succulent Karoo vegetation is of high conservation value, and should the quarry be established every effort should be made to conserve a viable, representative portion of the shrubland habitat. The report proposed a management plan (see Appendix K2) to guarantee the survival of the undisturbed areas.

Bayflora Indigenous Nursery:

In 2002, Bayflora Indigenous Nursery conducted a phased search and rescue to remove three important Red Data species namely *Ixia dubia*, *Moraea neopavonia*, and *Antimima mucronata* as well as geophytes of importance. Phase 1 entailed the collection, cleaning and storing of the plants at the nursery. Phase 2 entailed the relocation of the collected plants in the conservation area along the cliff edges of the Berg River, as well as a second sweep of the area to lift and simultaneously transplant additional *A. mucronata*. Phase 3 (2003) was conducted to collect additional plants that may have been missed, and Phase 4 meant the replanting of the rescued plants (2004). The search and rescue operation was done in the areas to the west, north-west and south of the mining footprint.

FAUNA

BDQ has been in existence for numerous years, and the fauna resident in the area became accustomed to the mining operations and co-exist with the activities.

No protected or red data listed species were found to be resident within the boundaries of the study area.

To date no specialist study has been commissioned on the fauna of the study area given the:

- ❖ isolation of the undisturbed remnants of natural veld;
- ❖ slow rate of disturbance of the veld that occurs ahead of the topsoil removal programme; and
- ❖ fact that mining already occurs on two portions of the mine with the result that any wide reaching impact on fauna will already have occurred.

It appears that the fauna and bird-life reacted positively to the sanctuary offered by the restricted entry to the mining property, and despite the increased noise-, dust- and activity levels they returned to their habitats given their awareness of the safety offered.

Preservation of the cliffs for small mammals and birds as well as tall Bluegums for Fish Eagle nesting sites has contributed positively to faunal and bird preservation.

HUMAN ENVIRONMENT

CULTURAL AND HERITAGE ENVIRONMENT

(Refer to the Archaeological Impact Assessment: Bridgetown Quarry – 1996 attached as Appendix L)

The South African Heritage Resources Agency (SAHRA) compiled the Palaeontological (fossil) Sensitivity Map (PSM) to guide developers, heritage officers and practitioners in screening palaeontologically sensitive areas at the onset of a project. When the footprint of the study area is layered over the PSM, it shows an area of low (blue) concern as presented in the figure below. In light of this, no palaeontological study is required, however a protocol for finds is required.

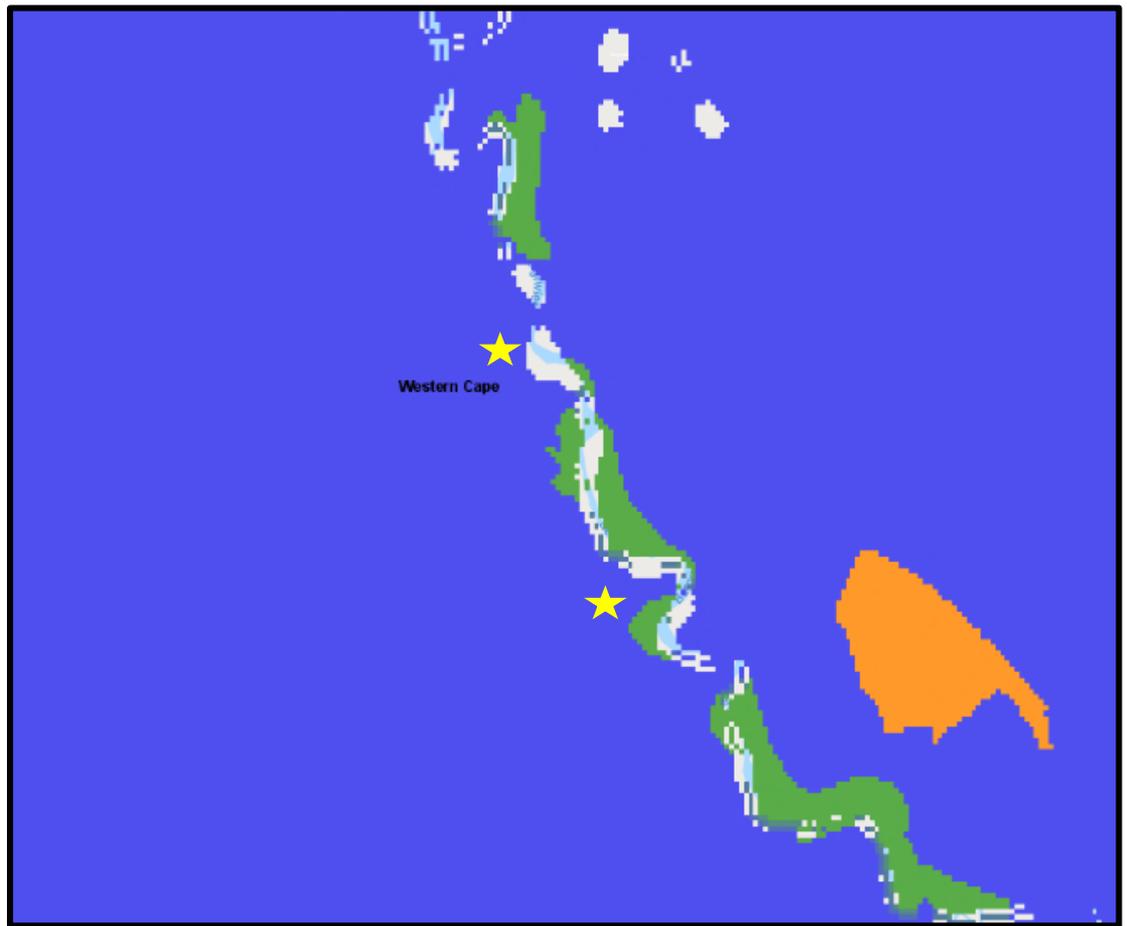


Figure 31: The SAHRA palaeontological sensitivity map shows the study area (yellow stars) falls in an area of Low (blue) concern (image obtained from the PalaeoSensitivity Map).

Prof HJ Deacon and Ms BE Burger conducted an Archaeological Impact Assessment (AIA) in 1996 for the (then) proposed Bridgetown Mine. The scope of work was to assess the significance of any archaeological occurrences on the property and report accordingly. The survey recorded a low-density scatter of stone artefacts at a number of points in the landscape but not of these were rated as having other than low archaeological significance. The study further identified two sets of ruined buildings in a very poor state on the property. The age of the structures was not established but could have been 100 years or more and the historical significance if any was unknown.

The AIA concluded that there are no know archaeological occurrences of significance on the property, and mining will not affect these resources. It recommended that provision be made for:

- ❖ informing staff operating the mine of the kinds of archaeological materials that may be encountered in subsurface exposures; and
- ❖ making provision for periodic inspection of exposures, especially when the topsoil is removed in preparing the quarry pit.

The report further mentioned that if the quarry will threaten the ruined structures on the property, their possible historical significance be investigated before demolition. According to site management, the ruins mentioned in this report falls outside the mining boundaries and will not be demolished.

SOCIO-ECONOMIC ENVIRONMENT

(Information extracted from the BDQ 2019 Social and Labour Plan)

The Swartland Local Municipality (SLM) (within which the BDQ falls) is a Category B municipality situated within the West Coast District in the Western Cape Province. It is one of five municipalities in the district, with a head office and main infrastructure based in Malmesbury. Malmesbury fulfils an important urban niche in the region and the province. Its high development potential can be attributed to factors such as its relative accessibility along the N7 road/rail corridor; closeness to Cape Town; diversified economic base, which not only accommodates agriculture but also well-developed industrial and commercial sectors; and supportive infrastructure. Malmesbury is home to a number of large companies, as well as regional offices of provincial and national government departments.

Population Profile:

The population increased from 72 116 in 2001 to 113 762 in 2011 and to 133 762 in 2016. The average growth rate between 2001 and 2011 was 4.7% per annum while the growth between 2011 and 2016 decreased to an average growth of 3.3% per annum. The population of the West Coast District increased by 2.2% per annum between 2011 and 2016. 65.1% of the population is Coloured, 18.6% White, 15.7% Black African and 0.6% Indian or Asian.

Gender Profile:

SLM's population in 2016 is strongly concentrated in the younger age cohorts with the largest proportions of people in the following age groups: 0-4 (12 444 persons), 15-19 (12 316 persons) and 30-34 (12 133 persons). Sixty one percent of the Swartland population in 2016 was 34 years of age and younger. For both 2011 and 2016, the dependency ratio of 44.7 indicates that 30.9% of the population (the 0-14 and 65+ groups) depend on 69.1% of the population (15-65).

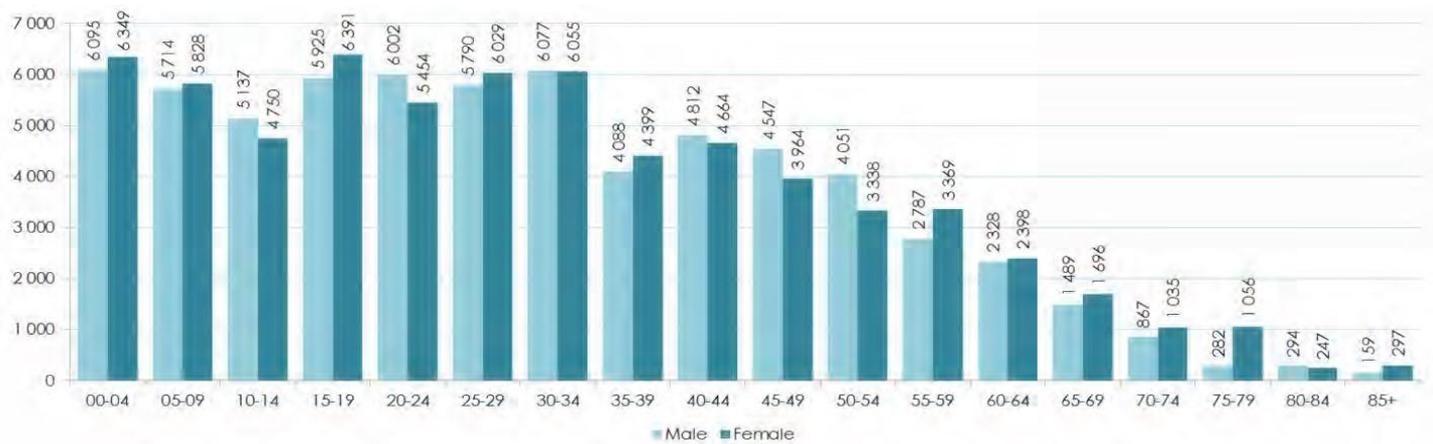


Figure 32: Swartland local municipal gender profile (source: Community survey 2016, South Africa)

Growth and GDP Contribution:

Swartland contributed 27.1% to the West Coast District's GDP in 2016. The GDP growth of Swartland averaged 2.9% per annum over the period 2006 - 2016. This is marginally above the average of the District (2.7%). The sectors that contributed the most to the Swartland's GDP in 2016 are Manufacturing (22.9%), Wholesale and retail trade, catering and accommodation (17.5%) and Agriculture, forestry and fishing (15.9%). Overall, between 2006 and 2016, every economic sector in Swartland grew positively in terms of GDP except for the Electricity, gas and water sector that experienced a negative growth of -1.7%.

Education Levels:

Learner enrolment grew from 16 933 in 2015 to 17 356 in 2016 and to 17 647 in 2017. This could be attributed to a number of factors including demographics and socio-economic context. The dropout rates for learners within Swartland municipal area increased from a low 20.1% in 2015 to 23.2% in 2016 and then decreased again to 20.2% in 2017. The 2017 rate was the lowest in the District as well as the Province. Dropouts are influenced by a wide array of socio-economic factors including unemployment, poverty and teenage pregnancies. The Swartland matric pass rate increased from 86.5% in 2015 to 89.4% in 2016 and then dropped to 83.5% in 2017, which is below its 2015 level. Better results could improve access for learners to higher education to broaden their opportunities. The 2017 matric pass rate for the Swartland area was the lowest in the West Coast District.

Employment Profile:

The sectors that contributed the most to Swartland's employment in 2016 were Agriculture, forestry and fishing (30.3%), the Wholesale and retail trade, catering and

accommodation sector (19.0%) and the Community, social and personal services (12.5%). Overall, between 2006 and 2016, only the Agriculture, forestry and fishing sector shed jobs (-4 621) as shown in the table below.

Table 19: Table showing the Swartland employment by section for 2016.

Sector	% of workforce	Number of jobs	Jobs lost/gained 2006-2016
Agriculture, forestry and fishing	30.3	13 636	-4 621
Mining and quarrying	0.1	24	1
Manufacturing	10.8	4 858	417
Electricity, gas and water	0.3	135	39
Construction	4.6	2 053	283
Wholesale and retail trade, catering and accommodation	19.0	8 552	2 658
Transport, storage and communication	2.3	1 052	351
Finance, insurance; real estate and business services	8.6	3 862	1231
General government	11.5	5 181	1 855
Community, social and personal services	12.5	5 627	975
Total	100.0	44 980	3189

The National Development Plan has set a target of reducing income inequality in South Africa from a Gini coefficient of 0.7 in 2010 to 0.6 by 2030. The graph below indicates that Swartland's income inequality has steadily increased from 2011 onward, reaching 0.582 in 2016 and then declining marginally to 0.578 in 2017. Income inequality levels were marginally lower in Swartland than in the West Coast District (0.59) and the Western Cape (0.61).

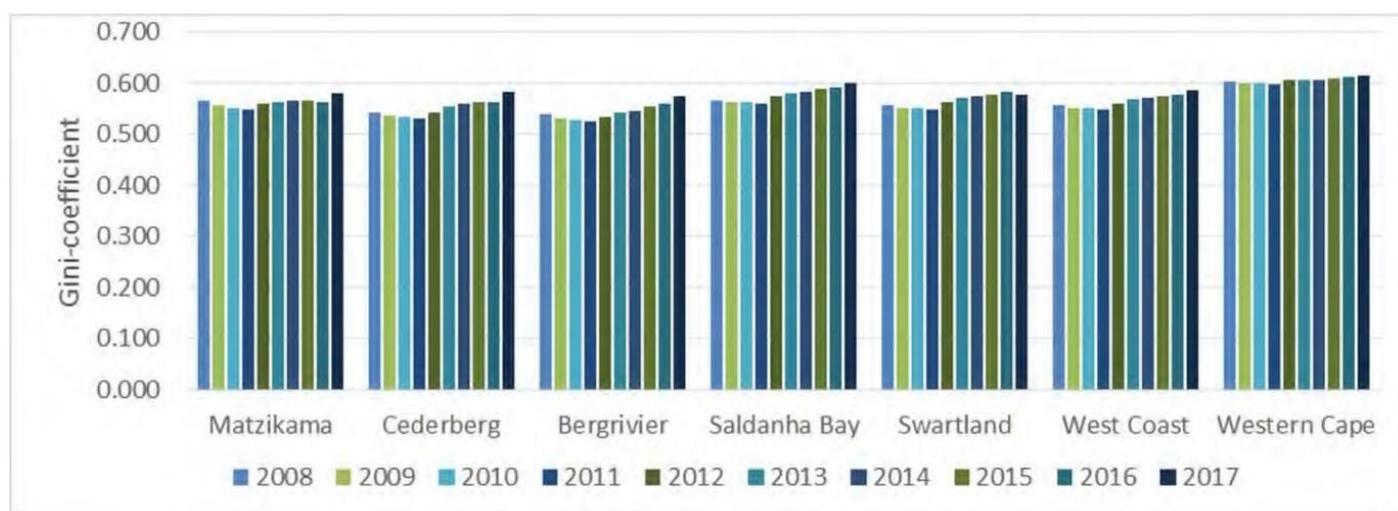


Figure 33: Swartland's income inequality graph.

(b) Description of the current land uses

Bridgetown Dolomite Quarry:

BDQ is surrounded by extensive wheat farms with localized irrigated crop farming (primarily on the eastern bank of the Berg River). While the central and southern areas which have been planted with wheat show an average yield of 4-4.5 ton/ha per year, the northern section has no agricultural land capability given its rocky nature.

The mine also borders the upper reaches of the Misverstand Dam (to the east) and its' associated recreational activities such as boating and restricted shore-side development by comparison to the main dam recreational area at Misverstand / Matjiesfontein. The optional land capability for recreational development along the dam is rather limited on the "mining properties" by the presence of the dolomite cliffs, which isolate the site from the water, while the isolated lower riverbanks are subject to winter flooding at present and will be completely inundated by a dam wall increase. Also, refer to Figure 3 that shows the layout of BDQ, as well as Appendix D1.

The surrounding land use includes intensive irrigation farming activities that include:

- ❖ Irrigated annual crops under centre pivot (wheat, sweetcorn, watermelon, melon, and tomatoes);
- ❖ Citrus and deciduous fruit orchards; and
- ❖ Vineyards.

Drieheuvels Quarry:

Portion 1 of the farm Drieheuvels 399 is situated in a rural setting bordered to the north / north-east by the Berg River, and the expropriated area for the raised dam wall impoundment of the Misverstand Dam. The farm is mainly used for wheat cultivation, and the majority of the property has been altered to allow for this land use. The following table provides a description of the land uses and/or prominent features that currently occur within a 500 m radius of the proposed extension area. Also, refer to Appendix D2 for the Surrounding Land Use Map of DQ.

Table 20: Land uses and/or prominent features that occur within 500 m radius of the proposed extension area.

LAND USE CHARACTER	YES	NO	DESCRIPTION
Natural area	YES	-	The proposed extension area borders the Berg River to the north/north-east where some natural vegetation remains in the riparian area.
Low density residential	-	NO	
Medium density residential	-	NO	
High density residential	-	NO	
Informal residential	-	NO	
Retail commercial & warehousing	-	NO	
Light industrial	-	NO	
Medium industrial	-	NO	
Heavy industrial	-	NO	
Power station	-	NO	
High voltage power line	-	NO	
Office/consulting room	-	NO	
Military or police base / station / compound	-	NO	
Spoil heap or slimes dam	-	NO	
Quarry, sand or borrow pit	-	NO	The nearest boundary of BDQ is ± 2 km north-west of the proposed extension area.
Dam or reservoir	-	NO	
Hospital/medical centre	-	NO	
School/ crèche	-	NO	
Tertiary education facility	-	NO	
Church	-	NO	
Old age home	-	NO	
Sewage treatment plant	-	NO	
Train station or shunting yard	-	NO	
Railway line	-	NO	
Major road (4 lanes or more)	-	NO	
Airport	-	NO	
Harbour	-	NO	
Sport facilities	-	NO	
Golf course	-	NO	
Polo fields	-	NO	
Filling station	-	NO	
Landfill or waste treatment site	-	NO	
Plantation	-	NO	
Agriculture	YES	-	As mentioned earlier the proposed extension area is situated within an area used for agricultural purposes.

LAND USE CHARACTER	YES	NO	DESCRIPTION
River, stream or wetland	YES	-	The Berg River borders the site to the north, east and south-east.
Nature conservation area	-	NO	
Mountain, hill or ridge	YES	-	The elevation of the area gradually increases from the Berg River inland.
Museum		NO	
Historical building		NO	
Protected Area		NO	
Graveyard		NO	
Archaeological site		NO	
Other land uses (describe)		NO	

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

The specific environmental features of the BDQ was discussed under *Part A(1)(g)(iv)(1)(a) Type of environment to be affected by the proposed activity*. This section describes the site-specific environmental features of the proposed DQ footprint.

SITE SPECIFIC TOPOGRAPHY

The natural topographical slope of the proposed DQ mining area (S1 & S2) is in an eastern direction from the highest point of the current wheat field towards the lower reaches of the riparian vegetation at the Berg River. The highest point of the proposed mining area is at 62 mamsl (north-western corner) with the lowest laying at 37 mamsl (south-eastern corner) as shown in the figure below.



Figure 34: Site-specific elevation of the proposed Drieheuvels Quarry mining area (image obtained from Google Earth).

The DQ will cut into the eastern slope of the hill. Due to the nature of the activity, the topography of the hill will be altered in that the eastern facing rise will be mined out; to be rehabilitated with a stepped/sloped face along the western boundary of the proposed mining area.

SITE SPECIFIC VISUAL CHARACTERISTICS

The proposed extension area (S1 & S2) will mainly be visible from the north-east, east and south due to its position against the eastern rise of the hill. The operation will be screened towards the north, north-west.

The figure below shows the viewshed analysis of the study area for a ±10 km radius around the proposed area. The green shaded areas indicates the positions from where the mining operation will be visible. The analysis shows that the visual impact will be highest in the immediate surrounding area towards the south and south-east due to the elevation of the earmarked area. It is therefore anticipated that the proposed quarry will mainly be visible from the eastern and western banks of the Berg River within the short to medium distance (maximum 6 km) zone; however, as the distance between the proposed development and the observer increases the visual impact will decrease. To the north, north-west the visual impact will be negligible.



Figure 35: Viewshed of the proposed extension area where the green shaded areas indicate the positions from where the mining area (lower yellow polygon) will be visible (image obtained from Google Earth).

SITE SPECIFIC AIR AND NOISE QUALITY

The farm yards, opposite the Berg River, on Portion 9 of the farm Die Pont Annex No 225 is nearest to the proposed extension area at ± 560 m (east of the quarry), and ± 1.3 km (north-east) respectively. The landowners house (Drieheuvelds No 335/1) is ± 1.4 km south of the proposed development area. As mentioned earlier, the prevalent wind direction of the study area is in a south to south-western direction during the summer months, changing to a north, north-western direction during winter, highly reducing the potential of dust blowing from the operation towards the surrounding landowners (opposite the river). Currently, the air quality of the study area is impacted on by the agricultural activities of the area.

Emission into the atmosphere is controlled by the National Environmental Management: Air Quality Act, 2004. The proposed DQ 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. Should the right holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low-medium significance.

The noise to be generated at the DQ will contribute to the noise ambiance of the surrounding environment, currently impacted on by agricultural activities. The proposed activity will contribute noise generated because of blasting, as well as loading, and transporting of material. The nuisance value of noise generated by the proposed operation, to residence in the near vicinity is deemed to be of low-medium significance. Blasting (instantaneous short duration noise) is proposed approximately once per month, and the noise generated by earthmoving equipment is deemed compatible with the machinery already operating in the area, especially during harvesting.

SITE SPECIFIC GEOLOGY

(Information extracted from the Preliminary inspection and due diligence of dolomite quality from exploratory RC drill holes DRH01, DRH02 and DRH03: Drieheuvelds Dolomite Project. LexRox 2017 attached as Appendix I4)

In 1979, the Geological Survey (GS) drilled 24 exploratory drill holes over the Drieheuvelds deposit. Dolomite was intersected at depths of 70 mbgl during the exploratory drilling program (Report No. 0145, Geological Survey, 1979). A subsequent field investigation conducted by Blue Falcon 94 Trading (Pty) Ltd (Blue Falcon) in 2013 was aimed to acquire relevant field data with which to ground truth the GS data and verify a local geological map compiled by N. Slabber (1995). Blue Falcon estimated the available resource for the deposit and subsequently reported an inferred dolomite resource of 1.1 Mt, with an additional target dolomite resource of 7.5 Mt. In late 2017, LexRox drilled due diligence holes over the Drieheuvelds dolomite deposit with the primary aim of confirming and validating the presence of adequate quality of the dolomite present as described by the GS (1979) and modelled by Blue Falcon (2013).

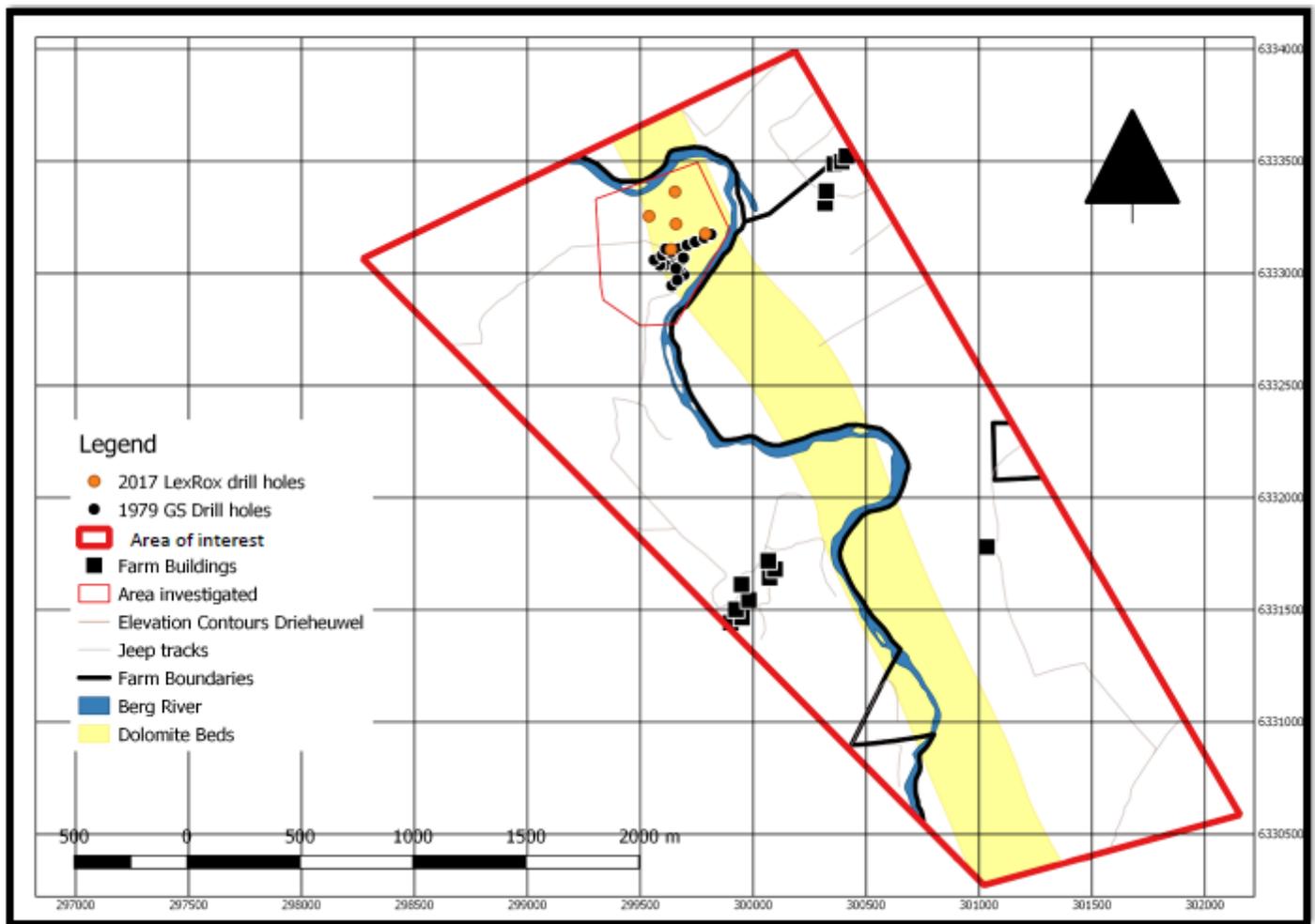


Figure 36: Map showing the investigation area of GS 1979, Blue Falcon 2013 and the LexRox 2017 due diligence work (LexRox 2017).

The Drieheuvelds dolomite deposit is hosted within the lower greenschist facies, Pan-African Bridgetown Formation (~650 – 600 Ma) of the Malmesbury Group meta-volcanosedimentary sequence of the NNW-SSE trending Saldania (~550 Ma) orogenic sub-province and is included within the Boland litho-stratigraphic terrain. The Bridgetown Formation is locally defined by a NW-SE trending tabular body of grey-cream to white coloured dolomite. The dolomite body retains an average width of about 200 - 350 m on the surface and dips approximately 45° towards the east. Structurally, the deposit represents a continuous band of outcrop and sub-outcrop of the eastern limb of a west verging regional anticline that can be traced for approximately 14 km along the Berg River. Collectively the local lithologies of the Bridgetown Formation consists of massive dolomite interbedded with meta-volcanosedimentary sequences (collectively referred to as greenstones by previous authors due to the pervasive existence of green coloured secondary minerals such as chlorite, actinolite and epidote) of meta-basalt, meta-tuff, meta-greywacke, graphitic schist, muscovite-quartz schist, phyllitic shale, chert and jasperlite (Slabber, 1995).

The dolomite body in the Drieheuvels Project area is bordered immediately to the south-west and north-east by chert, phyllite and greenstone dominated metavolcanics and metasediments. In the SPH Bridgetown dolomite quarry immediately to the north west of the Drieheuvels project area the local geology of the dolomite deposit is best exposed and serves as an adequate case study for the sub-surface geology to be expected within the Drieheuvels project area. (LexRox 2017).

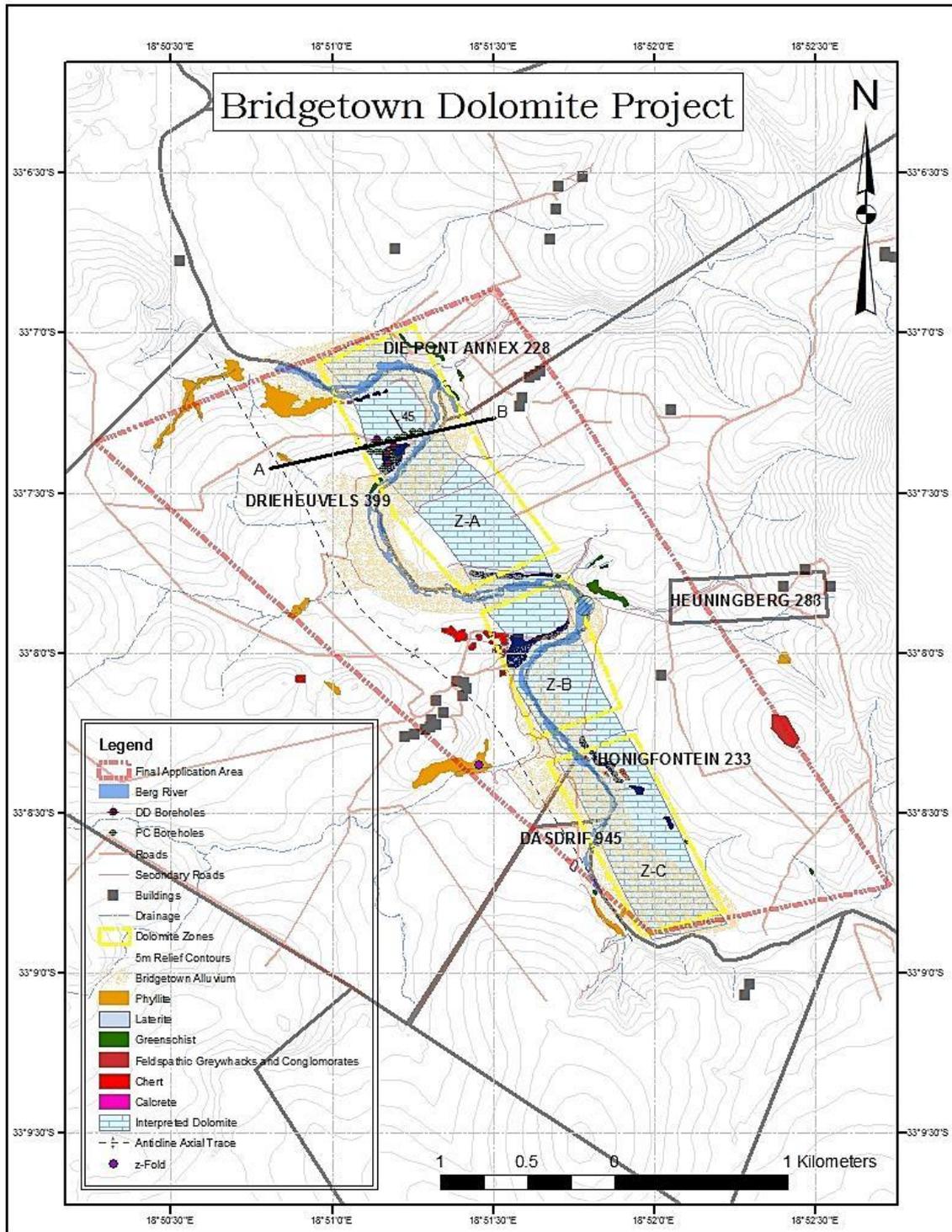


Figure 37: Deposit surface geology as described by Blue Falcon (2013).

