ZANDBERG SANDPUT (PTY) LTD

PORTION 4 OF THE FARM ZANDBERG FONTEIN NO 97

ROBERTSON MUNICIPAL DISTRICT

WESTERN CAPE PROVINCE

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

DEPARTMENTAL REFERENCE NUMBER:

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EXECUTIVE SUMMARY

Zandberg Sandput (Pty) Ltd submitted a Section 102 amendment application in June 2020 to add 108.3851 ha to the current 17.6826 ha mining footprint over Portion 4 of the farm Zandberg Fontein No 97 in the Robertson area of the Western Cape Province. Since then, the extension footprint was reduced from ±108 ha to 4 ha to accommodate the biodiversity sensitive matters of the property. The S102 necessitates an application for a Part 2 amendment of the mine's EMPR in terms of GNR 326 Section 31. The S102 application further constitute listed/specified activities in terms of the NEMA: EIA Regulations, 2014 (as amended) and therefore requires an environmental impact assessment (EIA).

Current Zandberg Sand Mine

The Zandberg Sand Mine operated under an old order mining permit (Reference No: MP 39/98) that was converted to a new order mining right (Protocol No: 1435) in terms of Item 7 of Schedule 2 of the MPRDA, 2002 in March 2011. This mining right (7.4826 ha) was valid until February 2016, upon which a renewal application was lodged with the DMRE. The mining right was subsequently renewed until May 2047. In 2014, the MR Holder applied for a 10.2026 ha extension of the approved 7.4826 ha mining area that was granted in December 2018. In November 2018, the mining right was ceded from WJ Viljoen to Zandberg Sandput (Pty) Ltd that is the current MR holder.

The current mining activity entails the direct mining of blocks/strips of sand of ±0.25 ha in size. The topsoil is stockpiled at the edge of the strip to be replaced during the rehabilitation of the area. The sand is then removed from the stripped area with a front-end-loader that loads it directly onto the trucks of clients. Mined strips are rehabilitation as mining progress into new areas, with no more than two strips (±0.5 ha) open at any given time.

Section 102 Application

As mentioned earlier, since June 2020, and upon receipt of the specialist studies and public comments, the proposed extension footprint had to be reduced from ±108 ha to 4 ha to accommodate the biodiversity sensitive matters of the property. Subsequently, the EIA identified three site alternatives (only one to be approved) that could all allow the expansion of the existing mining footprint, and the winning of the available sand resource on the property. If the S102 application is approved, the proposed extension area will be developed over a section of the property that is zoned for agricultural purposes with natural to near natural vegetation cover. Mining will advance into the extension area as the current mining footprint (±17.7 ha) becomes mined. Due to the position of the proposed extension area the mining

method needs to be slightly amended (strip-mining to the Doze Push method) when the mine reaches the extension area, however the MR Holder will not establish any infrastructure in the extension area, and will still implement progressive rehabilitation of mined layers. Should the project be authorised the mining area will contain a front-end-loader and excavator.

Alternatives:

Initially (2020), the project team identified one site alternative (±108 ha) with a possibility of two layout alternatives that were assessed during the EIA process. The findings of this assessment was collated in a draft Environmental Impact Assessment Report (DEIAR) that was distributed for public commenting between October and November 2020. Following the publication of the 2020 DEIAR, receipt of the public comments, and subsequent reassessment of the study area, the project proposal was drastically reduced from ±108 ha to 4 ha.

Subsequently the DEIAR report was revised and three site alternatives (S1 – S3), apart from the no-go alternative, were assessed upon review of the site specific information, comments received during the public participation process, and the outcomes of the most recent specialist studies. S3 was identified as the preferred site alternative.

Public Participation Process:

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 initial public participation process informed the stakeholders and I&AP's of the project and allowed for a commenting period until 02 March 2020. The comments received were incorporated into the Draft Scoping Report ((DSR) that was circulated for public commenting until 17 July 2020. The comments received on the DSR was incorporated into the Final Scoping Report that was submitted to the DMRE for approval.

Upon approval of the Final Scoping Report, a Draft Environmental Impact Assessment Report (DEIAR) and Environmental Management Programme (EMPR) was compiled that were circulated for public comment for a 30-day commenting period ending 30 November 2020. The comments received on the draft EIA & EMPR (2020) lead to the reduction of the proposed extension area, and subsequent revision of the DEIAR & EMPR (2022). The 2022 DEIAR & EMPR was also circulated for public commenting over a 30-day period ending on 17 February 2022. The comments received on this report were incorporated into this report, the final EIA & EMPR, to be submitted for decision making to DMRE.

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 extension of the mining area are as follows:

Topography:

- The topography of S3 is less dramatic than that of S2, and is suitable for sand mining if the recommendations of the mine planner are followed. The layout will also simplify the configuration of the final mining area should the S102 application be approved.

Visual Characteristics:

- The potential visual impact of S3 is deemed to be of medium significance based on the small scale of the proposed operation, proposed progressive rehabilitation, as well as the fact that no infrastructure will be established. Should the rehabilitation measures be implemented very little residual visual impact is expected upon closure of the mine.

Air and Noise Quality:

- The prevalent wind direction of the study area highly reduces the potential of dust blowing from the operation towards the surrounding landowners.
- The potential impact of the sand mining activity on the air and/or noise ambiance of the area is deemed to be of low significance.

Hydrology:

- The wetland report (WATSAN 2016) concluded that the impact of the Zandberg sand mine on the infiltration of groundwater is small and that the effect on the entire aquifer will hardly be noticed. The study further confirmed that no natural wetlands were present within the approved mining area.
- The infield- and desktop watercourse delineation (2021) confirmed the presence of two wetland habitats within the 500 m of all three alternatives. Both wetlands fall outside the proposed extension areas (S1-S3) and will therefore not be affected by the expansion of the mining footprint. A buffer area of 15 m must be maintained around the footprint of AW1.

- The WDHA concludes that no watercourse was identified within the footprint of S3, and therefore expanding the mine towards the west into S3 will not result in the transformation of any watercourse.
- As the groundwater level is ±3 m deep in the valley below the mining area, it is not expected that mining the sand from S3 will intercept (or come within 1.5 m) the groundwater layer if the mining depth is limited to the underlying sandstone layer.

Biodiversity, Conservation, and Groundcover:

- All three alternatives fall within an area classified as CBA1.
- Approximately 148 ha of pristine Breede Sand Fynbos exists on site. ±2.7% of this will be transformed by the proposed mining extension, however, this will not prevent national conservation targets from being achieved.
- Due to the nature of the sand deposit that is of interest to the applicant, complete avoidance of the Breede Sand Fynbos vegetation is not possible.
- The fact that rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC, together with the fact that suitable amount of Breede Sand Fynbos is available on site for biodiversity offsetting, will greatly mitigate the impacts of the proposed mining activities in the long-term.
- For this project, an area of 169 ha within the farm portion is proposed as biodiversity offset area that complies with the 30:1 ratio.
- The BSA notes that S3 can be considered as intermediate in mining preference between S1 and S2. One advantage of S3 is that it minimizes edge effects as the perimeter of S3 is the smallest of all three alternative sites.
- The LLM noted that the current project proposal will assist in aligning the proposal more closely with the Langeberg SDF, 2015 and the WC Rural Development Guidelines, 2019 which aim to minimise loss of habitat and ecosystem functionality in Core 1 SPCs.

Fauna:

- Placing the footprint at S3 will ensure connectivity is maintained on the upper regions of the slope and prevent fragmentation of the habitat.
- The configuration of S3 is preferred with regard to faunal related impacts (excl. butterflies).
- The significance of the impacts on terrestrial animal species (excl. butterflies) can be rated as Low-Moderate.
- No SCC butterflies were recorded within the footprint of S3 and the specialist supports the mining of S3.

- The overall Red List status of *C. rileyi* will improve if the Zandberg populations is protected.

Cultural and Heritage Environment:

- The HIA concluded that the earmarked extension area is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely.

Socio-Economic Environment:

- The company has fully embraced the concept of sectoral training and has access to the activities of SETA and MQA. The mine will continue to pay the skills development levies of all its employees to the South African Receiver of Revenue as a legal requirement.
- The LED project allocated to Zandberg Sandput (Pty) Ltd and approved by the municipality is the installation of block paving/cement slabs at the Willem Buchaltz School, La Chasseur Robertson.

Existing Infrastructure:

- Apart from the power line that follows the La Chasseur/Agter-Kliphoogte road just inside the farm boundary, no other infrastructure has been established on the property that can be affected by the proposed extension development.

Land Use:

- Mining will temporarily affect ±22 ha of the earmarked property if the S102 application is approved.
- The mine will continue with the progressive rehabilitation of mined areas to in the end restore the entire mining footprint to facilitate the establishment of indigenous vegetation that can once again be zoned for agriculture.

During the environmental impact assessment process the feasibility of the proposed activity 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 Site Alternative 3 in conjunction with the proposed Biodiversity Offset Area be approved, and 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 operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of R 95 159.50. The MR Holder currently has a financial guarantee to the value of R 110 000 lodged with the DMRE that will remain in place for the duration of the mining period.

LIST OF ACRONYMS

ABET	Adult Basic Education and Training
ART	Antiretroviral Therapy
ASTM	American Society for Testing and Materials
AW1	Artificial Wetland Habitat
BGCMA	Breede-Gouritz Catchment Management Agency
BID	Background Information Document
BSA	Botanical Study and Assessment
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Areas
CFB	Cape Fold Belt
CN	CapeNature
CR	Critical Endangered
CWDM	Cape Winelands District Municipality
DAFF	Department of Agriculture, Forestry and Fisheries
DD	Data Deficient
DEA&DP	Department of Environmental Affairs and Development Planning
DEDT	Department of Economic Development and Tourism
DEIAR	Draft Environmental Impact Assessment Report
DMRE	Department of Mineral Resources and Energy
DoL	Department of Labour
DRDLR	Department of Rural Development and Land Reform
DSD	Department of Social Development
DSR	Draft Scoping Report
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
EMPR	Environmental Management Programme
EN	Endangered
ENPAT	Environmental Potential Atlas for South Africa
ESA	Early Stone Age
EWT	Endangered Wildlife Trust
FEIAR	Final Environmental Impact Assessment Report

FEL	Front-End-Loader
FEPA	Freshwater Ecosystem Priority Area
FOS	Factor of Safety
GA	General Authorisation
GCD	Ground Control Districts
GDP	Gross Domestic Product
GNR	Government Notice Number
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IUCN	International Conservation for Conservation of Nature
LC	Least Concern
LED	Local Economic Development
LLM	Langeberg Local Municipality
LSA	Later Stone Age
METT	Management Effectiveness Tracking Tool
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)
MQA	Mining Qualifications Authority
MR	Mining Right
MR Holder	Zandberg Sandput (Pty) Ltd
MSA	Middle Stone Age
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:PAA	National Environmental Management: Protected Areas Act, 2004 (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No 59 of 2008)
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NID	Notice of Intend to Develop
NPAES	National Protected Areas Expansion Strategy, 2016
NRTA	National Road Traffic Act, 1996 (Act No 25 of 1999)
NT	Near Threatened

NWA	National Water Act, 1998 (Act No 36 of 1998)
OHSA	Occupational Health and Safety Act, 1993 (Act No 85 of 1993)
OSL	Optically Stimulated Luminescence
PA	Protected Area
PCB's	Polychlorinated Biphenyls
PCO	Pest Control Officer
POSA	Plants of Southern Africa
PPE	Personal Protection Equipment
PSM	Palaeontological Sensitivity Map
QDGC	Quarter Degree Grid Cell
RSA	Republic of South Africa
S1	Site Alternative 1
S2	Site Alternative 2
S3	Site Alternative 3
S102	Section 102 Application in terms of the MPRDA, 2002
SABAP	South African Bird Atlas
SAHRA	South African Heritage Resources Agency
SAMBF	South African Mining and Biodiversity Forum
SAMRAD	South African Mining Mineral Resources Administration System
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SCC	Species of Conservation Concern
SETA	Sector Education and Training Authority
SG	Surveyor General
SLP	Social and Labour Plan
SOP	Standard Operational Procedure
UCVB1	Unchannelled Valley Bottom Wetland
VU	Vulnerable
WCBSP	Western Cape Biodiversity Spatial Plan
WCNCO	Western Cape Nature Conservation Ordinance, 1974 (No 19 of 1974)
WDHA	Wetland Delineation and Habitat Assessment
WMA	Water Management Area

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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:	Zandberg Sandput (Pty) Ltd
TEL NO:	023 626 1836
FAX NO:	-
POSTAL ADDRESS:	P.O. Box 717, Robertson, 6705
PHYSICAL ADDRESS:	Zandberg Fontein Farm, Robertson
FILE REFERENCE NUMBER SAMRAD:	WC30/5/1/2/2/87MR & WC30/5/1/2/2/10080MR

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 (Pty) Ltd

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. Zandberg Sandput (Pty) Ltd (hereafter referred to as the "MR Holder") appointed Greenmined Environmental (Pty) Ltd (hereafter referred to as "Greenmined") to undertake the study needed. Greenmined has no vested interest in Zandberg Sandput (Pty) Ltd or the proposed project and declares its independence as required by the EIA Regulations, 2014 (as amended).

i) Details of the EAP

Name of the Practitioner:	Ms Christine Fouché
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 Fouché has a Diploma in Nature Conservation and a B.Sc. in Botany and Zoology. Full cirriculum vitae with evidence is attached as Appendix U.

(2) Summary of the EAP's past experience
(In carrying out the Environmental Impact Assessment Procedure)

Ms Fouché has sixteen years' experience in doing Environmental Impact Assessments and Mining Applications in South Africa. See a list of past project attached as Appendix U.

b) Description of the property

Table 1: Description of the property.

Farm Name:	Portion 4 of the farm Zandberg Fontein No 97
Application area (Ha)	⋉ Approved MR area: 17.6826 ha ⋉ Section 102 Application Area: 4 ha ⋉ Total MR area: 21.6826 ha
Magisterial district:	Robertson
Distance and direction from nearest town	The Zandberg Sand Mine is located ±7 km south-west of Robertson.
21 digit Surveyor General Code for each farm portion	C06500000000097000004

c) Locality map

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

The requested map is attached as Appendix B.

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

In June 2020, Zandberg Sandput (Pty) Ltd submitted a Section 102 ("S102") amendment application to add 108.3851 ha to the current 17.6826 ha mining footprint. The S102 application necessitated an application for a Part 2 amendment of the mine's EMPR in terms of GNR 326 Section 31. The S102 application further constituted listed/specified activities in terms of the NEMA: EIA Regulations, 2014 (as amended) and therefore required an environmental impact assessment (EIA) that assess project specific environmental impacts and alternatives, consider public input, and propose mitigation measures, to ultimately culminate in an environmental management programme that informs the competent authority (Department of Mineral Resources and Energy) when considering the environmental authorisation. Following receipt of the specialist studies and public comments, the proposed extension area was reduced from 108.3851 ha to 4 ha.

See attached as Appendix C a copy of the site layout plan of the proposed extension area.

i) Listed and specified activities

Table 2: Listed and specified activities triggered by the proposed S102 amendment application.

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)
Application for a Section 102 MPRDA, 2002 amendment of the mining right.	21.6826 ha	X	GNR 324 LN 3 Activity 12 GNR 325 LN 2 Activity 17 GNR 327 LN 1 Activity 27, 28

GNR 324 Listing Notice 3 Activity 12:

The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

i. Western Cape

i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;

ii. Within critical biodiversity areas identified in bioregional plans;

GNR 325 Listing Notice 2 Activity 17:

Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—

(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or

(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;

but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.