The LexRox drilling results (2017) saw major element chemistry comparison of the Drieheuvels samples with the BDQ samples. Of all the samples, 95% classified as grade material and 5% classified as waste material. The high percentage of samples classified as grade material testifies to the good quality, relative homogenous and massive nature of the deposit. LexRox concluded the following physical observations during the drilling of the Drieheuvels study area:

- ❖ The top weathering surface was much shallower at Drieheuvels (2-3 m) in comparison to the depth of weathering observed on the sidewalls at Bridgetown (6-7 m). A deeper weathering profile in the western area of the Drieheuvels Project was however indicated by test drill holes DRH3A and DRH3B.
- ❖ Based on observed RC drilling chips, the dolomite appears to be more fresh and unweathered as compared to dolomite in the Bridgetown quarry.
- ❖ The nature of the dolomite was much fresher with a fresh white colour present from a shallow depth compared to a more fractured and jointed material at the Bridgetown Quarry with material generally having a creamier colour.
- ❖ The relief present at Drieheuvels might provide an easier mining operation with the material being mined from a sidewall against the increasing southern slope. This in comparison to a pit/quarry required at Bridgetown.

The LexRox report concluded that the laboratory results confirm that the dolomite samples collected from the 100 m due diligence RC drilling program on the Drieheuvels 399 property are generally comparable and almost certainly of better quality when compared to dolomite mined and processed into a saleable product at the SPH Bridgetown Quarry (LexRox 2017).

SITE SPECIFIC HYDROLOGY

Surface Water:

As mentioned in *Part A(1)(g)(iv)(1)(a) Type of environment to be affected by the proposed activities – Surface Water*, The NFEPA status of the study area is classified as a no priority area, and no wetlands or other drainage line were identified within the proposed footprint area. Mining will be kept above the 1:100 year floodline of the Berg River as shown in the figure below and attached as Appendix J6.

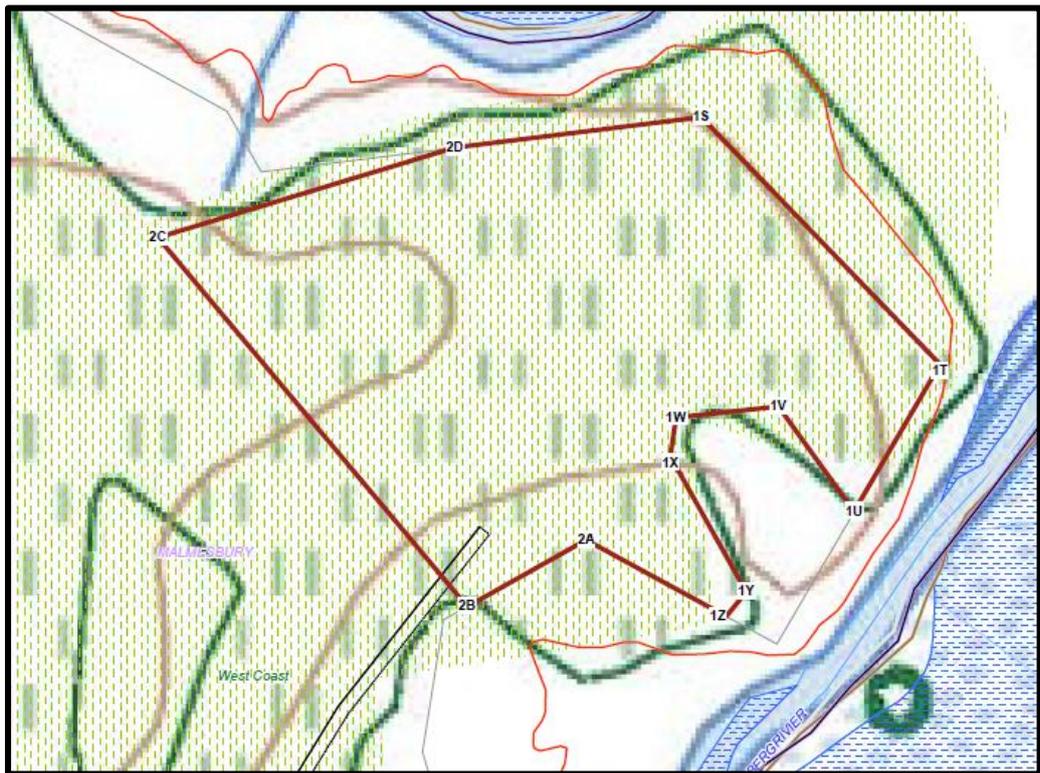


Figure 38: Proposed mining area in relation to the 1:100 year floodline (red line) of the Berg River.

The proposed DQ does however fall within 500 m of the Berg River and therefore may require a Water Use Authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21(i). The right holder is in discussion with the DWS to determine the way forward.

Groundwater:

As mentioned in *Part A(1)(g)(iv)(1)(a) Type of Environment Affected by the Proposed Activity – Hydrology*, since the installation of the monitoring boreholes the water table have remained reasonably steady at 10.67 m and 11.09 m below the land surface at the western and eastern boreholes respectively. Due to the proximity of the DQ to the BDQ the groundwater level is expected to be similar. Mining the DQ below the groundwater level requires a water use authorisation from the DWS, a discharge point to dewater the excavation (if applicable), alternatively the addition of a sump to the excavation surface, and continuous groundwater quality and quantity monitoring.

In light of this, the right holder indicated that the DQ mining footprint would only be mined up to the groundwater level; no mining will continue below the groundwater level.

SITE SPECIFIC MINING AND BIODIVERSITY CONSERVATION AREAS

Following the earlier discussion in this regard; when the proposed footprint of S1 and S2 is layered over the Mining and Biodiversity Guideline Map the map shows the area to be of highest biodiversity importance with a highest risk for mining. The Mining and Biodiversity Guideline notes that EIA's and specialists should focus on confirming the presence and significance of these biodiversity features, identifying features not included in the existing datasets, and on providing site-specific information to guide the application of the mitigation hierarchy. The area of highest biodiversity importance does not correspond with the WCBSP. In terms of the WCBSP, the proposed DQ footprint falls outside the nearby CBA and ESA footprints.

Ground truthing confirmed that the proposed footprint of S1 has been altered by agricultural practices and no natural areas of conservation concern are left. The footprint proposed for S2 however, extends over a portion with natural occurring Swartland Shale Renosterveld that is classified as Critically Endangered.

SITE SPECIFIC VEGETATION

Although the proposed DQ lays within the Swartland Shale Renosterveld vegetation type, the site-specific groundcover of S1 was highly altered by wheat cultivation. No natural occurring Renosterveld remains within the proposed footprint as shown in the photographs below. However, the proposed footprint of S2 includes an area with natural vegetation that has not been altered by agriculture. Should S2 be approved, mining will destroy the vegetation of this area and another piece of Renosterveld will be lost.



Figure 39: Pictures showing the vegetation covered of the proposed footprint area (S1).



Figure 40: Pictures showing the section with Swartland Shale Renosterveld that falls within the footprint of site alternative 2.



Figure 41: Pictures showing the vegetation covered of the surrounding area. Photo taken from the proposed mining footprint (S1) towards the Berg River.

SITE SPECIFIC FAUNA

The proposed footprint of the DQ has, for numerous years, been used as a wheat field. At the time of the inspection, no resident protected or red data species were identified within the proposed footprint area. Fauna that may enter the mining area will be able to move away or through the site, without being harmed. Workers must be educated and managed to ensure that no fauna is harmed.

SITE SPECIFIC CULTURAL AND HERITAGE ENVIRONMENT

No sites of archaeological or cultural importance were identified during the site inspection. Consultation with the interested and affected parties did not identify any potential area of concern and the SAHRA palaeontological sensitivity map shows that the area is of Low concern. The potential impact of the proposed mining activities on the cultural and/or heritage environment is therefore deemed insignificant.

SITE SPECIFIC INFRASTRUCTURE

As the proposed mining area will be developed on a wheat field, no infrastructure exists (on site) that will be impacted on.

The existing farm road will be used to reach the mining area and the right holder will be responsible for the maintenance of the road for the duration of the operational phase.

(d) Environmental and current land use map.

(Show all environmental, and current land use features)

The environmental and current land use maps are attached as Appendix D1 (BDQ) and D2 (DQ) respectively.

v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

As BDQ has been operational for the past 29 years, the impacts associated with the operational phase of the quarry was listed under *h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.*

For the DQ the following potential impacts were identified for each main activity in each phase. The significance rating was determined using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance.* The impact rating listed below was determined for each impact **prior** to bringing the proposed mitigation measures into consideration, therefore the worst-case scenario and should be seen as a preliminary assessment. The degree of mitigation indicates the possibility of partial, full or no mitigation of the identified impact.

SITE ESTABLISHMENT:

Visual intrusion because of site establishment

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Medium-High			Site Alternative 1			Degree of Mitigation: Partial	
3	5	2	3.3	5	5	5	16.5
Rating: Medium-High			Site Alternative 2			Degree of Mitigation: Partial	
3	5	2	3.3	5	5	5	16.5

Potential negative impact on the nearby CBA/ESA

Severity	Duration	Extent	Consequence		Likelihood	Significance
			Probability	Frequency		
Rating: Low-Medium			Site Alternative 1		Degree of Mitigation: Full	
3	5	4	4	2	1	6
Rating: Low-Medium			Site Alternative 2		Degree of Mitigation: Full	
3	5	4	4	2	1	6

Potential loss of Swartland Shale Renosterveld to access the mineral

Severity	Duration	Extent	Consequence		Likelihood	Significance
			Probability	Frequency		
Rating: Low-Medium			Site Alternative 1		Degree of Mitigation: Full	
4	5	1	3.3	3	1	6.6
Rating: Medium-High			Site Alternative 2		Degree of Mitigation: None	
4	5	1	3.3	5	5	16.5

Potential impact on fauna within the footprint area

Severity	Duration	Extent	Consequence		Likelihood	Significance
			Probability	Frequency		
Rating: Low-Medium			Site Alternative 1		Degree of Mitigation: Full	
3	5	1	3	3	2	7.5
Rating: Low-Medium			Site Alternative 2		Degree of Mitigation: Full	
3	5	1	3	3	2	7.5

Potential impact on areas/infrastructure of heritage or cultural concern

Severity	Duration	Extent	Consequence		Likelihood	Significance
			Probability	Frequency		
Rating: Low-Medium			Site Alternative 1		Degree of Mitigation: Full	
4	5	3	4	2	1	6
Rating: Low-Medium			Site Alternative 2		Degree of Mitigation: Full	
4	5	3	4	2	1	6

Alteration of the agricultural sense of place

Rating: Low-Medium

Degree of Mitigation: Fully Mitigated

Severity	Duration	Extent	Consequence		Likelihood	Significance
			Probability	Frequency		
Rating: Medium-High			Site Alternative 1		Degree of Mitigation: None	
3	5	2	3.3	5	5	16.5
Rating: Medium-High			Site Alternative 2		Degree of Mitigation: None	
3	5	2	3.3	5	5	16.5

Loss of agricultural land to allow for mining (site-specific footprint)

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	5	1	2.6	5	5	5	13
Rating: Medium			Site Alternative 2			Degree of Mitigation: Partial	
2	5	1	2.6	5	5	5	13

Potential impact of mining on surrounding land use

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	5	2	3	4	4	4	12
Rating: Medium			Site Alternative 2			Degree of Mitigation: Partial	
2	5	2	3	4	4	4	12

STRIPPING AND STOCKPILING OF TOPSOIL:

Dust nuisance caused by the disturbance of soil

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
2	2	2	2	4	4	4	8
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
2	2	2	2	4	4	4	8

Noise nuisance generated by earthmoving machinery

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	2	2	2	3	3	3	6
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Partial	
2	2	2	2	3	3	3	6

Loss/contamination of stockpiled topsoil

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
2	4	1	2.3	4	2	3	6.9
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
2	4	1	2.3	4	2	3	6.9

Potential infestation of the topsoil heaps with weeds or invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
3	4	2	3	4	2	3	9
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
3	4	2	3	4	2	3	9

Potential contamination of footprint area and surface runoff because of hydrocarbon spillages

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
4	3	2	3	4	2	3	9
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
4	3	2	3	4	2	3	9

Potential erosion of denuded areas

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
2	5	1	2.6	4	2	3	7.8
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
2	5	1	2.6	4	2	3	7.8

DRILLING AND BLASTING:

Health and safety risk posed by blasting activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
5	5	1	3.6	3	2	2.5	9
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
5	5	1	3.6	3	2	2.5	9

Dust nuisance caused by blasting activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
3	5	2	3.3	5	3	4	13.2
Rating: Medium			Site Alternative 2			Degree of Mitigation: Partial	
3	5	2	3.3	5	3	4	13.2

Noise nuisance because of blasting

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
3	5	2	3	5	3	4	13.2
Rating: Medium			Site Alternative 2			Degree of Mitigation: Partial	
3	5	2	3	5	3	4	13.2

Potential impact of blasting vibrations on surrounding infrastructure

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
3	5	2	3	5	3	4	13.2
Rating: Medium			Site Alternative 2			Degree of Mitigation: Partial	
3	5	2	3	5	3	4	13.2

EXCAVATION, LOADING AND HAULING TO THE PROCESSING PLANT OF BRIDGETOWN DOLOMITE QUARRY

Visual intrusion associated with the excavation area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			Site Alternative 1			Degree of Mitigation: Partial	
3	5	2	3.3	5	5	5	16.5
Rating: Medium-High			Site Alternative 2			Degree of Mitigation: Partial	
3	5	2	3.3	5	5	5	16.5

Dust nuisance due to excavation, loading and vehicles transporting the material

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Full	
3	5	2	3.3	4	5	4.5	14.9
Rating: Medium			Site Alternative 2			Degree of Mitigation: Full	
3	5	2	3.3	4	5	4.5	14.9

Noise nuisance generated by excavation equipment and earthmoving machinery

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	5	2	3	3	3	3	9
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Partial	
2	5	2	3	3	3	3	9

Unsafe working environment for employees

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Full	
3	5	1	3	4	5	4.5	13.5
Rating: Medium			Site Alternative 2			Degree of Mitigation: Full	
3	5	1	3	4	5	4.5	13.5

Contamination of area with hazardous- and/or general waste

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
4	3	2	3	4	2	3	9
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
4	3	2	3	4	2	3	9

Deterioration of the access road (farm road) to the mining area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Full	
3	5	2	3.3	4	3	3.5	11.6
Rating: Medium			Site Alternative 2			Degree of Mitigation: Full	
3	5	2	3.3	4	3	3.5	11.6

Potential impact on the groundwater of the footprint area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Full	
4	5	2	3.6	4	2	3	10.8
Rating: Medium			Site Alternative 2			Degree of Mitigation: Full	
4	5	2	3.6	4	2	3	10.8

Potential impact on the Berg River due to surface runoff

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
4	4	5	4.3	2	2	2	8.6
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
4	4	5	4.3	2	2	2	8.6

SLOPING AND LANDSCAPING DURING REHABILITATION:

Safety risk posed by un-sloped areas

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Medium			Site Alternative 1			Degree of Mitigation: Full	
4	5	1	3.3	4	5	4.5	14.9
Rating: Medium			Site Alternative 2			Degree of Mitigation: Full	
4	5	1	3.3	4	5	4.5	14.9

Soil erosion

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
3	5	1	3	4	2	3	6
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
3	5	1	3	4	2	3	6

Dust nuisance due to landscaping activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
2	3	2	2.3	4	1	2.5	5.8
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
2	3	2	2.3	4	1	2.5	5.8

Noise nuisance generated during the rehabilitation phase

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Low			Site Alternative 1			Degree of Mitigation: Partial	
2	3	2	2.3	3	1	2	4.6
Rating: Low			Site Alternative 2			Degree of Mitigation: Partial	
2	3	2	2.3	3	1	2	4.6

Loss of reinstated topsoil from denuded areas

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
3	5	1	3	4	2	3	9
Rating: Low-Medium			Site Alternative 2			Degree of Mitigation: Full	
3	5	1	3	4	2	3	9

Potential infestation of the reinstated areas with weeds and invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1		Degree of Mitigation: Full		
3	5	2	3.3	4	2	3	9.9
Rating: Low-Medium			Site Alternative 2		Degree of Mitigation: Full		
3	5	2	3.3	4	2	3	9.9

Potential contamination of environment because of improper waste disposal

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1		Degree of Mitigation: Full		
4	5	1	3.3	4	1	2.5	8.3
Rating: Low-Medium			Site Alternative 2		Degree of Mitigation: Full		
4	5	1	3.3	4	1	2.5	8.3

vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

Methodology for the assessment of the potential environmental, social and cultural impacts

DEFINITIONS AND CONCEPTS:

Environmental significance:

The concept of significance is at the core of impact identification, evaluation and decision-making. The concept remains largely undefined and there is no international consensus on a single definition. The following common elements are recognized from the various interpretations:

- ❖ Environmental significance is a value judgment
- ❖ The degree of environmental significance depends on the nature of the impact
- ❖ The importance is rated in terms of both biophysical and socio-economic values
- ❖ Determining significance involves the amount of change to the environment perceived to be acceptable to affected communities.

Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of

acceptability) (DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5).

The concept of risk has two dimensions, namely the consequence of an event or set of circumstances, and the likelihood of particular consequences being realized (Environment Australia (1999) Environmental Risk Management).

Impact

The positive or negative effects on human well-being and / or the environment.

Consequence

The intermediate or final outcome of an event or situation OR it is the result, on the environment, of an event.

Likelihood

A qualitative term covering both probability and frequency.

Frequency

The number of occurrences of a defined event in a given time or rate.

Probability

The likelihood of a specific outcome measured by the ratio of a specific outcome to the total number of possible outcomes.

Environment

Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation (ISO 14004, 1996).

Methodology that will be used

The environmental significance assessment methodology is based on the following determination:

$$\text{Environmental Significance} = \text{Overall Consequence} \times \text{Overall Likelihood}$$

Determination of Overall Consequence

Consequence analysis is a mixture of quantitative and qualitative information and the outcome can be positive or negative. Several factors can be used to determine consequence. For determining the environmental significance in terms of consequence, the following factors

were chosen: **Severity/Intensity, Duration and Extent/Spatial Scale**. Each factor is assigned a rating of 1 to 5, as described in the tables below.

Determination of Severity / Intensity

Severity relates to the nature of the event, aspect or impact to the environment and describes how severe the aspects impact on the biophysical and socio-economic environment.

Table 1 will be used to obtain an overall rating for severity, taking into consideration the various criteria.

Table 21: Table to be used to obtain an overall rating of severity, taking into consideration the various criteria.

TYPE OF CRITERIA	RATING				
	1	2	3	4	5
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant/ Harmful	Great/ Very harmful	Disastrous Extremely harmful
Social/ Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable/ Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate/ High potential to mitigate impacts to level of insignificance/ Easily reversible	Low cost to mitigate	Substantial cost to mitigate/ Potential to mitigate impacts/ Potential to reverse impact	High cost to mitigate	Prohibitive cost to mitigate/ Little or no mechanism to mitigate impact Irreversible
Biophysical (Air quality, water quantity and quality, waste production, fauna and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

Determination of Duration

Duration refers to the amount of time that the environment will be affected by the event, risk or impact, if no intervention e.g. remedial action takes place.

Table 22: Criteria for the rating of duration.

RATING	DESCRIPTION
1	Up to one month
2	One month to three months (quarter)
3	Three months to one year
4	One to ten years

RATING	DESCRIPTION
5	Beyond ten years

Determination of Extent/Spatial Scale

Extent or spatial scale is the area affected by the event, aspect or impact.

Table 23: Criteria for the rating of extent / spatial scale.

RATING	DESCRIPTION
1	Immediate, fully contained area
2	Surrounding area
3	Within Business Unit area of responsibility
4	Within the farm/neighbouring farm area
5	Regional, National, International

Determination of Overall Consequence

Overall consequence is determined by adding the factors determined above and summarized below, and then dividing the sum by 3.

Table 24: Example of calculating overall consequence.

CONSEQUENCE	RATING
Severity	Example 4
Duration	Example 2
Extent	Example 4
SUBTOTAL	10
TOTAL CONSEQUENCE: (Subtotal divided by 3)	3.3

Determination of Likelihood:

The determination of likelihood is a combination of Frequency and Probability. Each factor is assigned a rating of 1 to 5, as described below and in tables 6 and 7.

Determination of Frequency

Frequency refers to how often the specific activity, related to the event, aspect or impact, is undertaken.

Table 25: Criteria for the rating of frequency.

RATING	DESCRIPTION
1	Once a year or once/more during operation
2	Once/more in 6 Months
3	Once/more a Month

RATING	DESCRIPTION
4	Once/more a Week
5	Daily

Determination of Probability

Probability refers to how often the activity or aspect has an impact on the environment.

Table 26: Criteria for the rating of probability.

RATING	DESCRIPTION
1	Almost never / almost impossible
2	Very seldom / highly unlikely
3	Infrequent / unlikely / seldom
4	Often / regularly / likely / possible
5	Daily / highly likely / definitely

Overall Likelihood

Overall likelihood is calculated by adding the factors determined above and summarized below, and then dividing the sum by 2.

Table 27: Example of calculating overall likelihood.

CONSEQUENCE	RATING
Frequency	Example 4
Probability	Example 2
SUBTOTAL	6
TOTAL LIKELIHOOD (Subtotal divided by 2)	3

Determination of Overall Environmental Significance:

The multiplication of overall consequence with overall likelihood will provide the environmental significance, which is a number that will then fall into a range of **LOW**, **LOW-MEDIUM**, **MEDIUM**, **MEDIUM-HIGH** or **HIGH**, as shown in the table below.

Table 28: Determination of overall environmental significance.

SIGNIFICANCE OR RISK	LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
Overall Consequence x Overall Likelihood	1 - 4.9	5 - 9.9	10 - 14.9	15 – 19.9	20 - 25

Qualitative description or magnitude of Environmental Significance

This description is qualitative and is an indication of the nature or magnitude of the Environmental Significance. It also guides the prioritizations and decision making process associated with this event, aspect or impact.

Table 29: Description of environmental significance and related action required.

SIGNIFICANCE	LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
Impact Magnitude	Impact is of very low order and therefore likely to have very little real effect. Acceptable.	Impact is of low order and therefore likely to have little real effect. Acceptable.	Impact is real, and potentially substantial in relation to other impacts. Can pose a risk to company	Impact is real and substantial in relation to other impacts. Pose a risk to the company. Unacceptable	Impact is of the highest order possible. Unacceptable. Fatal flaw.
Action Required	Maintain current management measures. Where possible improve.	Maintain current management measures. Implement monitoring and evaluate to determine potential increase in risk. Where possible improve	Implement monitoring. Investigate mitigation measures and improve management measures to reduce risk, where possible.	Improve management measures to reduce risk.	Implement significant mitigation measures or implement alternatives.

Based on the above, the significance rating scale has been determined as follows:

- High** Of the highest order possible within the bounds of impacts, which could occur. In the case of negative impacts, there would be no possible mitigation and / or remedial activity to offset the impact at the spatial or time scale for which it was predicted. In the case of positive impacts, there is no real alternative to achieving the benefit.
- Medium-High** Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
- Medium** Impact would be real but not substantial within the bounds of those, which could occur. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and easily possible, In case of positive impacts; other means of achieving these benefits would be about equal in time, cost and effort.

Low-Medium	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved or little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.
Low	Impact would be negligible. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or a number of ways, than this means of achieving the benefit
Insignificant	There would be a no impact at all – not even a very low impact on the system or any of its parts.

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)

BRIDGETOWN DOLOMITE QUARRY

Project/site alternatives does not apply to the current Bridgetown Dolomite Operation. The mine's EMPR (2009) notes that the only alternative high grade dolomite sites (Vredendal / Van Rhynsdorp) are at a considerable distance which results in twice the transport cost of delivery to the Arcelor Mittal steel plant. While these operations were originally considered in a tender process, they were discarded based on cost.

DRIEHEUVELS QUARRY

SITE ALTERNATIVE 1

Site Alternative 1 (S1) entails the extension of the existing BDQ with 13.1 ha that extends over a wheat field. S1 was selected as the preferred alternative for the following reasons:

- ❖ The proposed footprint area offers the right holder access to the dolomite resource on the property, as determined through extensive prospecting.
- ❖ The layout of the proposed footprint excludes areas with natural occurring Swartland Shale Renosterveld of critical conservation importance.
- ❖ The existing farm road can be used to access the footprint area; therefore, no road construction is need.
- ❖ The proposed site alternative does not trigger listed activities in terms of the NEMA: EIA Regulations, 2017.

Negative aspects associated with Site Alternative 1 entails:

- ❖ Approximately 13.1 ha will be lost to agriculture for the duration of the mining operation. This area will however return to agricultural use upon closure.
- ❖ During the operational phase, the mining activity will affect the visual characteristics, air quality and noise levels of the surrounding environment as well as contribute the impact of mining within an area mainly designated for agricultural purposes.

SITE ALTERNATIVE 2

Site Alternative 2 entails the extension of the existing BDQ with 13.46 ha that extends over an area with Swartland Shale Renosterveld. The following matters, associated with the proposed areas of S2, were considered:

Positive aspects associated with Site Alternative 2 include:

- ❖ The layout of this footprint allows a simpler mine design.
- ❖ The proposed footprint area offers the right holder access to the dolomite resource on the property, as determined through extensive prospecting.
- ❖ No road construction is need as the existing farm road can be used to access the footprint area.

Negative aspects associated with Site Alternative 2 entails:

- ❖ The footprint extends over an area with Swartland Shale Renosterveld that is classified as Critically Endangered;
- ❖ This site alternative triggers listed activities in terms of the NEMA: EIA Regulations, 2017.
- ❖ Approximately 13.46 ha will be lost to agriculture for the duration of the mining operation. This area will however return to agricultural use upon closure.
- ❖ During the operational phase, the mining activity will affect the visual characteristics, air quality and noise levels of the surrounding environment as well as contribute the impact of mining within an area mainly designated for agricultural purposes.

PROJECT ALTERNATIVE

The use of the existing processing infrastructure at BDQ was considered to establishing crushing and screening infrastructure at the DQ. The use of the existing BDQ processing plant will result in the following positive aspects:

- ❖ It will lower the initial DQ setup- and production cost;
- ❖ Present the right holder with a larger footprint for the mining of dolomite, as no area will be lost to infrastructure development;

- ❖ Lessen the impact on the environment both directly (e.g. dust and noise generation, risk of pollution, visual impact), and indirectly (e.g. need for electricity, water and maintenance services); and
- ❖ Without the need to decommission mining/processing related infrastructure, the rehabilitation of the DQ footprint will be less expansive.

NO-GO ALTERNATIVE

The following matters were considered regarding the no-go alternative:

- ❖ Should the no-go option be implemented Lime Sales Ltd would not be able to exploit the dolomite source on the property, resulting in a loss of income.
- ❖ The landowner will not receive compensation for the use of the earmarked footprint on his property.
- ❖ Should the DQ not commence the present situation will persist, and no potential impacts on the visual characteristics, air quality, and/or noise ambiance of the surrounding area, will be applicable.

POSITIVE IMPACTS ASSOCIATED WITH S1 & S2

- ❖ Lime Sales Ltd could exploit the dolomite resource on Portion 1 of the farm Drieheuvels 399, while making use of the existing infrastructure at BDQ.
- ❖ The use of the BDQ processing infrastructure, lessens the impact on the environment both directly (e.g. dust and noise generation, risk of pollution, visual impact), and indirectly (e.g. need for electricity, water and maintenance services).
- ❖ The proposed mine plan lowers the initial DQ setup- and production cost.
- ❖ The land-use of the property will be diversified, and the mining activity will contribute compensation funds to the landowner.
- ❖ Without the need to decommission mining/processing related infrastructure, the rehabilitation of the DQ footprint will be less expansive.

POTENTIAL NEGATIVE IMPACTS ASSOCIATED WITH S1 & S2

SITE ESTABLISHMENT

- ❖ Visual intrusion because of site establishment;
- ❖ Potential negative impact on the nearby CBA/ESA;
- ❖ Potential loss of Swartland Shale Renosterveld to access the mineral;
- ❖ Potential impact on fauna within the footprint area;
- ❖ Potential impact on areas/infrastructure of heritage or cultural concern;

- ❖ Alteration of the agricultural sense of place;
- ❖ Loss of agricultural land to allow for mining (site-specific footprint); and
- ❖ Potential impact of mining on surrounding land use.

STRIPPING AND STOCKPILING OF TOPSOIL

- ❖ Dust nuisance caused by the disturbance of soil;
- ❖ Noise nuisance generated by earthmoving machinery;
- ❖ Loss/contamination of stockpiled topsoil;
- ❖ Potential infestation of the topsoil heaps with weeds or invader plant species;
- ❖ Potential contamination of footprint area and surface runoff because of hydrocarbon spillages; and
- ❖ Potential erosion of denuded areas.

DRILLING AND BLASTING

- ❖ Health and safety risk posed by blasting activities;
- ❖ Dust nuisance caused by blasting activities;
- ❖ Noise nuisance because of blasting; and
- ❖ Potential impact of blasting vibrations on surrounding infrastructure.

EXCAVATION, LOADING AND HAULING TO THE PROCESSING PLANT OF BRIDGETOWN DOLOMITE QUARRY

- ❖ Visual intrusion associated with the excavation area;
- ❖ Dust nuisance due to excavation, loading and vehicles transporting material;
- ❖ Noise nuisance generated by excavation equipment and earthmoving machinery;
- ❖ Unsafe working environment for employees;
- ❖ Contamination of area with hazardous- and/or general waste;
- ❖ Deterioration of the access road (farm road) to the mining area;
- ❖ Potential impact on the groundwater of the footprint area; and
- ❖ Potential impact on the Berg River due to surface runoff.

SLOPING AND LANDSCAPING DURING REHABILITATION

- ❖ Safety risk posed by un-sloped areas;
- ❖ Soil erosion;
- ❖ Dust nuisance due to landscaping activities;

- ❖ Noise nuisance generated during the rehabilitation phase;
- ❖ Loss of reinstated topsoil from denuded areas;
- ❖ Potential infestation of the reinstated areas with weeds and invader plant species; and
- ❖ Potential contamination of environment because of improper waste disposal.

In light of the above, and the review of the potential impacts associated with S1, Site Alternative 2 is deemed not to be the preferred option as this alternative will have a higher ecological significance without the need or motivation justifying it.

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

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment / discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

The following mitigation measures are proposed to address/minimize the impact of the BDQ and the proposed DQ on the surrounding environment:

TOPOGRAPHY AND VISUAL CHARACTERISTICS

Visual Mitigation (BDQ):

To lower the visual impact of BDQ on the receiving environment, the following attenuation measures were built into the project:

Northern Section:

- ❖ Retention of the cliffs facing east.
- ❖ Limiting mining to above the 40 m contour in the east.
- ❖ Mining the topographic spur out as a slot only leaving residual exposed faces in the south, which are 10 m higher than the 40 m rim of the excavation.

Processing Area:

- ❖ Location of these facilities within the northern drainage basin permits seclusion of the activities by the watershed ridge from the south, east and north-east.
- ❖ The facilities/activities are only visible from the Tweevlei labourer's houses.

Southern Section (after 2025):

- ❖ Mining from a central excavation outward so that only the skyline is lowered as seen from the east bank.
- ❖ Retention of the cliffs and 20 m mining pillar largely limiting impact to overhead view only.

Visual Mitigation (DQ):

The risk of the proposed Drieheuvels Quarry having a negative impact on the aesthetic quality of the surrounding environment can be reduced to a medium risk through the implementation of the mitigation measures listed below:

- ❖ The site must have a neat appearance and be kept in good condition at all times.
- ❖ Mining equipment must be stored neatly in dedicated areas when not in use.
- ❖ The right holder must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area.
- ❖ The excavation must be contained within the approved footprint of the permitted area.
- ❖ Topsoil and overburden heaps must be stored in the form of berms along the north-western and north-eastern boundaries of the mining footprint to screen the activities from residents on the eastern bank of the river.
- ❖ Upon closure, the site must be rehabilitated to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum.

AIR AND NOISE QUALITY

Dust Mitigation (BDQ):

The 2009 EMPR of BDQ proposed the following dust mitigation measures to minimize the dust impact on the surrounding environment:

- ❖ Wetting of the earmarked area must be done prior to topsoil stripping or overburden blasting.
- ❖ Topsoil stripping/overburden blasting must be scheduled out of the dry windy season, and take place during calm days (avoid high wind conditions).
- ❖ Permanent haul roads must be armoured to lessen dust generation, and a water truck must be used to wet temporary haul roads.
- ❖ Dust generation at the primary tipping area must be controlled by a semi-enclosed hopper, and the installation of a water sprayer system.
- ❖ Dust from the conveyor belts must be controlled by enclosing the transfer points, installing water sprayers and enclosing the screen in a screen house. Semi-wet screening must be conducted.
- ❖ The Ag-lime milling and screening plant must be enclosed.
- ❖ Low-level stockpiles with a maximum moisture content must be maintained at the Ag-lime stockpiling and loading area.

- ❖ Make use of a water truck to control the generation of dust on roads adjacent to farm houses/wheat fields.
- ❖ Retain the berm and trees that were established at the old Ag-lime plant site (1998-2009) to limit the impact of dust on the adjacent residents.
- ❖ Maintain the dust monitoring system implemented at the site.

Dust Mitigation (DQ):

The risk of dust, generated from DQ, having a negative impact on the surrounding environment can be reduced to being Low-Medium through the implementation of the mitigation measures listed below:

- ❖ The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents that contains no PCB's (e.g. DAS products).
- ❖ The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression.
- ❖ Speed on the haul roads must be limited to 20 km/h to prevent the generation of excess dust.
- ❖ Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining.
- ❖ Topsoil/overburden stockpiles around the footprint must be covered alternatively planted with indigenous grass species to minimise exposed surface areas, reducing windblown dust from the site. The vegetation will also assist in capturing wind born dust and minimizing the spread of dust from the site.
- ❖ Loads must be flattened and covered to ensure minimal spillage of material takes place during transportation, also preventing windblown dust.
- ❖ Weather conditions must be considered upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts.
- ❖ The fallout dust monitoring system, already in place at BDQ, must be extended to include the proposed DQ area.
- ❖ All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012).
- ❖ Best practice measures shall be implemented during the stripping of topsoil, excavation, and transporting of material from site to minimize potential dust impacts.

Noise Mitigation (BDQ):

The following noise related mitigation measures are proposed at BDQ:

- ❖ Noise monitoring must be implemented on a continuous basis.
- ❖ Employees must have access to the correct PPE.
- ❖ Blasting may only take place under favourable weather conditions i.e. no blasting allowed under low cloud, temperature inversions, or during windy conditions.
- ❖ Monitoring of the noise- and vibration levels must be implemented with each blast.

Noise Mitigation (DQ):

The risk of noise, generated because of the proposed DQ, having a negative impact on the surrounding environment can be reduced to being Low-Medium through the implementation of the mitigation measures listed below:

- ❖ The site will only operate during daylight hours from Monday to Saturday.
- ❖ Site management must ensure that employees and staff conduct themselves in an acceptable orderly manner while on site.
- ❖ No loud music may be permitted at the mining area.
- ❖ All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).
- ❖ The type, duration and timing of the blasting procedures must be planned with due cognizance of other land users and structures in the vicinity. Surrounding landowners must be notified in writing prior to each blasting occasion.
- ❖ Best practice measures shall be implemented in order to minimize potential noise impacts.
- ❖ Noise generated by the proposed activity shall comply with the Western Cape Noise Control Regulations (PN 200/2013), June 2013.
- ❖ A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.

GEOLOGY AND SOIL

Topsoil Handling (BDQ):

The 1997 BDQ EMPR proposed the following mitigation measures regarding topsoil handling:

- ❖ With regard to the reuse of the agricultural soil, all topsoil must be removed to at least 500 mm depth in the southern section and possibly 200 mm in the south of the northern section.
- ❖ Topsoil in the plant area must be removed to 150 mm and stockpiled for later use in rehabilitation.
- ❖ As the topsoil will be stockpiled for a lengthy period, stockpile depth for seedbank preservation is irrelevant but 3 m should not be exceeded. When reused, the material will require re-nitrification either by legume planting or fertilising during replacement.

Topsoil Handling (DQ):

The following mitigation measures are proposed, for DQ, to ensure proper topsoil management and lower the significance of the potential impact from Low-Medium to Low:

- ❖ The upper 300 mm of the soil must be stripped and stockpiled before mining.
- ❖ Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes.
- ❖ Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that topsoil is stockpiled for the minimum possible time.
- ❖ The topsoil must be placed on a levelled area, within the mining footprint, preferably along the north-western and north-eastern boundary of the mining area, and measures must be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water. No topsoil may be stockpiled in undisturbed areas.
- ❖ Topsoil heaps may not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.
- ❖ The temporary topsoil stockpiles must be kept free of invasive plant species.
- ❖ Storm- and runoff water must be diverted around the stockpile area to prevent erosion.
- ❖ Topsoil heaps to be stored longer than a period of 6 months needs to be vegetated with an indigenous grass seed mix if vegetation does not naturally germinate within the first growth season.
- ❖ The stockpiled topsoil must be evenly spread over the rehabilitated area upon closure of the site.
- ❖ The right holder must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil

by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.

- ❖ A cover crop must be planted and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum production. It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established.
- ❖ Run-off water must be controlled via temporary banks during mining, where necessary on the slopes, to ensure that accumulation of run-off does not cause down-slope erosion.
- ❖ The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.

HYDROLOGY

Erosion Control and Storm Water Mitigation (BDQ):

The following storm water mitigation measures were proposed for BDQ:

- ❖ Storm water cut-off trenches will be provided above topsoil berms, waste dumps, plant and product stockpile area. Such trenches will lead into storm water retention ponds, which will serve as water features on site.
- ❖ Silt runoff collection trenches will be construed below topsoil berms, waste dumps, plant, manoeuvring and product stockpile areas. These trenches will lead to silt retention ponds from which silt can be removed by excavator or FEL to be disposed of as layers in the overburden dump.
- ❖ The quality of storm water released from the retention ponds shall not exceed the ambient TSS load of runoff from the surrounding wheat fields.
- ❖ The right holder must adhere to the requirements of the water use authorisations and all activities must take place a distance from the western edge of the Misverstand Dam to allow for sufficient space for effective silt retention capabilities.

Erosion Control and Storm Water Mitigation (DQ):

The erosion potential of the DQ mining area can be reduced to being Low through the implementation of the mitigation measures listed below:

- ❖ The runoff from compacted surfaces must be slowed down and dispersed sufficiently to prevent accelerated erosion.
- ❖ Erosion control measure must be put in place to minimise erosion along the proposed mining area. Extra precautions must be taken in areas where the soils are deemed highly

erodible. Erosion control measures could include the use of sand bags, hessian sheets, retention or replacement of vegetation.

- ❖ Stockpiling of soil must not be allowed on or near steep slopes. This is to prevent pollution or the impediment of surface run-off.
- ❖ Drainage must be controlled to ensure that runoff from the project area does not culminate in off-site pollution, flooding or result in any damage to infrastructure downstream or any storm water discharge points.
- ❖ Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:
 - Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems.
 - Dirty water must be collected and contained in a system separate from the clean water system.
 - Dirty water must be prevented from spilling or seeping into clean water systems.
 - A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns).
 - The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan.

Surface- and Groundwater Mitigation Measures (BDQ):

The following mitigation measures are proposed to address the impact of BDQ on the groundwater:

- ❖ To avoid fuel and lubrication spills from the workshop, the vehicle-refuelling bay shall be provided with a concrete apron to catch any diesel spills and the workshop floor and apron shall be drained to an oil trap.
- ❖ Foul water from the offices and personnel amenities will be lead into properly sized and constructed conservancy tanks and French drains suitably backfilled with stones to achieve sufficient soak away in the phyllite. Given their elevation at 20 m above groundwater tale, no groundwater contamination will occur.

Surface- and Groundwater Mitigation Measures (DQ):

The following mitigation measures are proposed to prevent the DQ affecting surface- and/or groundwater:

- ❖ The storm water mitigation measures as proposed in this document must be implemented on site.
- ❖ The current water-monitoring programme of BDQ must be extended to include the DQ mining area. Water samples must be collected from the Berg River upstream and downstream of the mining operations.
- ❖ Mining depth must be restricted to the groundwater level of the footprint.
- ❖ Should the groundwater table be intersected, the opinion of a geohydrologists must be obtained to guide future mining operations.

MINING, BIODIVERSITY AND VEGETATION

Vegetation Mitigation Measures (BDQ):

The botanist proposed the following management plan to reduce the impact of BDQ on the natural vegetation within the footprint:

- ❖ Transplanting would be possible in the remainder of the vegetation type on site.
- ❖ Limit disturbance of natural vegetation to a small an area as possible.
- ❖ Prevent erosion of final pit edges.
- ❖ New roads should be built on agricultural land and should as far as possible avoid being located in the natural vegetation.
- ❖ Suggests the employment of an environmental officer.
- ❖ The mining company must take responsibility for transplanting of endangered species (i.e. the company must employ an expert to conduct this operation).
- ❖ No dumping, grazing or any other activity be allowed in the natural areas.

Vegetation Mitigation Measures Including the Protection of Swartland Shale Renosterveld, the CBA and ESA (DQ):

The following mitigation measures are proposed to prevent the DQ affecting the nearby CBA/ESA, and subsequently lower the significance of the potential impact from Low-Medium to Low:

- ❖ The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area.

- ❖ The area outside the mining boundaries must be declared a no-go area, and all employees must be educated accordingly.
- ❖ Measures must be implemented to limit flyrock falling outside the mining area. All flyrock (of diameter 150 mm and larger) which falls beyond the working area, together with the rock spill must be collected and removed.

Management of Invasive Plant Species (DQ):

The risk of weeds or invader plants invading the DQ can be reduced to being Low through the implementation of the mitigation measures listed below:

- ❖ An invasive plant species management plan (Appendix M) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities.
- ❖ All stockpiles (topsoil) must be kept free of invasive plant species.
- ❖ Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:
 - The plants can be uprooted, felled or cut off and can be destroyed.
 - A registered pest control officer (PCO) can treat the plants chemically with an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.

FAUNA

Protection of Fauna (BDQ):

The 1997 BDQ EMPR states that as no specific fauna was identified for preservation, no specific steps is needed in this regard. However, the preservation of the cliff and riverine area represents a specific habitat for especially birds of prey and reptiles.

Protection of Fauna (DQ):

The risk resulting from the DQ on the terrestrial fauna of the footprint area as well as the surrounding environment can be reduced to Low through the implementation of the mitigation measures listed below:

- ❖ The site manager must ensure no fauna is caught, killed, harmed, sold or played with.
- ❖ Workers must be instructed to report any animals that may be trapped in the working area.
- ❖ No snares may be set or nests raided for eggs or young.

CULTURAL AND HERITAGE ENVIRONMENT

Archaeological, Heritage and Palaeontological Aspects (BDQ):

The AIA conducted at the BDQ footprint reported that mining would not affect any archaeological features of importance. As the ruin referred to in the report (Ruin No. 8) is located outside the southern mining section, the ruin will remain intact.

Archaeological, Heritage and Palaeontological Aspects (DQ):

The impact on archaeological, heritage and palaeontological aspects, because of the DQ, is deemed insignificant but site management must take note of the following mitigation measures:

- ❖ All mining must be confined to the development footprint area.
- ❖ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- ❖ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- ❖ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify Heritage Western Cape (HWC).
- ❖ Work may only continue once the go-ahead was issued by HWC.

LAND USE AND EXISTING INFRASTRUCTURE

Mitigating the Impact on Surrounding Land Use (DQ):

The following mitigation measures can be implemented to accommodate the surrounding landowners of DQ:

- ❖ The visual-, dust-, noise-, water-, waste- and health and safety mitigation measures as proposed in this document must be implemented on site to reduce the impact of the DQ on the surrounding landowners.

Access Road Mitigation (DQ):

The impact on the access road, because of the DQ, can be reduced to being Low through the implementation of the mitigation measures listed below:

- ❖ Storm water must be diverted around the access road to prevent erosion.

- ❖ Vehicular movement must be restricted to the existing access road and crisscrossing of tracks through undisturbed areas must be prohibited.
- ❖ The right holder must repair rutting and erosion of the access road caused as a direct result of the mining activities.
- ❖ Overloading of the truck must be prevented.

GENERAL

Waste Management (DQ):

The risk of uncontrolled waste generation, at DQ, having a negative impact on the surrounding environment can be reduced to being Low through the implementation of the mitigation measures listed below:

- ❖ Regular vehicle maintenance, repairs and services may only take place at the off-site workshop and service area of BDQ. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a 200 litre closed container/bin to be removed from the emergency service area to the workshop in order to ensure proper disposal.
- ❖ If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.
- ❖ Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site.
- ❖ Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. The hazardous waste generated at the DQ can be incorporated into the existing hazardous waste handling system at BDQ.
- ❖ Spills must be cleaned up immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMR) by removing the spillage together with the polluted soil and incorporating it into the existing hazardous waste handling system of BDQ (if possible), or by disposing it at a recognised facility. Proof must be filed.
- ❖ All general waste must be contained within the site vehicles and daily be removed from the mining area to the general waste storage area of BDQ.
- ❖ Re-use or recycling of waste products must be encouraged on site.
- ❖ No waste may be buried or burned on the site.
- ❖ Site management must ensure that employees make use of formal ablution facilities. Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet shall be serviced at least once a week for the duration of the mining activities.

- ❖ The use of any temporary, chemical toilet facilities must not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the right holder.
- ❖ When small volumes of wastewater are generated during the life of the mine the following is applicable:
 - Water containing waste must not be discharged into the natural environment.
 - Measures to contain the wastewater and safely dispose thereof must be implemented.
- ❖ It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities.

Management of Health and Safety Risks (BDQ):

The following safety related mitigation measures are proposed for BDQ:

- ❖ An overburden bench about 4 - 5 m wide must be constructed around the perimeter of the quarry excavations.
- ❖ Maximum charge per delay must be maintained at levels, which ensure low vibration levels.

Management of Health and Safety Risks (DQ):

The health and safety risk, posed by the DQ can be reduced to being Low through the implementation of the mitigation measures listed below:

- ❖ Workers must have access to the correct personal protection equipment (PPE) as required by law.
- ❖ All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).
- ❖ The type, duration and timing of the blasting procedures must be planned with due cognizance of other land users and structures in the vicinity.
- ❖ The surrounding landowners and communities must be informed in writing ahead of any blasting event.
- ❖ The compliance of ground vibration and airblast levels must be monitored to USBM standards with each blasting event.
- ❖ A vibro recorder must be used to record all blasts.
- ❖ Audible warning of a pending blast must be given at least 3 minutes in advance of the blast.

- ❖ Measures to limit flyrock must be taken. All flyrock (of diameter 150 mm and larger) which falls beyond the working area, together with the rock spill must be collected and removed.

Rehabilitation of the Excavated Area (DQ):

The risk of unsloped and unrehabilitated areas posing a safety risk can be reduced to being Low through the implementation of the mitigation measures listed below:

- ❖ The excavated area must serve as a final depositing area for the placement of overburden.
- ❖ Rocks and coarse material removed from the excavation must be dumped into the excavation.
- ❖ No waste may be permitted to be deposited in the excavations.
- ❖ Once overburden, rocks and coarse natural materials have been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.
- ❖ The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within 6 months from closure of the site.
- ❖ If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

ix) Motivation where no alternative sites were considered.

N/A

x) Statement motivating the alternative development location within the overall site.

(Provide a statement motivating the final site layout that is proposed)

Bridgetown Dolomite Quarry:

Not applicable.

Drieheuvels Quarry:

As mentioned earlier, the environmental assessment considered two site alternatives that would allow the extension of the existing BDQ footprint. The footprint of S2 extends over an area with Swartland Shale Renosterveld that is classified as Critically Endangered, and even though the layout of this footprint allows a simpler mine design the footprint of S1 was identified

as the preferred alternative. The following matters contributed to the identification of the preferred development footprint:

1. **Visual Characteristics** – Upon rehabilitation of the mining area and the replacement of the topsoil, the residual visual impact is expected to be of Low significance.
2. **Geology** – The preliminary inspection and due diligence of the dolomite quality (Appendix I4) within the proposed footprint confirmed the presence of high quality dolomite.
3. **Hydrology – Surface Water**: The NFEPA status of the study area is classified as a no priority area, and no wetlands or other drainage line crosses the study area. Mining will be kept above the 1:100 year floodline of the Berg River. The right holder will confirm whether the proposed DQ footprint requires water use authorisation from the DWS.

Groundwater: The depth of the DQ will be restricted to the groundwater level, and the impact of the proposed operation on the groundwater of the study area can be mitigated to be of low significance.

4. **Biodiversity, Conservation, and Groundcover** – Ground truthing confirmed that the proposed footprint of S1 has been altered by agricultural practices and no natural areas of conservation concern remains.

h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.

(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures).

The following section provides a description of the findings and recommendations of the EIAR, inclusive of the relevant specialist studies, and its associated impact on the receiving and surrounding environment. The impacts and risks associated with the Bridgetown Mining Operation were separated into the impacts associated with **1) Bridgetown Dolomite Quarry**, and those associated with the proposed **2) Drieheuvels Quarry**.

1. BRIDGETOWN DOLOMITE QUARRY

The following BDQ impacts are those listed in the 2009 EMPR of the mine. The impact significance was determined for each impact after bringing the mitigation measures into consideration and therefore represents the final layout/activity proposal.

CONSTRUCTION PHASE

The EMPR did not identify construction phase impacts as this phase has been completed. Construction phase related impacts were addressed as it occurred, and mitigating and monitoring measures were put in place to reduce the force of the impacts. BDQ is now in the operational phase.

OPERATIONAL PHASE

1.1 SOIL

The Northern Mining Section will eventually occupy an area of 18.2 ha. The area is characterized by shallow soils and general karst dolomite outcrops which given the shallow soils and rocky conditions has never been ploughed even for wheat farming. The metallurgical plant area, screenings stockpiles, overburden dump and Ag-lime plant are all situated in the Northern Mining Section and cover an area of ±12 ha resulting the temporary loss of agricultural soil. When the Southern Mining Section is developed, an additional area of 19 ha of deep Hutton soils will be destroyed which would otherwise be suitable for either wheat or irrigated crop farming. In the interim, this area is used for wheat farming. The old Ag-lime quarry has been back-filled with waste rock and overburden derived from the North Section Quarry. It was levelled and covered with topsoil, and result in the recovery of ±1.2 ha of agricultural land for about 10 years until the southern quarry is developed. With regard to the re-use of the agricultural soils, all topsoil encountered is removed to 0.3 m depth and stockpiled for later use and rehabilitation of both mining sections. Because the topsoil is stockpiled for lengthy periods, stockpile depths for seedbank preservation is irrelevant but does not exceed 3 m. When re-used, the material will require re-nitrification by legumes and or fertilizers during replacement.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Moderate	Immediate	Life of Mine	Definite

1.1.1 Fuel / Oil Spills

The potential exists for soils to be contaminated through oil/fuel leakage from minor fuel/oil spills during in-field servicing.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Minor	Incident	Short	Likely

1.2 AGRICULTURE AND LAND CAPABILITY

The 18.2 ha quarry area of the northern section was never used for agriculture due to the rocky soil conditions. Approximately 19 ha of arable soil in the Southern Mining Section will permanently be lost for agriculture when mining is finally completed in this area. The metallurgical plant and dolomite screenings stockpiles areas covering ±12 ha are temporary removed from agriculture. On final closure, the plant area will be demolished rehabilitated and returned to agriculture. The dolomite screenings stockpiles will gradually be reclaimed for Ag-lime production. The aggregate plant will similarly be demolished, rehabilitated and returned to agriculture. As the average wheat production is 4.25 ton/ha, the permanent loss in wheat production will be 19 x 4.25 ton/ha, which is ±81 tons wheat. This impact is insignificant.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Insignificant	Starting 2025	Permanent	Definite

1.3 GEOLOGY

The impact will be generated by the removal of some further 12.5 million “in situ” tons (over 25 years) of dolomite in the northern section and 3.8 million in situ tons of dolomite in the southern section, giving a further 16.3 million “in situ” tons of dolomite to be mined. Prospecting and geophysical work has shown that the dolomite continues to between 80 m and 150 m below land surface. The total resource is therefore large but other constraining factors such as ground water and property boundaries limit the chances of mining to these depths. Further dolomite resources do exist to the north-west and south-east of Bridgetown along the Berg River but they are now largely sterilized by their very close proximity to the Berg River, intensive agriculture and ecological constraints.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Significant	Immediate and Progressive	Life of Mine	Definite

1.4 TOPOGRAPHY

The mining will have the following impacts on the topography:

- ❖ Temporary impacts until closure due to the plants, workshop and stockpiles. These impacts have to some extent been mitigated by planting trees to screen them from view and by placing them in unobtrusive positions where possible.
- ❖ The two quarries will have a permanent impact on the topography. However, because they will be mined deeper than the adjacent Berg River it is planned that at closure, slots to the Berg River will be excavated to allow the river to flood the excavations thereby increasing the capacity of the adjacent Misverstand Dam.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Moderate	Immediate and Reducing	Permanent	Definite

1.5 VEGETATION

While the cliff vegetation is not destined to be disturbed by mining activities, its preservation status has been made known by management to the workforce to preserve the cliffs and vegetation as a natural backdrop to the dam both for water surface users, more importantly visual impact on the residents and users of the east river bank. The only significant vegetation that has been disturbed is the mixed Renosterveld / Succulent Karoo removed by the northern mining section above the 40 m contour.

During the years when weather conditions were favourable “botanical sweeps” were made and all the species identified in the report were removed by a qualified botanist and transplanted in “safe locations” on the dolomite cliffs adjacent to the Berg River / Misverstand Dam. During topsoil removal, the upper 150 mm of soil is bulldozed together with the plant material to be used later as cover material on both the overburden waste dump and the topsoil stockpile thereby preserving the seed bank for natural re-vegetation.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Significant	Immediate	Life of Mine	Definite

1.6 FAUNA

As no specific fauna has been identified for preservation, no specific steps are taken in this regard. However, the preservation of the cliff and riverine area represents a specific habitat for especially birds of prey and reptiles. Mammals and rodents are not affected by the mining because heavy vehicles do not operate over the entire site. The remainder of the properties presents a suitable similar habitat. Birds similarly have large tracts of habitat elsewhere on the properties. Other impacts regarding mammals and all livestock on the farm includes poaching, theft and road kills by vehicles on the site. Care is constantly taken that the site is secured and that animals are not trapped from time to time within the mining area.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Minor	Immediate	Life of Mine	Improbable

1.7 SURFACE WATER

1.7.1 Run-off Control

While surface water is presently controlled in the wheat fields by contour furrows, erosion dongas have developed in both the northern and southern drainage channels over the past 50 years where bedrock is now exposed in places. In the light of the low average rainfall storm water cut-off and associated silt run-off are controlled by cut-off tranches above topsoil berms, waste dumps, plant and product stockpile areas. Haul roads and all roads leading to the plants are properly shaped and cambered by a road-grader to control run-off water into drainage ditches and prevent ponding and potholes forming.

1.7.2 Water Consumption – Abstraction Permits

Authority No. 23/20/98 (dated 18/08/1998) has been granted by the DWS to Lime Sales to abstract 85 000 m³ of water per year from the Berg River for industrial purposes. The mine also holds water use and storage registration documents in respect of Vledermuisdrift and Vogelstruisdrift together with the registration certificates 22038867 and 22064757. On a normal production day, the BDQ consumes ±217 kL per working day for the purpose of washing and beneficiating the dolomite. In addition, an average of 45 kL per day of the water, which seeps into the Northern Quarry, is used for dust suppression on all the roads at the project.

1.7.3 Other Potential Pollution Sources

Foul water from the offices and personnel amenities. This water is lead into properly sized and constructed conservancy tanks and French drains suitably backfilled with stones to achieve sufficient soak-away in the underlying phyllite. Given their elevation at 20 m above groundwater table, no groundwater contamination will occur.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Moderate	Immediate	Life of Mine	Improbable

1.8 GROUNDWATER

The water table lies at between 10 and 11 m below land surface in the Northern Mining Section. At present, the deepest point in the northern quarry is at the 6 mamsl elevation. Phreatic water seeps into the quarry on a continuous basis and is pumped out to surface at a rate of 104 kL per day every day of the year. The quality of this water is very poor and cannot be utilized on site except for dust suppression on the roads because if the water is used for any other purpose, e.g. in the process plant it will cause serious corrosion. The low quality of the quarry water is due to the phyllite rock surrounding the dolomite deposit. The rate of inflow of the ground water has stabilized over the past few years but peaks in winter when evaporation is low and also during wet weather. The excess quarry water is pumped to the adjacent normally dry brackish side-stream where it either evaporates or sinks into underlying silt. This water disappears before it reaches the Berg River, which is also monitored below the confluence. The northern quarry model has been designed to mine to the +7 m elevation (i.e. +40 m deep). When data regarding the permeability and hydraulic conductivity of the dolomite is determined at the +7 m elevation, a decision will be taken as to whether the quarry could be safely deepened further.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Significant	Immediate and Progressive	Life of Mine	Definite

1.9 AIR QUALITY (DUST)

To ensure that dust impact on the surrounding residences, workshops, pack shed and crops does not occur, the dust control/suppression measures as listed under the mitigation measures have been applied for each potential dust source.

A permanent “Dust Watch” dust monitoring system has been installed downwind of the dust sources at the Bridgetown project. The dust monitoring system was installed in response to complaints by neighbouring farmers on the eastern bank of the Berg River. To address these complaints and to reduce the effects of the dust, the following changes were made at the old Ag-lime plant site between 1998 and 2009:

- ❖ A berm was built for wind and noise protection; and
- ❖ Trees were planted to reduce wind speed.

The old Ag-lime plant is now demolished but the berm and trees have been retained. In addition, a larger water-truck was purchased to continuously wet the gravel roads at the project throughout the working day. The Environmental Management Committee (EMC), which was set up at the commencement of the northern section mining operations, monitors the results of the “Dust Watch” system. Current assessment of the level of complaints over the last 26 years by the farmers reflects a distinct reduction as no dust issues have been raised.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Significant	Immediate	Life of Mine	Definite

1.10 NOISE

Given the nature of the enterprise, noise is generated at various centres.

- ❖ The Northern Plant Operation:

Due to its remote location, noise from the Northern Plant has never posed any problem to surrounding owners and the noise impact on employees is monitored by the company EOHS. Given the levels of noise, appropriate HPD's are provided for employees and the area is appropriately signposted. In general, plant noise levels are at 45 dBA 400 m from the site given line of sight. 55 dBA is the maximum recommended noise level for a residential area in daytime (SABS 1083). However, given the location of the plant in the enclosed valley with the watershed almost enclosing the entire plant site, the noise impact from the plant is well below the above-recorded level over similar distance. The plant noise is, however reflected off the hill in the direction of the Tweevlei labourer's cottages

where noise levels are ± 50 dBA at a distance of 550 m. As the Tweevlei farmstead is located over the hilltop, the reflection of sound by the ridge results in a very rapid decline of noise level with no significant impact on the Tweevlei residences. It must be borne in mind that noise dispersion is very sensitive to wind speed and direction.

❖ Blast Noise

As in the case of dust, the level of complaints have reduced significantly over the past years. The blast record is at 124 dBA at 150 m from the blast and therefore 10 dBA below the maximum-recorded level of 134 dBA. While blasting has a “startling effect” on nearby people, it does not cause any damage to hearing. In order to reduce the impact of blasting noise blasting only takes place under favourable weather conditions i.e. no blasting under low cloud and or under temperature inversions. The noise levels caused by blasting is monitored and measured at every blast.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Significant	Immediate	Life of Mine	Definite

1.11 BLAST VIBRATION

(Refer to Part A(1)(d)(ii) Description of the activity to be undertaken – 2.6 Blasting Vibrations)

The low-recorded vibration levels clearly indicate that blast vibration has no impact on surrounding structures. In the blast design, the maximum charge per delay is maintained at a level, which ensures that these low vibration levels apply. Blasting takes place on average once per month and approximately 50 000 tons of dolomite is loosened at each blast. At each blast, the vibration is measured and recorded at the farmhouse of Mr W. Smuts (± 550 m away). This is done in response to complaints that the blasting causes damage to windows and roof sheets. Subsequent investigations found that the blast vibration was not responsible.

Blasting is not conducted when the following weather conditions apply:

Cold temperature inversion conditions

- ❖ Low cloud cover;
- ❖ Strong winds blowing in the direction of farming communities or residents.

Because under these prevailing weather conditions the air blast levels are high. The mine management check the weather conditions with the Weather Bureau before deciding when a blast should take place. The blast holes are drilled and charged by a blasting contractor and

the mine manager conducts the blasting in accordance with the procedures and practices as laid out in Chapter 9 of the Regulations of the Minerals Act 50/1991. To date no ground vibration impact damage has been reported.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Significant	Immediate	Life of Mine	Definite

1.12 FLY ROCK

As private structures and public access is available within 500 metres of the blasting operations, Bridgetown Dolomite Mine J/V has applied for and has been granted permission to blast within 500 m of any building, public thoroughfare railway, power line or any place where people congregate. (Regulation 9:33:5 Mines and Works Act). Fly Rock can pose a serious risk to persons using boats on the Misverstand Dam, which lies adjacent to the Northern Quarry as well as users of the labourers' cottages on Die Pont. Therefore, extra supervision and attention is paid to ensuring that persons are not present in the above-mentioned places when blasting is being conducted. Immediately prior to blasting the above mentioned sites are carefully inspected and three circuits of the quarry are executed to ensure that no person is present when blasting takes place. As it envisaged that blasting will also take place on average once per month in the southern section when mining commences in this area. The Eskom 350 kVA power line supplying the Tweevlei residence and the dolomite production complex has been re-routed well to the south of its original position to avoid damage to the power line from blasting operations in the quarry. The mine will bear the cost of protecting the pump stations on the riverbank from fly-rock damage. The mine will also bear the responsibility of re-establishing any electrical supply to such pump stations should fly-rock damage their overhead power supplies. Alternatively, the mine will relay such lengths of cable underground to protect them from possible fly-rock damage.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
Moderate	Immediate	Life of Mine	Possible

1.13 ARCHAEOLOGY

The Specialist Archaeological Report, reports that mining will not affect any archaeological features of importance. As the ruin referred to in this report (Ruin No. 8) is located outside the southern mining section, this ruin will remain intact.

SIGNIFICANCE / MAGNITUDE	TIMING	DURATION	PROBABILITY
No Impact	No Impact	No Impact	No Impact

2. DRIEHEUVELS QUARRY

An initial significance rating (listed under *v) Impacts and Risks Identified*) was determined for each potential impact should the mitigation measures proposed in this document not be implemented on-site. The impact assessment process then continued in identifying mitigation measures to address the impact that the proposed mining activity may have on the surrounding environment. The significance rating was again determined for each impact associated with the preferred site (S1) using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact ratings listed below was determined for each impact **after** bringing the proposed mitigation measures into consideration and therefore represents the final layout/activity proposal.

SITE ESTABLISHMENT:

Visual intrusion because of site establishment

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	5	2	3	5	4	4.5	13.5

Potential negative impact on the nearby CBA/ESA

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
3	5	4	4	1	1	1	4

Potential loss of Swartland Shale Renosterveld to access the mineral

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
4	5	1	3.3	1	1	1	3.3

Potential impact on fauna within the footprint area

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
3	5	1	3	1	1	1	3

Potential impact on areas/infrastructure of heritage or cultural concern

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
4	5	3	4	1	1	1	4

Alteration of the agricultural sense of place

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			Site Alternative 1			Degree of Mitigation: None	
3	5	2	3.3	5	5	5	16.5

Loss of agricultural land to allow for mining (site-specific footprint)

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	4	1	2.3	5	5	5	11.5

Potential impact of mining on surrounding land use

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	5	2	3	2	2	2	6

STRIPPING AND STOCKPILING OF TOPSOIL:

Dust nuisance caused by the disturbance of soil

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Full	
2	2	2	2	2	3	2.5	5

Noise nuisance generated by earthmoving machinery

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Partial	
2	2	2	2	2	2	2	4

Loss/contamination of stockpiled topsoil

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
2	1	1	1.3	2	2	2	2.6

Potential infestation of the topsoil heaps with weeds or invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
2	2	2	2	2	2	2	4

Potential contamination of footprint area and surface runoff because of hydrocarbon spillages

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
3	1	1	1.6	2	2	2	3.2

Potential erosion of denuded areas

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
2	2	1	1.6	2	2	2	3.2

DRILLING AND BLASTING:

Health and safety risk posed by blasting activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
5	2	1	2.6	2	1	1.5	3.9

Dust nuisance caused by blasting activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	5	2	3	5	3	4	12

Noise nuisance because of blasting

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	5	2	3	5	3	4	12

Potential impact of blasting vibrations on surrounding infrastructure

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	5	2	3	2	3	2.5	7.5

EXCAVATION, LOADING AND HAULING TO THE PROCESSING PLANT OF BRIDGETOWN DOLOMITE QUARRY

Visual intrusion associated with the excavation area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			Site Alternative 1			Degree of Mitigation: Partial	
2	5	2	3	5	4	4.5	13.5

Dust nuisance due to excavation, loading and vehicles transporting the material

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
2	1	2	1.6	2	2	2	3.2

Noise nuisance generated by excavation equipment and earthmoving machinery

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Partial	
2	3	2	2.3	2	2	2	4.6

Unsafe working environment for employees

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
3	1	1	1.6	2	2	2	3.2

Contamination of area with hazardous- and/or general waste

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
3	1	1	1.6	2	2	2	3.2

Deterioration of the access road (farm road) to the mining area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
3	2	2	2.3	2	2	2	4.6

Potential impact on the groundwater of the footprint

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
2	5	2	3	2	1	1.5	4.5

Potential impact on the Berg River due to surface runoff

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
4	3	2	3	2	1	1.5	4.5

SLOPING AND LANDSCAPING DURING REHABILITATION:

Safety risk posed by un-sloped areas

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
4	3	1	2.6	2	1	1.5	3.9

Soil erosion

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
2	2	1	1.6	2	2	2	3.2

Dust nuisance due to landscaping activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
2	1	2	1.6	2	1	1.5	2.4

Noise nuisance generated during the rehabilitation phase

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Partial	
2	3	2	2.3	2	1	1.5	3.5

Loss of reinstated topsoil from denuded areas

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
3	2	1	2	2	2	2	4

Potential infestation of the reinstated areas with weeds and invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1			Degree of Mitigation: Full	
2	1	1	1.3	2	2	2	2.6

Potential contamination of environment because of improper waste disposal

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			Site Alternative 1		Degree of Mitigation: Full		
3	1	1	1.6	2	1	1.5	2.4

i) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

Table 30: Assessment of each identified potentially significant impact and risk.