GNR 327 Listing Notice 1 Activity 27:

The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-

(i) the undertaking of a linear activity; or
(ii) maintenance purposes undertaken in accordance with a maintenance management plan.

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
GNR 327 Listing Notice 1 Activity 28: *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*			
Demarcation of the extension area with visible beacons.	4 ha	N/A	Not listed
Stripping and stockpiling of topsoil.	±3 ha	X	GNR 324 LN 3 Activity 12 GNR 327 LN 1 Activity 27, 28
Excavation of sand.	±3 ha	X	GNR 325 LN 2 Activity 17 GNR 327 LN 1 Activity 28
Replacing the topsoil upon closure of a mined layer.	±1 ha (Phase 1 & 2)	X	GNR 327 LN 1 Activity 22 GNR 327 LN 1 Activity 28
Final rehabilitation and closure of the site.	±0.50 ha (Final Phase)	X	GNR 327 LN 1 Activity 22
GNR 327 Listing Notice 1 Activity 22: *The decommissioning of any activity requiring –* *(i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or* *(ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure;* *but excluding the decommissioning of an activity relating to the secondary processing of a –* *(a) mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource; or* *(b) petroleum resource, including the refining of gas, beneficiation, oil or petroleum products; –* *in which case activity 31 in this Notice applies.*			

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 Environmental Management Programme Report of Zandberg Sand Mine, 2014)

1. BACKGROUND INFORMATION (ZANDBERG SAND MINE)

(Refer to Appendix F1: Mining Authorisations)

Sand mining commenced in the 1980's on Portion 4 of the farm Zandberg Fontein No 97, Robertson. The Zandberg Sand Mine operated under an old

order mining permit (Reference No: MP 39/98) that was converted to a new order mining right (Protocol No: 1435) in terms of Item 7 of Schedule 2 of the MPRDA, 2002 in March 2011. This mining right (7.4826 ha) was valid until February 2016, upon which a renewal application was lodged with the DMRE. The mining right was subsequently renewed until May 2047.

In 2014, the MR Holder applied for a 10.2026 ha extension (light blue polygon in Figure 2) of the approved 7.4826 ha mining area (dark blue polygon in Figure 2) that was granted in December 2018. In November 2018, the mining right was ceded from WJ Viljoen to Zandberg Sandput (Pty) Ltd that is the current MR holder.

The table below lists the GPS coordinates of the current mining footprint (17.6826 ha).

Table 3: GPS coordinates of the approved mining right area.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
G	33º50'41.92"	19º48'54.92"	-33.844978º	19.815256º
H	33º50'49.92"	19º48'56.52"	-33.847200º	19.815700º
I	33º50'52.18"	19º48'45.17"	-33.847827º	19.812547º
J	33º50'44.16"	19º48'43.56"	-33.845601º	19.812100º
K	33º50'42.81"	19º48'50.44"	-33.845225º	19.814011º
L	33º50'37.25"	19º48'49.99"	-33.843681º	19.813886º
M	33º50'37.92"	19º48'37.05"	-33.843867º	19.810292º
N	33º50'51.13"	19º48'38.18"	-33.847536º	19.810606º

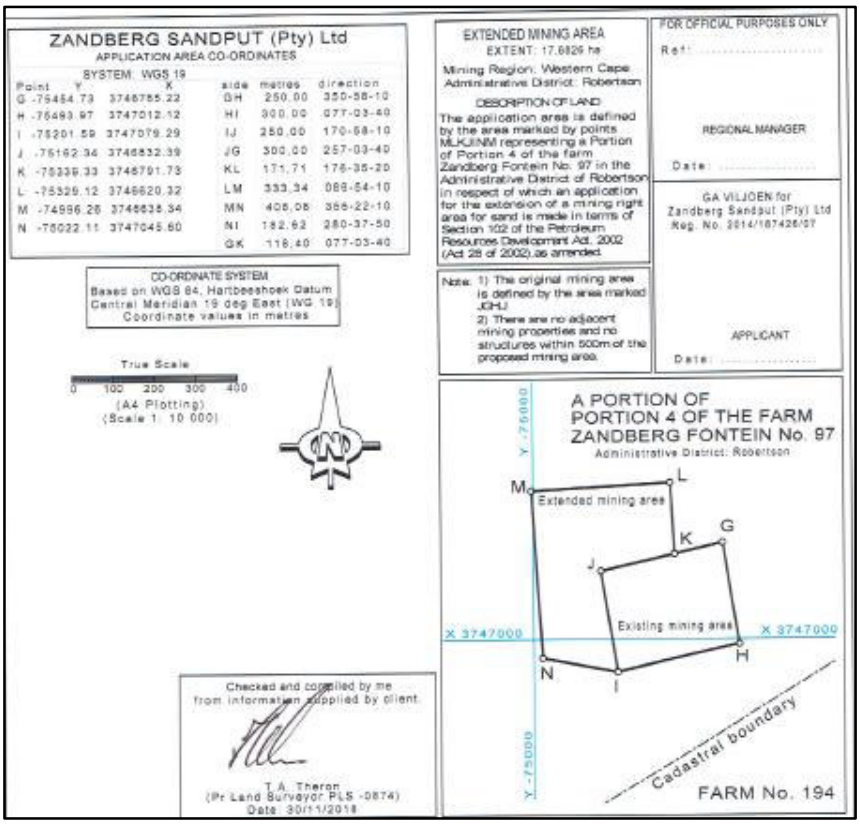


Figure 1: Cadastral map showing the approved mining footprint of Zandberg Sandput (Pty) Ltd.

Figure 2: Satellite view showing the location of the MR area in relation to the surrounding landscape, where the dark blue polygon shows the initial mining footprint, and the light blue polygon shows the approved extension area. (Image obtained from Google Earth).

1.1 CONSTRUCTION PHASE

The Zandberg sand mine has been in full production for at least 26 years, with the site establishment phase already completed in the 1980's. In light of this, no construction/development phase applies to the current operations.

1.2 PRESENT MINING OPERATIONS / OPERATIONAL PHASE

The current mining method, of the approved mining area, involves the removal of the topsoil of a strip of ±0.25 ha within which the sand is mined in a block of approximately 50 x 50 m. The topsoil is stockpiled at the edge of the strip to be replaced during the rehabilitation of the area. The sand is then removed from the stripped area with a front-end-loader (FEL) that loads it directly onto the trucks of clients. To date every mined strip (±0.25 ha) was rehabilitation before work continued at the consecutive phase/strip. However lately the height of the dune increased considerably and safety requirements now dictate that the MR Holder reduce the height of the mining face. This is achieved by pushing the sand (after removal of the topsoil) down the mining face onto a section of the adjacent/most recently mined strip. The excavator then loads the sand from the floor of the mine onto the trucks of the clients. In light of this, the mining method now requires a maximum of two strips (±0.5 ha) to be open at any given time. As the face of the dune recedes, the mined areas (no longer needed for the loading of sand) are rehabilitated.

1.2.1 Zoning

Langeberg Local Municipality approved an application to rezone a portion of Remainder of Portion 4 of the farm Zandberg Fontein No 97 from Agricultural Zone I to Industrial Zone III (Mining) in terms of Section 60 of the Langeberg Land Use Planning Bylaw of 2015 (PN 264/2015) in March 2018. Refer to Appendix F2 for a copy of the rezoning approval.

1.2.2 Existing Infrastructure

No permanent infrastructure has been established within the mining area, and no electricity connection is needed to allow for the operation of the mine. A chemical toilet, was placed on site, that is used by the FEL operator.

The FEL is removed to the off-site workshop on the farm or the town of Robertson when maintenance and/or servicing is needed. Likewise, the mining site does not require the storage of diesel, and fueling of the FEL is done at the farm yard (off-site) or by means of a mobile diesel bowser with the use of a drip tray.

The Applicant makes use of an existing gravel road that connects with the La Chasseur/Agter-Kliphoogte road (DR1342) to access the sand mine. During the land use application (for the current MR), the Department of Transport and Public Works (DTPW) required that the necessary right of way servitude be registered regarding the access road, and that the access road be constructed as a Main Farm Access as per their standard (see Appendix H) and provided with a sealed hard-surface. The MR Holder is in the process of implementing these requirements.

1.2.3 Mine Plan

Mining commenced in the south-eastern corner of the mining area. Presently, the mining direction is towards the northern- and western boundaries of the approved footprint. The EMPR of the MR Holder mentions that at no time may there be more than 1 ha of land opened and/or in use. As shown in the figure below, the initial mining footprint (G – K / dark blue polygon) has been mined, and mining now extends into the approved extension area (I – N / light blue polygon). Approximately 7.6 ha (as estimated October 2021) of the approved 17.6826 ha area remains available for mining.

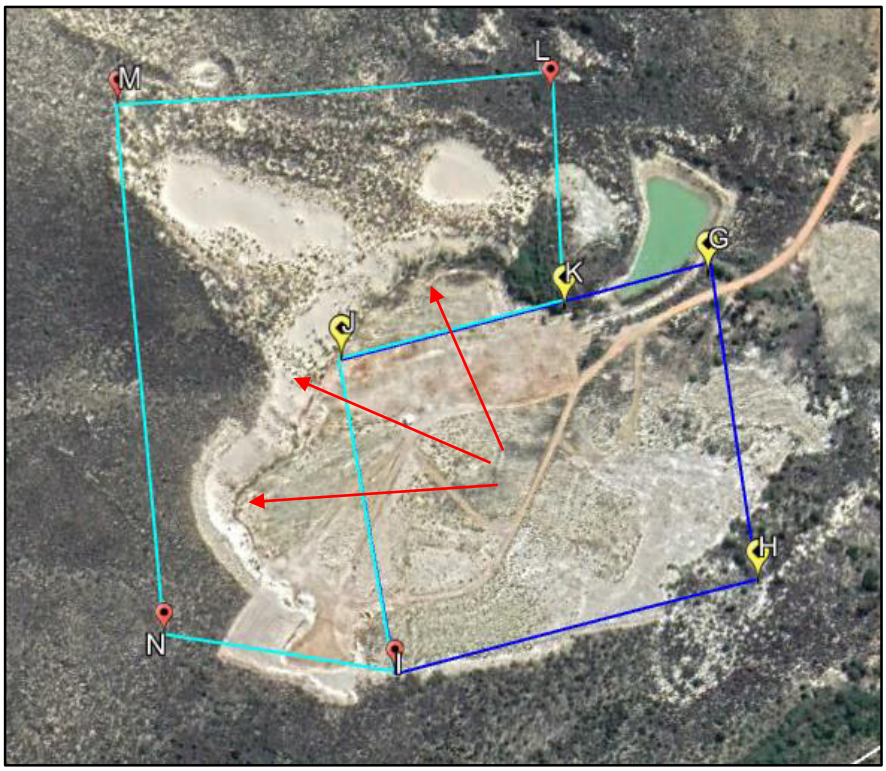


Figure 3: Satellite view showing the mined G – K area (dark blue polygon), as well as the area I – N (light blue polygon) that is presently being mined. The arrows indicate the mining direction. (Image obtained from Google Earth, 2020).

The material mined from the footprint is sold as building- and filling sand to the local building industry which include the towns of Robertson, Ashton and McGregor.

1.2.4 Topsoil Management

As mentioned earlier, the topsoil stripped from the area to be mined is stockpiled at the edge of the strip where it is protected until it is replaced over the mined area during the rehabilitation phase (medium term). Depending on market demand and the depth of the sand resource in the opened strip, topsoil is typically stored for a period of ±6 months.

Presently, the MR Holder, makes use of a rehabilitation contractor that re-spreads the topsoil to an approximate depth of 300 mm upon which the reinstated area is planted with a cover crop. As topsoil isn't stored for lenghty periods, additional fertilising hasn't been necessary thus far.

1.2.5 Waste Management Programme

Due to the nature of the activity, the small scale of the operation, and the fact that no infrastructure was established or maintenance work is done within the approved mining footprint, very little to no general waste is generated as a direct result of the mining activities. Currently, the general waste of the site (such as food wrappers, water bottles etc.) is kept inside the FEL/site vehicles until it is removed, at the end of the day, to the off-site workshop where it is kept in general waste bins until it is removed to the Robertson landfill site.

Likewise, very little (if any) generation of hazardous waste is applicable to this activity. Hazardous waste could potentially result from accidental spillages or breakdowns. Such contaminated areas (when applicable) will then immediately (within first hour of the occurrence) be cleaned and the contaminated soil contained in a designated hazardous waste container that will immediately be removed to the off-site workshop. The hazardous waste will either be disposed of at a registered hazardous waste handling facility, or be collected by a registered waste handling contractor. All safe disposal certificates will be filed for auditing purposes.

The chemical toilet is serviced by a registered sub-contractor and the proof of the services are kept on file for auditing purposes.

The mine does not store any waste within the boundaries of the site, and no mining related waste is buried/burned on the farm.

1.2.6 Water Management

(Refer to Appendix G1: Water Use Authorisations as well as Appendix G2: Wetland Delineation Report)

The sand mine does not require processing water and due to the (heavy) nature of the sand being mined, very little to no water is needed as dust levels are typically low. Dust generated on the access road is, as far as possible, managed through alternative dust suppression methods to minimise water use.

In 2016, the MR Holder applied for water use authorisation for activities that trigger Section 21(c) and 21(i) of the NWA, 1998 as the mining

footprint is within 500 m of a wetland. The application was accompanied by a Wetland Delineation Report (see Appendix G2) conducted by WATSAN Africa in 2016.

The wetland report had to verify the presence or absence of a wetland within the potential mining area, as well as determine whether the wetland against the lower slope of the Zandberg mountain is indeed a valid wetland in need of protection or whether is has been artificially induced by the mining activities with little if any conservation status. The report concluded that the wet area is an anthropologically induced wetland that could perhaps be classified as “incidental” rather than “artificial”. It bears no special or any other conservation status, and the area of the mine does not have any connectivity with the drainage line in the valley below (opposite the road). The report stated that since the trench is entirely artificial with an insignificant conservation status it is of no concern at all and therefore recommended that the mining (approved mining area) should go ahead.

DWS subsequently issued the General Authorisation in September 2017 and the Water Certificate was received in 2018.

(Also refer to Part A(1)(g)(iv)(1)(c) *Descripton of specific environemntal features and infrastructure on the site – Site Specific Hydrology and Geohydrology*)

1.2.7 Progressive Rehabilitation

As mentioned earlier, once a strip is mined the MR Holder contracts the services of a rehabilitation contractor to level the footprint and reinstate the stockpiled topsoil over the area in question (refer to 1.2.4 Topsoil Management above). To date (December 2021) approximately 10 ha has been rehabilitated by the MR Holder.

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

2. S102 APPLICATION

2.1 PROJECT PROPOSAL

As mentioned earlier, the MR Holder submitted an application for consent of the Minister to extend the existing mining right footprint of the Zandberg

Sand Mine with 108.3851 ha, in terms of Section 102 of the MPRDA, 2002 in June 2020. The table below lists the GPS coordinates of the initial extension area proposed in 2020.

Table 4: GPS coordinates of the initial S102 extension area proposal.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
L	33º50'37.25"	19º48'49.99"	-33.843681º	19.813886º
M	33º50'37.92"	19º48'37.05"	-33.843867º	19.810292º
N	33º50'51.13"	19º48'38.18"	-33.847536º	19.810606º
I	33º50'52.18"	19º48'45.17"	-33.847827º	19.812547º
R	33º51'15.84"	19º48'03.10"	-33.854400º	19.800862º
Q	33º51'00.47"	19º47'51.75"	-33.850163º	19.797751º
P	33º50'20.73"	19º48'34.09"	-33.839014º	19.809360º

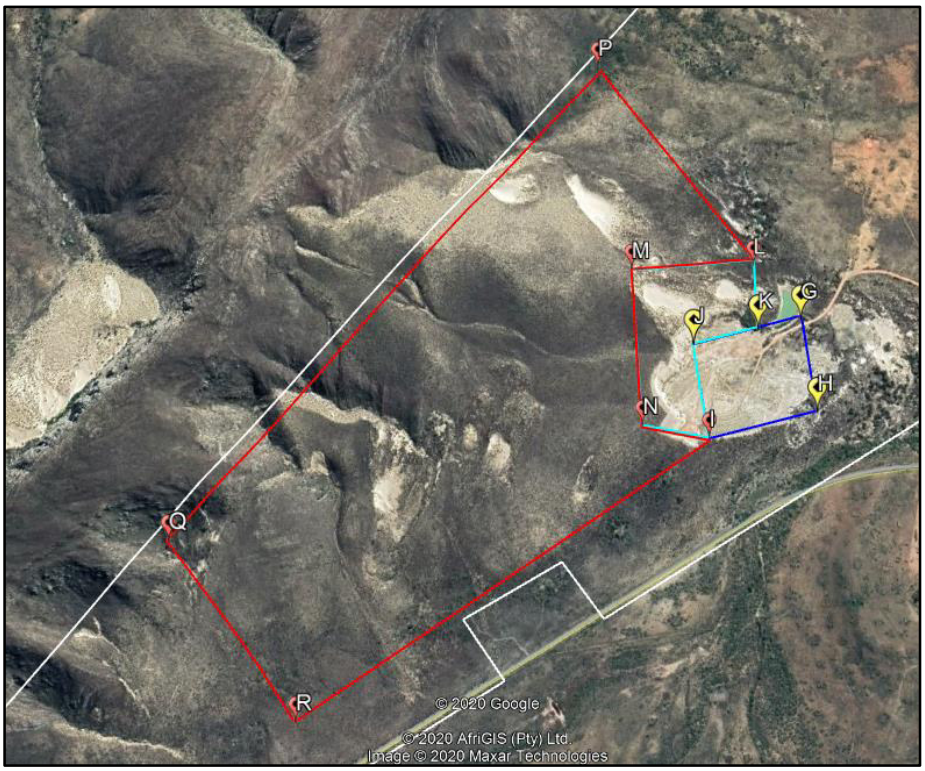


Figure 4: Satellite view showing the S102 extension area (red polygon) that was initial proposed in 2020, in relation to the approved MR area (blue polygons), and the surrounding landscape where the white line shows the property boundary. (Image obtained from Google Earth).

Since June 2020, and upon receipt of the specialist studies and public comments, the proposed extension footprint had to be reduced from ±108 ha to 4 ha to accommodate the biodiversity sensitivity of the property. Subsequently, the EIA identified three site alternatives (only one to be

approved) that could all allow the expansion of the existing mining footprint, and the winning of the available sand resource on the property as discussed in more detail under *Part A(1)(g)(i) Details of the development footprint alternatives considered*, and illustrated in the following figure.

Figure 5: Satellite view showing the existing mining footprint (dark and light blue polygons), with the three different site alternative extension areas (4 ha each) to be assessed during the EIA phase. (Image obtained from Google Earth).

If the S102 application is approved, the proposed extension area (S1/S2/S3) will be developed over a section of the property that is zoned for agricultural purposes with natural to near natural vegetation cover. Mining will advance into the extension area (refer to Part A(1)(g)(i) *Details of the development footprint alternatives considered*) as the current footprint (±17.7 ha) is mined.

Due to the position of the proposed extension area (S1/S2/S3) the mining method needs to be slightly amended (as discussed in more detail below) when the mine reaches the extension area, however the MR Holder will not establish any infrastructure in the extension area, and will still implement progressive rehabilitation of mined layers. Should the project be authorised the mining area will contain a front-end-loader and excavator.

Should the S102 amendment application be granted and the mining of sand from the extension area (S1/S2/S3) be allowed, the proposed project 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 extension area boundary, and the establishment of the biodiversity offset area identified during the environmental impact assessment.

(2) Operational phase which will involve stripping the topsoil from the footprint of Phase/Layer 1. The topsoil will be stockpiled at the edge of the layer to be replaced during the rehabilitation of the area. The sand will be mined through the Doze Push Method, whereby the material is pushed by a dozer from the top of the pay zone down to the loading area, where the front-end-loader (FEL) loads it directly onto the trucks of clients that transport it from site.

(3) Decommissioning phase, which will include activities that can be divided into medium- and long term categories. In the medium term, rehabilitation will entail the continuous reinstatement of mined layers and the management of weeds and invasive plant species. In the long term, rehabilitation will involve final landscaping of the site, the replacement of the topsoil of the final layer and the removal of the FEL and excavator from the site prior to the submission of a closure application to the Department of Mineral Resources and Energy (DMRE). The MR holder will further be responsible for the seeding of all rehabilitated areas. Once the full mining area is rehabilitated, the MR holder will be required to submit a closure application to the DMRE in accordance with section 43(4) of the MPRDA, 2002. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998.

2.2 SITE ESTABLISHMENT PHASE

Site establishment will entail the demarcation of the extension area boundaries, and the establishment of the biodiversity offset as detailed below:

2.2.1 Demarcation of Mining Boundaries

(Refer to Part A(1)(g)(i) Details of the development footprint alternatives considered & Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – Site Specific Vegetation.)

Pursuant to receipt of an Environmental Authorisation (EA) and the Section 102 Mining Right (MR) amendment, and prior to mining, the boundary of the new mining footprint (S1/S2/S3) has to be demarcated with clearly visible beacons.

2.2.2 Biodiversity Offset Area

(Also refer to Part A(1)(g)(iv)(1)(c) Description of the specific environmental features and infrastructure on the site – Site Specific Mining and Biodiversity Conservation Areas for more information regarding the biodiversity offset area).

Prior to the development commencing, the offset establishment phase must be concluded. While letters of commitment (Appendix F4 & F5) have been obtained from the Applicant and landowner (Zandbergfontein Trust), it is critical that institutional and financial arrangements are formalized prior to development commencing to ensure that long-term conservation outcomes are achieved in practice. As such, the offset specialist recommended that a suspensive clause be added to the conditions of the Environmental Authorization that specifically requires the Applicant to formalize financial and institutional arrangements for the offset sites prior to development commencing. The Applicant has a responsibility to:

- fund initial establishment costs,
- prepare the biodiversity offset management plan, and
- formalise an offset implementation agreement with the landowner before development commences.

Thereafter, the Landowner, and the appointed Management Authority, would ensure appropriate management of the site with

funds made available by the Applicant (refer to Figure 18 of the Biodiversity Offset Report).

The offset establishment phase effectively involves the formalisation of the offset as a protected area and the preparation of a management plan and baseline monitoring report. An overview of proposed activities is summarised below:

1. Formalising boundaries: Preparation of an SG approved "proclamation diagram" by a registered land surveyor to delineate the earmarked offset area;

2. Biodiversity Offset Management Plan: Preparation of an operational management plan for the biodiversity offset site in line with the NEM:PAA requirements;

3. Formalising Biodiversity Offset Implementation Agreement between Applicant and Landowner: Compilation of an agreement that formalises the institutional and financial arrangements prior to development commencing. The biodiversity offset implementation agreement must comply with the requirements of the draft National Biodiversity Offset Guidelines (DFFE, 2021a) as listed in the Biodiversity Offset Report (pg 39).

4. Technical Support and Application for Protected Area (PA) Establishment: Compilation of documentation necessary for PA application and submission to MEC for gazetting;

5. Submission to Deeds Office: Attorney to prepare notarial deeds for submission to Deeds office;

6. Public Participation: Advertising intention to declare area as a protected area in two newspapers;

7. Demarcation of the Biodiversity Offset Site: Demarcation of offset area with suitable concrete markers.

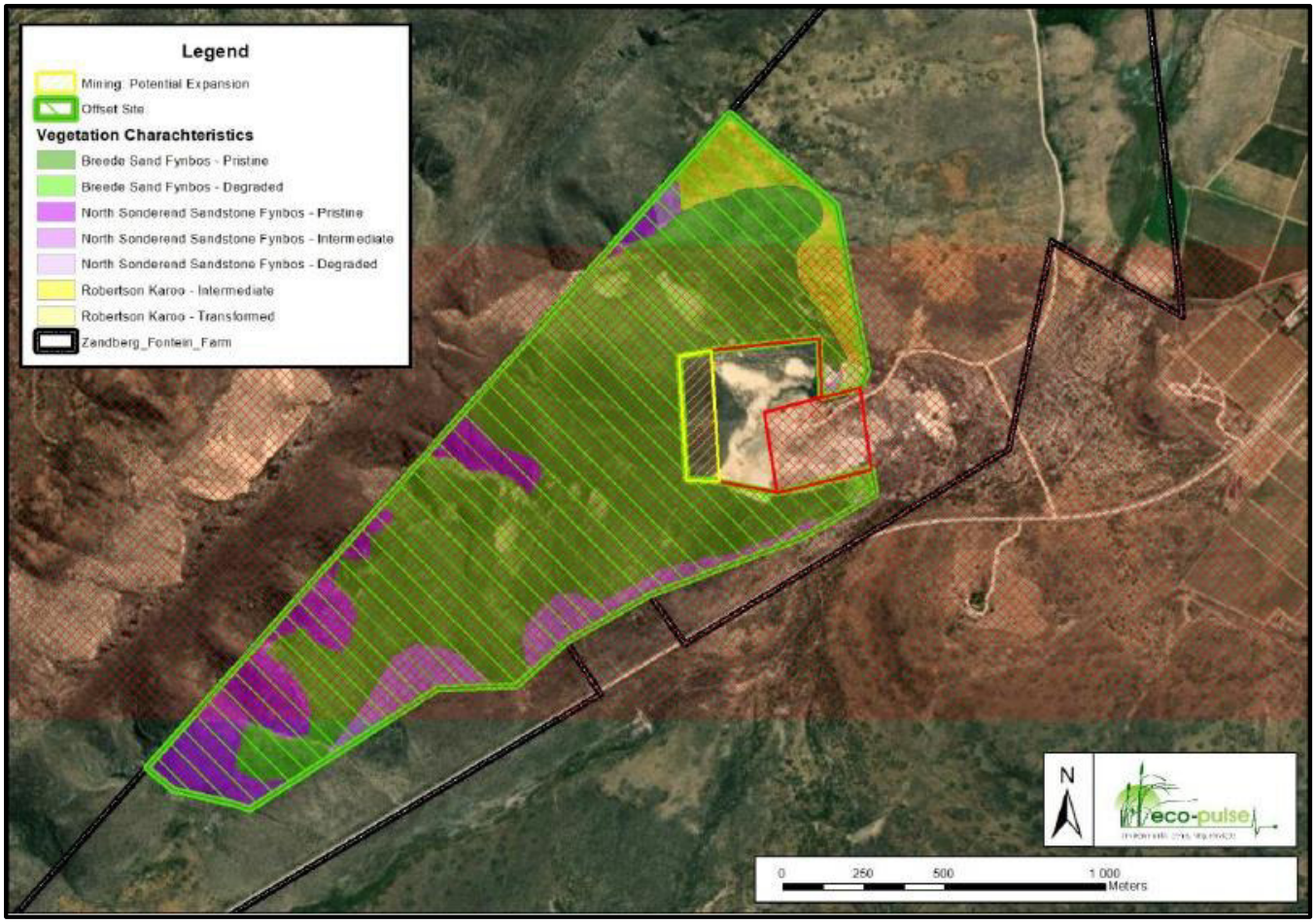


Figure 6: Proposed biodiversity offset site with associated vegetation attributes (image obtained from Eco-Pulse, 2022)

2.3 OPERATIONAL PHASE

As mentioned earlier, the MR Holder presently removes the topsoil off a strip of ±0.25 ha within which the sand is mined in a block of approximately 50 x 50 m. The topsoil is stockpiled at the edge of the strip to be replaced during the rehabilitation of the area. The sand is then removed from the stripped area with a FEL that loads it directly onto the trucks of clients. The MR Holder removes the sand up to the underlying sandstone/clay layer that gradually rises up the hill and acts as the limiting depth of the mine. Upon reaching the sandstone/clay layer the mined strip is rehabilitated as work continues into the consecutive phase/strip. No more than two strips (±0.5 ha) are open at any given time.

The mining engineer however proposed a different mining method for the proposed S102 extension area as discussed in more detail below.

2.3.1 Mine Planning

(Information extracted from the Geology, Geotechnical and Mining Assessment of Zandberg Sandput, 2021/22)

During the EIA phase of the S102 application, three site alternatives were identified by the project team (discussed in more detail under Part A(1)(g)(i) *Details of the development footprint alternatives considered*) that all allow for the mining of the sand resource on the property, although only one area can be approved due to the size restrictions (4 ha) derived from the CBA offset ratio (1:30). Subsequently, MLB Consulting (MLB) was appointed to compile a Geology, Geotechnical and Mining Assessment that comments on the mining prospect of each identified site alternative.

Following a site inspection in September 2021, MLB constructed 3D digital terrain models of the proposed extension areas (S1, S2, S3) in relation to the existing mining area as shown in the following figures.

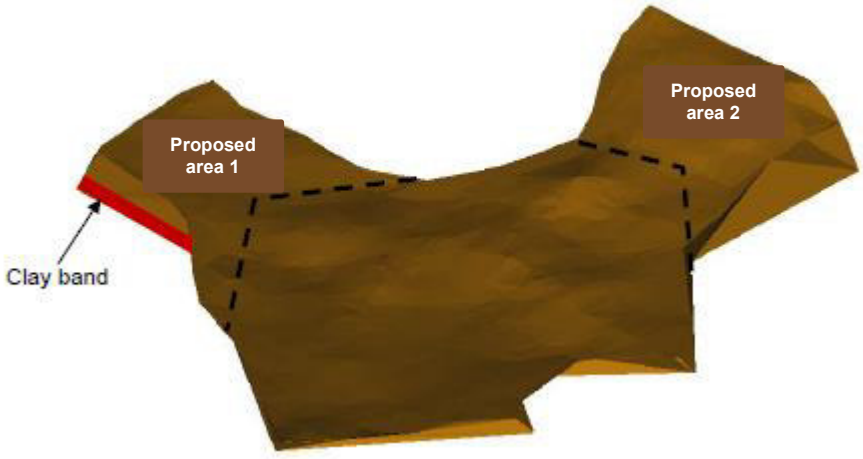


Figure 7: 3D Model showing the proposed mining areas (S1 & S2) in relation to the existing mining footprint (MLB, 2021).

Figure 8: 3D Model showing the layout of site alternative 3 (MLB, 2022).

From the first figure the 5 m thick clay band, present below the sand layer, in S1 can be seen.

2.3.1.1 Slope Design

According to MLB, slope instability has generally been categorised according to failure modes, based on the primary mechanism of failure. These mechanisms have been categorised as:

- Circular failure – occur as a slump, deep seated failure, not necessarily dependent on the presence of weak geological structures;
- Planar failure – occur as a result of shear strength being overcome on a plane of weakness;
- Wedge failure – occur as a result of intersection of two discontinuity planes of weakness;
- Toppling failure – occur generally where thin, elongated rock columns (formed by discontinuity planes of weakness) are present, with little or no confinement on one side.

Taking slope stability, -geometry, and safety factors into account, MLB generated simulation models for S1 and S2 respectively (as presented below). The models show 10 m bench heights that have been simulated with 20 m geotechnical catchment benches separating them. As S3 extends partly into S1 (to the south) and S2 (to the north), the slope/excavation design also applies to S3.