ACTIVITY Whether listed or not listed. (E.g. 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.)	POTENTIAL IMPACT (E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, air pollution, etc...etc...etc.)	ASPECTS AFFECTED	PHASE In which impact is anticipated. (E.g. Construction, commissioning, operational Decommissioning closure, post closure.)	SIGNIFICANCE If not mitigated.	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc etc) E.g. Modify through alternative method Control through noise control Control through management and monitoring through rehabilitation.	SIGNIFICANCE If mitigated.
BRIDGETOWN DOLOMITE QUARRY						
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. 	❖ Impact on soil.	The loss/contamination of topsoil will affect the rehabilitation of the excavation upon closure of the site, and the contamination of the footprint area will negatively affect the surface runoff and potentially the groundwater.	Operational Phase	<ul style="list-style-type: none"> ❖ Minor ❖ Significant ❖ Moderate ❖ Minor ❖ Significant ❖ Minor 	<u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.	❖ Moderate

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. 	<ul style="list-style-type: none"> ❖ Impact on land capability. 	The post-mining land use potential will be affected.	Operational Phase	<ul style="list-style-type: none"> ❖ Minor ❖ Moderate ❖ Moderate ❖ Minor ❖ Moderate ❖ Minor 	<u>Control:</u> Implementing good management practices.	<ul style="list-style-type: none"> ❖ Insignificant
<ul style="list-style-type: none"> ❖ Pumping out groundwater. 	<ul style="list-style-type: none"> ❖ Impact on geology. 	An impact on the groundwater of the area will negatively affect all water users.	Operational Phase	<ul style="list-style-type: none"> ❖ Moderate 	<u>Control & Remedy:</u> Continuous water monitoring and rectification measures when needed.	<ul style="list-style-type: none"> ❖ Significant
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on topography. 	This impact affects the surrounding land users.	Operational Phase	<ul style="list-style-type: none"> ❖ Minor ❖ Significant ❖ Minor ❖ Significant 	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	<ul style="list-style-type: none"> ❖ Moderate
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on agriculture. 	This impact affects the agricultural operations of the properties.	Operational Phase	<ul style="list-style-type: none"> ❖ Minor ❖ Moderate ❖ Moderate ❖ Minor ❖ Moderate 	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	<ul style="list-style-type: none"> ❖ Insignificant
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on vegetation and fauna. 	This will affect the biodiversity of the receiving environment.	Operational Phase	<ul style="list-style-type: none"> ❖ Moderate ❖ Moderate ❖ Moderate ❖ Moderate ❖ Moderate 	<u>Control & Stop:</u> Implementing good management practices.	<p><i>Vegetation:</i></p> <ul style="list-style-type: none"> ❖ Significant <p><i>Fauna:</i></p> <ul style="list-style-type: none"> ❖ Minor

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
❖ Pumping out groundwater.				❖ Minor		
❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles.	❖ Impact on surface water.	An impact on the surface water will negatively affect the downstream water users.	Operational Phase	❖ Moderate ❖ Minor ❖ Minor ❖ Minor	<u>Control:</u> Implementing proper housekeeping practices and stormwater control measures.	❖ Moderate
❖ Topsoil removal. ❖ Quarry excavations. ❖ Blasting. ❖ Pumping out groundwater.	❖ Impact on groundwater.	An impact on the groundwater of the area will negatively affect all water users.	Operational Phase	❖ Minor ❖ Moderate ❖ Minor ❖ Significant	<u>Control & Remedy:</u> Continuous water monitoring and rectification measures when needed.	❖ Significant
❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock.	❖ Impact on air quality (dust).	Increased dust generation will affect the air quality of the receiving environment.	Operational Phase	❖ Moderate ❖ Minor ❖ Moderate ❖ Moderate ❖ Minor ❖ Moderate ❖ Minor	<u>Control:</u> Dust suppression methods and proper housekeeping.	❖ Significant
❖ Roads on site. ❖ Quarry excavations. ❖ Processing plants. ❖ Blasting.	❖ Impact on noise.	Should noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Operational Phase	❖ Minor ❖ Minor ❖ Moderate ❖ Minor	<u>Control:</u> Noise suppression methods and proper housekeeping.	❖ Significant
❖ Quarry excavations. ❖ Blasting.	❖ Impact on blast vibration.	Blasting vibrations may affect the activities/infrastructure	Operational Phase	❖ Moderate ❖ Minor	<u>Control:</u> Adherence to the blasting rules and regulations.	❖ Significant

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
		of the surrounding landowners.				
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Pumping out groundwater. ❖ Flyrock. 	❖ Impact on sensitive landscape.	This will affect the biodiversity of the receiving environment.	Operational Phase	<ul style="list-style-type: none"> ❖ Minor ❖ Minor ❖ Significant ❖ Moderate ❖ Minor ❖ Minor ❖ Minor ❖ Minor 	<u>Control:</u> Implementing proper housekeeping.	❖ Moderate
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	❖ Impact on visual impact.	The visual impact may affect the aesthetics of the landscape.	Operational Phase	<ul style="list-style-type: none"> ❖ Moderate ❖ Moderate ❖ Significant ❖ Moderate ❖ Significant ❖ Minor ❖ Minor 	<u>Control:</u> Implementing proper housekeeping.	❖ Moderate
<ul style="list-style-type: none"> ❖ Quarry excavations. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	❖ Recreation at Berg River.	An impact on the Berg River will negatively affect the downstream water users.	Operational Phase	<ul style="list-style-type: none"> ❖ Minor ❖ Minor ❖ Moderate ❖ Moderate 	<u>Control:</u> Implementing proper housekeeping practices and stormwater control measures.	❖ Moderate
DRIEHEUVELS QUARRY						
❖ Demarcation of site with visible beacons.	❖ No impact could be identified other than the beacons being outside the	N/A	Site Establishment phase	N/A	Control through management and monitoring.	N/A

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	boundaries of the approved mining area.					
<ul style="list-style-type: none"> ❖ Site establishment. ❖ Excavation, loading and hauling to processing plant of BDQ. 	<ul style="list-style-type: none"> ❖ Visual intrusion because of site establishment. ❖ Visual intrusion associated with the excavation area. 	The visual impact may affect the aesthetics of the landscape.	Site Establishment- & Operational Phase	<ul style="list-style-type: none"> ❖ Medium-High ❖ Medium-High 	<u>Control:</u> Implementing proper housekeeping.	<ul style="list-style-type: none"> ❖ Medium ❖ Medium
<ul style="list-style-type: none"> ❖ Site establishment 	<ul style="list-style-type: none"> ❖ Potential negative impact on the nearby CBA/ESA. 	This will affect the biodiversity of the receiving environment.	Site Establishment phase	<ul style="list-style-type: none"> ❖ Low-Medium 	<u>Control:</u> Keep mining within the approved footprint area.	<ul style="list-style-type: none"> ❖ Low
<ul style="list-style-type: none"> ❖ Site establishment 	<ul style="list-style-type: none"> ❖ Potential loss of Swartland Shale Renosterveld to access the mineral. 	This will affect the biodiversity of the receiving environment.	Site Establishment phase	<ul style="list-style-type: none"> ❖ Low-Medium (S1) ❖ Medium-High (S2) 	<u>Modify:</u> Adhere to the footprint of S1 instead of S2.	<ul style="list-style-type: none"> ❖ Low (S1) ❖ Medium-High (S2)
<ul style="list-style-type: none"> ❖ Site establishment 	<ul style="list-style-type: none"> ❖ Potential impact on fauna within the footprint area. 	This will affect the biodiversity of the receiving environment.	Site Establishment phase	<ul style="list-style-type: none"> ❖ Low-Medium 	<u>Control & Stop:</u> Implementing good management practices.	<ul style="list-style-type: none"> ❖ Low
<ul style="list-style-type: none"> ❖ Site establishment 	<ul style="list-style-type: none"> ❖ Potential impact on areas/infrastructure of heritage or cultural concern. 	This could affect the cultural and heritage legacy of the receiving environment.	Site Establishment phase	<ul style="list-style-type: none"> ❖ Low-Medium 	<u>Control & Stop:</u> Implementing good management practices.	<ul style="list-style-type: none"> ❖ Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
❖ Site establishment	❖ Alteration of the agricultural sense of place.	This impact affects the agricultural operations of the property.	Site Establishment & Operational Phase	❖ Medium-High	<u>Control:</u> Implementing good management practices.	❖ Medium-High
❖ Site establishment	❖ Loss of agricultural land to allow for mining (site-specific footprint)	This impact affects the agricultural operations of the property.	Site Establishment & Operational Phase	❖ Medium	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	❖ Medium
❖ Site establishment	❖ Potential impact of mining on surrounding land use.	This impact affects the activities of the surrounding land users.	Site Establishment & Operational Phase	❖ Medium	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	❖ Low-Medium
❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation	❖ Dust nuisance caused by the disturbance of soil. ❖ Dust nuisance caused by blasting activities. ❖ Dust nuisance due to excavation, loading and vehicles transporting material. ❖ Dust nuisance due to landscaping activities.	Increased dust generation will affect the air quality of the receiving environment.	Site Establishment-, Operational-, and Decommissioning Phase	❖ Low-Medium ❖ Medium ❖ Medium ❖ Low-Medium	<u>Control:</u> Dust suppression methods and proper housekeeping.	❖ Low-Medium ❖ Medium ❖ Low ❖ Low
❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ	❖ Noise nuisance generated by earthmoving machinery. ❖ Noise nuisance because of blasting.	Should noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Site Establishment-, Operational-, and Decommissioning Phase	❖ Low-Medium ❖ Medium ❖ Low-Medium ❖ Low	<u>Control:</u> Noise suppression methods and proper housekeeping.	❖ Low ❖ Medium ❖ Low ❖ Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
❖ Sloping and landscaping during rehabilitation	<ul style="list-style-type: none"> ❖ Noise nuisance generated by excavation equipment and earthmoving machinery. ❖ Noise nuisance generated during the rehabilitation phase. 					
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Loss/contamination of stockpiled topsoil. ❖ Potential erosion of denuded areas. ❖ Soil erosion. ❖ Loss of reinstated topsoil from denuded areas. 	The loss/contamination of topsoil will affect the rehabilitation of the excavation upon closure of the site.	Site Establishment-, and Decommissioning Phase	<ul style="list-style-type: none"> ❖ Low-Medium ❖ Low-Medium ❖ Low-Medium ❖ Low-Medium 	<u>Control & Remedy:</u> Proper housekeeping and storm water management.	<ul style="list-style-type: none"> ❖ Low ❖ Low ❖ Low ❖ Low
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Potential infestation of the topsoil heaps with weeds or invader plant species. ❖ Potential infestation of the reinstated areas with weeds and invader plant species. 	Infestation of the footprint by invader plant species may affect the biodiversity of the receiving environment.	Site Establishment-, and Decommissioning Phase	<ul style="list-style-type: none"> ❖ Low-Medium ❖ Low-Medium 	<u>Control & Remedy:</u> Implementation of an invasive plant species management plan.	<ul style="list-style-type: none"> ❖ Low ❖ Low
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Potential contamination of footprint area and surface runoff because of hydrocarbon spillages. 	Contamination of the footprint area will negatively affect the soil, surface runoff and potentially the groundwater. It will also	Site Establishment-, Operational-, and Decommissioning Phase	<ul style="list-style-type: none"> ❖ Low-Medium ❖ Low-Medium ❖ Low-Medium 	<u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.	<ul style="list-style-type: none"> ❖ Low ❖ Low ❖ Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	<ul style="list-style-type: none"> ❖ Contamination of area with hazardous-and/or general waste. ❖ Potential contamination of environment because of improper waste disposal. 	incur additional costs to the right holder.				
<ul style="list-style-type: none"> ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Health and safety risk posed by blasting activities. ❖ Unsafe working environment for employees. ❖ Safety risk posed by un-sloped areas. 	An unsafe working environment affects the labour force, as well as pose a threat to animals and humans that may enter the mining footprint.	Operational-, and Decommissioning Phase	<ul style="list-style-type: none"> ❖ Low-Medium ❖ Medium ❖ Medium 	<u>Stop & Control:</u> Adherence to the blasting rules and regulations, demarcation of the mining area and proper housekeeping.	<ul style="list-style-type: none"> ❖ Low ❖ Low ❖ Low
<ul style="list-style-type: none"> ❖ Drilling and blasting 	<ul style="list-style-type: none"> ❖ Potential impact of blasting vibrations on surrounding infrastructure. 	Blasting vibrations may affect the activities/infrastructure of the surrounding landowners.	Operational Phase	<ul style="list-style-type: none"> ❖ Medium 	<u>Control:</u> Adherence to the blasting rules and regulations.	<ul style="list-style-type: none"> ❖ Low-Medium
<ul style="list-style-type: none"> ❖ Excavation, loading and hauling to the processing plant of BDQ. 	<ul style="list-style-type: none"> ❖ Deterioration of the access road (farm road) to the mining area. 	Collapse of the road infrastructure will affect the landowner.	Operational Phase	<ul style="list-style-type: none"> ❖ Medium 	<u>Control & Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining.	<ul style="list-style-type: none"> ❖ Low
<ul style="list-style-type: none"> ❖ Excavation, loading and hauling to the processing plant of BDQ. 	<ul style="list-style-type: none"> ❖ Potential impact on the groundwater of the footprint area. 	An impact on the groundwater of the area	Operational Phase	<ul style="list-style-type: none"> ❖ Medium 	<u>Control:</u> Control the mining depth to above the groundwater level.	<ul style="list-style-type: none"> ❖ Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
		will negatively affect all water users.				
❖ Excavation, loading and hauling to the processing plant of BDQ.	❖ Potential impact on the Berg River due to surface runoff.	An impact on the Berg River will negatively affect the downstream water users.	Operational Phase	❖ Low-Medium	<u>Control:</u> Implementing proper housekeeping practices and stormwater control measures.	❖ Low

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked Appendix N.

j) Summary of specialist reports.

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):

Table 31: Summary of specialist reports.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
<p>Archaeological Report:</p> <p>Archaeological Impact Assessment Bridgetown Quarry.</p> <p>December 1996</p> <p><i>(See Appendix L for a full copy of the assessment)</i></p>	<p><u>Recommendations:</u></p> <ul style="list-style-type: none"> ❖ As there are no know archaeological occurrences of significance on the property, mining will not affect these resources. As archaeological visibility is low, it is recommended that provision be made for: ❖ informing staff operating the mine of the kinds of archaeological materials that may be encountered in subsurface exposures and ❖ making provision for periodic inspection of exposures, especially when the topsoil is removed in preparing a new quarry block 	<p>All the recommendations proposed by the specialist are implemented on site.</p>	<p>Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: <i>Cultural and Heritage Environment.</i></p> <p>Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: <i>Archaeological, Heritage and Paleontological Aspects.</i></p>

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	<p>❖ If the quarry operation will threaten the ruined structures on the property then it is recommended that their possible historical significance be investigated before demolition. This investigation would entail consulting the diagrams in the Deeds Office and possibly relevant archival records to establish the history of ownership and the position of any buildings on the property. This recommendation applies particularly to the large ruin near point 8.</p>		<p>Part A(1)(u)(i)(2) Impact on any national estate referred to in section 3(2) of the NHRA.</p>
<p>Botanical Survey Report</p> <p>Botanical Survey of the Proposed Northern Section of the Bridgetown Dolomite Quarry.</p> <p>August 1997</p> <p><i>(See Appendix K2 for a full copy of the document)</i></p>	<p><u>Recommendations:</u></p> <p>The Succulent Karoo vegetation of the study area is of high conservation value and if possible, the entire site should be protected. This would require another source of dolomite to be found. If, notwithstanding the conservation value of the Succulent Karoo vegetation of the site, the quarry is to be established every effort should be made to conserve a viable, representative portion of the rare shrubland habitat.</p> <p>The two Mesembryanthemaceae, along with other species which may be found to be significant in the following survey, could possibly be transplanted into areas with have similar soil conditions.</p> <p>If mining is to go ahead in the area it is essential that certain conditions be attached which will guarantee the survival of the undisturbed areas. These would have to be addressed in a detailed management plan.</p> <p>Important issues which amongst others, will have to be addressed in the management plan would include:</p>	<p>The following recommendations were implemented on site:</p> <ul style="list-style-type: none"> ❖ The quarry area should be fenced off, limiting disturbance to as small an area as possible. If possible, the fence line should run within a meter of the edge of the quarry pit. ❖ Mechanisms should be put in place to reduce the risk of erosion of the edges of the quarry or possible collapsing of the sides of the quarry. ❖ If possible, there should be only one access road to the quarry and the approach should be over agricultural land only. ❖ An environmental control officer should be employed to monitor the mining and to ensure that the measures that need to be taken to protect the remaining vegetation are implemented. 	<p>Part A(1)(d)(ii) Description of the activities to be undertaken: <i>2.4.1.1 Botanical Investigation.</i></p> <p>Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: <i>Vegetation.</i></p> <p>Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: <i>Mining, Biodiversity and Vegetation.</i></p> <p>Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity: <i>1. Bridgetown Dolomite Quarry.</i></p>

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	<ol style="list-style-type: none"> 1. The quarry area should be fenced off, limiting disturbance to as small an area as possible. If possible, the fence line should run within a meter of the edge of the quarry pit. 2. Mechanisms should be put in place to reduce the risk of erosion of the edges of the quarry or possible collapsing of the sides of the quarry, although these may be unlikely due to the nature of the substrate. 3. If possible, there should be only one access road to the quarry and the approach should be over agricultural land only. 4. An environmental control officer should be employed to monitor the mining and to ensure that the measures that need to be taken to protect the remaining vegetation are implemented. 5. The mining company should be responsible for the employment of a person or persons to carry out the transplanting of plants to new sites. 6. The remaining Succulent Karoo vegetation as well as the adjacent floodplain vegetation should be protected in a proclaimed nature reserve. This would be a reserve, which would almost entirely surround the quarry site. 7. Disturbed areas within the nature reserve should be rehabilitated and no grazing should be permitted in these areas. 8. No dumping of any form should be allowed in the nature reserve. 9. Mitigation measures should be implemented to reduce excessive dust levels. 	<ul style="list-style-type: none"> ❖ The mining company should be responsible for the employment of a person or persons to carry out the transplanting of plants to new sites. ❖ No dumping of any form should be allowed. ❖ Mitigation measures should be implemented to reduce excessive dust levels. ❖ Alien vegetation should be cleared and an ongoing eradication programme should be implemented. 	

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	10. Alien vegetation should be cleared from the nature reserve and an ongoing eradication programme should be implemented.		
<p>Geological Report</p> <p>Geological Report: Bridgetown Dolomite Mine.</p> <p>March 2008</p> <p><i>(See Appendix I2 for a full copy of the document)</i></p>	<p>The purpose of this report was to collate the geological data, which has been ascertained at Bridgetown over the years since prospecting, and mining commenced. The report calculated the reserves and discussed the threats and risks of the operation.</p> <p>The report did not make recommendations and concluded that:</p> <ul style="list-style-type: none"> ❖ The Bridgetown Dolomite Mine's "northern deposit" has a future life of 26 years (2008) at present production rates. The dolomite ore reserves have been properly established and the mining is proceeding satisfactorily. ❖ Further dolomite resources have been indicated in the "southern deposit" where additional prospecting is required. 	N/A	<p>Part A(1)(d)(ii) Description of the activities to be undertaken: 2.3.1 <i>Chemistry and Geology</i>.</p> <p>Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: <i>Geology and Soil</i>.</p> <p>Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: <i>Geology and Soil</i>.</p> <p>Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity: 1. <i>Bridgetown Dolomite Quarry</i>.</p>

k) Environmental impact statement

i) Summary of the key findings of the environmental impact assessment;

The key findings of the environmental impact assessment regarding the proposed DQ entail the following:

Project proposal:

- ❖ Lime Sales Limited intends submitting a S102 amendment application to add 13.0949 ha over Portion 1 of the farm Drieheuvels 399, to the current 168.5502 ha mining footprint of the Bridgetown Dolomite Quarry. The DQ will be mined through conventional opencast methods, upon which the mined material will be delivered to the BDQ for processing at the existing Ag-lime plant. An existing road can be used to gain access to the proposed DQ and the infrastructure/equipment to be established will be of temporary nature.

Topography:

- ❖ The DQ will cut into the eastern slope of the hill. Due to the nature of the activity, the topography of the hill will be altered in that the eastern facing rise will be mined out; to be rehabilitated with a stepped/sloped face along the western boundary of the proposed mining area.

Visual Characteristics:

- ❖ The proposed quarry will mainly be visible from the eastern and western banks of the Berg River within the short to medium distance (maximum 6 km) zone; however, as the distance between the proposed development and the observer increases the visual impact will decrease. To the north, north-west the visual impact will be negligible.

Air and Noise Quality:

- ❖ The prevalent wind direction of the study area is in a south to south-western direction during the summer months, changing to a north, north-western direction during winter, highly reducing the potential of dust blowing from the operation towards the surrounding landowners (opposite the river).
- ❖ The proposed DQ does not trigger an application in terms of the NEM:AQA, 2004, and emissions to be generated is expected to entail dust due to the

displacement of soil and transport of material on gravel roads. Should the right holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low-medium significance.

- ❖ The proposed activity will contribute noise generated because of blasting, as well as loading, and transporting of material. The nuisance value of noise generated by the proposed operation, to residence in the near vicinity is deemed to be of low-medium significance.

Geology:

- ❖ The LexRox report concluded that the laboratory results confirm that the dolomite samples collected from the 100 m due diligence RC drilling program on the Drieheuvels 399 property are generally comparable and almost certainly of better quality when compared to dolomite mined and processed into a saleable product at the SPH Bridgetown Quarry (LexRox 2017).

Hydrology:

Surface Water:

- ❖ The NFEPA status of the study area is classified as a no priority area, and no wetlands or other drainage line were identified within the proposed footprint area. The proposed DQ does however fall within 500 m of the Berg River and therefore may require a Water Use Authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21(i). The right holder is in discussion with the DWS to determine the way forward.

Groundwater:

- ❖ Due to the proximity of the DQ to the BDQ, the groundwater level is expected to be similar. The right holder indicated that the DQ mining footprint would only be mined up to the groundwater level; no mining will continue below the groundwater level.

Biodiversity Conservation Areas:

- ❖ Ground truthing confirmed that the proposed footprint of S1 has been altered by agricultural practices and no natural areas of conservation concern are left. The footprint proposed for S2 however, extends over a

portion with natural occurring Swartland Shale Renosterveld that is classified as Critically Endangered.

Vegetation:

- ❖ No natural occurring Renosterveld remains within the proposed footprint. However, the proposed footprint of S2 includes an area with natural vegetation that has not been altered by agriculture.

Cultural and Heritage Environment:

- ❖ No sites of archaeological or cultural importance were identified during the site inspection. Consultation with the interested and affected parties did not identify any potential area of concern and the SAHRA palaeontological sensitivity map shows that the area is of Low concern. The potential impact of the proposed mining activities on the cultural and/or heritage environment is therefore deemed insignificant.

Existing Infrastructure:

- ❖ As the proposed mining area will be developed on a wheat field, no infrastructure exists (on site) that will be impacted on.
- ❖ The existing farm road will be used to reach the mining area and the right holder will be responsible for the maintenance of the road for the duration of the operational phase.

Land Use:

- ❖ Mining will temporarily affect 13.1 ha of Portion 1 of the farm Drieheuvels 399.
- ❖ Upon closure the excavation will be rehabilitated and once again be available for agricultural use.

ii) Finale Site Map

Provide a map at an appropriate scale, which superimposes the proposed overall activity and its associated structure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers Attach as **Appendix**

See the maps showing the site activities attached as Appendix C1 and C2 respectively.

iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

The positive impacts associated with the Bridgetown Dolomite Operation (BDQ & DQ) include:

- ❖ The site's (BDQ) locational advantages for supply of dolomite flux to the Arcelor Mittal Steel plant, offers a transport cost saving of half of that of the only alternative high-grade dolomite site at Vredendal / Van Rhynsdorp.
- ❖ Given that the steel plant uses only dolomite material in the size range +13 mm to -40 mm, while the Ag-lime size specification is -1.7 mm, the Ag-lime plant (BDQ) thus effectively uses the mine grit and dust waste production from the metallurgical plant to manufacture Ag-lime.
- ❖ In addition, the Ag-lime plant (BDQ) uses the slimes (recovered from the metallurgical plant's washing screens) which would otherwise represent a significant environmental impact.
- ❖ Dolomite aggregate and sand is required in the surrounding districts for civil engineering projects, road surfacing and decorative purposes.
- ❖ Lime Sales Ltd could exploit the dolomite resource on Portion 1 of the farm Drieheuvels 399, while making use of the existing infrastructure at BDQ.
- ❖ The use of the BDQ processing infrastructure, lessens the impact on the environment both directly (e.g. dust and noise generation, risk of pollution, visual impact), and indirectly (e.g. need for electricity, water and maintenance services).
- ❖ The proposed mine plan lowers the initial DQ setup- and production cost.
- ❖ The land-use of the property will be diversified, and the mining activity will contribute compensation funds to the landowner.
- ❖ Without the need to decommission mining/processing related infrastructure, the rehabilitation of the DQ footprint will be less expansive.

The negative impacts associated with BDQ that were deemed to have a Moderate or higher significance/risk includes:

Bridgetown Dolomite Quarry:

- | | |
|--------------|--------------------|
| ❖ Soil | Moderate |
| ❖ Geology | Significant |
| ❖ Topography | Moderate |
| ❖ Vegetation | Significant |

❖ Surface Water	Moderate
❖ Groundwater	Significant
❖ Air Quality (Dust)	Significant
❖ Noise	Significant
❖ Blast Vibration	Significant
❖ Fly Rock	Moderate

The negative impacts associated with the proposed DQ that were deemed to have a Low-Medium or higher significance/risk includes:

❖ Visual intrusion because of site establishment	Medium
❖ Alteration of the agricultural sense of place	Medium-High
❖ Loss of agricultural land to allow for mining	Medium
❖ Potential impact of mining on surrounding land use	Low-Medium
❖ Dust nuisance caused by the disturbance of soil	Low-Medium
❖ Dust nuisance caused by blasting activities	Medium
❖ Noise nuisance because of blasting	Medium
❖ Potential impact of blasting vibrations on surrounding infrastructure	Low-Medium
❖ Visual intrusion associated with the excavation area	Medium

l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorization.