Site Alternative 1 Modelling Results:

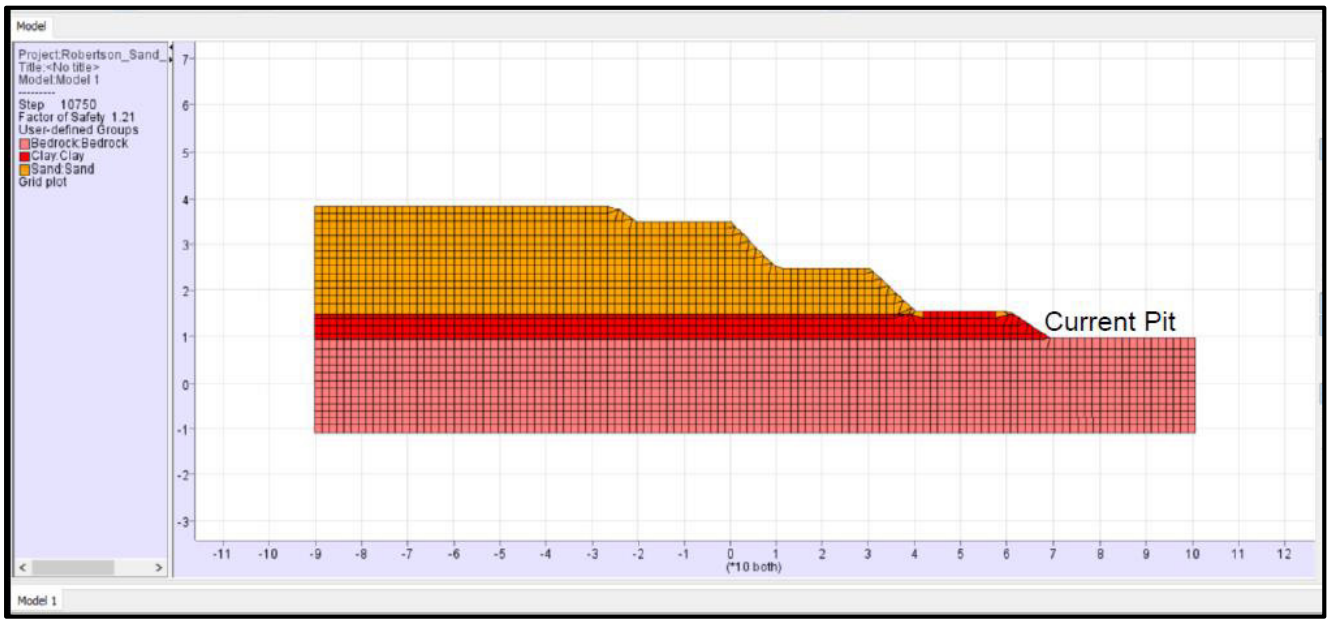


Figure 9: Site Alternative 1 – Plot showing the material types where the orange layer indicates the sand layer, the bright red layer indicates the clay band, and the lower faded red shows the bedrock (image obtained from MLB).

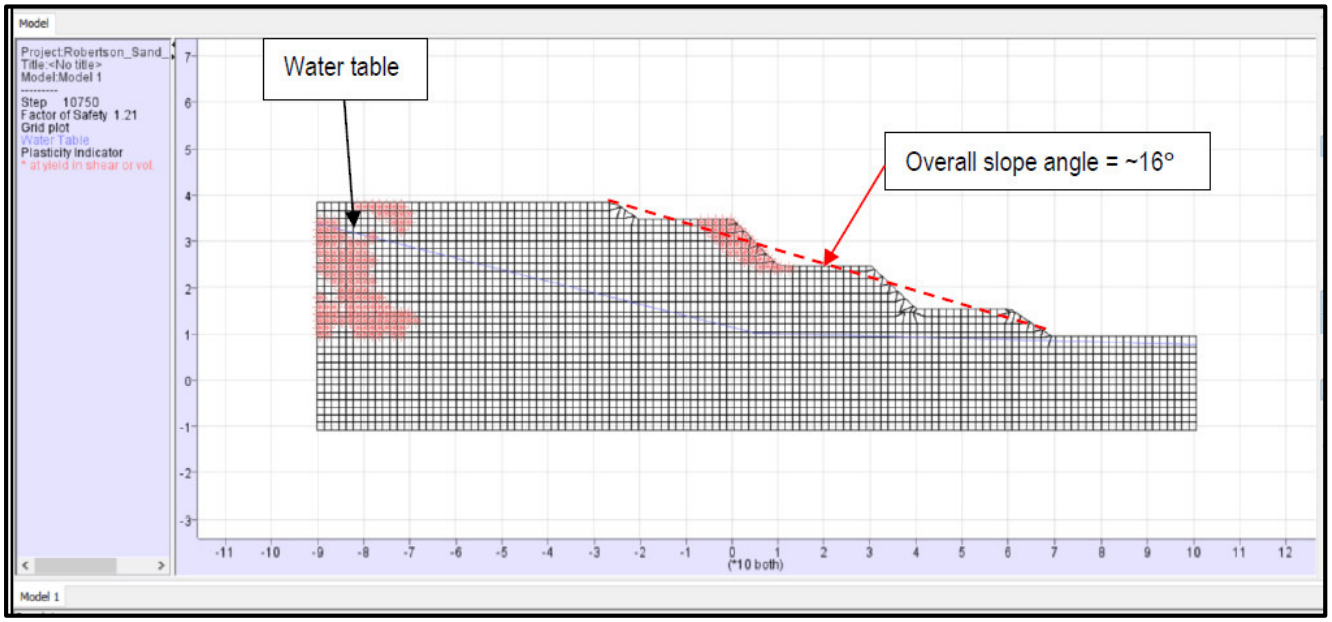


Figure 10: Site Alternative 1 – Plot showing water table and overall slope angle to result in a safety factor of 1.21 (image obtained from MLB).

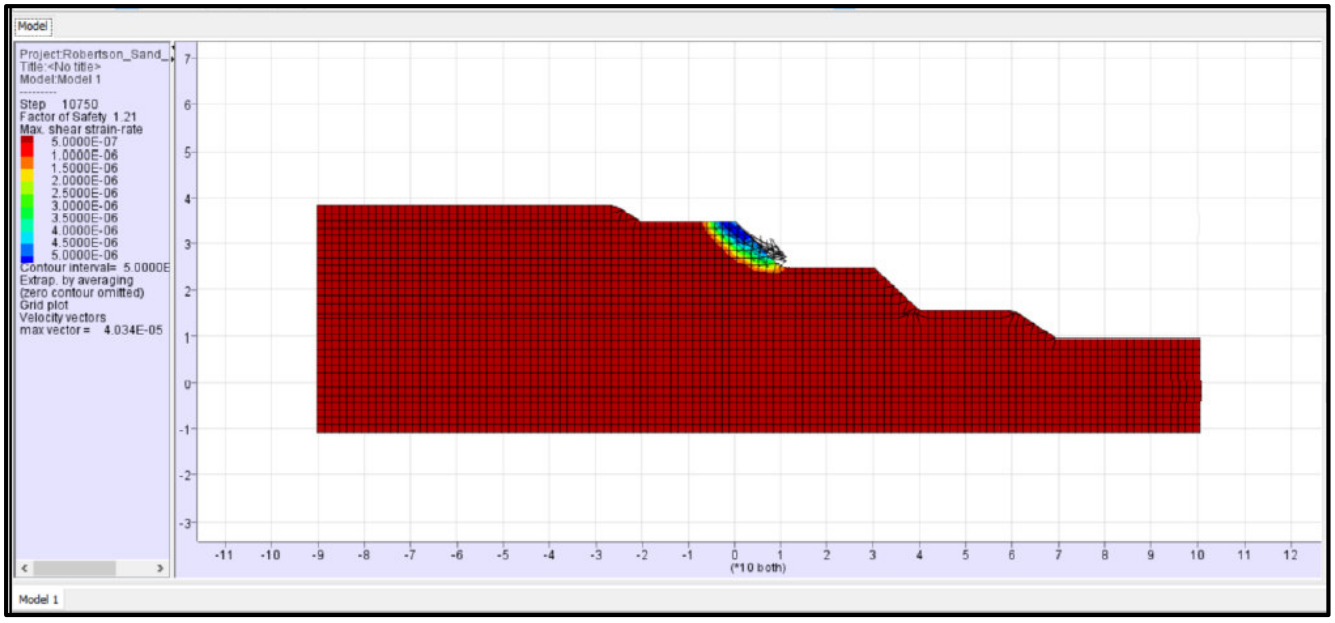


Figure 11: Site Alternative 1 – Plot showing that a safety factor of 1.21 is achievable with maximum shear strain rates of less than 5 x 10^{-6} (image obtained from MLB).

MLB concluded that the potential for circular failure is regarded as Low if a factor of safety (FOS) of ~1.21, with a very low shear strain rate of 5 x 10^{-6}, is maintained at S1. The overall slope is predicted to remain stable for the input parameters used in the above model.

Site Alternative 2 Modelling Results:

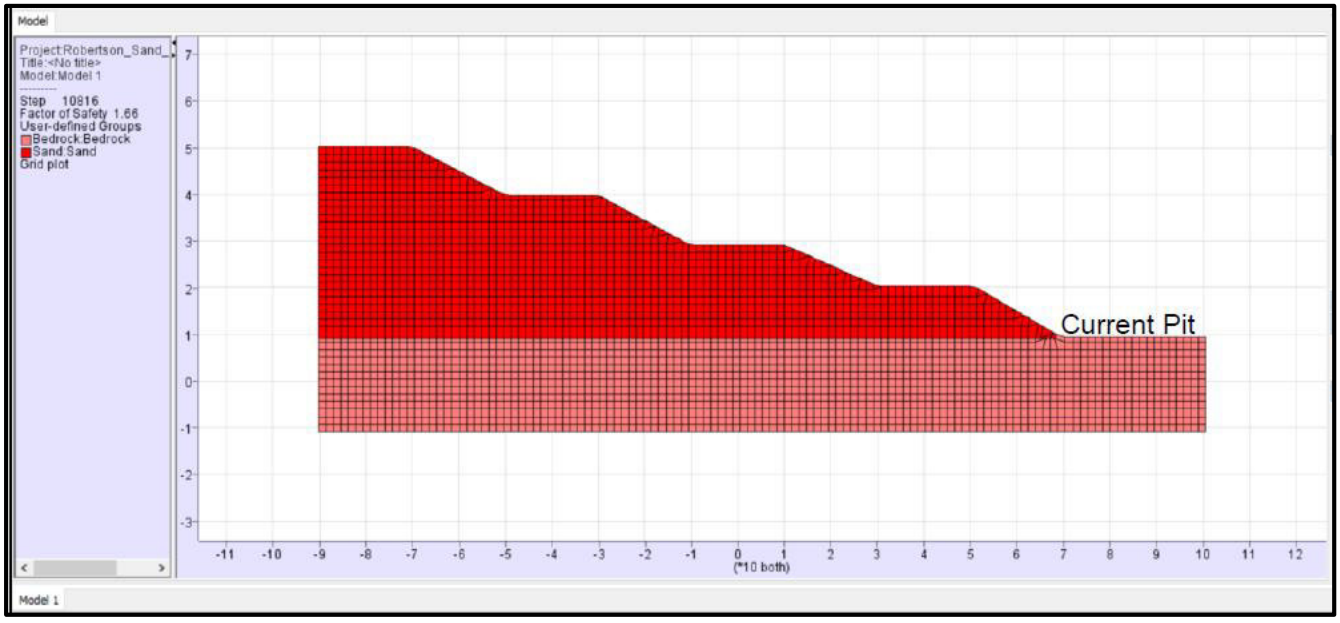


Figure 12: Site Alternative 2 – Plot showing the material types where the upper bright red section indicates the sand, and the lower faded red shows the bedrock (image obtained from MLB).

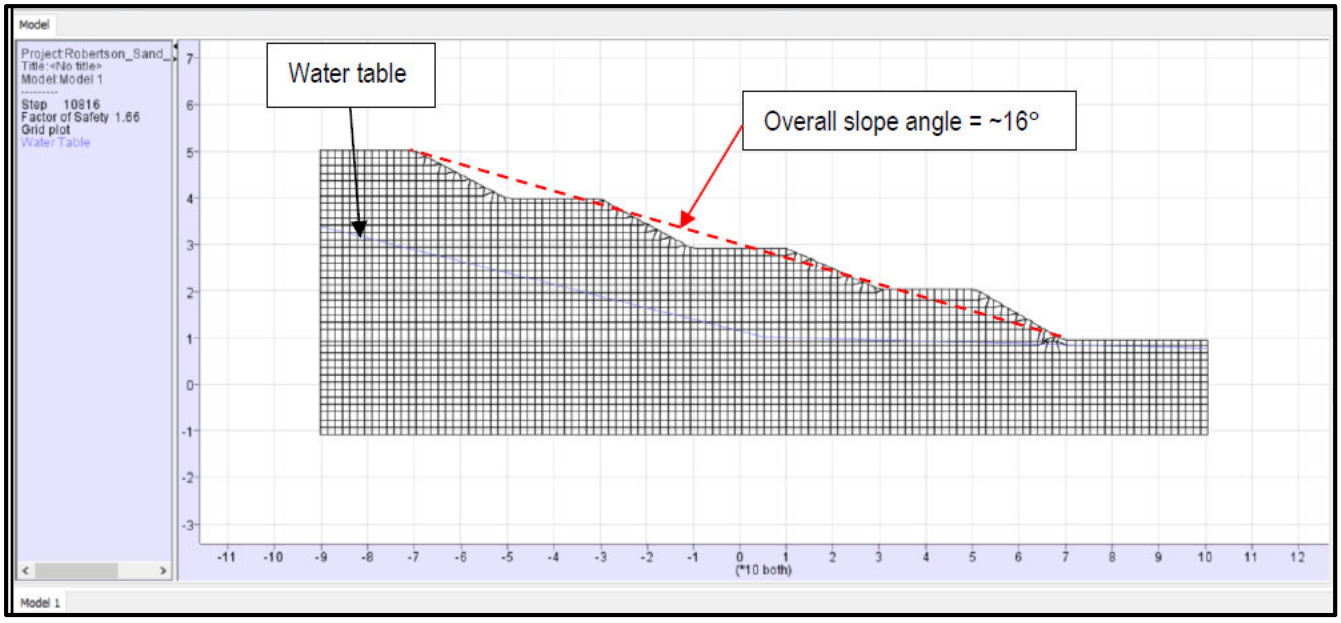


Figure 13: Site Alternative 2 – Plot showing water table and overall slope angle to result in a safety factor of 1.66 (image obtained from MLB).