Table 32: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
<p>TOPOGRAPHY AND VISUAL CHARACTERISTICS</p> <p>Visual Mitigation</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Bridgetown Dolomite Quarry - Northern Section:</u></p> <ul style="list-style-type: none"> ❖ Retain the cliffs facing east. ❖ Limit mining to above the 40 m contour in the east. ❖ Mine the topographic spur out as a slot only leaving residual exposed faces in the south, which are 10 m higher than the 40 m rim of the excavation. <p><u>Bridgetown Dolomite Quarry – Processing Plant:</u></p> <ul style="list-style-type: none"> ❖ Locate these facilities within the northern drainage basin. <p><u>Bridgetown Dolomite Quarry – Southern Section:</u></p> <ul style="list-style-type: none"> ❖ Mine from a central excavation outward so that only the skyline is lowered as seen from the east bank. ❖ Retain the cliffs and 20 m mining pillar largely limiting impact to overhead view only. <p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Ensure that the site have a neat appearance and is kept in good condition at all times. ❖ Store mining equipment in dedicated areas when not in use. 	<ul style="list-style-type: none"> ❖ Minimise the impact of the mining operations on the visual characteristics of the receiving environment during the operational phase, and minimise the residual impact after closure.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		<ul style="list-style-type: none"> ❖ Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area. ❖ Contain excavations to the approved footprint of the permitted area. ❖ Store topsoil and overburden heaps in the form of berms along the north-western and north-eastern boundaries of the mining footprint to screen the activities from residents on the eastern bank of the river. ❖ Rehabilitate the site upon closure to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum. 	
<p>AIR AND NOISE QUALITY</p> <p>Dust Mitigation</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Dust monitoring specialist to report monthly on dust levels at the mine.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Bridgetown Dolomite Quarry:</u></p> <ul style="list-style-type: none"> ❖ Pre-wet earmarked area prior to topsoil stripping or overburden blasting. ❖ Schedule topsoil stripping/overburden blasting out of the dry windy season, during calm (avoid high wind conditions) days. ❖ Armour permanent haul roads to lessen dust generation, and use a water truck to wet temporary haul roads. ❖ Control dust generation at the primary tipping area with a semi-enclosed hopper, and the installation of a water sprayer system. ❖ Enclose the transfer points, install water sprayers and enclose the screen in a screen house to control dust from the conveyor belts. Implement semi-wet screening. ❖ Enclose the Ag-lime milling and screening plant. ❖ Maintain low-level stockpiles with a maximum moisture content at the Ag-lime stockpiling and loading area. ❖ Make use of a water truck to control the generation of dust on roads adjacent to farm houses/wheat fields. 	<ul style="list-style-type: none"> ❖ Dust prevention measures are applied to minimise the generation of dust.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		<ul style="list-style-type: none"> ❖ Retain the berm and trees that were established at the old Ag-lime plant site (1998-2009) to limit the impact of dust on the adjacent residents. ❖ Maintain the dust monitoring system implemented at the site. <p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Control the liberation of dust into the surrounding environment by the use of; inter alia, water spraying and/or other dust-allaying agents. ❖ Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. ❖ Limit speed on the haul roads to 20 km/h to prevent the generation of excess dust. ❖ Minimise areas devoid of vegetation, and only remove vegetation immediately prior to mining. ❖ Cover, alternatively plant topsoil/overburden stockpiles around the footprint with indigenous grass species to minimise exposed surface areas, reducing windblown dust from the site. ❖ Flatten and cover loads to ensure minimal spillage of material takes place during transportation, also preventing windblown dust. ❖ Consider weather conditions upon commencement of daily operations. ❖ Extend the fallout dust monitoring system, already in place at BDQ, to the DQ area. ❖ Ensure dust-generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012). ❖ Implement best practice measures during the stripping of topsoil, excavation, and transporting of material from site to minimize potential dust impacts. 	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
<p>AIR AND NOISE QUALITY</p> <p>Noise Mitigation</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Occupational hygienist to monitor compliance of the site.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Bridgetown Dolomite Quarry:</u></p> <ul style="list-style-type: none"> ❖ Implement continuous noise monitoring. ❖ Provide employees with the correct PPE. ❖ Ensure blasting take place under favourable weather conditions i.e. no blasting allowed under low cloud, temperature inversions, or during windy conditions. ❖ Monitor the noise- and vibration levels of each blast. <p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Only operate the site during daylight hours from Monday to Saturday. ❖ Ensure that employees and staff conduct themselves in an acceptable manner while on site. ❖ No loud music may be permitted at the mining area. ❖ Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996. ❖ Plan the type, duration and timing of the blasting procedures with due cognizance of other land users and structures in the vicinity. Notify the surrounding landowners in writing prior to each blasting occasion. ❖ Implement best practice measures to minimise potential noise impacts. ❖ Ensure noise generated by the proposed activity comply with the Western Cape Noise Control Regulations (PN 200/2013), June 2013. ❖ Contract a qualified occupational hygienist to quarterly monitor and report on the personal noise exposure of the employees working at the mine. Monitoring must be in accordance with SANS 10083:2004 	<ul style="list-style-type: none"> ❖ Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		(Edition 5) sampling method as well as NEM:AQA 2004, SANS 10103:2008.	
<p>GEOLOGY AND SOIL</p> <p>Topsoil Handling</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Bridgetown Dolomite Quarry:</u></p> <ul style="list-style-type: none"> ❖ Remove all topsoil at least 500 mm deep from the southern section and possibly 200 mm from the south of the northern section. ❖ Remove topsoil in the plant area to 150 mm and stockpiled for later use in rehabilitation. ❖ The topsoil stockpiles should not be exceeded 3 m. When reused, the material will require re-nitrification either by legume planting or fertilising during replacement. <p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Strip and stockpile the upper 500 mm of the soil before mining. ❖ Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process. ❖ Ensure topsoil stripping, stockpiling and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time. ❖ Place the topsoil heaps on a levelled area within the mining footprint area, preferably along the north-western and north-eastern boundary of the mining area, and implement measures to safeguard the piles from being washed away. Do not stockpile topsoil in undisturbed areas. ❖ Ensure that topsoil heaps do not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. ❖ Keep temporary topsoil stockpiles free of invasive plant species. 	<ul style="list-style-type: none"> ❖ Adequate fertile topsoil is available to rehabilitate the mined area upon closure.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		<ul style="list-style-type: none"> ❖ Divert storm- and runoff water around the stockpile area to prevent erosion. ❖ Vegetate the topsoil heaps to be stored longer than 6 months with an indigenous grass seed mix if vegetation does not naturally germinate within the first growth season. ❖ Spread the topsoil evenly over the rehabilitated area upon closure of the site. ❖ Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. ❖ Plant a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover crop for optimum production. Rehabilitation extends until the first cover crop is well established. ❖ Control run-off water with temporary banks, where necessary, to prevent accumulation of run-off causing down-slope erosion. ❖ Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement. 	
<p>HYDROLOGY</p> <p>Erosion Control and Storm Water Mitigation</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Bridgetown Dolomite Quarry:</u></p> <ul style="list-style-type: none"> ❖ Provide storm water cut-off trenches above topsoil berms, waste dumps, plant and product stockpile area. Such trenches must lead into storm water retention ponds. ❖ Add silt runoff collection trenches below topsoil berms, waste dumps, plant, manoeuvring and product stockpile areas. These trenches must lead to silt retention ponds from which silt is removed by excavator or FEL to be disposed of as layers in the overburden dump. 	<ul style="list-style-type: none"> ❖ Impact to the environment caused by storm water discharge is avoided.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		<ul style="list-style-type: none"> ❖ Ensure that the quality of storm water released from the retention ponds does not exceed the ambient TSS load of runoff from the surrounding wheat fields. ❖ Adhere to the requirements of the water use authorisations and that all activities take place a distance from the western edge of the Misverstand Dam to allow for sufficient space for effective silt retention capabilities. <p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Slow the runoff from compacted surfaces down and disperse it sufficiently to prevent accelerated erosion. ❖ Put erosion control measures in place to minimise erosion along the proposed mining area. Take extra precautions in areas where the soils are deemed highly erodible. ❖ Do not stockpile soil on or near steep slopes. ❖ Control all drainage from the project area to prevent off-site pollution, flooding or damage to infrastructure downstream of any storm water discharge points. ❖ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS. 	
<p>HYDROLOGY</p> <p>Surface- and Groundwater Mitigation Measures</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Bridgetown Dolomite Quarry:</u></p> <ul style="list-style-type: none"> ❖ Provide the vehicle-refuelling bay with a concrete apron to catch diesel spills from the workshop, and ensure that the workshop floor and apron drains to an oil trap. ❖ Direct foul water from the offices and personnel amenities into properly sized and constructed conservancy tanks and French drains suitably backfilled with stones to achieve sufficient soak away in the phyllite. 	<ul style="list-style-type: none"> ❖ Impact to the surface- and groundwater because of mining is avoided.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		<p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Implement the storm water mitigation measures as proposed in this document. ❖ Extend the current water-monitoring programme of BDQ to include the DQ mining area. Collect water samples from the Berg River upstream and downstream of the mining operations. ❖ Restrict the mining depth to the groundwater level of the footprint. ❖ Obtain the opinion of a geohydrologists should the groundwater table be intersected, to guide future mining operations. 	
<p>MINING, BIODIVERSITY AND VEGETATION</p> <p>Vegetation Mitigation Measures Including the Protection of Swartland Shale Renosterveld, the CBA and ESA.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Botanist to assist with the relocation of plants of importance.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Bridgetown Dolomite Quarry:</u></p> <ul style="list-style-type: none"> ❖ Transplant plants of importance to the remaining vegetation type. ❖ Limit disturbance of natural vegetation to a small an area as possible. ❖ Prevent erosion of final pit edges. ❖ Build new roads on agricultural land and as far as possible avoid the natural vegetation. ❖ Employ an environmental officer. ❖ Take responsibility for transplanting endangered species (i.e. the company must employ an expert to conduct this operation). ❖ Do not allow dumping, grazing or any other activity in the natural areas. <p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Clearly demarcate the mining boundaries and contain all operations to the approved mining area. 	<ul style="list-style-type: none"> ❖ Vegetation clearing is restricted to the authorised development footprint of the mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		<ul style="list-style-type: none"> ❖ Declared the area outside the mining boundaries a no-go area, and educate all employees accordingly. ❖ Implement measures to limit flyrock falling outside the mining area. Collect and remove all flyrock (of diameter 150 mm or larger) that falls beyond the working area. 	
<p>MINING, BIODIVERSITY AND VEGETATION</p> <p>Management of Invasive Plant Species</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. ❖ Keep all stockpiles (topsoil & overburden) free of invasive plant species. ❖ Control declared invader or exotic species on the rehabilitated areas. 	<ul style="list-style-type: none"> ❖ Mining area is kept free of invasive plant species.
<p>FAUNA</p> <p>Protection of Fauna</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Bridgetown Dolomite Quarry:</u></p> <ul style="list-style-type: none"> ❖ Strive to preserve the cliff and riverine areas as a habitat for especially birds of prey and reptiles. <p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Ensure no fauna is caught, killed, harmed, sold or played with. ❖ Instruct workers to report any animals that may be trapped in the working area. ❖ Ensure no snares are set or nests raided for eggs or young. 	<ul style="list-style-type: none"> ❖ Disturbance to fauna is minimised.
<p>CULTURAL AND HERITAGE ENVIRONMENT</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p>	<p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Confine all mining to the development footprint area. 	<ul style="list-style-type: none"> ❖ Impact to cultural/heritage resources is avoided or at least minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
Archaeological, Heritage and Palaeontological Aspects	<p>Archaeologist to comment should any features of importance be unearthed.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> ❖ Implement the following change find procedure when discoveries are made on site: <ul style="list-style-type: none"> ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. ▪ Work may only continue once the go-ahead was issued by SAHRA. 	
<p>LAND USE AND EXISTING INFRASTRUCTURE</p> <p>Mitigating the Impact on Surrounding Land Use</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Implement the visual-, dust-, noise-, water-, waste- and health and safety mitigation measures as proposed in this document. 	<ul style="list-style-type: none"> ❖ Mining has the least possible impact on the surrounding land uses.
<p>LAND USE AND EXISTING INFRASTRUCTURE</p> <p>Access Road Mitigation</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p>	<p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Divert storm water around the access road to prevent erosion. 	<ul style="list-style-type: none"> ❖ The access road remains accessible to the landowner during the operational phase, and upon closure, the road is returned in a

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
	Compliance to be monitored by the Environmental Control Officer.	<ul style="list-style-type: none"> ❖ Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas. ❖ Repair rutting and erosion of the access road caused as a direct result of the mining activities. ❖ Prevent the overloading of the trucks. 	better, or at least the same state as received by the right holder.
<p>GENERAL</p> <p>Waste Management</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Registered waste handling contractors to dispose of waste generated at the mine.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Ensure regular vehicle maintenance, repairs and services are done at the off-site workshop and service area of BDQ. Make sure drip trays are used when emergency repairs have to be done on equipment not able to move to the workshop. ❖ Equip the diesel bowser with a drip tray if used on site. The nozzle of the bowser must rest in a sleeve to prevent dripping after refuelling. ❖ Clean drip trays after use. Do not use dirty drip trays. ❖ Collect all hazardous waste products in a suitable receptacle and remove from the site, either for resale or for appropriate disposal at a recognised facility. Incorporate the hazardous waste generated at DQ into the existing hazardous waste handling system of BDQ. ❖ Clean spills immediately, within 2 hours of occurrence, to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and disposing it into the existing hazardous waste handling system of BDQ (if possible), or at a recognised facility. File proof. ❖ Contain all general waste within the site vehicles and daily remove it from the mining area to the general waste storage area of BDQ. ❖ Encourage re-use or recycling of waste products. ❖ Prevent the burning or burying of waste on site. 	<ul style="list-style-type: none"> ❖ Wastes are appropriately stored, handled and safely disposed of at a recognised waste facility.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		<ul style="list-style-type: none"> ❖ Ensure employees make use of the formal ablution facilities. Provide ablution facilities in the form of a chemical toilet. An accredited liquid waste handling contractor must service the toilet at least once a week. ❖ Ensure that the use of temporary, chemical toilet facility do not cause pollution of water sources, or pose a health hazard. In addition, prevent any form of secondary pollution from the disposal of refuse or sewage. Address any pollution problems immediately. ❖ Contain wastewater and safely dispose thereof when small volumes of wastewater is generated during the life of the mine. No discharge into the natural environment allowed. ❖ Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the DWS and other relevant authorities. 	
<p>GENERAL</p> <p>Management of Health and Safety Risks</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Health and safety representative to manage H&S aspects at the mine.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Bridgetown Dolomite Quarry:</u></p> <ul style="list-style-type: none"> ❖ Construction an overburden bench about 4 - 5 m wide around the perimeter of the quarry excavations. ❖ Maintain maximum charge per delay, when setting blasts, to ensure low vibration levels. <p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Ensure that workers have access to the correct PPE as required by law. ❖ Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). ❖ Plan the type, duration and timing of blasting with due cognizance of other land users and structures in the vicinity. 	<ul style="list-style-type: none"> ❖ Employees work in a healthy and safe environment.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		<ul style="list-style-type: none"> ❖ Inform the surrounding landowners and communities in writing ahead of any blasting event. ❖ Monitor the compliance of ground vibration and airblast levels to USBM standards with each blasting event. ❖ Record all blasts with a vibro recorder. ❖ Give audible warning of a pending blast at least 3 minutes in advance of the blast. ❖ Limit fly rock, and collect and remove flyrock and rock spill that falls beyond the working area. 	
<p>GENERAL</p> <p>Rehabilitation of the Excavated Area</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<p><u>Drieheuvels Quarry:</u></p> <ul style="list-style-type: none"> ❖ Use the excavated area as a final depositing area for the placement of overburden. ❖ Dump rocks and coarse material removed from the excavation into the pit. ❖ Prevent the deposition of any waste into the excavation. ❖ Return the topsoil previously stored to its original depth over the area once overburden, rocks and coarse natural material have been added to the excavation and it was profiled with acceptable contours and erosion control measures. ❖ If necessary, fertilize the area to allow vegetation to establish rapidly. Seed the site with a local or adapted indigenous seed mix should natural vegetation not re-establish within 6 months from closure. 	<ul style="list-style-type: none"> ❖ The residual impact of the mine on the receiving environment is minimised.

m) Final proposed alternatives.

(provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives, which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

As explained under *Part A(1)(g) Motivation for preferred development footprint* two site alternatives were considered. The footprint of S2 extends over an area with Swartland Shale Renosterveld that is classified as Critically Endangered, and even though the layout of this footprint allows a simpler mine design the footprint of S1 was identified as the preferred alternative. See the final site map attached as Appendix C2.

n) Aspects for inclusion as conditions of Authorization.

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorization

The management objectives listed in this report under *Part A(1)(L) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* above should be considered for inclusion in the environmental authorisation.

Additional to those conditions the following must be considered as conditions of the Environmental Authorisation:

- ❖ A land use application in terms of Section 25(2) of the Swartland Municipality By-Law relating to Municipal Land Use Planning (PG 7741 of March 2017) must be approved for the proposed mining footprint over Portion 1 of the farm Drieheuvels 399.
- ❖ A land development application in terms of Section 53 of the Land Use Planning Act, 2014 must be approved for the proposed mining footprint over Portion 1 of the farm Drieheuvels 399.
- ❖ The proposed mining area falls within 500 m of the Berg River and may require a Water Use Authorization in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for water uses as defined in section 21 (c) and section 21 (i).

o) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

The assumptions made in this document which relate to the assessment and mitigation measures proposed, stem from site-specific information gathered from BDQ's site management, as well as site inspections, and background information. No uncertainty regarding the proposed project (DQ) or the receiving environment could be identified.

p) Reasoned opinion as to whether the proposed activity should or should not be authorized

i) Reasons why the activity should be authorized or not.

BDQ has been operational for 29 years and this report accompanies a Section 102 amendment application to expand the existing mining boundaries to include the proposed mining area on Portion 1 of the farm Drieheuvelds 399. Should the mitigation measures and monitoring programmes proposed in this document be implemented, no fatal flaws could at this point and time be identified that were deemed as severe as to prevent the activity continuing.

ii) Conditions that must be included in the authorization

(1) Specific conditions to be included into the compilation and approval of EMPr

The management objectives listed in this report under *Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr* must be included into the compilation and approval of the EMPr.

(2) Rehabilitation requirements

The rehabilitation- and closure objectives, for both BDQ as well as the proposed DQ, proposed in *Part B(d)(i) Determination of Closure Objectives* and the Rehabilitation Plan attached as Appendix O, to this report, must be included in the authorisation.

Once the entire mining area (BDQ & DQ) was rehabilitated the right holder is required to submit a closure application to the Department of Mineral Resources in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of*

the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report". The Closure Application will also be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

q) Period for which the Environmental Authorization is required.

The right holder requested that the Environmental Authorisation be valid for the duration of the mining right (at least until 2044).

r) Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic assessment report and the Environmental Management Programme report.

The undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme report.

s) Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

i) Explain how the aforesaid amount was derived.

The annual amount required to manage and rehabilitate the environment was estimated to be R 274 472. Please see the explanation as to how this amount was derived at attached as Appendix P – Financial and Technical Ability.

ii) Confirm that this amount can be provided for from operating expenditure.

(Confirm that the amount is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

Lime Sales Limited will be responsible for the financial and technical aspects of the proposed mining project. The operating expenditure is provided for as such in the Financial and Technical Ability attached as Appendix P to this report.

t) Deviations from the approved scoping report and plan of study.

i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).

This EIAR and EMPR accompanies a Section 102 application to extend the existing mining boundaries of BDQ to allow the mining of dolomite on Portion 1 of the farm Drieheuvelds 399. The amendment of the EIAR and EMPR was applied for in terms of GNR 326 Section 31 Amendments to be applied for in terms of Part 2, and therefore no scoping report and plan of study for scoping were applicable.

ii) Motivation for the deviation.

Not applicable.

u) Other Information required by the competent Authority

i) 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:

(1) Impact on the socio-economic conditions of any directly affected person.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix 219.1 and confirm that the applicable mitigation is reflected in 2.5.3, 2.11.6 and 2.12 herein).

The following potential impacts were identified that may affect socio-economic conditions of directly affected persons:

Bridgetown Dolomite Quarry:

❖ Agriculture and Land Capability

The 18.2 ha quarry area of the northern section was never used for agriculture due to the rocky soil conditions. Approximately 19 ha of arable soil in the Southern Mining Section will permanently be lost for agriculture when mining is finally completed in this area. The metallurgical plant and dolomite screenings stockpiles areas covering ±12 ha are temporary removed from agriculture. On final closure, the

plant area will be demolished rehabilitated and returned to agriculture. The dolomite screenings stockpiles will gradually be reclaimed for Ag-lime production. The aggregate plant will similarly be demolished, rehabilitated and returned to agriculture. As the average wheat production is 4.25 ton/ha, the permanent loss in wheat production will be 19×4.25 ton/ha, which is ± 81 tons wheat. This impact is insignificant.

❖ **Air Quality (Dust)**

In order to ensure that dust impact on the surrounding residences, workshops, pack shed and crops does not occur, the dust control/suppression measures as listed under the mitigation measures have been applied for each potential dust source.

A permanent “Dust Watch” dust monitoring system has been installed downwind of the dust sources at the Bridgetown project. To address complaints and to reduce the effects of the dust, the following changes were made at the old Ag-lime plant site between 1998 and 2009:

- ❖ A berm was built for wind and noise protection; and
- ❖ Trees were planted to reduce wind speed.

The old Ag-lime plant is now demolished but the berm and trees have been retained. In addition, a larger water-truck was purchased to continuously wet all the gravel roads at the project throughout the working day. The Environmental Management Committee (EMC), which was set up at the commencement of the northern section mining operations, monitors the results of the “Dust Watch” system. Current assessment of the level of complaints over the last 26 years by the farmers reflects a distinct reduction as no dust issues have been raised.

❖ **Noise**

Due to its remote location of the northern plant noise has never posed any problem to surrounding owners and the noise impact on employees is monitored by the company EOHS. The plant noise is, however reflected off the hill in the direction of the Tweevlei labourers’ cottages where noise levels are ± 50 dBA at a distance of 550 m. As the Tweevlei farmstead is located over the hilltop, the reflection of sound by the ridge

results in a very rapid decline of noise level with no significant impact on the Tweevlei residences. It must be borne in mind that noise dispersion is very sensitive to wind speed and direction.

While blasting has a “startling effect” on nearby people, it does not cause any damage to hearing. In order to reduce the impact of blasting noise blasting only takes place under favourable weather conditions i.e. no blasting under low cloud and or under temperature inversions. The noise levels caused by blasting is monitored and measured at every blast.

❖ **Blast Vibration**

The low-recorded vibration levels clearly indicate that blast vibration has no impact on surrounding structures.

❖ **Fly Rock**

As private structures and public access is available within 500 m of the blasting operations, Bridgetown Dolomite Mine J/V applied for and received permission to blast within 500 m of any building, public thoroughfare railway, power line or any place where people congregate. The Eskom 350 kVA power line supplying the Tweevlei residence and the dolomite production complex has been re-routed well to the south of its original position to avoid damage to the power line from blasting operations in the quarry. The mine will bear the cost of protecting the pump stations on the riverbank from fly-rock damage. The mine will also bear the responsibility of re-establishing any electrical supply to such pump stations should fly-rock damage their overhead power supplies. Alternatively, the mine will relay such lengths of cable underground to protect them from possible fly-rock damage.

Drieheuvels Quarry:

❖ **Visual intrusion associated with the proposed mining activities**

The proposed quarry will mainly be visible from the eastern and western banks of the Berg River within the short to medium distance (maximum 6 km) zone; however, as the distance between the proposed development and the observer increases the visual impact will decrease. To the north, north-west the visual impact will be negligible. If the

excavation is rehabilitated upon final closure of the site, the visual impact will be minimised and no residual impact is expected.

❖ **Alteration of the agricultural sense of place and loss of agricultural land to allow for mining**

Mining will affect 13.1 ha of the earmarked farm for the duration of the operational phase. The right holder and landowner signed an agreement to this affect (see Appendix F3). Upon final closure, the excavation will be rehabilitated to ensure that the footprint will once again be available for agricultural use by the landowner.

❖ **Potential impact of mining on surrounding land use, dust generation and increased noise levels**

As mentioned earlier, the prevalent wind direction of the study area is in a south to south-western direction during the summer months, changing to a north, north-western direction during winter, highly reducing the potential of dust blowing from the operation towards the surrounding landowners (opposite the river). Currently, the air quality of the study area is impacted on by the agricultural activities of the area. Should the right holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low-medium significance.

The noise to be generated at the DQ will contribute to the noise ambiance of the surrounding environment, currently impacted on by agricultural activities. The nuisance value of noise generated by the proposed operation, to residence in the near vicinity is deemed to be of low-medium significance. Blasting (instantaneous short duration noise) is proposed approximately once per month, and the noise generated by earthmoving equipment is deemed compatible with the machinery already operating in the area, especially during harvesting.

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

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as **Appendix 219.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein).

BDQ does not affect any sites of archaeological or cultural importance, and no -sites of importance were identified within the proposed footprint of the DQ. In light of this, no sites or artefacts classified as national estate as referred to in section 3(2) of the National Heritage Resources Act (Act 25 of 1999) were identified within the study area.

v) Other matter required in terms of section 24(4)(a) and (b) of the Act.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives as contemplated in sub-regulation 22(2)(h), exist the EAP must attach such motivation as **Appendix 4**)

The site alternatives for the proposed Drieheuvels Quarry, investigated during the impact assessment process, were done at the hand of information obtained during the site investigation, public participation process, specialist studies (BDQ) as well as desktop studies conducted of the study area. As discussed earlier the following alternatives were considered:

1. Site Alternative 1 – Extension of the existing Bridgetown Dolomite Quarry with 13.1 ha that extends over a wheat field.
2. Site Alternative 2 – Extension of the existing Bridgetown Dolomite Quarry with 13.46 ha that extends over an area with Swartland Shale Renosterveld.
3. Project Alternative – The use of the existing processing infrastructure at BDQ compared to establishing crushing and screening infrastructure at the DQ.
4. No-go Alternative – No change to the *status quo*.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Draft environmental management programme.

a) Details of the EAP,

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

The details and expertise of Ms C Fouche of Greenmined Environmental (Pty) Ltd that acts as EAP on this project has been included in *Part A(1)(a) Details of Greenmined Environmental* as well as Appendix R as required.

b) Description of the Aspects of the Activity

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required)

The aspects of the activity that are covered by the draft environmental management programme has been described and included in *Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity.*

c) Composite Map

(Provide a map (**Attached as an Appendix**) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers)

As mentioned under *Part A(1)(k)(ii) Finale Site Map* these maps have been compiled and are attached as Appendix C1 and C2 respectively.

d) Description of Impact management objectives including management statements

i) Determination of closure objectives.

(ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The primary objective, at the end of the mine's life, is to obtain a closure certificate at minimum cost and in as short a time period as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) [MPRDA]. To realise this, the following main objectives must be achieved:

- ❖ Remove all temporary infrastructure and waste from the mine as per the requirements of this EMPR and of the Provincial Department of Minerals and Resources.
- ❖ Demolish / dispose of permanent infrastructure with no post-mining use/potential.
- ❖ Ensure that no threat to the groundwater quality remains.
- ❖ Ensure that permanent changes in topography (due to mining) are sustainable and do not cause erosion or the damming of surface water.
- ❖ Shape and contour disturbed areas in compliance with the EMPR.
- ❖ Make all excavations safe.
- ❖ Ensure that all rehabilitated areas are stable and self-sustaining in terms of vegetation cover.

The site-specific closure objectives are discussed in detail in the attached Rehabilitation Plan (Appendix O), however, a summary of the closure objectives for the Bridgetown Dolomite Operation were included below.

1. BRIDGETOWN DOLOMITE QUARRY

The following objectives are leading closure indicators that need to be applied across all domains, read in conjunction with the principles that embody the strategic objectives. The rehabilitation plan must address all the areas associated with closing the operations, of which rehabilitation and re-vegetation forms part of a component.

The first step in developing the overall mine closure strategy is to identify potential post mining land use options and establish key objectives for closure to be incorporated in the project design. The preferred post-mining land use for BDQ is to return the area to agricultural use, whereby the excavations will be designed as landscape features. It is proposed that the excavations will be flooded to the Misverstand Dam's full supply level of ± 26 m to ± 34 m. As cliffed water bodies the excavations will serve primarily, as waterfowl and bird of prey sanctuaries, while simultaneously increasing the dam's capacity by $\pm 4 - 5$ million m^3 .

In this context, the primary objectives for the closure of the mining operations are:

- ❖ Establish a safe and stable post-mining land surface which supports vegetation growth and is erosion resistant over the long-term;
- ❖ Re-establish a self-generating ecosystem comprising local indigenous fauna and flora which resembles the surrounding environment, as close as practical;
- ❖ Leave the rehabilitated area in a safe, stable, non-polluting and tidy state with no remaining mining related plant or –infrastructure that is not required for post-operational use;
- ❖ Minimise downstream impacts on vegetation due to interruption of drainage; and
- ❖ Identify any potential long-term soil-, surface water-, or groundwater pollution associated with the rehabilitated area and formulate an action plan to address this.

The following general specifications (listed below and presented in the following figures) will be standard throughout the rehabilitation process:

- ❖ An overburden bench about 4 - 5 m wide must be constructed around the perimeter of the quarry excavations.
- ❖ Vegetation must be established on sloped benches to stabilise the soil and lessen the visual impact.

Bench Planting:

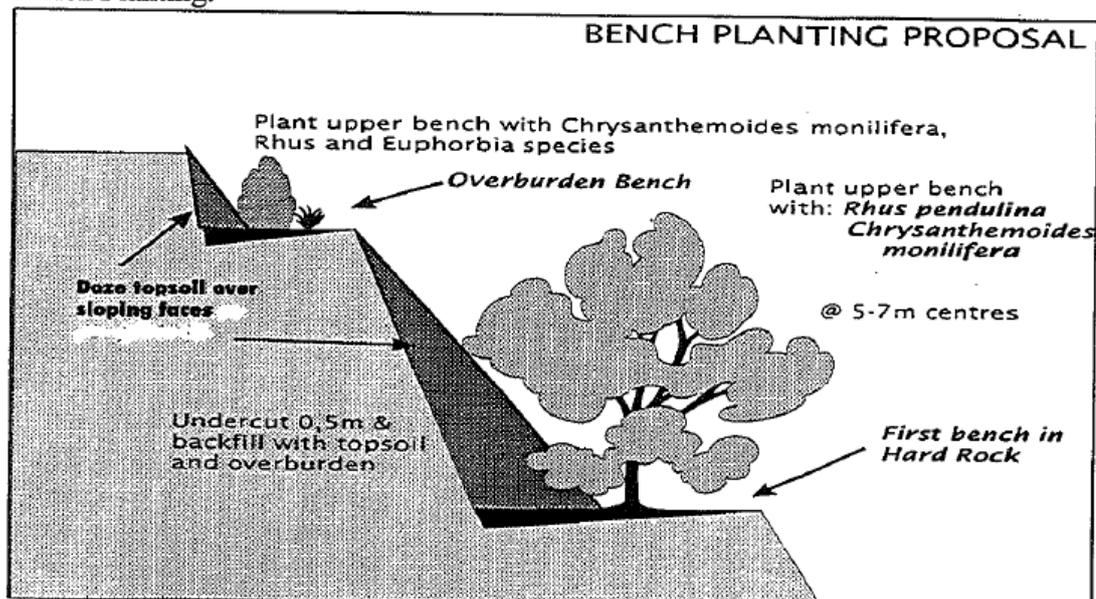


Figure 42: Bench planting proposal.

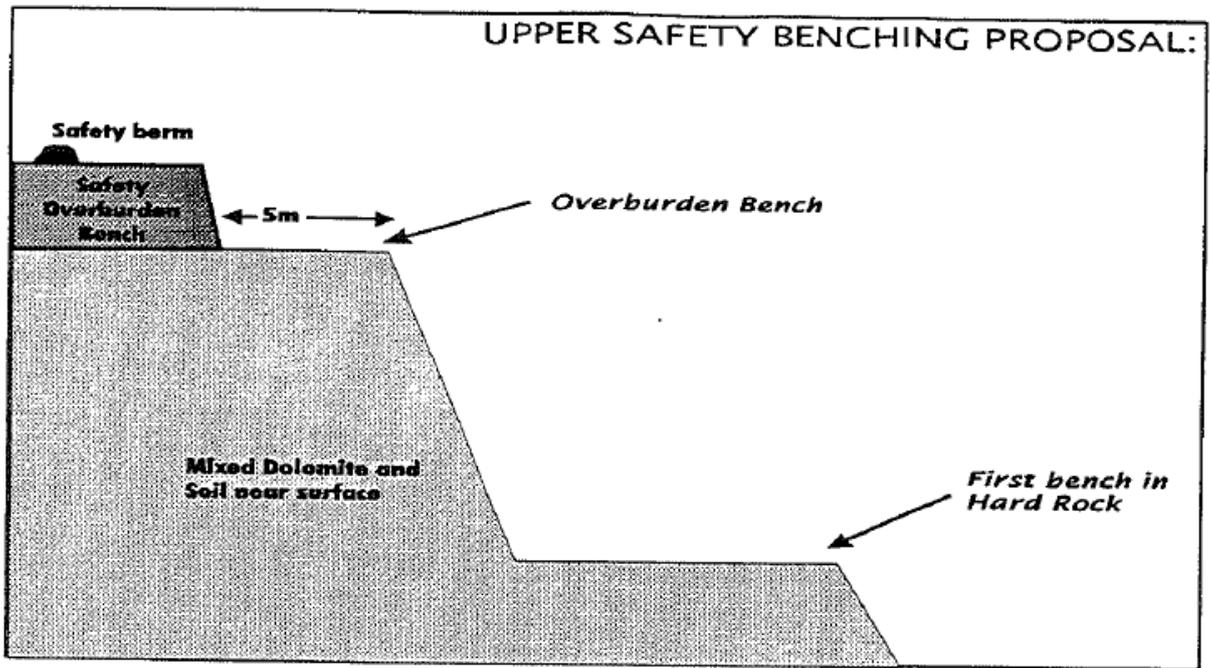


Figure 43: Upper safety benching proposal.

1.1 Design Principles

Upon closure of the quarry, Lime Sales Ltd, will contract the expertise of a rock engineer to guide the final design of the excavations. The rock engineer will be directed by the rehabilitation measures proposed in the 2009 EMPR, as summarized below:

1.1.1 Northern Section

The northern section will require the bulk of the investment to decommissioning and rehabilitation measures as listed below:

Excavation

When the final perimeter of the northern section quarry is reached, upper level perimeter benching will be conducted. This involves the construction of a ± 5 m wide overburden bench with a face height of 2 - 3 m to act as a safety bench around the entire periphery of the excavation. The southern faces are up to 10 m higher than the eastern, northern and western faces and will be bench planted to reduce their impact on the adjacent Berg River / Misverstand Dam.

The optimal situation to be achieved would be if the water in the flooded excavation could circulate naturally. This can best be achieved if the Misverstand Dam's full supply level is raised to level 34 m and two short slots at level 30 m can be developed from the excavation into the dam to the north and east. If however, the Misverstand Dam's full supply level is not increased, then one slot should be developed to the east at the 24 m level. Water circulation would still occur, but at a much slower rate.

Plant and Stockpiling Area

When the overburden dump reaches its final configuration, the surface and leading edges will be levelled (if applicable), fertilized and seeded. Furthermore, optional excavation rehabilitation includes the dumping of overburden followed by topsoil over the upper faces of the excavation. Upon final closure, all plant is to be removed. Any excess stock is to be placed neatly in one section of the stockpiling area. The entire area is to be ripped, topsoil and seeded with the landowner's preference of seed mix.

Buildings and Structures

The buildings not required by the landowner in future must be demolished, the foundations removed and the building rubble tipped into the excavation before flooding. The resultant hardened areas are to be ripped, topsoiled and seeded.

1.1.2 Southern Section

In the southern mining section, very few activities must remain if the operational measures were successfully implemented. The bulk of the rehabilitation in this phase will be taken up by the excavation of a water ingress point from the by then possibly increased Misverstand Dam. It is proposed to allow water in through a blasted adit with a floor level of 30 m (i.e. advance existing bench level 30 m in the area and allowing the quarry to flood). This will be done should the excavation not be filled by waste rock from the northern section (no longer applicable as the quarry was already refilled).

All hardened surfaces such as roads or other high activity areas not required by the landowner will be ripped, top soiled and seeded with a grass seedmix as required by the landowner, including wheat if required.

As the topsoil in the southern excavation is thicker and continuous, some of this area's topsoil will be used in the rehabilitation of the northern quarry and the remainder will be stored in 3 m high windrows until final rehabilitation of the mining area.

1.1.3 Final Rehabilitation

Access Roads

Access roads or portions thereof that will no longer be required by the landowner will be removed and rehabilitated to the satisfaction of the Regional Manager (DMR). Unwanted roads will be ripped or ploughed, and if necessary appropriately fertilised. Any gate, wall or fence erected by BDQ must be removed as per agreement with the landowner. Storm water control structures, such as berms, will be installed to prevent erosion of the rehabilitated roads.

Alien Invader Control

The aim of alien vegetation control is to effectively identify and remove alien vegetation and understand the importance of indigenous vegetation. The flood plain vegetation (outside operational mining footprint) was significantly invaded by alien invader plant species upon destruction of the natural vegetation due to trampling by sheep and cattle. Control of the problem plants must take place during the decommissioning phase.