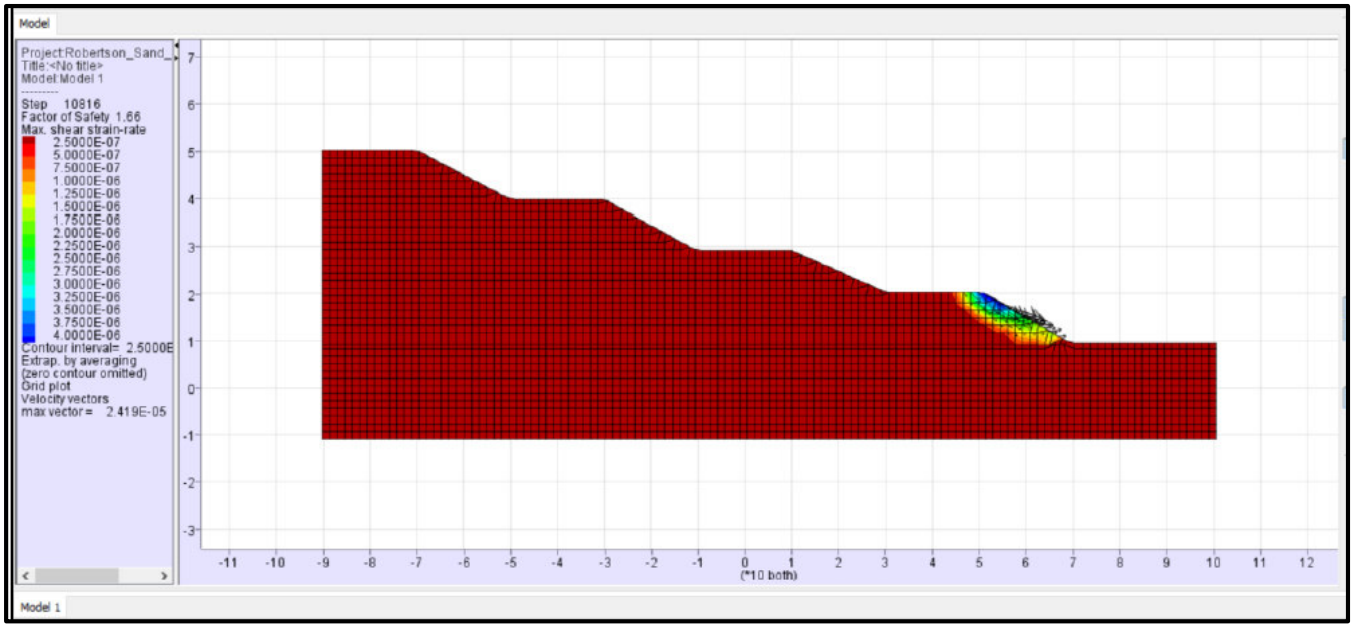


Figure 14: Site Alternative 2 – Plot showing that a safety factor of 1.66 is achievable with maximum shear strain rates of less than 4 x 10^{-6} (image obtained from MLB).

MLB concluded that the potential for circular failure is regarded as Low if a FOS of ~1.66, with a very low shear strain rate of 4 x 10^{-6}, is maintained at S2. The overall slope is predicted to remain stable for the input parameters used in the above model.

Recommended Slope Angles:

MLB concluded that the final pit geometry (S1/S2/S3) must comply with the following:

- bench heights of 10 m;
- bench widths of 20 m;
- bench face angles of ~27°; and
- overall slope angle of ~16°.

The vertical extent of the planned mining operation (S2, and the upper part of S3) will be limited to ±30 m depth within the unconsolidated aeolian sand deposits, while S1, and the lower part of S3 can be mined to an approximate depth of 15 m – 25 m. Water is not expected to be problematic since mining will be done above the water table.

2.3.1.2 Resource Estimation

The total inferred resources for S1 showed a resource volume of ±450 000 m³ (vertical extent ~25 m), while S2 was estimated to be ±890 000 m³ (vertical extent ~30 m), S3 has a mineable sand volume of ±685 000 m³ (MLB, 2021/22).

From a mining and feasibility side, S2 is the more preferred alternative, as this 4 ha area can be mined accountably with regard to slope stability, -geometry, and safety factors, while allowing the MR Holder access to the greater portion of the sand resource on the property (compared to the reserve of S1). S3 is however an intermediate option (between S1 and S2) because the northern part of the footprint extends into the thicker sand layer, although the southern part could only be mined to a maximum depth of 15 m – 20 m.

2.3.1.3 Mining Sequence

MLB recommended the following mining sequence for each site alternative as presented in the following schematics, with the mining direction of S1 and S2 extending from the face of the excavation model boundary towards the extreme rear extent of the model boundary with increasing depth.

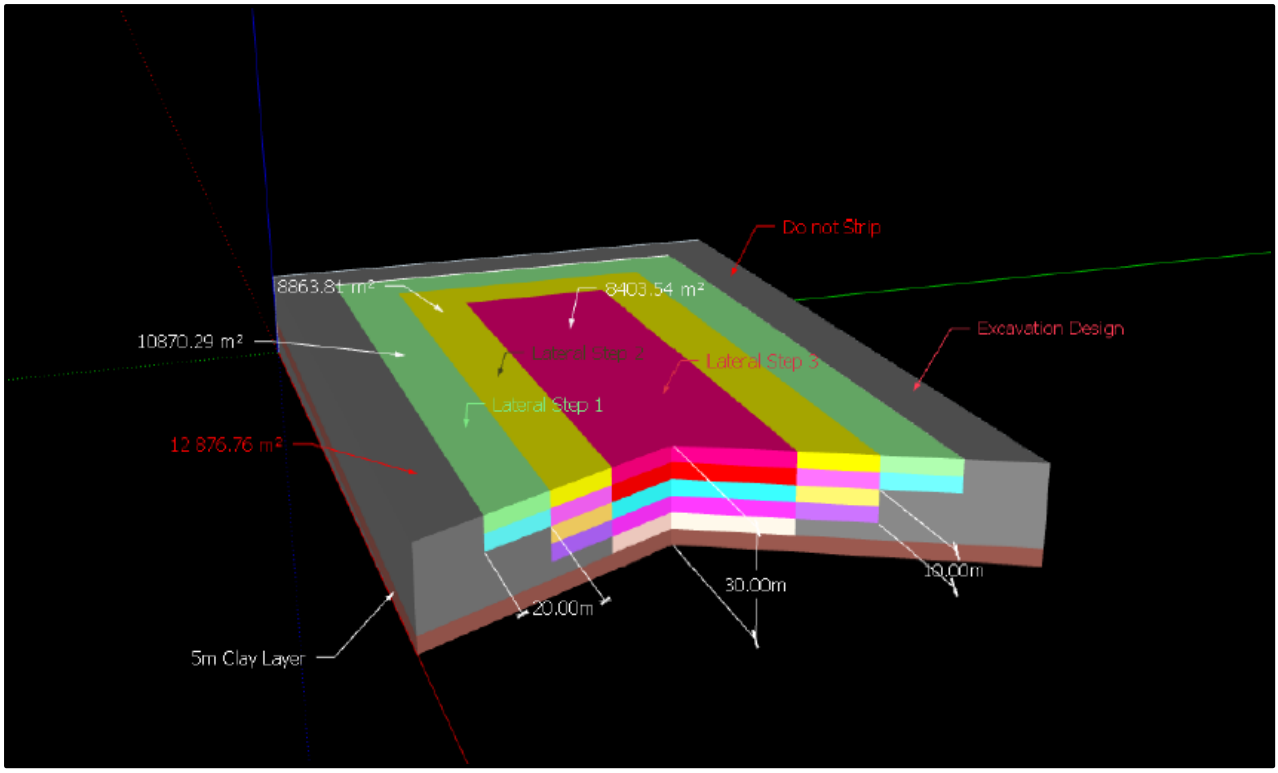


Figure 15: Schematic plan showing the recommended mining sequence for Site Alternative 1 (image obtained from MLB).

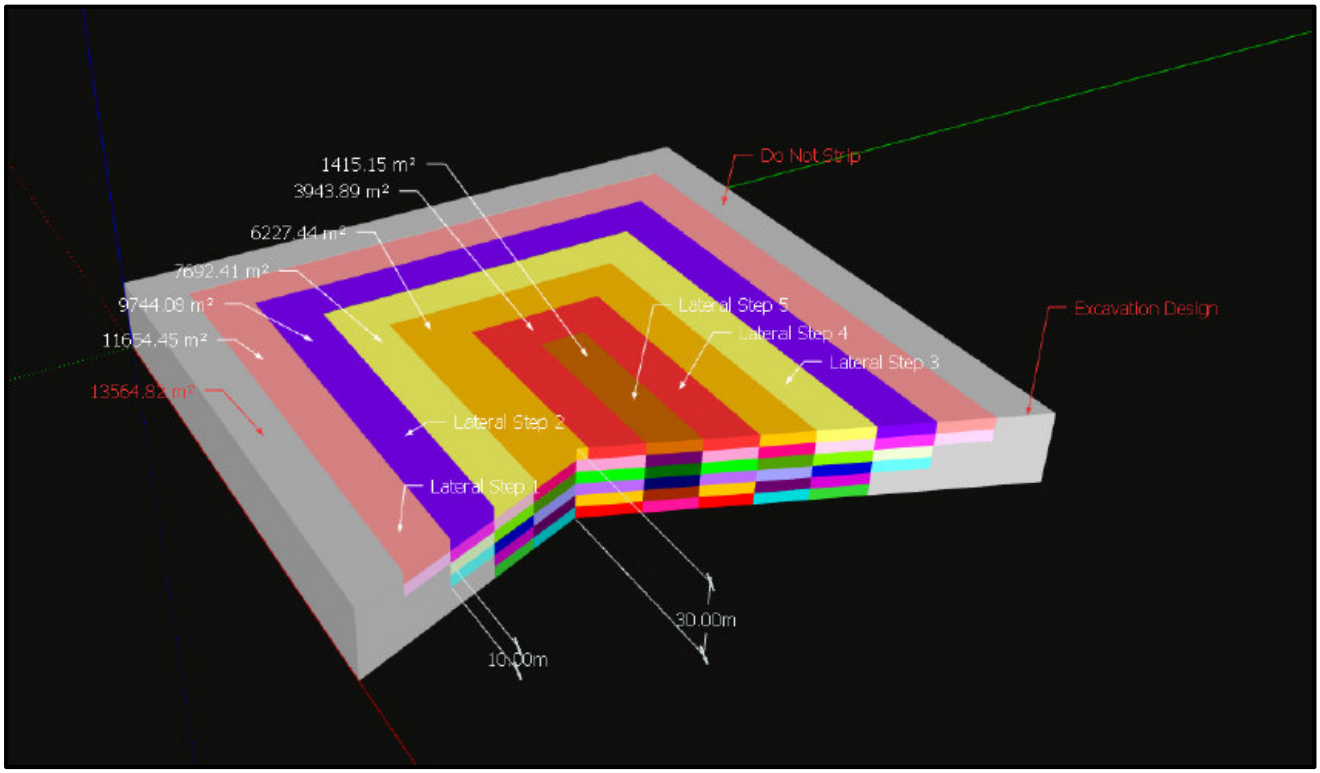


Figure 16: Schematic plan showing the recommended mining sequence for Site Alternative 2 (image obtained from MLB).

The mining sequence, of MLB, was then layered over a satellite view of the study area, and the following schematic representations were drawn for the first two site alternatives.

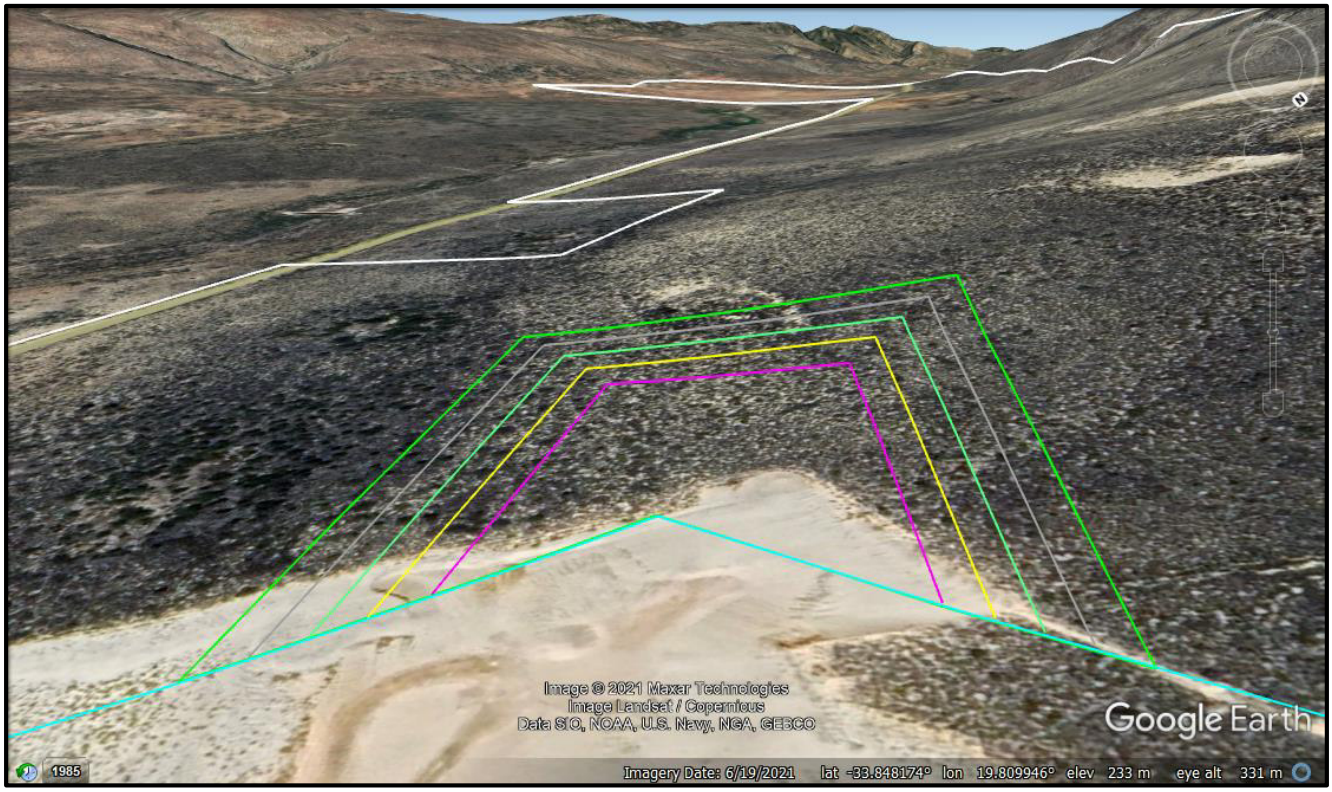


Figure 17: Satellite view of the proposed mining sequence proposed by MLB for Site Alternative 1, where the line colours correspond with those used in Figure 15. The white line shows the farm boundary (image obtained from Google Earth).

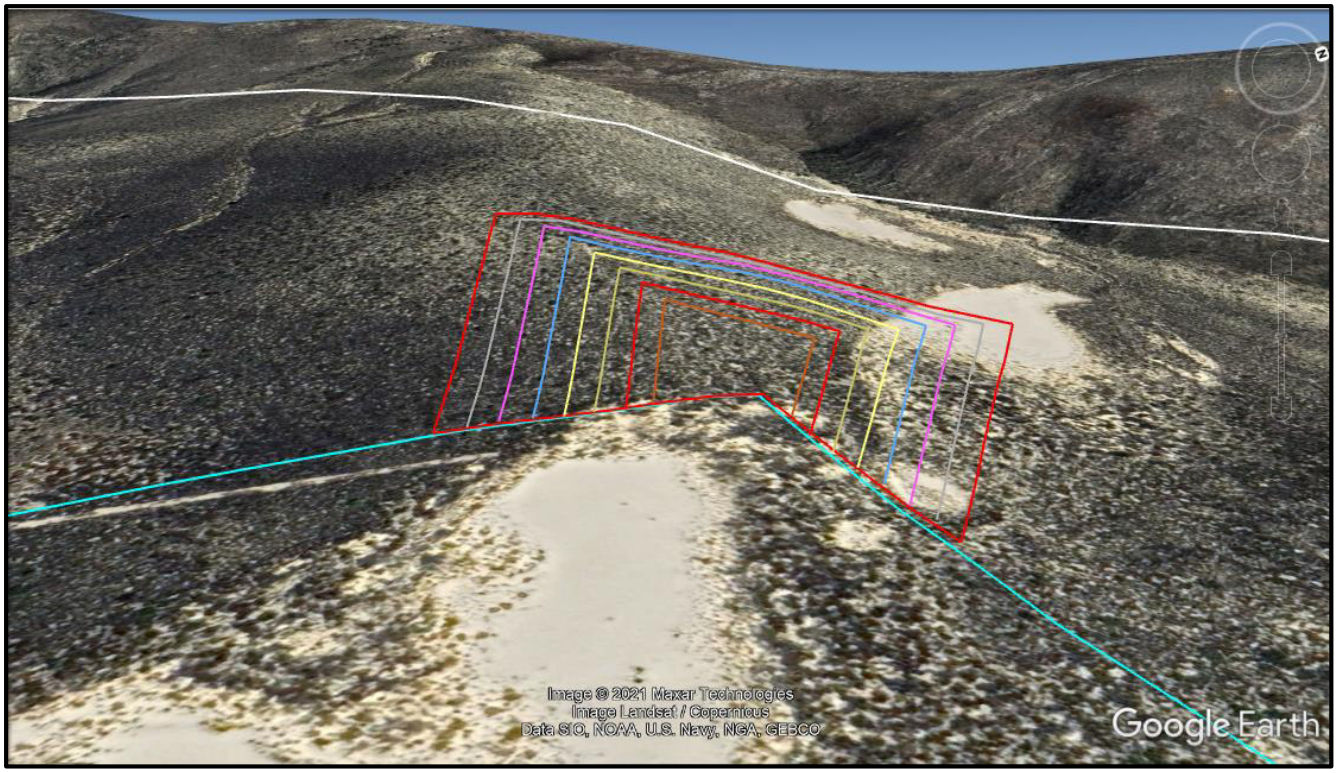


Figure 18: Satellite view of the proposed mining sequence proposed by MLB for Site Alternative 2, where the line colours correspond with those used in Figure 16. The white line shows the farm boundary (image obtained from Google Earth).

The extraction sequence of S3 (shown in the following figure) will require the establishment of a ramp access from the current mining area and stripping of the highest elevation down towards the lower elevations. Should the extension into S3 be approved, the mining program of the already approved mine will be directed in a manner that will ultimately accommodate the proposed mining sequence of S3. In other words, the access ramp and loading zone may extend from the S3 footprint into the mined area of the adjacent approved footprint. All mining activities (including the access ramp and loading zone) will be within the boundaries of the mining footprint (already approved and S3), and therefore does not necessitate the disturbance of additional (more than 4 ha) fynbos.

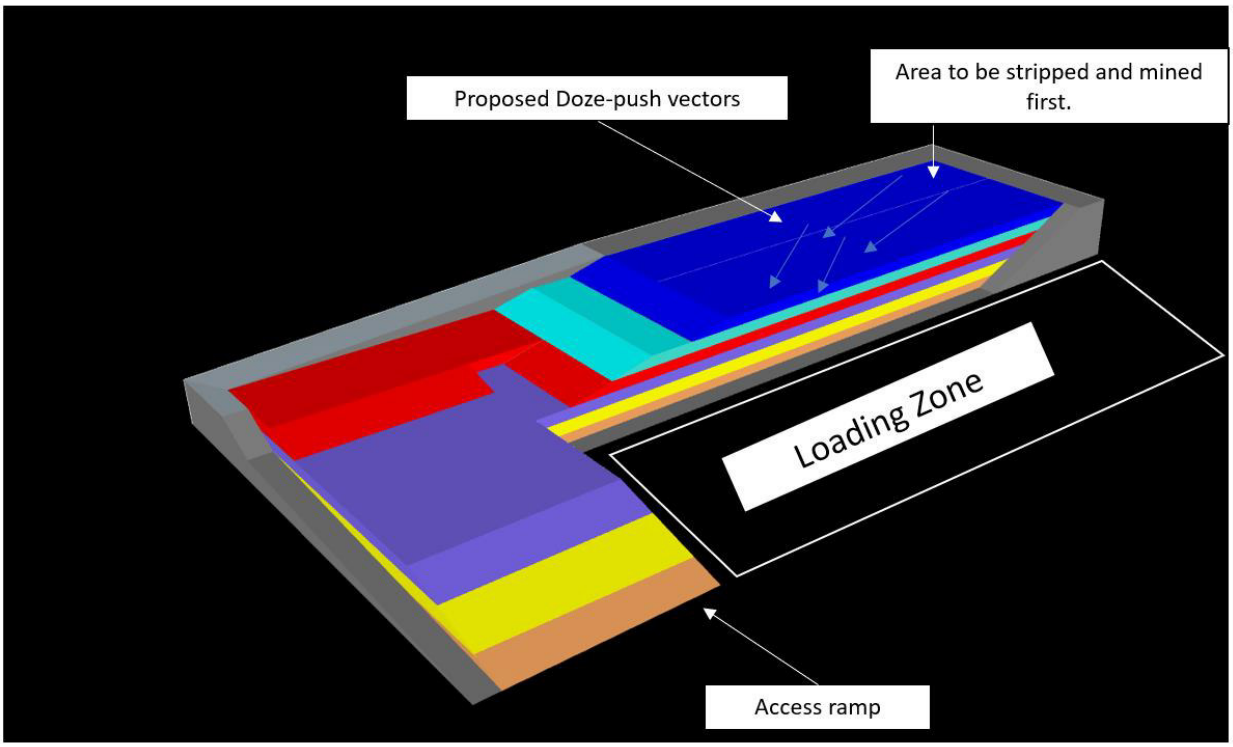


Figure 19: Annotated extraction model showing proposed extraction strategy for S3 MLB, 2022).

2.3.1.4 Mining Method

As mentioned earlier, the proposed mining method of the extension area (S1/S2/S3) will be the Doze Push Method that is commonly applied at unconsolidated ore, or bulk commodity mines. After the stripping and stockpiling of the topsoil, the sand is pushed by a dozer from the top of the pay zone down to the loading area. The dozer will cut benches of a defined width and height (20 m width x 10 m height in this case), and step off onto the pay zone until the next bench has to be cut.

This mining method is a continuous mining approach in that the longevity of the excavation sustains the extraction of the mineable pay zone until depleted. Progressive rehabilitation is applied to the catchment berms and benches as mining progresses down the slope. The advantage of this method is that it allows a longer residence time in the defined mining area which benefits areal landform disturbance as mining efforts are concentrated in a defined area for a longer period.

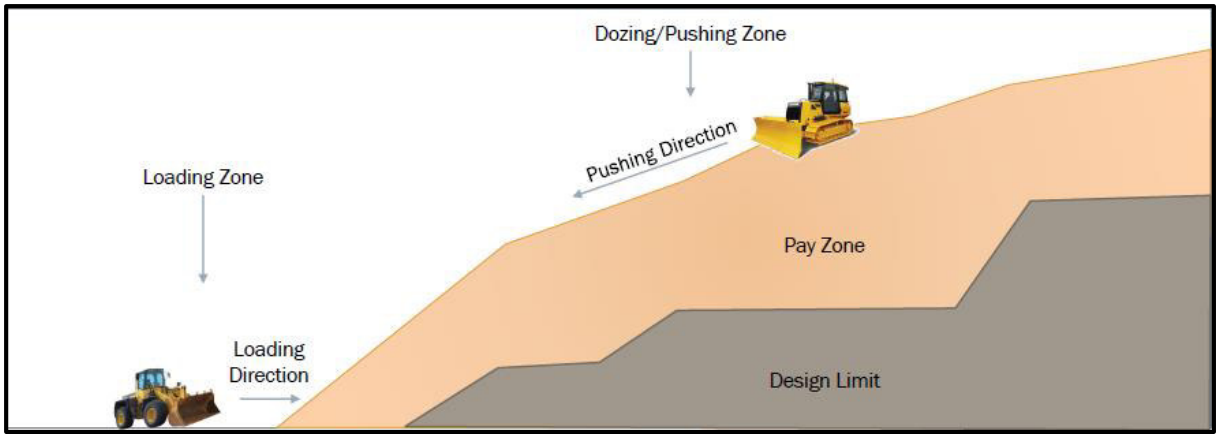


Figure 20: Schematic representation of the proposed mining method MLB, 2022).

2.3.2 Clearing of Vegetation

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

The three alternative extension footprints (S1 – S3) all fall within the Breede Sand Fynbos (FFd 8), and extends into the Langeberg Critical Biodiversity Area (CBA1). As the extension of the mining area will necessitate the removal of Breede Sand Fynbos to allow access to the mineral (sand), Nkurenkuru Ecology & Biodiversity was appointed to conduct a Botanical Study and Assessment (BSA) of the proposed extension areas (S1 – S3). The BSA is attached as Appendix I2 to this report, and the findings and recommendation of the specialist were incorporated into the DEIAR.

As discussed in Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on the site – Site Specific Vegetation,* the botanist supports the mining of S1, rather than S2, since it contains lower numbers of individual Species of Conservation Concern (SCC) than site alternative 2 and 3. However, the botanist notes that S3 is also a viable option, since it has the smallest perimeter of all three alternative areas, which would minimise edge effects.

Notwithstanding the above, and regardless whether S1, S2 or S3 is approved, the proposed extension of the mining footprint will require the removal of Breede Sand Fynbos to access the sand resource. The vegetation of the earmarked layer will be removed with the topsoil and will act as mulch to be replaced on the mined areas.

2.3.3 Topsoil Stripping

Topsoil will be removed from the first phase/layer and stockpiled along the upper edge to be replaced during the rehabilitation of each bench. Topsoil stripping will entail the removal of the upper 500 – 1 000 mm of the soil, whether it contains sand (commodity) or not. The topsoil berms will not be driven over, contaminated, flooded or moved during the operational phase. The topsoil berm will measure a maximum of 2 m in height to prevent compaction and preserve micro-organisms within the topsoil.

2.3.4 Access Road

The MR Holder will continue to use of the existing gravel road that leads into the current mining area, and if needed extend it into the mining area as mining progresses. Should haul roads be needed where no farm roads exist, the footprint of the haul roads will be contained to the approved mining area, specifically to areas where mining still needs to be done. No haul roads will be allowed over rehabilitated areas or no-go areas, and upon closure of the site all haul roads, no longer needed by the landowner, will be ripped and rehabilitated. As mentioned earlier, the MR holder will only commence with the proposed activity, once the sand resource in the existing mining area (±17.7 ha) is depleted. In light of this, the proposed activity will not increase the current traffic demand on the area, but merely entail the continuation of it. The haul roads (if needed) will not trigger listed activities in terms of the NEMA: EIA Regulations, 2014 (as amended).

2.3.5 Water Use

Dust generated on the access road will as far as possible be managed through alternative dust suppression methods to prevent the use of water for dust suppression. These measures will include a combination of the following:

- The speed of all mining equipment/vehicles will be restrictions to 20 km/h on the internal farm roads/haul roads to minimize dust generation;
- The removal of vegetation will only be done immediately prior to the mining of an area in an attempt to lessen denuded areas (acting as dust source) to the absolute minimum.

2.3.6 Waste Management

The MR Holder will continue to manage any waste that might be generated at the mine as described earlier under 1.2.5 *Waste Management.*

2.3.7 Servicing and Maintenance

No workshop will be established within the mining footprint, and maintenance and/or servicing of the FEL and excavator (if applicable) will continue at the off-site workshop on the farm or the town of Robertson. If emergency repairs are needed on equipment not able to move to the workshop, drip trays will be used under the machinery and all waste will be contained and removed from the emergency service area to the workshop to ensure proper disposal. No fuel will be stored at the mine, and fuelling of the FEL and/or excavator (when applicable) will continue at the farm yard or by means of a mobile diesel bowser with the use of drip trays.

2.3.8 Progressive Rehabilitation

The progressive rehabilitation (medium term) of mined layers will be implemented for the duration of the project.

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

2.3.9 Biodiversity Offset Management

Once the biodiversity offset site has been formally secured, the offset management phase will begin. In this instance, it is envisaged that the offset area will continue being managed as part of the existing farming operation of the landowner. Costs for site management would be accounted for separately and would either be funded directly by the Applicant or via a Trust established for this purpose. At this stage, it is envisaged that Zandbergfontein Trust (or any future landowner) would act as the delegated Management Authority for the offset site and take on responsibilities for ensuring that site management requirements as outlined below are implemented.

- Management Planning: Updating the Biodiversity Offset Management Plan regularly as required;

- Management Support: Oversight of site management including maintain site demarcations, managing activities on the site and preventing illegal activities as outlined in the Management Plan;

- Invasive Plant Control: Apart from some targeted clearing of degraded areas, alien clearing costs are expected to be very limited as the IAP infestation levels are very low. A walkthrough of the area twice a year to hand-pull any seedlings has however been included for budgetary purposes.

- Ecological Monitoring: Vegetation and other monitoring required as per the management plan.

- Management Review and Reporting: METT Assessment to be undertaken in collaboration with CapeNature (if required).

2.3.10 Review & Update of the Biodiversity Offset Report

Once the Biodiversity Offset Report was approved, it is envisaged that key implementation requirements linked with the Establishment Phase will be tracked by the ECO as part of auditing the compliance against the EMPr prior to development commencing. Thereafter it is envisaged that CapeNature will provide a longer-term supporting role in ensuring that management of the biodiversity offset site is effective in securing biodiversity values of the site.

2.4 DECOMMISSIONING PHASE

Rehabilitation will include activities to be divided into medium- and long term categories. In the medium term, rehabilitation will entail the continuous reinstatement and seeding of mined layers, and the management of weeds and invasive plant species. In the long term, rehabilitation will involve final landscaping of the site, the replacement of the topsoil on the final layer and the removal of the FEL and excavator prior to the submission of a closure application to the Department of Mineral Resources and Energy (DMRE).

2.4.1 Mine Planning Rehabilitation Recommendations

MLB proposed the following rehabilitation activities that should be undertaken during the final rehabilitation phase of the project:

- All mobile equipment/foreign matter should be removed from the site;
- The entire disturbed area should be inspected for any signs of pollution (as a result of mining activities) and if identified it should be removed and disposed of in a registered landfill site;
- Stockpiled overburden/topsoil should be backfilled into the excavations and any steep walls should be sloped to a safe angle and aesthetic rounding to be applied where applicable to restore natural landforms;
- The disturbed area should be reseeded and alien vegetation should be controlled until the site is successfully revegetated;
- Areas compacted as a result of mining activities undertaken should be loosened to promote self-vegetation, and any ruts created by accessing or leaving the site will be filled to ensure that no future erosion shall emanate from the site;
- The landowner should be requested to inspect the success of the rehabilitation.

2.4.2 Botanical Rehabilitation Recommendations

The BSA notes that in conjunction with biodiversity offsetting, rehabilitation of mined areas will be crucial for minimising and mitigating the impacts of the proposed mining activities. The site inspection of the botanist revealed that there is good potential for mined areas to be rehabilitated to a state that supports most of the species characteristic of Breede Sand Fynbos. The fact that rehabilitated areas can enable the return and persistence of Breede Sand Fynbos SCC, together with the fact that a suitable amount of Breede Sand Fynbos is available on site for biodiversity offsetting, will greatly mitigate the impacts of the proposed mining activities.

According to the BSA the ideal rehabilitation plan includes both concurrent rehabilitations, where rehabilitation is implemented alongside mining, and final rehabilitation, which is carried out once mining ceases and the mine enters the decommissioning and closure phases. It is imperative that, while vegetation is still establishing, soil erosion and compaction is carefully monitored and controlled. As a preventative action, it is also crucial that any

unnecessary disturbance and removal of vegetation is avoided at all costs. Soil compaction greatly increases surface water runoff and impedes the quick and effective establishment of a suitable vegetation cover. It should thus be limited/prevented.