2. DRIEHEUVELS QUARRY

The decommissioning phase will entail the rehabilitation of the mining site. Upon cessation of the mining activities, the area will be fully rehabilitated. The face along the western boundary of the excavation will either be sloped at 1:3 to the pit floor, to prevent soil erosion, or be stepped by creating benches of not more than 3 meters high. Due to the nature of the project, no

buildings/infrastructure have to be removed. The right holder will comply with the minimum closure objectives as prescribed by DMR and detailed below:

Rehabilitation of the excavated area:

- ❖ The excavated area must serve as a final depositing area for the placement of overburden.
- ❖ Rocks and coarse material removed from the excavation must be dumped into the excavation.
- ❖ No waste may be permitted to be deposited in the excavations.
- ❖ Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.
- ❖ The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within 6 months from closure of the site.
- ❖ If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMR) may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification

Final rehabilitation:

- ❖ Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
- ❖ All equipment, plant, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
- ❖ Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.

- ❖ The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) need to be eradicated from the site.
- ❖ Final rehabilitation must be completed within a period specified by the Regional Manager (DMR).

Control of invasive plant species is an important aspect after topsoil replacement and seeding has been done in an area. Site management must implement an invasive plant species management plan (see Appendix M) during the 12 months' aftercare period to address germination of problem plants in the area.

ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

Bridgetown Dolomite Quarry:

Bi-annual water monitoring takes place at five positions in and around BDQ. DWS granted Lime Sales Ltd a GA to pump seepage water to the side-stream.

The mine further implements the following monitoring programs to manage the impact on the environment:

- ❖ Dust monitoring;
- ❖ Noise monitoring; and
- ❖ Blasting vibrations monitoring.

Drieheuvels Quarry:

Due to the nature of the proposed mining operation, it is believed that the risk of environmental damage or pollution is of low significance. If site management implement the mitigation measures as prescribed in this document, it is believed that the impact on the receiving environment can be adequately controlled.

iii) Potential risk of Acid Mine Drainage.

(Indicate whether or not the mining can result in acid mine drainage).

Not applicable, as neither the operations of BDQ nor the proposed DQ has a potential to generate acid mine drainage.

iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.

Not applicable.

v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.

Not applicable.

vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.

Not applicable.

vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation.

As mentioned in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.9 Water Management*, BDQ extracts ± 217 kL water per working day (i.e. 79 559 kL/year) from the Berg River for the purpose of washing and beneficiating the dolomite. The water is stored in two concrete reservoirs on the site. The water used for washing the dolomite gravitates as effluent to two settling ponds where the fines and sludge is separated from the water. The purified river water is recycled into the washing process, and the dolomite fines and sludge tailings are used to manufacture Ag-lime after drying.

Phreatic water which seeps into the quarry at the present average rate of 104 kL per day is sub-standard. Approximately 45 kL/day of this water is used on the roads at the site to reduce dust emissions. The balance of the phreatic water is pumped to the dry side-stream to the west of the quarry where it soaks into the soft alluvium and evaporates before the side stream reaches the Berg River.

Potable water is transported to the mine from Moorreesburg. The total water consumption of BDQ is $\pm 262\ 000$ l/day (217 000 l from Berg River and 45 000 l from the quarry sump). The total water circulation, including recycling of wash water from tailings, equates to 563 000 l/day.

Water needed at the proposed DQ will be transported to site from BDQ. It is proposed that the proposed DQ will have a water need of approximately 10 000 l/day when operational.

viii) Has a water use license been applied for?

Lime Sales Ltd has a valid water use license to extract 85 000 m³ water per year from the Berg River (see Appendix J1). Lime Sales Ltd was also granted two water use registration certificates (No. 22064757 dated 04 September 2002 and No. 22038867 dated 11 October 2002) to store water and use the water at the project. Refer to Table 3 in Part *A(1)(d)(ii) Description of the activities to be undertaken – 2.10 Water Management*, for a list of the water use authorisations held by Lime Sales Ltd.

The proposed DQ falls within 500 m of the Berg River and therefore may require a Water Use Authorisation in terms of Section 39 of the NWA, 1998 for water uses as defined in section 21(c) and 21(i). The right holder is in discussion with the DWS to determine the way forward.

ix) Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

Table 33: Impact to be mitigated in their respective phases

ACTIVITIES (as listed in 2.11.1)	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
	of operation in which activity will take place. State; Planning and design, Pre-Construction, Operational, Rehabilitation, Closure, Post closure	(volumes, tonnages and hectares or m ²)	(describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants)	(A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either – Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
BRIDGETOWN DOLOMITE QUARRY					
<u>Impact on Geology and Soil:</u> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles.	Operational Phase	±168.55 ha	<u>Geology and Soil:</u> ❖ With regard to the reuse of the agricultural soil, all topsoil must be removed to at least 500 mm depth in the southern section and possibly 200 mm in the south of the northern section. ❖ Topsoil in the plant area must be removed to 150 mm and stockpiled for later use in rehabilitation.	Soil must be managed in accordance with the: ❖ CARA, 1983 ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O)	Throughout the operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<ul style="list-style-type: none"> ❖ Blasting. ❖ Pumping out groundwater 			<ul style="list-style-type: none"> ❖ As the topsoil will be stockpiled for a lengthy period, stockpile depths for seedbank preservation is irrelevant but 3 m should not be exceeded. When reused, the material will require renitrification either by legume planting or fertilising during replacement. 		
<p><u>Impact on sensitive landscapes, vegetation and fauna:</u></p> <ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Pumping out groundwater. 	Operational Phase	±168.55 ha	<p><u>Mining, Biodiversity and Vegetation:</u></p> <p><i>Vegetation:</i></p> <ul style="list-style-type: none"> ❖ Transplanting would be possible in the remainder of the vegetation type on site. ❖ Limit disturbance of natural vegetation to a small an area as possible. ❖ Prevent erosion of final pit edges. ❖ New roads should be built on agricultural land and should as far as possible avoid being located in the natural vegetation. ❖ Suggests the employment of an environmental officer. ❖ The mining company must take responsibility for transplanting of endangered species (i.e. the company must employ an expert to conduct this operation). ❖ The remaining Succulent Karoo vegetation type should be protected in a proclaimed reserve around the proposed northern excavation. ❖ No dumping, grazing or any other activity be allowed in the reserve. 	<p>Natural areas and fauna must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:BA 2004 ❖ Western Cape Biodiversity Spatial Plan 	Throughout the operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p><i>Fauna:</i></p> <ul style="list-style-type: none"> ❖ The presevation of the cliff and riverine area represents a specific habitat for especially birds of prey and reptiles. 		
<p><u>Impact on surface water:</u></p> <ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	Operational Phase	±168.55 ha	<p><u>Erosion Control and Storm Water Mitigation:</u></p> <ul style="list-style-type: none"> ❖ Storm water cut-off trenches will be provided above topsoil berms, waste dumps, plant and product stockpile area. Such trenches will lead into storm water retention ponds which will serve as water features on site. ❖ Silt runoff collection trenches will be construed below topsoil berms, waste dumps, plant, manoeuvring and product stockpile areas. These trenches will lead to silt retention ponds from which silt can be removed by excavator or FEL to be disposed of as layers in the overburden dump. ❖ The quality of storm water released from the retention ponds shall not exceed the ambient TSS load of runoff from the surrounding wheat fields. ❖ The right holder must adhere to the requirements of the water use authorisations and all activities must take place a distance from the western edge of the Misverstand Dam to allow for sufficient space for effective silt retention capabilities. 	<p>Storm water must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEMA, 1998 ❖ NWA, 1998 	Throughout the operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<p><u>Impact on groundwater:</u></p> <ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Blasting. ❖ Pumping out groundwater. 	Operational Phase	±168.55 ha	<p><u>Groundwater Mitigation Measures:</u></p> <ul style="list-style-type: none"> ❖ To avoid fuel and lubrication spills from the workshop, the vehicle refuelling bay shall be provided with a concrete apron to catch any diesel spills and the workshop floor and apron shall be drained to an oil trap. ❖ Foul water from the offices and personnel amenities will be lead into properly sized and constructed conservancy tanks and French drains suitably backfilled with stones to achieve sufficient soak away in the phyllite. Given their elevation at 20 m above groundwater tale, no groundwater contamination will occur. 	<p>Water related matters must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998 	Throughout the operational phases.
<p><u>Impact on air quality (dust):</u></p> <ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	Operational Phase	±168.55 ha	<p><u>Air and Noise Quality:</u></p> <ul style="list-style-type: none"> ❖ Wetting of the earmarked area must be done prior to topsoil stripping or overburden blasting. ❖ Topsoil stripping/overburden blasting must be scheduled out of the dry windy season, and take place during calm days (avoid high wind conditions). ❖ Permanent haul roads must be armoured to lessen dust generation, and a water truck must be used to wet temporary haul roads. ❖ Dust generation at the primary tipping area must be controlled by a semi-enclosed hopper, and the installation of a water sprayer system. ❖ Dust from the conveyor belts must be controlled by enclosing the transfer points, installing water 	<p>Dust generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ National Dust Control Regulations, GN No R827 ❖ ASTM D1739 (SANS 1137:2012) 	Throughout the operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>sprayers and enclosing the screen in a screen house. Semi-wet screening must be conducted.</p> <ul style="list-style-type: none"> ❖ The Ag-lime milling and screening plant must be enclosed. ❖ Low-level stockpiles with a maximum moisture content must be maintained at the Ag-lime stockpiling and loading area. ❖ Make use of a water truck to control the generation of dust on roads adjacent to farm houses/wheat fields. ❖ Retain the berm and trees that were established at the old Ag-lime plant site (1998-2009) to limit the impact of dust on the adjacent residents. ❖ Maintain the dust monitoring system implemented at the site. 		
<p><u>Impact on noise:</u></p> <ul style="list-style-type: none"> ❖ Roads on site. ❖ Quarry excavations. ❖ Processing plants. ❖ Blasting. 	Operational Phase	±168.55 ha	<p><u>Air and Noise Quality:</u></p> <ul style="list-style-type: none"> ❖ Noise monitoring must be implemented on a continuous basis. ❖ Employees must have access to the correct PPE. ❖ Blasting may only take place under favourable weather conditions i.e. no blasting allowed under low cloud, temperature inversions, or during windy conditions. ❖ Monitoring of the noise- and vibration levels must be implemented with each blast. 	<p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NRTA, 1996 ❖ Western Cape Noise Control Regulations (PN 200/2013), June 2013 	Throughout the operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<p><u>Impact on blast vibrations:</u></p> <ul style="list-style-type: none"> ❖ Quarry excavations. ❖ Blasting. 	Operational Phase	±168.55 ha	<p><u>Management of Health and Safety Risks:</u></p> <ul style="list-style-type: none"> ❖ Maximum charge per delay must be maintained at levels, which ensure low vibration levels. 	<p>Health and safety aspects on site must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ MHSA, 1996 ❖ OHSA, 1993 ❖ OHSAS 18001 ❖ USBM standards 	Throughout the operational phases.
<p><u>Impact on topography and visual impact:</u></p> <ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	Operational Phase	±168.55 ha	<p><u>Topography and Visual Characteristics:</u></p> <p><i>Northern Section:</i></p> <ul style="list-style-type: none"> ❖ Retention of the cliffs facing east. ❖ Limiting mining to above the 40 m contour in the east. ❖ Mining the topographic spur out as a slot only leaving residual exposed faces in the south, which are 10 m higher than the 40 m rim of the excavation. <p><i>Processing Area:</i></p> <ul style="list-style-type: none"> ❖ Location of these facilities within the northern drainage basin permits seclusion of the activities by the watershed ridge from the south, east and north-east. ❖ The facilities/activities are only visible from the Tweevlei labourer's houses. <p><i>Southern Section:</i></p> <ul style="list-style-type: none"> ❖ Mining from a central excavation outward so that only the skyline is lowered as seen from the east bank. 	<p>Management of the mining activities must be in accordance with the:</p> <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998 	Throughout the operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> ❖ Retention of the cliffs and 20 m mining pillar largely limiting impact to overhead view only. 		
<p>Recreation at Berg River:</p> <ul style="list-style-type: none"> ❖ Quarry excavations. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	Operational Phase	±168.55 ha	<p>Management of Health and Safety Risks:</p> <ul style="list-style-type: none"> ❖ An overburden bench about 4 - 5 m wide must be constructed around the perimeter of the quarry excavations. 	<p>Health and safety aspects on site must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ MHSA, 1996 ❖ OHS Act, 1993 ❖ OHSAS 18001 	Throughout the operational phases.
DRIEHEUVELS QUARRY					
<ul style="list-style-type: none"> ❖ Demarcation of site with visible beacons. 	Site Establishment phase	13.1 ha	Demarcation of the site will ensure that all employees are aware of the boundaries of the mining area, and that work stay within the approved area.	<p>Mining is only allowed within the boundaries of the approved area.</p> <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998 	Beacons need to be in place throughout the life of the mine.
<ul style="list-style-type: none"> ❖ Site establishment. ❖ Excavation, loading and hauling to processing plant of BDQ. 	Site Establishment- & Operational Phase	13.1 ha	<p>Visual Mitigation:</p> <ul style="list-style-type: none"> ❖ The site must have a neat appearance and be kept in good condition at all times. ❖ Mining equipment must be stored neatly in dedicated areas when not in use. ❖ The right holder must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area. ❖ The excavation must be contained within the approved footprint of the permitted area. 	<p>Management of the mining activities must be in accordance with the:</p> <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998 	Throughout the site establishment- and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> ❖ Topsoil and overburden heaps must be stored in the form of berms along the north-western and north-eastern boundaries of the mining footprint to screen the activities from residents on the eastern bank of the river. ❖ Upon closure the site must be rehabilitated to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum. ❖ Visual intrusion associated with the excavation area. 		
<ul style="list-style-type: none"> ❖ Site establishment 	Site Establishment phase	N/A	<p><u>Vegetation Mitigation Measures Including the Protection of Swartland Shale Renosterveld, the CBA and ESA:</u></p> <ul style="list-style-type: none"> ❖ The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area. ❖ The area outside the mining boundaries must be declared a no-go area, and all employees must be educated accordingly. ❖ Measures must be implemented to limit flyrock falling outside the mining area. All flyrock (of diameter 150 mm and larger) which falls beyond the working area, together with the rock spill must be collected and removed. 	<p>Natural vegetated areas must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:BA 2004 ❖ Western Cape Biodiversity Spatial Plan 	Throughout the site establishment phase.
<ul style="list-style-type: none"> ❖ Site establishment 	Site Establishment phase	13.1 ha	<p><u>Protection of Fauna:</u></p> <ul style="list-style-type: none"> ❖ The site manager must ensure no fauna is caught, killed, harmed, sold or played with. 	<p>Fauna must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:BA 2004 	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> ❖ Workers must be instructed to report any animals that may be trapped in the working area. ❖ No snares may be set or nests raided for eggs or young. 		
<ul style="list-style-type: none"> ❖ Site establishment 	Site Establishment phase	13.1ha	<p><u>Archaeological, Heritage and Palaeontological Aspects:</u></p> <ul style="list-style-type: none"> ❖ All mining must be confined to the development footprint area. ❖ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ❖ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. ❖ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify Heritage Western Cape (HWC). ❖ Work may only continue once the go-ahead was issued by HWC. 	<p>Cultural/heritage aspects must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NHRA, 1999 	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
❖ Site establishment	Site Establishment & Operational Phase	13.1ha	<p><u>Mitigating the Impact on Surrounding Land use:</u></p> <ul style="list-style-type: none"> ❖ The visual-, dust-, noise-, water-, waste- and health and safety mitigation measures as proposed in this document must be implemented on site to reduce the impact of the DQ on the surrounding landowners. 	<p>Mitigating the impact on the surrounding land use must be in accordance with the:</p> <ul style="list-style-type: none"> ❖ ASTM D1739 (SANS 1137:2012) ❖ CARA, 1983 ❖ MHSA, 1996 ❖ MPRDA, 2002 ❖ National Dust Control Regulations, GN No R827 ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NEM:WA, 2008 ❖ NWA, 1998 	Throughout the site establishment-, and operational phase.
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	Site Establishment-, Operational-, and Decommissioning Phase	13.1ha	<p><u>Dust Mitigation:</u></p> <p>used by the disturbance of soil.</p> <ul style="list-style-type: none"> ❖ The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents that contains no PCB's (e.g. DAS products). ❖ The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. ❖ Speed on the haul roads must be limited to 20 km/h to prevent the generation of excess dust. ❖ Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining. 	<p>Dust generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ National Dust Control Regulations, GN No R827 ❖ ASTM D1739 (SANS 1137:2012) 	Throughout the site establishment-, operational, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> ❖ Topsoil/overburden stockpiles around the footprint must be covered alternatively planted with indigenous grass species to minimise exposed surface areas, reducing windblown dust from the site. The vegetation will also assist in capturing wind born dust and minimizing the spread of dust from the site. ❖ Loads must be flattened and covered to ensure that minimal spillage of material takes place during transportation, also preventing windblown dust. ❖ Weather conditions must be considered upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts. ❖ The fallout dust monitoring system, already in place at BDQ, must be extended to include the proposed DQ area. ❖ All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012). ❖ Best practice measures shall be implemented during the stripping of topsoil, excavation, and transporting of material from site to minimize potential dust impacts. 		
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting 	Site Establishment-, Operational-, and Decommissioning Phase	13.1 ha	<p><u>Noise Mitigation:</u></p> <ul style="list-style-type: none"> ❖ The site will only operate during daylight hours from Monday to Saturday. 	<p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NRTA, 1996 	Throughout the site establishment-, operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<ul style="list-style-type: none"> ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 			<ul style="list-style-type: none"> ❖ Site management must ensure that employees and staff conduct themselves in an acceptable orderly manner while on site. ❖ No loud music may be permitted at the mining area. ❖ All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996). ❖ The type, duration and timing of the blasting procedures must be planned with due cognizance of other land users and structures in the vicinity. Surrounding land owners must be notified in writing prior to each blasting occasion. ❖ Best practice measures shall be implemented in order to minimize potential noise impacts. ❖ Noise generated by the proposed activity shall comply with the Western Cape Noise Control Regulations (PN 200/2013), June 2013. ❖ A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008. 	<ul style="list-style-type: none"> ❖ Western Cape Noise Control Regulations (PN 200/2013), June 2013 	
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil 	Site Establishment-, and Decommissioning Phase	13.1 ha	<p><u>Topsoil Handling:</u></p> <ul style="list-style-type: none"> ❖ The upper 300 mm of the soil must be stripped and stockpiled before mining. 	<p>Topsoil must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA, 2004 	Throughout the site establishment-, operational, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<ul style="list-style-type: none"> ❖ Sloping and landscaping during rehabilitation 			<ul style="list-style-type: none"> ❖ Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes. ❖ Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that topsoil is stockpiled for the minimum possible time. ❖ The topsoil must be placed on a levelled area, within the mining footprint, preferably along the north-western and north-eastern boundary of the mining area, and measures must be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water. No topsoil may be stockpiled in undisturbed areas. ❖ Topsoil heaps may not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. ❖ The temporary topsoil stockpiles must be kept free of invasive plant species. ❖ Storm- and runoff water must be diverted around the stockpile area to prevent erosion. ❖ Topsoil heaps to be stored longer than a period of 6 months needs to be vegetated with an indigenous grass seed mix if vegetation does not naturally germinate within the first growth season. ❖ The stockpiled topsoil must be evenly spread over the rehabilitated area upon closure of the site. 	<ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O) 	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> ❖ The right holder must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal. ❖ A cover crop must be planted and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum production. It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established. ❖ Run-off water must be controlled via temporary banks during mining, where necessary on the slopes, to ensure that accumulation of run-off does not cause down-slope erosion. ❖ The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement. 		
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Sloping and landscaping during rehabilitation 	Site Establishment-, and Decommissioning Phase	13.1 ha	<p><u>Management of Invader Plant Species:</u></p> <ul style="list-style-type: none"> ❖ An invasive plant species management plan (Appendix M) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 	<p>Invader plants must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA 2004 ❖ Invasive Plant Species Management Plan (Appendix M) 	Throughout the site establishment-, operational, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities.</p> <ul style="list-style-type: none"> ❖ All stockpiles (topsoil) must be kept free of invasive plant species. ❖ Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used: <ul style="list-style-type: none"> ▪ The plants can be uprooted, felled or cut off and can be destroyed completely. ▪ The plants can be treated chemically by a registered pest control officer (PCO) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide. 		
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<p>Site Establishment-, Operational-, and Decommissioning Phase</p>	<p>13.1ha</p>	<p><u>Waste Management:</u></p> <ul style="list-style-type: none"> ❖ Regular vehicle maintenance, repairs and services may only take place at the off-site workshop and service area of BDQ. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a 200 litre closed container/bin to be removed from the emergency service area to the workshop in order to ensure proper disposal. ❖ If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during each and every refuelling 	<p>Mining related waste must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998 ❖ NEM:WA, 2008 ❖ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ❖ NEMA, 1998 (Section 30) 	<p>Throughout the site establishment-, operational-, and decommissioning phase.</p>

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.</p> <ul style="list-style-type: none"> ❖ Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site. ❖ Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. The hazardous waste generated at the DQ can be incorporated into the existing hazardous waste handling system at BDQ. ❖ Spills must be cleaned up immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMR) by removing the spillage together with the polluted soil and incorporating it into the existing hazardous waste handling system of BDQ (if possible), or by disposing it at a recognised facility. Proof must be filed. ❖ All general waste must be contained within the site vehicles and daily be removed from the mining area to the general waste storage area of BDQ. ❖ Re-use or recycling of waste products must be encouraged on site. ❖ No waste may be buried or burned on the site. ❖ Site management must ensure that employees make use of formal ablution facilities. Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet shall be 		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>serviced at least once a week for the duration of the mining activities.</p> <ul style="list-style-type: none"> ❖ The use of any temporary, chemical toilet facilities must not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the right holder. ❖ When small volumes of wastewater are generated during the life of the mine the following is applicable: <ul style="list-style-type: none"> ▪ Water containing waste must not be discharged into the natural environment. ▪ Measures to contain the waste water and safely dispose thereof must be implemented. ❖ It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities. 		
<ul style="list-style-type: none"> ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ 	Operational-, and Decommissioning Phase	13.1ha	<p><u>Management of Health and Safety Risks:</u></p> <ul style="list-style-type: none"> ❖ Workers must have access to the correct personal protection equipment (PPE) as required by law. ❖ All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). ❖ The type, duration and timing of the blasting procedures must be planned with due 	<p>Health and safety aspects on site must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ MHSA, 1996 ❖ OHSAS, 1993 ❖ OHSAS 18001 ❖ USBM standards 	Throughout operational and decommissioning phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
❖ Sloping and landscaping during rehabilitation			<p>cognizance of other land users and structures in the vicinity.</p> <ul style="list-style-type: none"> ❖ The surrounding landowners and communities must be informed in writing ahead of any blasting event. ❖ The compliance of ground vibration and airblast levels must be monitored to USBM standards with each blasting event. ❖ A vibro recorder must be used to record all blasts. ❖ Audible warning of a pending blast must be given at least 3 minutes in advance of the blast. ❖ Measures to limit flyrock must be taken. All flyrock (of diameter 150 mm and larger) which falls beyond the working area, together with the rock spill must be collected and removed. 		
❖ Excavation, loading and hauling to the processing plant of BDQ.	Operational Phase	±4.6 km	<p><u>Access Road Mitigation:</u></p> <ul style="list-style-type: none"> ❖ Storm water must be diverted around the access road to prevent erosion. ❖ Vehicular movement must be restricted to the existing access road and crisscrossing of tracks through undisturbed areas must be prohibited. ❖ Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the right holder. ❖ Overloading of the truck must be prevented. 	<p>The access road must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NRTA, 1996 	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<ul style="list-style-type: none"> ❖ Excavation, loading and hauling to the processing plant of BDQ. 	Operational Phase	13.1ha	<p><u>Surface- and Groundwater Mitigation Measures:</u></p> <ul style="list-style-type: none"> ❖ The storm water mitigation measures as proposed in this document must be implemented on site. ❖ The current water-monitoring programme of BDQ must be extended to include the DQ mining area. Water samples must be collected from the Berg River upstream and downstream of the mining operations. ❖ Mining depth must be restricted to the groundwater level of the footprint. ❖ Should the groundwater table be intersected, the opinion of a geohydrologists must be obtained to guide future mining operations. 	<p>Water related matters must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998 	Throughout the decommissioning phase.
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil. ❖ Sloping and landscaping during rehabilitation. 	Site establishment- and Decommissioning Phase.	13.2ha	<p><u>Erosion Control and Storm Water Mitigation:</u></p> <ul style="list-style-type: none"> ❖ The runoff from compacted surfaces must be slowed down and dispersed sufficiently to prevent accelerated erosion. ❖ Erosion control measure must be put in place to minimise erosion along the proposed mining area. Extra precautions must be taken in areas where the soils are deemed highly erodible. Erosion control measures could include the use of sand bags, hessian sheets, retention or replacement of vegetation. ❖ Stockpiling of soil must not be allowed on or near steep slopes. This is to prevent pollution or the impediment of surface run-off. 	<p>Storm water must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEMA, 1998 ❖ NWA, 1998 	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> ❖ Drainage must be controlled to ensure that runoff from the project area does not culminate in off-site pollution, flooding or result in any damage to infrastructure downstream or any storm water discharge points. ❖ Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose: <ul style="list-style-type: none"> ▪ Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. ▪ Dirty water must be collected and contained in a system separate from the clean water system. ▪ Dirty water must be prevented from spilling or seeping into clean water systems. ▪ A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns). ▪ The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan. 		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
❖ Sloping and landscaping during rehabilitation.	Decommissioning Phase.	13.3ha	<p><u>Rehabilitation of the Excavated Area:</u></p> <ul style="list-style-type: none"> ❖ The excavated area must serve as a final depositing area for the placement of overburden. ❖ Rocks and coarse material removed from the excavation must be dumped into the excavation. ❖ No waste may be permitted to be deposited in the excavations. ❖ Once overburden, rocks and coarse natural materials have been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area. ❖ The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within 6 months from closure of the site. ❖ If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification. 	<p>Management of the mining area must be in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan 	Throughout the operational-, and decommissioning phase.

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ()):

Table 34: Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
<p>whether listed or not listed</p> <p>(E.g. 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.)</p>	<p>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)</p>		<p>In which impact is anticipated</p> <p>(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))</p>	<p>(modify, remedy, control, or stop) through</p> <p>(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..)</p> <p>E.g.</p> <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation. 	<p>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.</p>
BRIDGETOWN DOLOMITE QUARRY					
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. 	<ul style="list-style-type: none"> ❖ Impact on soil. 	<p>The loss/contamination of topsoil will affect the rehabilitation of the excavation upon closure of the site, and the contamination of the footprint area will negatively affect the surface runoff and potentially the groundwater.</p>	<p>Operational Phase</p>	<p><u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.</p>	<p>Soil must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. 	<ul style="list-style-type: none"> ❖ Impact on land capability. 	The post-mining land use potential will be affected.	Operational Phase	<u>Control:</u> Implementing good management practices.	<p>The mining footprint must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O)
<ul style="list-style-type: none"> ❖ Pumping out groundwater. 	<ul style="list-style-type: none"> ❖ Impact on geology. 	An impact on the groundwater of the area will negatively affect all water users.	Operational Phase	<u>Control & Remedy:</u> Continuous water monitoring and rectification measures when needed.	<p>Water related matters must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on topography. 	This impact affects the surrounding land users.	Operational Phase	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	<p>Management of the mining activities must be in accordance with the:</p> <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on agriculture. 	This impact affects the agricultural operations of the properties.	Operational Phase	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	<p>The mining footprint must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O)
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. 	<ul style="list-style-type: none"> ❖ Impact on vegetation and fauna. 	This will affect the biodiversity of the	Operational Phase	<u>Control & Stop:</u> Implementing good management practices.	<p>Natural areas and fauna must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:BA 2004

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
<ul style="list-style-type: none"> ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Pumping out groundwater. 		receiving environment.			<ul style="list-style-type: none"> ❖ Western Cape Biodiversity Spatial Plan
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on surface water. 	An impact on the surface water will negatively affect the downstream water users.	Operational Phase	<u>Control:</u> Implementing proper housekeeping practices and stormwater control measures.	<p>Storm water must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEMA, 1998 ❖ NWA, 1998
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Blasting. ❖ Pumping out groundwater. 	<ul style="list-style-type: none"> ❖ Impact on groundwater. 	An impact on the groundwater of the area will negatively affect all water users.	Operational Phase	<u>Control & Remedy:</u> Continuous water monitoring and rectification measures when needed.	<p>Water related matters must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	<ul style="list-style-type: none"> ❖ Impact on air quality (dust). 	Increased dust generation will affect the air quality of the receiving environment.	Operational Phase	<u>Control:</u> Dust suppression methods and proper housekeeping.	<p>Dust generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ National Dust Control Regulations, GN No R827 ❖ ASTM D1739 (SANS 1137:2012)
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Quarry excavations. ❖ Processing plants. ❖ Blasting. 	<ul style="list-style-type: none"> ❖ Impact on noise. 	Should noise levels become excessive it may have an impact on the noise ambiance	Operational Phase	<u>Control:</u> Noise suppression methods and proper housekeeping.	<p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NRTA, 1996

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
		of the receiving environment.			❖ Western Cape Noise Control Regulations (PN 200/2013), June 2013
<ul style="list-style-type: none"> ❖ Quarry excavations. ❖ Blasting. 	❖ Impact on blast vibration.	Blasting vibrations may affect the activities/infrastructure of the surrounding landowners.	Operational Phase	<u>Control:</u> Adherence to the blasting rules and regulations.	<p>Health and safety aspects on site must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ MHSA, 1996 ❖ OHSA, 1993 ❖ OHSAS 18001 ❖ USBM standards
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Pumping out groundwater. ❖ Flyrock. 	❖ Impact on sensitive landscape.	This will affect the biodiversity of the receiving environment.	Operational Phase	<u>Control:</u> Implementing proper housekeeping.	<p>Sensitive landscapes must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:BA 2004 ❖ Western Cape Biodiversity Spatial Plan
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	❖ Impact on visual impact.	The visual impact may affect the aesthetics of the landscape.	Operational Phase	<u>Control:</u> Implementing proper housekeeping.	<p>Management of the mining activities must be in accordance with the:</p> <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
<ul style="list-style-type: none"> ❖ Quarry excavations. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	<ul style="list-style-type: none"> ❖ Recreation at Berg River. 	An impact on the Berg River will negatively affect the downstream water users.	Operational Phase	<u>Control:</u> Implementing proper housekeeping practices and stormwater control measures.	Health and safety aspects on site must be managed in accordance with the: <ul style="list-style-type: none"> ❖ MHSA, 1996 ❖ OHSA, 1993 ❖ OHSAS 18001
DRIEHEUVELS QUARRY					
<ul style="list-style-type: none"> ❖ Demarcation of site with visible beacons. 	<ul style="list-style-type: none"> ❖ No impact could be identified other than the beacons being outside the boundaries of the approved mining area. 	N/A	Site Establishment phase	Control through management and monitoring.	Mining is only allowed within the boundaries of the approved area. <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998
<ul style="list-style-type: none"> ❖ Site establishment. ❖ Excavation, loading and hauling to processing plant of BDQ. 	<ul style="list-style-type: none"> ❖ Visual intrusion because of site establishment. ❖ Visual intrusion associated with the excavation area. 	The visual impact may affect the aesthetics of the landscape.	Site Establishment- & Operational Phase	<u>Control:</u> Implementing proper housekeeping.	Management of the mining activities must be in accordance with the: <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998
<ul style="list-style-type: none"> ❖ Site establishment 	<ul style="list-style-type: none"> ❖ Potential negative impact on the nearby CBA/ESA. 	This will affect the biodiversity of the receiving environment.	Site Establishment phase	<u>Control:</u> Keep mining within the approved footprint area.	Natural vegetated areas must be managed in accordance with the: <ul style="list-style-type: none"> ❖ NEM:BA 2004 ❖ Western Cape Biodiversity Spatial Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
❖ Site establishment	❖ Potential loss of Swartland Shale Renosterveld to access the mineral.	This will affect the biodiversity of the receiving environment.	Site Establishment phase	<u>Modify:</u> Adhere to the footprint of S1 instead of S2.	Natural vegetated areas must be managed in accordance with the: ❖ NEM:BA 2004 ❖ Western Cape Biodiversity Spatial Plan
❖ Site establishment	❖ Potential impact on fauna within the footprint area.	This will affect the biodiversity of the receiving environment.	Site Establishment phase	<u>Control & Stop:</u> Implementing good management practices.	Fauna must be managed in accordance with the: ❖ NEM:BA 2004
❖ Site establishment	❖ Potential impact on areas/infrastructure of heritage or cultural concern.	This could affect the cultural and heritage legacy of the receiving environment.	Site Establishment phase	<u>Control & Stop:</u> Implementing good management practices.	Cultural/heritage aspects must be managed in accordance with the: ❖ NHRA, 1999
❖ Site establishment	❖ Alteration of the agricultural sense of place.	This impact affects the agricultural operations of the property.	Site Establishment & Operational Phase	<u>Control:</u> Implementing good management practices.	Mining impact must be managed in accordance with the: ❖ MPRDA, 2002
❖ Site establishment	❖ Loss of agricultural land to allow for mining (site-specific footprint)	This impact affects the agricultural operations of the property.	Site Establishment & Operational Phase	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	Mining impact must be managed in accordance with the: ❖ MPRDA, 2002
❖ Site establishment	❖ Potential impact of mining on surrounding land use.	This impact affects the activities of the surrounding land users.	Site Establishment & Operational Phase	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	Mitigating the impact on the surrounding land use must be in accordance with the: ❖ ASTM D1739 (SANS 1137:2012)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
					<ul style="list-style-type: none"> ❖ CARA, 1983 ❖ MHSA, 1996 ❖ MPRDA, 2002 ❖ National Dust Control Regulations, GN No R827 ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NEM:WA, 2008 ❖ NWA, 1998
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Dust nuisance caused by the disturbance of soil. ❖ Dust nuisance caused by blasting activities. ❖ Dust nuisance due to excavation, loading and vehicles transporting material. ❖ Dust nuisance due to landscaping activities. 	Increased dust generation will affect the air quality of the receiving environment.	Site Establishment-, Operational-, and Decommissioning Phase	<u>Control:</u> Dust suppression methods and proper housekeeping.	Dust generation must be managed in accordance with the: <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ National Dust Control Regulations, GN No R827 ❖ ASTM D1739 (SANS 1137:2012)
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ 	<ul style="list-style-type: none"> ❖ Noise nuisance generated by earthmoving machinery. ❖ Noise nuisance because of blasting. 	Should noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Site Establishment-, Operational-, and Decommissioning Phase	<u>Control:</u> Noise suppression methods and proper housekeeping.	Noise generation must be managed in accordance with the: <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NRTA, 1996