It is imperative that any mined areas are re-vegetated as soon as possible. A suitable layer of topsoil, of the same type and quality as that of an equivalent benchmark site (in this case, pristine Breede Sand Fynbos) to that of the mined area, should immediately be applied to an area after it has been fully mined, and before revegetation of that area commences. The recommended depth of soil is between 500 – 1 000 mm. The botanist based this on observations made for the pristine Breede Sand Fynbos occurring directly to the southern border of the current mining area. This depth seems to be similar, and somewhat deeper, than the depth of the areas that have passively restored and which contain a good number of species, both SCC and non-SCC, characteristic of Breede Sand Fynbos. The added depth would likely also allow the establishment of *Protea laurifolia*, *Leucadendron salignum*, and *Leucospermum calligerum*, species that were absent in the current mining area but that are characteristic of the adjacent Breede Sand fynbos. The following figure shows the list of species that the specialist recommended (page 77 of the BSA attached as Appendix I2) to be used, that are characteristic of the environment (Breede Sand Fynbos).

- *Aspalathus lactea* subsp. *breviloba*
- *Aspalathus quinquefolia* subsp. *quinquefolia*
- *Crassothonna alba*
- *Disparago ericoides*
- *Ehrharta villosa* var. *villosa*
- *Erica plumosa*
- *Erica serrata*
- *Euchaetis pungens*
- *Leucadendron salignum*
- *Leucospermum calligerum*
- *Metalasia adunca*
- *Metalasia erubescens*
- *Polpoda capensis*
- *Prismatocarpus brevilobus*
- *Protea laurifolia*
- *Rafnia capensis* subsp. *capensis*
- *Senecio arenarius*
- *Stipagrostis zeyheri* subsp. *zeyheri*
- *Stoebe nervigera*
- *Struthiola fasciata*
- *Thamnochortus lucens*
- *Wachendorfia paniculata*
- *Willdenowia incurvata*
- *Willdenowia sulcata*

Figure 21: Recommended species to be used in the re-establishment of sand fynbos (page 77 of the BSA).

Refer to the BSA (Appendix I2) and Closure Plan (Appendix P) for the detailed rehabilitation recommendations regarding the re-seeding of the area.

The specialist notes that the rehabilitation should carefully be monitored during the operational phase, as well as the post-operational phase when the desired final ecosystem is being established. Monitoring must include aspects such as topsoil depth, soil erosion status, vegetation cover, and species diversity.

2.4.3 Decommissioning Objectives

The MR Holder proposed the following regarding the rehabilitation of the mined layers (also refer to the Closure Plan attached as Appendix P):

- The mining plan will be such that topsoil is stockpiled for the minimum possible time through rehabilitating different mining layers progressively as mining continues.
- To ensure minimum impact on drainage, the MR Holder will take care not to leave any depressions in the mining floor. A surface slope (even if minimal) will be maintained across the mining floor in the drainage direction, so that all excavations are free draining.
- After mining, any steep slopes at the edges of excavations will be reduced to a minimum and profiled to blend with the surrounding topography.
- The stockpiled topsoil will then be evenly spread over the entire mining area, so that there is a depth of 500 – 1 000 mm of sandy topsoil above the underlying layer. The depth will be monitored during spreading to ensure that coverage is adequate and even.
- The MR Holder will strive to (when possible) spread topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, is minimized.
- A cover crop will be planted and established immediately after spreading of topsoil to stabilize the soil and protect it from erosion.
- The rehabilitated area as well as the land down slope of it will monthly be monitored for erosion, and appropriately stabilized if any erosion occurs.

- The MR Holder will ensure monthly monitoring of weeds/invader plants that may germinated within the rehabilitated areas. The invasive plant species management plan (Appendix N) will be implemented on site.

The future land use of the mining footprint will be to return the rehabilitated area to the landowner and subsequent agricultural zoning upon receipt of a closure certificate from the DMRE.

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

Rehabilitation of the excavated area:

No waste may be permitted to be deposited in the mining area.

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 six months from closure of the site.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMRE) 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 was rehabilitated the MR 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 5: Policy and legislative context.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (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);	**REFERENCE WHERE APPLIED** (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** (E.g. in terms of the National Water Act: Water use license has/has not been applied for).
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	Part A(1)(g)(iv)(1)(b) Description of the current land uses.	The mitigation measures proposed for the site includes specifications of the CARA, 1983.

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
	Part A(iv)(1)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Invasive Plant Species.*	
Guideline on Need and Desirability	Part A(1)(f) Need and desirability of the proposed activities.	The need and desirability of the project was assessed in accordance with these guidelines.
Langeberg Local Authority Integrated Development Plan (IDP)	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed acidity – Socio-Economic Environment.	The IDP was used in the assessment of the socio economic profile of the receiving community.
Langeberg Land Use Planning Bylaw (264/2015) Langeberg Municipality – Integrated Zoning Scheme Bylaw (7929/2018)	Part A(1)(g)(iv)(1)(b) Description of current land uses. Appendix F2 – Proof of zoning approval.	LLM approved a rezoning application for the current mining footprint on a portion of Remainder of Portion 4 of the farm Zandberg Fontein No 97 in March 2018. The proposed S102 application requires a land use application to the Langeberg Local Municipality in terms of their Land Use Planning Bylaws. A town and regional planner has been appointed to commence with this application.
Mine Health and Safety Act, 1996 (Act No 29 of 1996) read together with applicable amendments and regulations thereto including relevant OHSA regulations.	Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Health and Safety Risks.*	The mitigation measures proposed for the site includes specifications of the MHSA, 1996.
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 A(1)(d) Description of the scope of the proposed overall activity.	Application for a Section 102 amendment application submitted to the DMRE-WC. Ref No. WC30/5/1/2/2/87MR & WC30/5/1/2/2/10080MR.
National Biodiversity Offset Guideline, 2021 (Draft)	Part A(1)(d)(ii) Description of the activities to be undertaken. Part A(1)(j) Summary of specialist reports.	The guidelines were used in the compilation of the Biodiversity Offset Report.

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
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): ᵡ GNR 326 Section 31 Amendments to be applied for in terms of Part 2 ᵡ GNR 324 Listing Notice 3 Activity 12 ᵡ GNR 325 Listing Notice 2 Activity 17 ᵡ GNR 327 Listing Notice 1 Activity 22 ᵡ GNR 327 Listing Notice 1 Activity 27 ᵡ GNR 327 Listing Notice 1 Activity 28	Part A1(d)(i) Listing and specified activities.	Application for a Part 2 amendment of the EMPR as well as an EA submitted to DMRE-WC. Ref No: WC 30/5/1/2/2/87 MR & WC30/5/1/2/2/10080MR.
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	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Air and Noise Quality.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Air and Noise Quality*.	The mitigation measures proposed for the site take into account the NEM:AQA, 2004 and the National Dust Control Regulations.
National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) read together with applicable amendments and regulations thereto.	Part A1(g)(iv)(1)(a) Type of environment affected by the proposed activity - *Biological Environment* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Mining, Biodiversity Conservation Areas, and Vegetation.*	The mitigation measures proposed for the site includes specifications of the NEM:BA, 2004.
National Environmental Management: Protected Areas Act, 2003 read together with applicable amendments and regulations thereto.	Part A(1)(d)(ii) Description of the activities to be undertaken. Part A(1)(j) Summary of specialist reports.	The Biodiversity Offset Area will be proclaimed in terms of the NEM:PAA, 2003.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) read together with applicable amendments and regulations thereto.	Part A(ii) Description of the activities to be undertaken: *Operational*	The mitigation measures proposed for the site take into account the NEM:WA, 2008.

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
NEM:WA, 2008: National norms and standards for the storage of waste (GN 9260).	*phase – 2.3.5 Waste Management.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Waste Management*.	
National Heritage Resources Act No 25 of 1999.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Human Environment.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Cultural and Heritage Environment.*	A Notice of Intent to Develop in terms of Section 38(8) of the NHRA, 1999 was submitted to Heritage Western Cape (HWC) for commenting, and a Heritage Impact Assessment (inclusive of an archaeological- and palaeontological impact assessment) were conducted. The HIA found that the earmarked area is not a sensitive heritage environment. The mitigation measures proposed for the site includes specifications of the NHRA, 1999.
National Road Traffic Act, 1996 (Act No. 93 of 1996)	Part A(ii) Description of the activities to be undertaken: *Operational phase – 2.3.3 Access Road.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Existing Infrastructure*.	The mitigation measures proposed for the project take into account the NRTA, 1996.
National Water Act, 1998 (Act No. 36 of 1998) read together with applicable amendments and regulations thereto. Department of Water Affairs and Forestry Best Practice Guideline Series (2007).	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Hydrology and Geohydrology.* Part B(1)(d)(viii) Has a water use licence been applied for?	The MR Holder has a valid General Authorisation issued by DWS in 2017 (see Appendix G1). An application will be submitted to the DWS to accommodate the proposed extension of the mining footprint in terms of the requirements of the NWA, 1998. The mitigation measures proposed for the site take into account the NWA, 1998.
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 public participation guidelines.

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
Spatial Planning and Land Use Management Act, 2013 (Act No 16 of 2013)	Part A(1)(g)(iv)(1)(b) Description of current land uses.	LLM approved a rezoning application for the current mining footprint on a portion of Remainder of Portion 4 of the farm Zandberg Fontein No 97 in March 2018. The proposed project requires a land development application to Provincial Government (DEA&DP). A town and regional planner was appointed to handle this application.
The South African Constitution.	Implied throughout the document.	To be upheld throughout the EIA assessment, planning-, construction-, operational- and decommissioning phases.
Western Cape Biodiversity Spatial Plan	Part A(1)(g)(iv)(1)(b) Description of current land uses.	LLM approved a rezoning application for the current mining footprint on a portion of Remainder of Portion 4 of the farm Zandberg Fontein No 97 in March 2018. The proposed extension area is currently zoned for agricultural use and a rezoning application will be prepared and submitted by a Town and Regional Planner.
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 – *Air and Noise Quality*.	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.	LLM approved a rezoning application for the current mining footprint on a portion of Remainder of Portion 4 of the farm Zandberg Fontein No 97 in March 2018. The proposed project requires a land development application to Provincial Government (DEA&DP). A town and regional planner was appointed to handle this application.
Western Cape Nature Conservation Ordinance, 1974 (No 19 of 1974), read with the Western Cape Natural Conservation Laws Amendment Act, 2000 (No 3 of 2000)	Part A1(g)(iv)(1)(a) Type of environment affected by the proposed activity - *Biological Environment* Part A(1)(g)(viii) The possible mitigation measures that could be	The mitigation measures proposed for the site considers the WCNCO 1974.

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
	applied on the level of risk – *Mining, Biodiversity Conservation Area, and Vegetation*.	
Western Cape Provincial Guidelines, 2015	Part A(1)(d)(ii) Description of the activities to be undertaken. Part A(1)(j) Summary of specialist reports.	The guidelines were used in the compilation of the Biodiversity Offset Report.

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).

Zandberg Sand Mine

Sand mining commenced in the 1980's on Portion 4 of the farm Zandberg Fontein No 97, Robertson. The sand of the Zandberg Sand Mine is of excellent quality and is sold to the building-, civil-, and construction industries within the Western Cape Province. The Zandberg sand is free of organic matter such as Port Jackson (*Acacia saligna*) and Redeye Wattle/Rooikrans (*Acacia cyclops*) seeds. In the building industry this is important as "contaminated" sand causes popping of plaster when the contaminants (seeds) react with the moisture in the mixture, expand, and cause cavities in the plaster.

The mine employs one operator (excluding management) that is from the local community. In addition, thereto the implementation of the Social and Labour Plan (which is obligatory for a mining right holder) contributes positively to the socio-economic environment of the local community.

This document, the 2022 final EIAR and EMPR, entails the second revision of the Zandberg Sand Mine's approved EMPR, with the purpose of aligning the mining documentation with this Section 102 amendment application to add 4 ha to the current ±18 ha mining footprint.

Section 102 Amendment Application:

The MR holder identified the need to expand the current mining area so as to ascertain and prolong the lifespan of the sand mine.

Clientele and Sand Market:

The sand of Zandberg Sand Mine (hereafter referred to as Zandberg) is sold to clients in Robertson, Bonnievale, Montagu, McGregor, Ashton, Stilbaai, Ladysmith, Riviersonderend, Swellendam, Heidelberg and Riversdale. Apart from Zandberg, the only other legally operational sand mine, is located near Worcester. However, the product of this mine is of lesser quality than the Zandberg sand, and the Worcester mine does not have the capacity to fulfill the high demands of the construction industry in the area.

Refer to Appendix H for testimonial letters that attest to the high quality rendered by Zandberg to its customers. CP Concrete (Pty) Ltd is a ready-mix company who buys ±1 000 ton sand/month from Zandberg for ready-mix concrete that is supplied to clients in Montagu, Bonnievale, Ashton, Stilbaai, Ladysmith etc. CP Concrete (Pty) Ltd is ±20 km from Zandberg, and of the opinion that the sand, bought from the mine, provides them with an edge in the market due to the high quality and the affordable cost at which this base product (for them) is obtained. This allows them to supply their customers with a high quality concrete at the most cost effective price.

High Rock Trading 88 CC (hereafter referred to as High Rock) is a transport company that delivers material to the construction industry. High Rock has been a Zandberg customer for ±10 years, and employs ten drivers that is dependent on the continued operation of the company. The company operates from Montagu and supplies building sand (bought from Zandberg) to clients in Robertson, McGregor, Ashton, Montagu, Bonnievale, Swellendam. The company also has a road maintenance contract with the Langeberg Municipality, for which the sand bought from Zandberg is used. High Rock is ±30 km from the Zandberg Sand Mine.

Eram Boublok & Vervoer (hereafter referred to as Eram) manufactures bricks and also supplies sand (from Zandberg) to clients in Barrydale, Swellendam, Montagu, Ashton, Robertson and McGregor. Eram is situated in Bonnievale, and therefore the acquisition of sand from Roberson is of fundamental importance to the

company as the cost of sand has a direct impact on the selling price of their products. Should the company buy sand from Worcester (only other legal sand mine in the vicinity), Eram will no longer be able to compete in the building industry as the additional transport cost will render their products too expensive for the target market. The company employs 20 Bonnievale residents that is dependent on the continued operation of the company. Further to this, the majority of the company's clients buy bricks for improvements/extensions to their RDP houses, and an increase in brick prices will have a direct impact on these and other clients. In their testimonial letter, Eram praises the high quality of the Zandberg sand that is crucial in the manufacturing of their products. Eram is ±36 km from the Zandberg Sand Mine, while the second nearest sand supplier (Worcester) is ±80 km from the company. In addition to the added travelling cost, the additional turnaround time associated with transporting sand from Worcester will have serious cost and efficiency implications to the company.

Impact on clients and the current developments within the direct vicinity of the Zandberg Sand Mine should the mine run out of sand:

As mentioned earlier, the only other legal sand mine is in Worcester, that will substantially increase the travel cost, -time, and effort that companies in the Robertson and greater area has to exert to obtain sand.

Zandberg has been a trusted supplier of high quality clean sand to their clients since the 1980's. Should the mine run out of sand/mining space, it will have a direct impact the product quality of their clients of which CP Concrete, High Rock and Eram are but a small example.