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
<ul style="list-style-type: none"> ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Noise nuisance generated by excavation equipment and earthmoving machinery. ❖ Noise nuisance generated during the rehabilitation phase. 				<ul style="list-style-type: none"> ❖ Western Cape Noise Control Regulations (PN 200/2013), June 2013
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Loss/contamination of stockpiled topsoil. ❖ Potential erosion of denuded areas. ❖ Soil erosion. ❖ Loss of reinstated topsoil from denuded areas. 	<p>The loss/contamination of topsoil will affect the rehabilitation of the excavation upon closure of the site.</p>	<p>Site Establishment-, and Decommissioning Phase</p>	<p><u>Control & Remedy:</u> Proper housekeeping and storm water management.</p>	<p>Topsoil must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O)
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Potential infestation of the topsoil heaps with weeds or invader plant species. ❖ Potential infestation of the reinstated areas with weeds and invader plant species. 	<p>Infestation of the footprint by invader plant species may affect the biodiversity of the receiving environment.</p>	<p>Site Establishment-, and Decommissioning Phase</p>	<p><u>Control & Remedy:</u> Implementation of an invasive plant species management plan.</p>	<p>Invader plants must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA 2004 ❖ Invasive Plant Species Management Plan (Appendix M)
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil 	<ul style="list-style-type: none"> ❖ Potential contamination of footprint area and 	<p>Contamination of the footprint area will negatively affect the</p>	<p>Site Establishment-, Operational-, and</p>	<p><u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.</p>	<p>Mining related waste must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
<ul style="list-style-type: none"> ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<p>surface runoff because of hydrocarbon spillages.</p> <ul style="list-style-type: none"> ❖ Contamination of area with hazardous- and/or general waste. ❖ Potential contamination of environment because of improper waste disposal. 	<p>soil, surface runoff and potentially the groundwater. It will also incur additional costs to the right holder.</p>	<p>Decommissioning Phase</p>		<ul style="list-style-type: none"> ❖ NEM:WA, 2008 ❖ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ❖ NEMA, 1998 (Section 30)
<ul style="list-style-type: none"> ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Health and safety risk posed by blasting activities. ❖ Unsafe working environment for employees. ❖ Safety risk posed by un-sloped areas. 	<p>An unsafe working environment affects the labour force, as well as pose a threat to animals and humans that may enter the mining footprint.</p>	<p>Operational-, and Decommissioning Phase</p>	<p><u>Stop & Control:</u> Adherence to the blasting rules and regulations, demarcation of the mining area and proper housekeeping.</p>	<p>Health and safety aspects on site must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ MHSA, 1996 ❖ OHSA, 1993 ❖ OHSAS 18001 ❖ USBM standards
<ul style="list-style-type: none"> ❖ Drilling and blasting 	<ul style="list-style-type: none"> ❖ Potential impact of blasting vibrations on surrounding infrastructure. 	<p>Blasting vibrations may affect the activities/infrastructure of the surrounding landowners.</p>	<p>Operational Phase</p>	<p><u>Control:</u> Adherence to the blasting rules and regulations.</p>	<p>Blasting must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ MHSA, 1996 ❖ OHSA, 1993 ❖ OHSAS 18001 ❖ USBM standards

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
❖ Excavation, loading and hauling to the processing plant of BDQ.	❖ Deterioration of the access road (farm road) to the mining area.	Collapse of the road infrastructure will affect the landowner.	Operational Phase	<u>Control & Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining.	The access road must be managed in accordance with the: ❖ NRTA, 1996
❖ Excavation, loading and hauling to the processing plant of BDQ.	❖ Potential impact on the groundwater of the footprint area.	An impact on the groundwater of the area will negatively affect all water users.	Operational Phase	<u>Control:</u> Control the mining depth to above the groundwater level.	Water related matters must be managed in accordance with the: ❖ NWA, 1998
❖ Excavation, loading and hauling to the processing plant of BDQ.	❖ Potential impact on the Berg River due to surface runoff.	An impact on the groundwater of the Berg River will negatively affect the downstream water users.	Operational Phase	<u>Control:</u> Implementing proper housekeeping practices and stormwater control measures.	Water related matters must be managed in accordance with the: ❖ NWA, 1998

f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

Table 35: Impact Management Actions

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<p>whether listed or not listed</p> <p>(E.g. 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.)</p>	<p>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)</p>	<p>(modify, remedy, control, or stop) through</p> <p>(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..)</p> <p>E.g.</p> <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation. 	<p>Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required.</p> <p>With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:</p> <p>Upon cessation of the individual activity</p> <p>Or .</p> <p>Upon the cessation of mining bulk sampling or alluvial diamond prospecting as the case may be.</p>	<p>(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)</p>
BRIDGETOWN DOLOMITE QUARRY				
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. 	<ul style="list-style-type: none"> ❖ Impact on soil. 	<p><u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.</p>	<p>Throughout the operational phase.</p>	<p>Soil must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O)
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. 	<ul style="list-style-type: none"> ❖ Impact on land capability. 	<p><u>Control:</u> Implementing good management practices.</p>	<p>Throughout the operational phase.</p>	<p>The mining footprint must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<ul style="list-style-type: none"> ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. 				<ul style="list-style-type: none"> ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O)
<ul style="list-style-type: none"> ❖ Pumping out groundwater. 	<ul style="list-style-type: none"> ❖ Impact on geology. 	<p><u>Control & Remedy:</u> Continuous water monitoring and rectification measures when needed.</p>	Throughout the operational phase.	<p>Water related matters must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on topography. 	<p><u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.</p>	Throughout the operational phase.	<p>Management of the mining activities must be in accordance with the:</p> <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on agriculture. 	<p><u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.</p>	Throughout the operational phase.	<p>The mining footprint must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O)
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Pumping out groundwater. 	<ul style="list-style-type: none"> ❖ Impact on vegetation and fauna. 	<p><u>Control & Stop:</u> Implementing good management practices.</p>	Throughout the operational phase.	<p>Natural areas and fauna must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:BA 2004 ❖ Western Cape Biodiversity Spatial Plan

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on surface water. 	<p><u>Control:</u> Implementing proper housekeeping practices and stormwater control measures.</p>	<p>Throughout the operational phase.</p>	<p>Storm water must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEMA, 1998 ❖ NWA, 1998
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Blasting. ❖ Pumping out groundwater. 	<ul style="list-style-type: none"> ❖ Impact on groundwater. 	<p><u>Control & Remedy:</u> Continuous water monitoring and rectification measures when needed.</p>	<p>Throughout the operational phase.</p>	<p>Water related matters must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	<ul style="list-style-type: none"> ❖ Impact on air quality (dust). 	<p><u>Control:</u> Dust suppression methods and proper housekeeping.</p>	<p>Throughout the operational phase.</p>	<p>Dust generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ National Dust Control Regulations, GN No R827 ❖ ASTM D1739 (SANS 1137:2012)
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Quarry excavations. ❖ Processing plants. ❖ Blasting. 	<ul style="list-style-type: none"> ❖ Impact on noise. 	<p><u>Control:</u> Noise suppression methods and proper housekeeping.</p>	<p>Throughout the operational phase.</p>	<p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NRTA, 1996 ❖ Western Cape Noise Control Regulations (PN 200/2013), June 2013

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<ul style="list-style-type: none"> ❖ Quarry excavations. ❖ Blasting. 	<ul style="list-style-type: none"> ❖ Impact on blast vibration. 	<p><u>Control:</u> Adherence to the blasting rules and regulations.</p>	<p>Throughout the operational phase.</p>	<p>Health and safety aspects on site must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ MHSA, 1996 ❖ OHSA, 1993 ❖ OHSAS 18001 ❖ USBM standards
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Pumping out groundwater. ❖ Flyrock. 	<ul style="list-style-type: none"> ❖ Impact on sensitive landscape. 	<p><u>Control:</u> Implementing proper housekeeping.</p>	<p>Throughout the operational phase.</p>	<p>Sensitive landscapes must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:BA 2004 ❖ Western Cape Biodiversity Spatial Plan
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 	<ul style="list-style-type: none"> ❖ Impact on visual impact. 	<p><u>Control:</u> Implementing proper housekeeping.</p>	<p>Throughout the operational phase.</p>	<p>Management of the mining activities must be in accordance with the:</p> <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998
<ul style="list-style-type: none"> ❖ Quarry excavations. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Recreation at Berg River. 	<p><u>Control:</u> Implementing proper housekeeping practices and stormwater control measures.</p>	<p>Throughout the operational phase.</p>	<p>Health and safety aspects on site must be managed in accordance with the:</p>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<ul style="list-style-type: none"> ❖ Blasting. ❖ Flyrock. 				<ul style="list-style-type: none"> ❖ MHPA, 1996 ❖ OHPA, 1993 ❖ OHPAS 18001
DRIEHEUVELS QUARRY				
<ul style="list-style-type: none"> ❖ Demarcation of site with visible beacons. 	<ul style="list-style-type: none"> ❖ No impact could be identified other than the beacons being outside the boundaries of the approved mining area. 	Control through management and monitoring.	Beacons need to be in place throughout the life of the mine.	<p>Mining is only allowed within the boundaries of the approved area.</p> <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998
<ul style="list-style-type: none"> ❖ Site establishment. ❖ Excavation, loading and hauling to processing plant of BDQ. 	<ul style="list-style-type: none"> ❖ Visual intrusion because of site establishment. ❖ Visual intrusion associated with the excavation area. 	<u>Control:</u> Implementing proper housekeeping.	Throughout the site establishment- and operational phases.	<p>Management of the mining activities must be in accordance with the:</p> <ul style="list-style-type: none"> ❖ MPRDA, 2002 ❖ NEMA, 1998
<ul style="list-style-type: none"> ❖ Site establishment 	<ul style="list-style-type: none"> ❖ Potential negative impact on the nearby CBA/ESA. 	<u>Control:</u> Keep mining within the approved footprint area.	Throughout the site establishment phase.	<p>Natural vegetated areas must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:BA 2004 ❖ Western Cape Biodiversity Spatial Plan
<ul style="list-style-type: none"> ❖ Site establishment 	<ul style="list-style-type: none"> ❖ Potential loss of Swartland Shale Renosterveld to access the mineral. 	<u>Modify:</u> Adhere to the footprint of S1 instead of S2.	Throughout the site establishment phase.	<p>Natural vegetated areas must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:BA 2004 ❖ Western Cape Biodiversity Spatial Plan
<ul style="list-style-type: none"> ❖ Site establishment 	<ul style="list-style-type: none"> ❖ Potential impact on fauna within the footprint area. 	<u>Control & Stop:</u> Implementing good management practices.	Throughout the site establishment-, and operational phase.	<p>Fauna must be managed in accordance with the:</p>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
				❖ NEM:BA 2004
❖ Site establishment	❖ Potential impact on areas/infrastructure of heritage or cultural concern.	<u>Control & Stop:</u> Implementing good management practices.	Throughout the operational phase.	Cultural/heritage aspects must be managed in accordance with the: ❖ NHRA, 1999
❖ Site establishment	❖ Alteration of the agricultural sense of place.	<u>Control:</u> Implementing good management practices.	Throughout the site establishment-, and operational phase.	Mining must be managed in accordance with the: ❖ MPRDA, 2002
❖ Site establishment	❖ Loss of agricultural land to allow for mining (site-specific footprint)	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	Throughout the site establishment-, and operational phase.	Mining must be managed in accordance with the: ❖ MPRDA, 2002
❖ Site establishment	❖ Potential impact of mining on surrounding land use.	<u>Control:</u> Implementing good management practices and keeping activities to the approved footprint.	Throughout the site establishment-, and operational phase.	Mitigating the impact on the surrounding land use must be in accordance with the: ❖ ASTM D1739 (SANS 1137:2012) ❖ CARA, 1983 ❖ MHSA, 1996 ❖ MPRDA, 2002 ❖ National Dust Control Regulations, GN No R827 ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NEM:WA, 2008 ❖ NWA, 1998

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Dust nuisance caused by the disturbance of soil. ❖ Dust nuisance caused by blasting activities. ❖ Dust nuisance due to excavation, loading and vehicles transporting material. ❖ Dust nuisance due to landscaping activities. 	<p><u>Control:</u> Dust suppression methods and proper housekeeping.</p>	<p>Throughout the site establishment-, operational, and decommissioning phase.</p>	<p>Dust generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ National Dust Control Regulations, GN No R827 ❖ ASTM D1739 (SANS 1137:2012)
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Noise nuisance generated by earthmoving machinery. ❖ Noise nuisance because of blasting. ❖ Noise nuisance generated by excavation equipment and earthmoving machinery. ❖ Noise nuisance generated during the rehabilitation phase. 	<p><u>Control:</u> Noise suppression methods and proper housekeeping.</p>	<p>Throughout the site establishment-, operational-, and decommissioning phase.</p>	<p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NEM:AQA. 2004 Regulation 6(1) ❖ NRTA, 1996 ❖ Western Cape Noise Control Regulations (PN 200/2013), June 2013
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Loss/contamination of stockpiled topsoil. ❖ Potential erosion of denuded areas. ❖ Soil erosion. ❖ Loss of reinstated topsoil from denuded areas. 	<p><u>Control & Remedy:</u> Proper housekeeping and storm water management.</p>	<p>Throughout the site establishment-, operational, and decommissioning phase.</p>	<p>Topsoil must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA, 2004 ❖ MPRDA, 2002 ❖ Rehabilitation Plan (Appendix O)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Potential infestation of the topsoil heaps with weeds or invader plant species. ❖ Potential infestation of the reinstated areas with weeds and invader plant species. 	<p><u>Control & Remedy:</u> Implementation of an invasive plant species management plan.</p>	<p>Throughout the site establishment-, operational, and decommissioning phase.</p>	<p>Invader plants must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ CARA, 1983 ❖ NEM:BA 2004 ❖ Invasive Plant Species Management Plan (Appendix M).
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Potential contamination of footprint area and surface runoff because of hydrocarbon spillages. ❖ Contamination of area with hazardous- and/or general waste. ❖ Potential contamination of environment because of improper waste disposal. 	<p><u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.</p>	<p>Throughout the site establishment-, operational-, and decommissioning phase.</p>	<p>Mining related waste must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998 ❖ NEM:WA, 2008 ❖ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ❖ NEMA, 1998 (Section 30)
<ul style="list-style-type: none"> ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Health and safety risk posed by blasting activities. ❖ Unsafe working environment for employees. ❖ Safety risk posed by un-sloped areas. 	<p><u>Stop & Control:</u> Adherence to the blasting rules and regulations, demarcation of the mining area and proper housekeeping.</p>	<p>Throughout operational and decommissioning phases.</p>	<p>Health and safety aspects on site must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ MHSA, 1996 ❖ OHSWA, 1993 ❖ OHSAS 18001 ❖ USBM standards
<ul style="list-style-type: none"> ❖ Drilling and blasting 	<ul style="list-style-type: none"> ❖ Potential impact of blasting vibrations on surrounding infrastructure. 	<p><u>Control:</u> Adherence to the blasting rules and regulations.</p>	<p>Throughout operational and decommissioning phases.</p>	<p>Blasting must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ MHSA, 1996

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
				<ul style="list-style-type: none"> ❖ OHSA, 1993 ❖ OHSAS 18001 ❖ USBM standards
<ul style="list-style-type: none"> ❖ Excavation, loading and hauling to the processing plant of BDQ. 	<ul style="list-style-type: none"> ❖ Deterioration of the access road (farm road) to the mining area. 	<p><u>Control & Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining.</p>	<p>Throughout the operational phase.</p>	<p>The access road must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NRTA, 1996
<ul style="list-style-type: none"> ❖ Excavation, loading and hauling to the processing plant of BDQ. 	<ul style="list-style-type: none"> ❖ Potential impact on the groundwater of the footprint area. 	<p><u>Control:</u> Control the mining depth to above the groundwater level.</p>	<p>Throughout the decommissioning phase.</p>	<p>Water related matters must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998
<ul style="list-style-type: none"> ❖ Excavation, loading and hauling to the processing plant of BDQ. 	<ul style="list-style-type: none"> ❖ Potential impact on the Berg River due to surface runoff. 	<p><u>Control:</u> Implementing proper housekeeping practices and stormwater control measures.</p>	<p>Throughout the decommissioning phase.</p>	<p>Water related matters must be managed in accordance with the:</p> <ul style="list-style-type: none"> ❖ NWA, 1998

i) Financial Provision

(1) Determination of the amount of Financial Provision.

- (a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.

Bridgetown Dolomite Quarry

The preferred post-mining land use for BDQ is to return the area to agricultural use, whereby the excavations will be designed as landscape features. It is proposed that the excavations will be flooded to the Misverstand Dam's full supply level of ± 26 m to ± 34 m. As cliffed water bodies the excavations will serve primarily, as waterfowl and bird of prey sanctuaries, while simultaneously increasing the dam's capacity by $\pm 4 - 5$ million m^3 .

Drieheuvels Quarry

Upon cessation of the mining activities, the area will be fully rehabilitated. The face along the western boundary of the excavation will either be sloped at 1:3 to the pit floor, to prevent soil erosion, or be stepped by creating benches of not more than 3 meters high.

Final rehabilitation will entail the removal of all equipment from the site. Final landscaping, levelling and top dressing will be done on all areas. Control of invasive plant species is an important aspect after topsoil replacement and seeding has been done in an area. Site management will implement an invasive plant species management plan (see Appendix M) during the 12 months' aftercare period to address germination of problem plants in the area. The right holder will comply with the minimum closure objectives as prescribed by DMR.

- (b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

This report, the draft EIAR & EMP, includes all the environmental objectives in relation to closure and will be available for perusal by the landowner, I&AP's and stakeholders over a 30-days commenting period. The comments received on the draft EIAR will be incorporated into the Final EIAR & EMP.

(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

The rehabilitation plans are attached as Appendix E1 (BDQ) and E2 (DQ) respectively.

(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The decommissioning phase will entail the final rehabilitation of both BDQ and the DQ mining footprint. The rehabilitation of the mining areas as indicated on the rehabilitation maps attached as Appendix E1 (BDQ) and E2 (DQ) respectively will comply with the minimum closure objectives as prescribed by DMR and detailed below, and therefore is deemed compatible:

Rehabilitation of the excavated area (BDQ & DQ):

- ❖ The excavated area must serve as a final depositing area for the placement of overburden.
- ❖ Rocks and coarse material removed from the excavation must be dumped into the excavation.
- ❖ No waste may be permitted to be deposited in the excavations.
- ❖ Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.
- ❖ The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within 6 months from closure of the site.
- ❖ If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMR) may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification

Rehabilitation of the Office, Processing- and Stockpile Area (BDQ):

- ❖ On completion of operations, all structures or objects on the camp/office site, no longer required by the landowner, shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).
- ❖ All processing infrastructure and stockpiled material must be removed,
- ❖ Where the office, processing- and/or stockpile areas have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface needs to be ripped or ploughed to a depth of at least 300mm and the topsoil previously stored adjacent the site, must be spread evenly to its original depth over the whole area.
- ❖ Topsoil spreading may only be done at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.
- ❖ A cover crop must be planted and established immediately after spreading of topsoil to stabilize the soil and protect it from erosion. It is important that rehabilitation be taken up to the point of crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established.
- ❖ If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMR) may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.
- ❖ Photographs of the office, processing- and stockpiling areas, before and during the mining operation and after rehabilitation, must be taken at selected fixed points and kept on record for the information of the Regional Manager.
- ❖ The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion does occur.

Final rehabilitation (BDQ & DQ):

- ❖ Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
 - ❖ All equipment, plant, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
 - ❖ Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
 - ❖ The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) need to be eradicated from the site.
 - ❖ Final rehabilitation must be completed within a period specified by the Regional Manager (DMR).
- (e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.**

The calculation of the quantum for financial provision was according to Section B of the working manual. The following calculation includes both the footprint of BDQ and DQ.

Mine type and saleable mineral by-product

According to Tables B.12, B.13 and B.14

Mine type	Dolomite
Saleable mineral by-product	None

Risk ranking

According to Tables B.12, B.13 and B.14

Primary risk ranking (either Table B.12 or B.13)	C (Low risk)
Revised risk ranking (B.14)	N/A

Environmental sensitivity of the mine area

According to Table B.4

Environmental sensitivity of the mine area	Low
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Level of information

According to Step 4.2:

Level of information available	Extensive
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Identify closure components

According to Table B.5 and site-specific conditions

COMPONENT NO.	MAIN DESCRIPTION	APPLICABILITY OF CLOSURE COMPONENTS	
		(CIRCLE YES OR NO)	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	YES	-
2(A)	Demolition of steel buildings and structures	YES	-
2(B)	Demolition of reinforced concrete buildings and structures	YES	-
3	Rehabilitation of access roads	YES	-
4(A)	Demolition and rehabilitation of electrified railway lines	-	NO
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	NO
5	Demolition of housing and facilities	YES	-
6	Opencast rehabilitation including final voids and ramps	YES	-
7	Sealing of shafts, adits and inclines	-	NO
8(A)	Rehabilitation of overburden and spoils	YES	-
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	YES	-
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	NO
9	Rehabilitation of subsided areas	-	NO

COMPONENT NO.	MAIN DESCRIPTION	APPLICABILITY OF CLOSURE COMPONENTS	
		(CIRCLE YES OR NO)	
10	General surface rehabilitation, including grassing of all denuded areas	YES	-
11	River diversions	-	NO
12	Fencing	YES	-
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	NO
14	2 to 3 years of maintenance and aftercare	-	NO

Unit rates for closure components

According to Table B.6 master rates and multiplication factors for applicable closure components. The master rate from the DMR Master Rates table for financial provision of 2019 was used.

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	16	1.00
2(A)	Demolition of steel buildings and structures	228	1.00
2(B)	Demolition of reinforced concrete buildings and structures	336	1.00
3	Rehabilitation of access roads	41	1.00
4(A)	Demolition and rehabilitation of electrified railway lines	-	-
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	-
5	Demolition of housing and facilities	455	1.00
6	Opencast rehabilitation including final voids and ramps	238 697	0.04
7	Sealing of shafts, adits and inclines	-	-
8(A)	Rehabilitation of overburden and spoils	159 131	1.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	198 195	1.00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	-
9	Rehabilitation of subsided areas	-	-
10	General surface rehabilitation, including grassing of all denuded areas	126 059	1.00
11	River diversions	-	-
12	Fencing	144	1.00
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	-
14	2 to 3 years of maintenance and aftercare	-	-

Determine weighting factors

According to Tables B.7 and B.8

Weighting factor 1: Nature of terrain/accessibility	1.10 (Undulating)
Weighting factor 2: Proximity to urban area where goods and services are to be supplied	1.05 (Peri-Urban)

Calculation of closure costs

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision.

Table 36: Calculation of closure cost

CALCULATION OF THE QUANTUM							
Mine:	Bridgetown Dolomite Quarry & Drieheuvels Quarry			Location:	Moorreesburg		
Evaluators:	C Fouche			Date:	31 October 2019		
No	Description	Unit	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A *B*C*D Amount (rands)
			Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m ³	18 444.86	16	1.00	1.10	R 324 629.54
2(A)	Demolition of steel buildings and structures	m ²	1 001	228	1.00	1.10	R 251 050.80
2(B)	Demolition of reinforced concrete buildings and structures	m ²	64	336	1.00	1.10	R 23 654.40
3	Rehabilitation of access roads	m ²	4 019.52	41	1.00	1.10	R 181 280.35
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	395	1.00	1.10	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	216	1.00	1.10	R 0.00
5	Demolition of housing and/or administration facilities	m ²	156	455	1.00	1.10	R 78 078.00
6	Opencast rehabilitation including final voids and ramps	ha	25	238 697	0.04	1.10	R 262 566.70
7	Sealing of shaft, audits and inclines	m ³	0	122	1.00	1.10	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	1.10	159 131	1.00	1.10	R 192 548.51
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0.25	198 195	1.00	1.10	R 54 503.63

8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	575 653	0.51	1.10	R 0.00
9	Rehabilitation of subsided areas	ha	0	133 249	1.00	1.10	R 0.00
10	General surface rehabilitation	ha	4.50	126 059	1.00	1.10	R 623 992.05
11	River diversions	ha	0	126 059	1.00	1.10	R 0.00
12	Fencing	m	2.50	144	1.00	1.10	R 396.00
13	Water Management	ha	0	47 931	0.17	1.10	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	0	16 776	1.00	1.10	R 0.00
15(A)	Specialists study	Sum	0				R 0.00
15(B)	Specialists study	Sum	0				R 0.00
Sum of items 1 to 15 above							R 1 992 699.97
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R 1 992 699.97		Sub Total 1	R 2 092 334.97

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 <R100 000 000.00		-
		12% of Subtotal 1 if Subtotal 1 >R100 000 000.00		-
2	Contingency	10.0% of Subtotal 1		R 209 233.50
Sub Total 2 (Subtotal 1 plus management and contingency)				R 2 301 568.47
Vat (15%)				R 345 235.27
GRAND TOTAL (Subtotal 3 plus VAT)				R 2 646 803.74

The amount that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of R 2 646 803.74.

(f) Confirm that the financial provision will be provided as determined.

Herewith I, the person, whose name is stated below confirm that I am the person authorised to act as representative of the right holder in terms of the resolution submitted with the application. I herewith confirm that the company will provide the amount that will be determined by the Regional Manager in accordance with the prescribed guidelines.

Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including

- g) Monitoring of Impact Management Actions**
- h) Monitoring and reporting frequency**
- i) Responsible persons**
- j) Time period for implementing impact management actions**
- k) Mechanism for monitoring compliance**

Table 37: Mechanisms for monitoring compliance with and performance assessment against the EMPR and reporting thereon.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
BRIDGETOWN DOLOMITE QUARRY				
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. ❖ Blasting. 	<ul style="list-style-type: none"> ❖ Impact on geology and soil. 	<ul style="list-style-type: none"> ❖ Storm water management structures such as berms to direct storm- and runoff water around the stockpiled topsoil area. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. 	<p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<p><u>Responsibility:</u></p> <p><i>Topsoil:</i></p> <ul style="list-style-type: none"> ❖ Remove all topsoil at least 500 mm deep from the southern section and possibly 200 mm from the south of the northern section. ❖ Remove topsoil in the plant area to 150 mm and stockpiled for later use in rehabilitation. ❖ The topsoil stockpiles should not be exceeded 3 m. When reused, the material will require re-nitrification either by legume planting or fertilising during replacement. <p><i>Soil Erosion:</i></p> <ul style="list-style-type: none"> ❖ Provide storm water cut-off trenches above topsoil berms, waste dumps, plant and product stockpile area. Such trenches must lead into storm water retention ponds. ❖ Add silt runoff collection trenches below topsoil berms, waste dumps, plant, manoeuvring and product stockpile areas. These trenches must lead to silt retention ponds from which silt is removed by excavator or FEL to be disposed of as layers in the overburden dump. ❖ Ensure that the quality of storm water released from the retention ponds does not exceed the ambient TSS load of runoff from the surrounding wheat fields. ❖ Adhere to the requirements of the water use authorisations and that all activities take place a distance from the western edge of the Misverstand Dam to allow for sufficient space for effective silt retention capabilities. 	
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. 	<ul style="list-style-type: none"> ❖ Impact on topography and visual impact. 	<ul style="list-style-type: none"> ❖ Minimize the visual impact of the activity on the surrounding environment through 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. 	<p>Applicable throughout operational-, and decommissioning phases.</p>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
<ul style="list-style-type: none"> ❖ Processing plants. ❖ Stockpiles. 		<p>proper site management and implementing good housekeeping practices.</p>	<ul style="list-style-type: none"> ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <p><i>Bridgetown Dolomite Quarry - Northern Section:</i></p> <ul style="list-style-type: none"> ❖ Retain the cliffs facing east. ❖ Limit mining to above the 40 m contour in the east. ❖ Mine the topographic spur out as a slot only leaving residual exposed faces in the south, which are 10 m higher than the 40 m rim of the excavation. <p><i>Bridgetown Dolomite Quarry – Processing Plant:</i></p> <ul style="list-style-type: none"> ❖ Locate these facilities within the northern drainage basin. <p><i>Bridgetown Dolomite Quarry – Southern Section:</i></p> <ul style="list-style-type: none"> ❖ Mine from a central excavation outward so that only the skyline is lowered as seen from the east bank. ❖ Retain the cliffs and 20 m mining pillar largely limiting impact to overhead view only. 	<ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	<ul style="list-style-type: none"> ❖ Impact on sensitive landscapes, vegetation and fauna. 	<ul style="list-style-type: none"> ❖ Visible beacons indicating the boundary of the mining area and buffer areas. ❖ Cover crop to seed reinstated areas. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. 	<p>Applicable throughout operational phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
❖ Pumping out groundwater.		❖ Toolbox talks to educate employees how to handle fauna that enter the work areas.	<p><u>Responsibility:</u></p> <p><i>Vegetation:</i></p> <ul style="list-style-type: none"> ❖ Transplant plants of importance to the remaining vegetation type. ❖ Limit disturbance of natural vegetation to a small an area as possible. ❖ Prevent erosion of final pit edges. ❖ Build new roads on agricultural land and as far as possible avoid the natural vegetation. ❖ Employ an environmental officer. ❖ Take responsibility for transplanting endangered species (i.e. the company must employ an expert to conduct this operation). ❖ Protect the remaining Succulent Karoo vegetation type in a proclaimed reserve around the proposed northern excavation. ❖ Do not allow dumping, grazing or any other activity in the reserve. <p><i>Fauna:</i></p> <ul style="list-style-type: none"> ❖ Strive to preserve the cliff and riverine areas as a habitat for especially birds of prey and reptiles. 	
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. ❖ Stockpiles. 	❖ Impact on surface water.	<ul style="list-style-type: none"> ❖ Surfaced areas at the workshop. ❖ Operational oil trap. ❖ Conservancy tanks and fresh drains of adequate size. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. 	<p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<u>Responsibility:</u> <ul style="list-style-type: none"> ❖ Provide the vehicle-refuelling bay with a concrete apron to catch diesel spills from the workshop, and ensure that the workshop floor and apron drains to an oil trap. ❖ Direct foul water from the offices and personnel amenities into properly sized and constructed conservancy tanks and French drains suitably backfilled with stones to achieve sufficient soak away in the phyllite. 	
<ul style="list-style-type: none"> ❖ Topsoil removal. ❖ Quarry excavations. ❖ Blasting. ❖ Pumping out groundwater. 	<ul style="list-style-type: none"> ❖ Impact on groundwater. 	<ul style="list-style-type: none"> ❖ Functional oil sump. ❖ Wash bay with impermeable surface. ❖ Properly sized and constructed conservancy tanks. 	<u>Role:</u> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> <ul style="list-style-type: none"> ❖ Provide the vehicle refuelling bay with a concrete apron to catch diesel spills from the workshop, and ensure that the workshop floor and apron drains to an oil trap. ❖ Direct foul water from the offices and personnel amenities into properly sized and constructed conservancy tanks and French drains suitably backfilled with stones to achieve sufficient soak away in the phyllite. 	<p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Topsoil removal. ❖ Quarry excavations. ❖ Processing plants. 	<ul style="list-style-type: none"> ❖ Impact on air quality (dust). 	<ul style="list-style-type: none"> ❖ Fallout dust monitoring equipment. ❖ Gravimetric dust monitoring equipment. 	<u>Role:</u> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored (quarterly) by the Occupational Hygienist. 	<p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
<ul style="list-style-type: none"> ❖ Stockpiles. ❖ Blasting. ❖ Flyrock. 		<ul style="list-style-type: none"> ❖ Dust suppression equipment such as a water car, water dispenser and sprayers on the crusher plant. ❖ Signage that clearly reduce the speed on the access roads. 	<ul style="list-style-type: none"> ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Pre-wet earmarked area prior to topsoil stripping or overburden blasting. ❖ Schedule topsoil stripping/overburden blasting out of the dry windy season, during calm (avoid high wind conditions) days. ❖ Armour permanent haul roads to lessen dust generation, and use a water truck to wet temporary haul roads. ❖ Control dust generation at the primary tipping area with a semi-enclosed hopper, and the installation of a water sprayer system. ❖ Enclose the transfer points, install water sprayers and enclose the screen in a screen house to control dust from the conveyor belts. Implement semi-wet screening. ❖ Enclose the Ag-lime milling and screening plant. ❖ Maintain low-level stockpiles with a maximum moisture content at the Ag-lime stockpiling and loading area. ❖ Make use of a water truck to control the generation of dust on roads adjacent to farm houses/wheat fields. ❖ Retain the berm and trees that were established at the old Ag-lime plant site (1998-2009) to limit the impact of dust on the adjacent residents. ❖ Maintain the dust monitoring system implemented at the site. 	<ul style="list-style-type: none"> ❖ Annual compliance monitoring of site by an Environmental Control Officer.
<ul style="list-style-type: none"> ❖ Roads on site. ❖ Quarry excavations. ❖ Processing plants. 	<ul style="list-style-type: none"> ❖ Impact on noise. 	<ul style="list-style-type: none"> ❖ Personal noise exposure monitoring equipment. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. 	<p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management.

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❖ Blasting.		<ul style="list-style-type: none"> ❖ Signage indicating noise zones. ❖ Silencers fitted to all project related vehicles, and the use of vehicles that are in road worthy condition in terms of the National Road Traffic Act, 1996. 	<ul style="list-style-type: none"> ❖ Compliance to be monitored (quarterly) by the Occupational Hygienist. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Implement continuous noise monitoring. ❖ Provide employees with the correct PPE. ❖ Ensure blasting take place under favourable weather conditions i.e. no blasting allowed under low cloud, temperature inversions, or during windy conditions. ❖ Monitor the noise- and vibration levels of each blast. 	❖ Annual compliance monitoring of site by an Environmental Control Officer.
<ul style="list-style-type: none"> ❖ Quarry excavations. ❖ Blasting. 	❖ Impact on blast vibration and recreation on the Berg River.	<ul style="list-style-type: none"> ❖ Stocked first aid box. ❖ Level 1 certified first aider. ❖ All appointments in terms of the Mine Health and Safety Act, 1996. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Construction an overburden bench about 4 - 5 m wide around the perimeter of the quarry excavations. ❖ Maintain maximum charge per delay, when setting blasts, to ensure low vibration levels. 	<p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

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DRIEHEUVELS QUARRY				
<ul style="list-style-type: none"> ❖ Demarcation of site with visible beacons. 	<ul style="list-style-type: none"> ❖ Maintenance of beacons 	<ul style="list-style-type: none"> ❖ Visible beacons need to be established at the corners of the mining area. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Ensure beacons are in place throughout the life of the mine. 	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.
<ul style="list-style-type: none"> ❖ Site establishment. ❖ Excavation, loading and hauling to processing plant of BDQ. 	<p><u>Topography and Visual Characteristics</u></p> <ul style="list-style-type: none"> ❖ Visual intrusion because of site establishment. ❖ Visual intrusion associated with the excavation area. 	<ul style="list-style-type: none"> ❖ Minimize the visual impact of the activity on the surrounding environment through proper site management and implementing good housekeeping practices. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Ensure that the site have a neat appearance and is kept in good condition at all times. ❖ Store mining equipment in dedicated areas when not in use. ❖ Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area. ❖ Contain excavations to the approved footprint of the permitted area. ❖ Store topsoil and overburden heaps in the form of berms along the north-western and north-eastern boundaries of the mining 	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

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			<p>footprint to screen the activities from residents on the eastern bank of the river.</p> <ul style="list-style-type: none"> ❖ Rehabilitate the site upon closure to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum. 	
<ul style="list-style-type: none"> ❖ Site establishment 	<p><u>Mining, Biodiversity and Vegetation:</u></p> <ul style="list-style-type: none"> ❖ Potential negative impact on the nearby CBA/ESA. 	<ul style="list-style-type: none"> ❖ Visible beacons indicating the boundary of the mining area. ❖ Cover crop to seed reinstated areas. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Clearly demarcate the mining boundaries and contain all operations to the approved mining area. ❖ Declared the area outside the mining boundaries a no-go area, and educate all employees accordingly. ❖ Implement measures to limit flyrock falling outside the mining area. Collect and remove all flyrock (of diameter 150 mm or larger) that falls beyond the working area. 	<p>Applicable throughout site establishment-, and operational phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.
<ul style="list-style-type: none"> ❖ Site establishment 	<ul style="list-style-type: none"> ❖ Potential loss of Swartland Shale Renosterveld to access the mineral. 			
<ul style="list-style-type: none"> ❖ Site establishment 	<p><u>Fauna:</u></p> <ul style="list-style-type: none"> ❖ Potential impact on fauna within the footprint area. 	<ul style="list-style-type: none"> ❖ Toolbox talks to educate employees how to handle fauna that enter the work areas. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Ensure no fauna is caught, killed, harmed, sold or played with. 	<p>Applicable throughout site establishment-, and operational phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

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			<ul style="list-style-type: none"> ❖ Instruct workers to report any animals that may be trapped in the working area. ❖ Ensure no snares are set or nests raided for eggs or young. 	
<ul style="list-style-type: none"> ❖ Site establishment 	<p><u>Cultural and Heritage Environment:</u></p> <ul style="list-style-type: none"> ❖ Potential impact on areas/infrastructure of heritage or cultural concern. 	<ul style="list-style-type: none"> ❖ Contact number of an archaeologist that can be contacted when a discovery is made on site. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Confine all mining to the development footprint area. ❖ Implement the following change find procedure when discoveries are made on site: <ul style="list-style-type: none"> ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify Heritage Western Cape (HWC). 	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

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			<ul style="list-style-type: none"> ▪ Work may only continue once the go-ahead was issued by HWC. 	
<ul style="list-style-type: none"> ❖ Site establishment 	<p><u>Land Use and Existing Infrastructure:</u></p> <ul style="list-style-type: none"> ❖ Potential impact of mining on surrounding land use. 	<ul style="list-style-type: none"> ❖ Monitoring Programme 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Implement the visual-, dust-, noise-, water-, waste- and health and safety mitigation measures as proposed in this document. 	<p>Throughout the site establishment-, and operational phase.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<p><u>Air and Noise Quality:</u></p> <ul style="list-style-type: none"> ❖ Dust nuisance caused by the disturbance of soil. ❖ Dust nuisance caused by blasting activities. ❖ Dust nuisance due to excavation, loading and vehicles transporting material. ❖ Dust nuisance due to landscaping activities. 	<ul style="list-style-type: none"> ❖ Fallout dust monitoring equipment. ❖ Gravimetric dust monitoring equipment. ❖ Dust suppression equipment such as a water car, water dispenser and sprayers on the crusher plant. ❖ Signage that clearly reduce the speed on the access roads. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ❖ Compliance to be monitored (quarterly) by the Occupational Hygienist. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Control the liberation of dust into the surrounding environment by the use of; inter alia, water spraying and/or other dust-allaying agents. ❖ Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. 	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

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			<ul style="list-style-type: none"> ❖ Limit speed on the haul roads to 20 km/h to prevent the generation of excess dust. ❖ Minimise areas devoid of vegetation, and only remove vegetation immediately prior to mining. ❖ Cover, alternatively plant topsoil/overburden stockpiles around the footprint with indigenous grass species to minimise exposed surface areas, reducing windblown dust from the site. ❖ Flatten and cover loads to ensure minimal spillage of material takes place during transportation, also preventing windblown dust. ❖ Consider weather conditions upon commencement of daily operations. ❖ Extend the fallout dust monitoring system, already in place at BDQ, to the DQ area. ❖ Ensure dust-generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012). ❖ Implement best practice measures during the stripping of topsoil, excavation, and transporting of material from site to minimize potential dust impacts. 	
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ 	<p><u>Air and Noise Quality:</u></p> <ul style="list-style-type: none"> ❖ Noise nuisance generated by earthmoving machinery. ❖ Noise nuisance because of blasting. 	<ul style="list-style-type: none"> ❖ Personal noise exposure monitoring equipment. ❖ Signage indicating noise zones. ❖ Silencers fitted to all project related vehicles, and the use of vehicles that are in road worthy 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored (quarterly) by the Occupational Hygienist. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. 	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

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<ul style="list-style-type: none"> ❖ Sloping and landscaping during rehabilitation 	<ul style="list-style-type: none"> ❖ Noise nuisance generated by excavation equipment and earthmoving machinery. ❖ Noise nuisance generated during the rehabilitation phase. 	<p>condition in terms of the National Road Traffic Act, 1996.</p>	<p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Only operate the site during daylight hours from Monday to Saturday. ❖ Ensure that employees and staff conduct themselves in an acceptable manner while on site. ❖ No loud music may be permitted at the mining area. ❖ Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996. ❖ Plan the type, duration and timing of the blasting procedures with due cognizance of other land users and structures in the vicinity. Notify the surrounding landowners in writing prior to each blasting occasion. ❖ Implement best practice measures to minimise potential noise impacts. ❖ Ensure noise generated by the proposed activity comply with the Western Cape Noise Control Regulations (PN 200/2013), June 2013. ❖ Contract a qualified occupational hygienist to quarterly monitor and report on the personal noise exposure of the employees working at the mine. Monitoring must be in accordance with SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA 2004, SANS 10103:2008. 	
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Sloping and landscaping during rehabilitation 	<p><u>Geology and Soil:</u></p> <ul style="list-style-type: none"> ❖ Loss/contamination of stockpiled topsoil. ❖ Potential erosion of denuded areas. 	<ul style="list-style-type: none"> ❖ Storm water management structures such as berms to direct storm- and runoff water around the stockpiled topsoil area. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. 	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management.

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	<ul style="list-style-type: none"> ❖ Soil erosion. ❖ Loss of reinstated topsoil from denuded areas. 		<p><u>Responsibility:</u></p> <p><i>Topsoil:</i></p> <ul style="list-style-type: none"> ❖ Strip and stockpile the upper 500 mm of the soil before mining. ❖ Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process. ❖ Ensure topsoil stripping, stockpiling and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time. ❖ Place the topsoil heaps on a levelled area within the mining footprint area, preferably along the north-western and north-eastern boundary of the mining area, and implement measures to safeguard the piles from being washed away. Do not stockpile topsoil in undisturbed areas. ❖ Ensure that topsoil heaps do not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. ❖ Keep temporary topsoil stockpiles free of invasive plant species. ❖ Divert storm- and runoff water around the stockpile area to prevent erosion. ❖ Vegetate the topsoil heaps to be stored longer than 6 months with an indigenous grass seed mix if vegetation does not naturally germinate within the first growth season. ❖ Spread the topsoil evenly over the rehabilitated area upon closure of the site. ❖ Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. ❖ Plant a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover 	<ul style="list-style-type: none"> ❖ Annual compliance monitoring of site by an Environmental Control Officer.

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			<p>crop for optimum production. Rehabilitation extends until the first cover crop is well established.</p> <ul style="list-style-type: none"> ❖ Control run-off water with temporary banks, where necessary, to prevent accumulation of run-off causing down-slope erosion. ❖ Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement. <p><i>Soil Erosion:</i></p> <ul style="list-style-type: none"> ❖ Slow the runoff from compacted surfaces down and disperse it sufficiently to prevent accelerated erosion. ❖ Put erosion control measures in place to minimise erosion along the proposed mining area. Take extra precautions in areas where the soils are deemed highly erodible. ❖ Do not stockpile soil on or near steep slopes. ❖ Control all drainage from the project area to prevent off-site pollution, flooding or damage to infrastructure downstream of any storm water discharge points. ❖ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS. 	
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Sloping and landscaping during rehabilitation 	<p><u>Mining, Biodiversity and Vegetation</u></p> <ul style="list-style-type: none"> ❖ Potential infestation of the topsoil heaps with weeds or invader plant species. ❖ Potential infestation of the reinstated areas 	<ul style="list-style-type: none"> ❖ Designated team to cut or pull out invasive plant species that germinated on site. ❖ Herbicide application equipment. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. 	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

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	with weeds and invader plant species.		<u>Responsibility:</u> <ul style="list-style-type: none"> ❖ Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. ❖ Keep all stockpiles (topsoil & overburden) free of invasive plant species. ❖ Control declared invader or exotic species on the rehabilitated areas. 	
<ul style="list-style-type: none"> ❖ Stripping and stockpiling of topsoil ❖ Excavation, loading and hauling to the processing plant of BDQ ❖ Sloping and landscaping during rehabilitation 	<u>General:</u> <ul style="list-style-type: none"> ❖ Potential contamination of footprint area and surface runoff because of hydrocarbon spillages. ❖ Contamination of area with hazardous- and/or general waste. ❖ Potential contamination of environment because of improper waste disposal. 	<ul style="list-style-type: none"> ❖ Oil spill kit. ❖ Sealed drip trays. ❖ Formal waste disposal system with waste registers, or access to the waste registers of BDQ. 	<u>Role:</u> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> <ul style="list-style-type: none"> ❖ Ensure regular vehicle maintenance, repairs and services are done at the off-site workshop and service area of BDQ. Make sure drip trays are used when emergency repairs have to be done on equipment not able to move to the workshop. ❖ Equip the diesel bowser with a drip tray if used on site. The nozzle of the bowser must rest in a sleeve to prevent dripping after refuelling. ❖ Clean drip trays after use. Do not use dirty drip trays. ❖ Collect all hazardous waste products in a suitable receptacle and remove from the site, either for resale or for appropriate disposal at a recognised facility. Incorporate the hazardous waste generated at DQ into the existing hazardous waste handling system of BDQ. 	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<ul style="list-style-type: none"> ❖ Clean spills immediately, within 2 hours of occurrence, to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and disposing it into the existing hazardous waste handling system of BDQ (if possible), or at a recognised facility. File proof. ❖ Contain all general waste within the site vehicles and daily remove it from the mining area to the general waste storage area of BDQ. ❖ Encourage re-use or recycling of waste products. ❖ Prevent the burning or burying of waste on site. ❖ Ensure employees make use of the formal ablution facilities. Provide ablution facilities in the form of a chemical toilet. An accredited liquid waste handling contractor must service the toilet at least once a week. ❖ Ensure that the use of temporary, chemical toilet facility do not cause pollution of water sources, or pose a health hazard. In addition, prevent any form of secondary pollution from the disposal of refuse or sewage. Address any pollution problems immediately. ❖ Contain wastewater and safely dispose thereof when small volumes of wastewater is generated during the life of the mine. No discharge into the natural environment allowed. ❖ Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the DWS and other relevant authorities. 	
<ul style="list-style-type: none"> ❖ Drilling and blasting ❖ Excavation, loading and hauling to the processing plant of BDQ 	<p><u>General:</u></p> <ul style="list-style-type: none"> ❖ Health and safety risk posed by blasting activities. 	<ul style="list-style-type: none"> ❖ Stocked first aid box. ❖ Level 1 certified first aider. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. 	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
❖ Sloping and landscaping during rehabilitation	<ul style="list-style-type: none"> ❖ Unsafe working environment for employees. ❖ Safety risk posed by un-sloped areas. ❖ Potential impact of blasting vibrations on surrounding infrastructure. 	<ul style="list-style-type: none"> ❖ All appointments in terms of the Mine Health and Safety Act, 1996. ❖ Vibro recorder. 	<p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Ensure that workers have access to the correct PPE as required by law. ❖ Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). ❖ Plan the type, duration and timing of blasting with due cognizance of other land users and structures in the vicinity. ❖ Inform the surrounding landowners and communities in writing ahead of any blasting event. ❖ Monitor the compliance of ground vibration and airblast levels to USBM standards with each blasting event. ❖ Record all blasts with a vibro recorder. ❖ Give audible warning of a pending blast at least 3 minutes in advance of the blast. ❖ Limit fly rock, and collect and remove flyrock and rock spill that falls beyond the working area. 	<ul style="list-style-type: none"> ❖ Annual compliance monitoring of site by an Environmental Control Officer.
❖ Excavation, loading and hauling to the processing plant of BDQ.	<p><u>Land Use and Existing Infrastructure:</u></p> <ul style="list-style-type: none"> ❖ Deterioration of the access road (farm road) to the mining area. 	<ul style="list-style-type: none"> ❖ Grader to restore the road surface when needed. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Divert storm water around the access road to prevent erosion. ❖ Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas. 	<p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<ul style="list-style-type: none"> ❖ Repair rutting and erosion of the access road caused as a direct result of the mining activities. ❖ Prevent the overloading of the trucks. 	
<ul style="list-style-type: none"> ❖ Excavation, loading and hauling to the processing plant of BDQ. 	<p><u>Hydrology:</u></p> <ul style="list-style-type: none"> ❖ Potential impact on the groundwater of the footprint area. ❖ Potential impact on the Berg River due to surface runoff. 	<ul style="list-style-type: none"> ❖ Sterile water sampling equipment. ❖ Accredited laboratory to test the water samples. ❖ Contact number of a geohydrologists that can be contacted when needed. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Implement the storm water mitigation measures as proposed in this document. ❖ Extend the current water-monitoring programme of BDQ to include the DQ mining area. Collect water samples from the Berg River upstream and downstream of the mining operations. ❖ Restrict the mining depth to the groundwater level of the footprint. ❖ Obtain the opinion of a geohydrologists should the groundwater table be intersected, to guide future mining operations. 	<p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.
<ul style="list-style-type: none"> ❖ Rehabilitation of the excavated area. 	<p><u>Rehabilitation of the excavated area:</u></p> <ul style="list-style-type: none"> ❖ Rehabilitation of the excavation. ❖ Final rehabilitation. 	<ul style="list-style-type: none"> ❖ Earthmoving equipment to reinstate mined-out areas. ❖ Cover crop to be established on reinstated area. 	<p><u>Role:</u></p> <ul style="list-style-type: none"> ❖ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. ❖ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. 	<p>Applicable throughout decommissioning phase.</p> <ul style="list-style-type: none"> ❖ Daily compliance monitoring by site management. ❖ Annual compliance monitoring of site by an Environmental Control Officer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> ❖ Erosion control infrastructure (when needed). 	<p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ❖ Use the excavated area as a final depositing area for the placement of overburden. ❖ Dump rocks and coarse material removed from the excavation into the pit. ❖ Prevent the deposition of any waste into the excavation. ❖ Return the topsoil previously stored to its original depth over the area once overburden, rocks and coarse natural material have been added to the excavation and it was profiled with acceptable contours and erosion control measures. ❖ If necessary, fertilize the area to allow vegetation to establish rapidly. Seed the site with a local or adapted indigenous seed mix should natural vegetation not re-establish within 6 months from closure. 	

l) Indicate the frequency of the submission of the performance assessment report.

An Environmental Audit Report in accordance with Appendix 7 as prescribed in Regulation 34 of the EIA Regulations, 2014 (as amended) will annually be submitted to DMR for compliance monitoring purposes or in accordance with the frequency stipulated by the Environmental Authorisation.

m) Environmental Awareness Plan

i) Manner in which the Applicant intends to inform his or her employees of any environmental risk which may result from their work.

The employees of BDQ take part in annual inductions, and new employees are inducted as they join the workforce.

Once the Section 102 amendment application was approved, a copy of the amended EMPR will be handed to the site manager. An induction meeting will be held with all the employees that will work at the proposed DQ to inform them of the Basic Rules of Conduct with regard to the environment.

ii) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

The operations manager must ensure that he/she understands the EMPR document and its requirement and commitments before any mining takes place. An Environmental Control Officer needs to check compliance of the mining activities to the management programmes described in the EMPR.

The following list represents the basic steps towards environmental awareness, which all participants in this project must consider whilst performing their tasks.

❖ **Site Management:**

- Stay within boundaries of site – do not enter adjacent properties
- Keep tools and material properly stored
- Smoke only in designated areas
- Use toilets provided – report full or leaking toilets

❖ **Water Management and Erosion:**

- Check that rainwater flows around work areas and are not contaminated
- Report any erosion
- Check that dirty water is kept from clean water

❖ **Waste Management:**

- Take care of your own waste
- Keep waste separate into labelled containers – report full bins
- Place waste in containers and always close lid
- Don't burn waste
- Pick-up any litter laying around

❖ **Hazardous Waste Management (Petrol, Oil, Diesel, Grease)**

- Never mix general waste with hazardous waste
- Use only sealed, non-leaking containers
- Keep all containers closed and store only in approved areas
- Always put drip trays under vehicles and machinery
- Empty drip trays after rain
- Stop leaks and spills, if safe
 - ✓ Keep spilled liquids moving away
 - ✓ Immediately report the spill to the site manager/supervision
 - ✓ Locate spill kit/supplies and use to clean-up, if safe
 - ✓ Place spill clean-up wastes in proper containers
 - ✓ Label containers and move to approved storage area

❖ **Discoveries:**

- Stop work immediately
- Notify site manager/supervisor
- Includes – Archaeological finds, Cultural artefacts, Contaminated water, Pipes, Containers, Tanks and drums, Any buried structures

❖ **Air Quality:**

- Wear protection when working in very dusty areas
- Implement dust control measures:
 - ✓ Water all roads and work areas according to instructions
 - ✓ Minimize handling of material

✓ Obey speed limit and cover trucks

❖ **Driving and Noise:**

- Use only approved access roads
- Respect speed limits
- Only use turn-around areas – no crisscrossing through undisturbed areas
- Avoid unnecessary loud noises
- Report or repair noisy vehicles

❖ **Vegetation and Animal life:**

- Do not remove any plants or trees without approval of the site manager
- Do not collect fire wood
- Do not catch, kill, harm, sell or play with any animal, reptile, bird or amphibian on site
- Report any animal trapped in the work area
- Do not set snares or raid nests for eggs or young

❖ **Fire Management:**

- Do not light any fires on site, unless contained in a drum at demarcated area
- Put cigarette butts in a rubbish bin
- Know the position of firefighting equipment
- Report all fires
- Don't burn waste or vegetation

n) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually).

The right holder undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMR for review and approved as being sufficient to cover the environmental liability at the time and for closure of the mine at that time.

2. UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports
- b) the inclusion of comments and inputs from stakeholders and I&AP's;
- c) the inclusion of inputs and recommendations from the specialist reports where relevant;
and
- d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;



Signature of the environmental assessment practitioner:

Greenmined Environmental

Name of Company:

25 November 2019

Date:

-END-

APPENDIX A1

REGULATION 42 MINE PLAN



APPENDIX A2
REGULATION 2(2) MINE PLAN



APPENDIX B1
BRIDGETOWN DOLOMITE QUARRY
LOCALITY MAPS



APPENDIX B2
DRIEHEUVELS QUARRY
LOCALITY MAP



APPENDIX C1
BRIDGETOWN DOLOMITE QUARRY
SITE ACTIVITIES PLANS



APPENDIX C2
DRIEHEUVELS QUARRY
SITE ACTIVITIES PLAN



APPENDIX D1

BRIDGETOWN DOLOMITE QUARRY

SURROUNDING LAND USE MAP



APPENDIX D2
DRIEHEUVELS QUARRY
SURROUNDING LAND USE MAP



APPENDIX E1

BRIDGETOWN DOLOMITE QUARRY

REHABILITATION MAP



APPENDIX E2
DRIEHEUVELS QUARRY
REHABILITATION MAP



APPENDIX F1
BRIDGETOWN DOLOMITE QUARRY
MINING AUTHORISATIONS



APPENDIX F2
BRIDGETOWN DOLOMITE QUARRY
ZONING APPROVAL



APPENDIX F3
DRIEHEUVELS QUARRY
LANDOWNER NOTIFICATION



APPENDIX G

VISUAL IMPACT MAP



APPENDIX H1

BRIDGETOWN DOLOMITE QUARRY

DISTANCE BETWEEN STRUCTURES

AND MINE



APPENDIX H2

BRIDGETOWN DOLOMITE QUARRY

DUST, NOISE AND BLASTING RESULTS



APPENDIX I1

BRIDGETOWN DOLOMITE QUARRY

GEOLOGICAL REPORT 1994



APPENDIX I2

BRIDGETOWN DOLOMITE QUARRY

GEOLOGICAL REPORT 2008



APPENDIX I3
BRIDGETOWN DOLOMITE QUARRY
GEOLOGICAL MAP



APPENDIX I4

DRIEHEUVELS QUARRY

PRELIMINARY INSPECTION AND DUE

DILIGENCE OF DOLOMITE QUALITY



APPENDIX J1
BRIDGETOWN DOLOMITE QUARRY
WATER USE AUTHORISATIONS



APPENDIX J2

BRIDGETOWN DOLOMITE QUARRY

TOPOGRAPHY AND SURFACE

DRAINAGE



APPENDIX J3
BRIDGETOWN DOLOMITE QUARRY
WATER SAMPLING LOCATIONS



APPENDIX J4
BRIDGETOWN DOLOMITE QUARRY
WATER QUALITY RESULTS



APPENDIX J5

REHABILITATION AGREEMENT



APPENDIX J6
DRIEHUEVELS QUARRY
1:100 YEAR FLOODLINE



APPENDIX K1
BRIDGETOWN DOLOMITE QUARRY
VEGETATION MAP



APPENDIX K2
BRIDGETOWN DOLOMITE QUARRY
BOTANICAL SURVEY



APPENDIX K3

BRIDGETOWN DOLOMITE QUARRY

SEARCH AND RESCUE REPORT



APPENDIX L
BRIDGETOWN DOLOMITE QUARRY
ARCHAEOLOGICAL IMPACT
ASSESSMENT



APPENDIX M
INVASIVE PLANT SPECIES
MANAGEMENT PLAN



APPENDIX N
SUPPORTING IMPACT ASSESSMENT



ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, herewith please receive an environmental impact statement that summarises the impact that the Bridgetown Dolomite Operation may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

<u>TYPE OF IMPACT</u>	<u>DURATION</u>	<u>LIKELIHOOD</u>	<u>SIGNIFICANCE</u>
<u>BRIDGETOWN DOLOMITE QUARRY</u>			
<ul style="list-style-type: none"> ❖ Soil ❖ Fuel/Oil Spills ❖ Agriculture and Land Capability ❖ Geology ❖ Topography ❖ Vegetation ❖ Fauna ❖ Surface Water ❖ Groundwater ❖ Air Quality (Dust) ❖ Noise ❖ Blast Vibration ❖ Fly Rock ❖ Archaeology 	Duration of operational phase ±25 years	<p>Definite</p> <p>Definite</p> <p>Definite</p> <p>Definite</p> <p>Definite</p> <p>Definite</p> <p>Improbable</p> <p>Improbable</p> <p>Definite</p> <p>Definite</p> <p>Definite</p> <p>Definite</p> <p>Definite</p> <p>Possible</p> <p>No Impact</p>	<p>Moderate</p> <p>Moderate</p> <p>Insignificant</p> <p>Significant</p> <p>Moderate</p> <p>Significant</p> <p>Minor</p> <p>Moderate</p> <p>Significant</p> <p>Significant</p> <p>Significant</p> <p>Significant</p> <p>Moderate</p> <p>No Impact</p>
<u>DRIEHEUVELS QUARRY</u>			
<p><u>Site Establishment:</u></p> <ul style="list-style-type: none"> ❖ Visual intrusion because of site establishment ❖ Potential negative impact on the nearby CBA/ESA. ❖ Potential loss of Swartland Shale Renosterveld to access the mineral. ❖ Potential impact on fauna within the footprint area. ❖ Potential impact on areas/infrastructure of heritage or cultural concern. ❖ Alteration of the agricultural sense of place. ❖ Loss of agricultural land to allow for mining (site-specific footprint). ❖ Potential impact of mining on surrounding land use. 	Duration of operational phase	<p>Definite</p> <p>Low Possibility</p> <p>Low Possibility</p> <p>Low Possibility</p> <p>Low Possibility</p> <p>Definite</p> <p>Definite</p> <p>Low Possibility</p>	<p>Medium Concern</p> <p>Low Concern</p> <p>Low Concern</p> <p>Low Concern</p> <p>Low Concern</p> <p>Medium-High Concern</p> <p>Medium Concern</p> <p>Low-Medium Concern</p>
<p><u>Stripping and Stockpiling of Topsoil:</u></p> <ul style="list-style-type: none"> ❖ Dust nuisance caused by the disturbance of soil. ❖ Noise nuisance generated by earthmoving machinery. ❖ Loss/contamination of stockpiled topsoil. 	Duration of operational phase	<p>Possible</p> <p>Low Possibility</p> <p>Low Possibility</p>	<p>Low-Medium Concern</p> <p>Low Concern</p> <p>Low Concern</p>

<u>TYPE OF IMPACT</u>	<u>DURATION</u>	<u>LIKELIHOOD</u>	<u>SIGNIFICANCE</u>
<ul style="list-style-type: none"> ❖ Potential infestation of the topsoil heaps with weeds or invader plant species. ❖ Potential contamination of footprint area and surface runoff because of hydrocarbon spillages. ❖ Potential erosion of denuded areas. 		<p>Low Possibility</p> <p>Low Possibility</p> <p>Low Possibility</p>	<p>Low Concern</p> <p>Low Concern</p> <p>Low Concern</p>
<p><u>Drilling and Blasting:</u></p> <ul style="list-style-type: none"> ❖ Health and safety risk posed by blasting activities. ❖ Dust nuisance caused by blasting activities. ❖ Noise nuisance because of blasting. ❖ Potential impact of blasting vibrations on surrounding infrastructure. 	Duration of operational phase	<p>Low Possibility</p> <p>Possible</p> <p>Possible</p> <p>Low Possibility</p>	<p>Low Concern</p> <p>Medium Concern</p> <p>Low-Medium Concern</p> <p>Low-Medium Concern</p>
<p><u>Excavation, Loading & Hauling to Processing Plant:</u></p> <ul style="list-style-type: none"> ❖ Visual intrusion associated with the excavation area. ❖ Dust nuisance due to excavation, loading and vehicles transporting the material. ❖ Noise nuisance generated by excavation equipment and earthmoving machinery. ❖ Unsafe working environment for employees. ❖ Contamination of area with hazardous- and/or general waste. ❖ Deterioration of the access road (farm road) to the mining area. ❖ Potential impact on the groundwater of the footprint. ❖ Potential impact on the Berg River due to surface runoff. 	Duration of operational phase	<p>Definite</p> <p>Possible</p> <p>Low Possibility</p> <p>Low Possibility</p> <p>Low Possibility</p> <p>Low Possibility</p> <p>Low Possibility</p> <p>Low Possibility</p>	<p>Medium Concern</p> <p>Low Concern</p>
<p><u>Sloping and Landscaping during Rehabilitation:</u></p> <ul style="list-style-type: none"> ❖ Safety risk posed by un-sloped areas. ❖ Soil erosion. ❖ Dust nuisance due to landscaping activities. ❖ Noise nuisance generated during the rehabilitation phase. ❖ Loss of reinstated topsoil from denuded areas. ❖ Potential infestation of the reinstated areas with weeds and invader plant species. ❖ Potential contamination of environment because of improper water disposal. 	Duration of operational phase	<p>Low Possibility</p>	<p>Low Concern</p>

APPENDIX O

REHABILITATION PLAN



APPENDIX P

FINANCIAL AND TECHNICAL ABILITY



APPENDIX Q

**PHOTOGRAPHS OF BRIDGETOWN
DOLOMITE QUARRY AND
DRIEHEUVELS QUARRY**



BRIDGETOWN DOLOMITE QUARRY



NORTHERN QUARRY



PROCESSING PLANT

BRIDGETOWN DOLOMITE QUARRY



STOCKPILE AREA



WORKSHOP



SETTLING PONDS

DRIEHEUVELS QUARRY



VIEW OF PROPOSED EXPANSION AREA TOWARDS THE BERG RIVER



VIEW OF RIPARIAN AREA BELOW THE PROPOSED EXPANSION AREA

APPENDIX R
CV AND PROOF OF EXPERIENCE OF
EAP