Zandberg Sand Mine was closed between 2016 and 2019 while sorting out legal matters regarding their mining right. During this time the buyers had to obtain sand from either Worcester or Malmesbury (>200 km). In 2017, a RDP development was planned in McGregor that needed sand for the building of houses. Although the contractor delayed parts of their project for a year, in the hope that the Zandberg Sand Mine will reopen, they eventually had to make use of fill sand from another source, that had to be brought in at a much higher cost, to at least be able to start with drainage pipes and pipeline. With the development of the Silwerstrand Golf Estate (2017/2018) the contractors had to make use of alternative sand suppliers as the Zandberg Sand Mine was still closed. Three years later (2021),

the result of sub-standard sand used in the plaster is evident in the constant popping and cracking that requires endless maintenance.

In light of the above, should the Zandberg Sand Mine run out of sand/mining space, and therefore cease to operate it will have far-reaching effects on a lot of businesses within the direct vicinity of Langeberg Local Municipality area, which in turn will have a negative effect on the economic development and job creation/job security within the area. The impact of potential closure will be of such a nature that it will force its clients' businesses to a standstill. This will have a major impact on not only contract prices, but also contract periods, which in turn will result in penalties payable.

Currently, there are many developments in the Langeberg Local Municipality area which include new estate developments, living complexes and the renovation of petrol stations.

Another impact that may arise from a premature closure of Zandberg, is the illegal sand mining from the banks of the Breede River. In such circumstance, the sand will be mined without any statutory requirements or compliance that will have far reaching detrimental effects to the receiving environment. All along the Breede River in this area, are heavy infestations of Port Jackson-, as well as Bluegum trees. Illegal mining of sand contaminated with the seeds of invader plant species (such as Port Jackson and Bluegum) will also have a devastating effect on the construction industry. Apart from the danger such contaminated sand poses to developments, it will also accelerate the distribution and proliferation of invader plant species throughout the province.

Socio-economic impacts on employees and the community

Zandberg Sand Mine currently has three full time employees (including management), which employees reside within the local community. There is also one board member, who does not form part of the full time employees.

In accordance with the Social and Labour requirements of the mine, the total amount to be spent on Human Resource Development within the first ten years should the Section 102 amendment application in terms of the Mining and Petroleum Resources Development Act, 2002 be successful will be in the region of R 538 000 which will be used to uplift the local community and increase the local economic development.

The premature closure of Zandberg will have far-reaching effects on a lot of business within the direct vicinity of mine as well as the greater Langeberg area, which in turn will have a negative effect on the economic development and job creation/job security within the area.

Biodiversity benefits attained from the S102 amendment application:

- Rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC.
- The biodiversity offset area will conserve at least 148 ha of pristine Breede Sand Fynbos.
- The overall Red List status of *C. rileyi* will improve if the Zandberg populations can be protected. It will also protect the population of the other potential SCC found on the property (*C. pyroeis*).

The need and desirability of the proposed extension operation was assessed in terms of the National Department of Environmental Affairs' Guideline on Need and Desirability (first version published in terms of section 24J of the NEMA in 2014, and second version in 2017)). The following table shows the questions that were considered in this regard.

Table 6: Need and desirability determination.

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
How were ecological integrity considerations taken into account? How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity?	As discussed under *Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity*, the Mining and Biodiversity Map shows that the proposed area extends over an area of highest biodiversity importance with a corresponding rating of highest risk for mining. According to the 2017 WCBSP, the Langeberg CBA 1 extends across the earmarked area. The vegetation type of the application area is known as Breede Sand Fynbos that is classified as Vulnerable. Nkurenkuru Ecology and Biodiversity was appointed to report on the botanical status of the earmarked area (Appendix I2). Cossypha Ecological was appointed for a preliminary faunal assessment (Appendix J1), and Dave Edge & Associates reported on the butterfly SCC that occur on the property (Appendix J2). Afzelia Environmental Consultants was appointed for a watercourse delineation and habitat assessment (Appendix G3) and also reported on the floodline determination (Appendix G4). Eco-Pulse Environmental Consulting Services subsequently compiled a Biodiversity Offset Report for the proposed project (Appendix K). The findings of all the specialists were used to refine the project proposal and application footprint, and subsequently S3 was identified as the preferred alternative that will have the least impact on the biological diversity of the study area. Further to this, the LLM noted that the current project proposal will assist in aligning the proposal more closely with the Langeberg SDF, 2015 and the WC Rural Development Guidelines, 2019 which aim to minimise loss of habitat and ecosystem functionality in Core 1 SPCs. Refer to: ⋉ Part A(1)(g)(i) Details of the development footprint alternatives considered; ⋉ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site; ⋉ Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk.	If S3 is approved the project proposal is highly desirable.
How will this development pollute and/or degrade the biophysical environment?	Due to the small scale and nature of the sand mining activity (excavation of sand with an excavator and FEL) the pollution potential is of low significance. Should S3 be implemented, the loss of biodiversity was deemed acceptable by the specialists as the 4 ha loss can be offset by the proposed ±169 ha biodiversity offset site.	

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
What waste will be generated by this development?	The general waste generated at the mine mainly consist of items such as food wrappers and water bottles of the FEL operator. This is kept within the site vehicles and daily removed to the off-site workshop. As mentioned earlier, hazardous waste may result from accidental spillages/breakdowns. Such contaminated areas will immediately (within first hour of the occurrence) be cleaned and the contaminated soil will be contained in a designated hazardous waste container that will immediately be removed to the off-site workshop, from where it will be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste contractor. The chemical toilet will be serviced by an accredited contractor. No waste is/will be disposed of, buried, burned or treated on the farm.	Highly Desirable
How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?	The MR Holder has been mining sand from the property for the past 26 years. Sand mining, on this property, however commenced in the 1980's with the surrounding areas occasionally used for grazing by the landowner. In light of this, sand mining has become a known activity of the Zandberg Fontein property. However, when the footprint of the proposed extension area is placed on the PSM, it extends over areas of high concern. ACO Associates CC was appointed to conduct a Heritage Impact Assessment (see Appendix L) to determine the sensitivity of the area. The assessment found that: "*the area identified for expansion of the ZandbergFontein sand mine is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. It is our considered opinion that provided the mitigation measures set out above are implemented, the overall impact of the proposed expansion of the ZandbergFontein sand mine will be of low heritage significance and the proposed activity is acceptable*."	Highly Desirable
How will this development use and/or impact on non-renewable natural resources?	The Zandberg Sand Mine sells the sand mined from the approved portion of Portion 4 of the farm Zandberg Fontein No 97. The total inferred resources for S1 showed a resource volume of ±450 000 m³, while S2 was estimated to be ±890 000 m³, S3 has a mineable sand volume of ±685 000 m³ (MLB, 2021/22). Based on the current production rate, the sand resource shows a potential life of mine of between 29 - 15 years (depending on which site alternative is approved). In light of this, it is believed that the MR holder responsibly consumes the sand resource on the property.	Highly Desirable
How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part?	The sand mine does not make use of electricity and very little (if any) water is needed to allow the operation of the activity.	Highly Desirable

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
How were a risk-averse and cautious approach applied in terms of ecological impacts?	Best-practice dictates that the offset investigation include a "Mitigation Hierarchy Assessment" to determine what additional steps can be put in place before resorting biodiversity offsets. An overview of the mitigation hierarchy is outlined in the Biodiversity Offset Report (Appendix K). Also refer to: ᛝ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Mining and Biodiversity Conservation Areas;	Highly Desirable
How will the ecological impacts resulting from this development impact on people's environmental right?	The mine is managed in accordance with the agricultural practices of the farm, and should the application be approved the potential visual-, dust-, and noise impacts associated with the proposed activity will be of very low significance. If the proposed mitigation measures and monitoring programs, as proposed in this document, is implemented, it is believed that no environmental rights of the surrounding residents/public will be affected by the ecological impacts associated with the proposed activity.	Highly Desirable
Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts.	Sand mining commenced in the 1980's on the farm Zandberg Fontein, and the revenue generated by the mine has since then contributed as an additional source of income (compensation) to the landowner. The Zandberg Sand Mine is well known in the surrounding community and to date no serious environmental or socio-economic impacts were identified to indicate/motivate the closure of the operation. The mine employs one local resident (excluding management) and contributes to the community as part of its SLP obligations. The proposed extension (if approved) will contribute to the continued existence of the mine as an important sand supplier in the Robertson and greater Langeberg area.	Highly Desirable
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	The mining of S3 will entail expanding the current mine with 4 ha to the west. The specialists are in agreement that the impacts associated with the development of S3 is acceptable and can be compensated for through the establishment of the 169 ha biodiversity offset site on the property. Refer to: ᛝ Part A(1)(g)(i) Details of the development footprint alternatives considered; ᛝ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site;	Desirable
Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified, resulted		

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
in the selection of the "best practicable environmental option" in terms of ecological considerations	⋉ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
What is the socio-economic context of the area?	Please refer to Heading 2(h)(iv)(1)(a) Socio-economic Environment.	Highly Desirable
Considering the socio-economic context, what will the socio-economic impacts be of the development, and specifically also on the socio-economic objectives of the area?	As mentioned earlier, the Zandberg Sand Mine has been operational for the past 26 years. The mine is a known supplier of sand in the Robertson community and contributes directly to society through the employment of a local resident as well as the Local Economic Development (LED) commitments of the mine (stipulated in the SLP). Indirectly, the mine contributes to infrastructure development in the surrounding area (sand supplier) and the spending of wages in the Robertson area.	
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	The mine supplies sand to the building industry in the Robertson and greater Langeberg area. In addition, the mine has to meet the commitments of the SLP regarding Human Resources Development, Local Economic Development, and the process pertaining to management of downscaling and retrenchment. Through the past 26 years, the mine did not affect the physical, psychological, cultural or social needs of the community in a negative manner. Nor will the proposed extension of the mining footprint impact negatively on the socio-economic status of the area.	Highly Desirable
Will the development result in equitable impact distribution, in the short- and long-term?	The Zandberg Sand Mine has been operating in a socially and economically sustainable manner during both the short- and long term.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
In terms of location, describe how the placement of the proposed development will contribute to the area.	The sand resource on the property has been mined since the 1980's, and as mentioned earlier, is a well-known sand supplier in the area. Expanding the sand mine will increase the lifespan of the mine, but also necessitate the establishment of a biodiversity offset area that will be a formally Protected Area. The project could contribute to the area in the following manner: - Rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC; - The biodiversity offset area will conserve at least 148 ha of pristine Breede Sand Fynbos; - The overall Red List status of *C. rileyi* will improve if the Zandberg populations can be protected. It will also protect the population of the other potential SCC found on the property (*C. pyroeis*).	Highly Desirable
How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	No negative socio-economic impacts could, at this stage, be identified that cannot be managed through the implementation of mitigation measures.	Highly Desirable
How will the socio-economic impacts resulting from this development impact on people's environmental right?	As mentioned in Heading *3(j)(1) Impact on the socio-economic condition of any directly affected person*, the activity may have an impact on the visual characteristics of the surrounding environment, and may potentially affect air quality and possibly the noise ambiance of the study area. However, the mine is managed in accordance with the practices of the farm, and should the application be approved the potential visual-, dust-, and noise impacts associated with the proposed activity will be of very low significance. If the proposed mitigation measures and monitoring programs, as proposed in this document, is implemented, it is believed that no environmental rights of the surrounding residents/public will be affected by the socio-economic impacts associated with the proposed activity.	Highly Desirable
Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts?	Sand mining commenced in the 1980's on the farm Zandberg Fontein, and the revenue generated by the mine has since then contributed as an additional source of income (compensation) to the landowner. The Zandberg Sand Mine is well known in the surrounding community and to date no serious environmental or socio-economic impacts were identified to indicate/motivate the closure of the operation. The mine employs one local resident (excluding management) and contributes to the community as part of its SLP obligations. The proposed extension (if approved) will contribute to the continued existence of the mine as an important sand supplier in the Robertson and greater Langeberg area.	Highly Desirable
What measures were taken to pursue the selection of the "best practicable environmental	Best-practice dictates that the offset investigation include a "Mitigation Hierarchy Assessment" to determine what additional steps can be put in place before resorting biodiversity offsets. An overview of the mitigation hierarchy is outlined in the	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
option" in terms of socio-economic considerations? What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons?	Biodiversity Offset Report (Appendix K). Should the S102 application be approved, the extension of the mining area will prolong the lifespan of the Zandberg Sand Mine that will directly contribute to the socio-economic status of the receiving environment through the employment of a local resident, support of the local economy, and the implementation of the SLP commitments. Also refer to: ⁎ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	
What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination? What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	The mine operates in accordance with, amongst others, the following: ⁎ CARA, 1983 – to ensure agriculture related compliance; ⁎ Financial Provision Regulations, 2015 – to ensure compliance in terms of rehabilitation; ⁎ Mine Health and Safety Act, 1996 (as amended) – to ensure employee safety; ⁎ MPRDA, 2002 (as amended) – to ensure mining related compliance; ⁎ NEM:AQA, 2004 – to ensure air quality related compliance; ⁎ NEM:BA, 2004 – to ensure biodiversity related compliance; ⁎ NEM:WA, 2008 – to ensure waste related compliance; ⁎ NEMA, 1998 (as amended) – to ensure environmental related compliance; ⁎ The land use zoning of the current mining footprint is also in line with the Land Use Planning Acts and Bylaws. Should the S102 amendment application be approved the extension area will also be subject to compliance with the above listed with the addition of the NEM:PAA, 2003 to ensure offset related compliance.	Highly Desirable
Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community that is consistent with the priority needs of the local area.	The mine supplies sand to the building industry in the Robertson and greater Langeberg area. In addition, the mine has to meet the commitments of the SLP regarding Human Resources Development, Local Economic Development, and the process pertaining to management of downscaling and retrenchment. Should the S102 application be approved, CapeNature will continuously be involved in the implementation and management of the biodiversity offset site.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected.	The mine operates in accordance with the specifications of the Mine Health and Safety Act, 1996. Site management holds daily discussions with the FEL operator regarding the work to be performed and the environment in which the work will take place. Grievances/concerns can be lodged during the daily site meetings.	Highly Desirable
Describe how the development will impact on job creation in terms of, amongst other aspects?	This application is for the extension of the existing mining area and no new job opportunities will be created. However, should the application be successful the job security of the current employee will be extended in accordance with the increased lifespan of the mine.	Highly Desirable
What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage.	The Zandberg Sand Mine operates under a valid mining right issued by the DMRE. Compliance of the mine with the approval conditions is reported on as per the departmental specifications. Should the S102 amendment application be approved the extension area will also be managed in accordance with all the mining and environmental related legislations.	Highly Desirable
Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left.	It is believed that the mitigation measures proposed in this document is realistic and can be implemented (when needed) by the mine to minimise the potential impacts.	Highly Desirable
What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution environmental	In terms of Section 41 of the MPRDA, 2002 a mining right holder must submit a financial provision to the DMRE that is sufficient to rehabilitate or manage the negative environmental impacts related to the mining activity. The Zandberg Sand Mine has a bank guarantee lodged with the DMRE that is deemed sufficient to cover the financial provision amount needed to rehabilitate the mining footprint. Should the S102 amendment application be approved and the DMRE require a change to the current bank guarantee the document will be amended accordingly.	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
damage or adverse health effects will be paid for by those responsible for harming the environment.		
Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified, resulted in the selection of the best practicable environmental option in terms of socio-economic considerations	Refer to: ⋉ Part A(1)(g) Motivation for the preferred development footprint within the approved site; ⋉ Part A(1)(g)(i) Details of the development footprint alternatives considered; ⋉ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Socio-Economic Environment; ⋉ Part A(1)(g)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	Highly Desirable
Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.	This application is for the extension of the current mining area. As mentioned earlier, should the S102 application be approved, the extension of the footprint will not cause a cumulative socio-economic impact as mining will gradually progress into the extension area.	Highly Desirable

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.

APPROVED ZANDBERG SAND MINE

Not applicable.

SECTION 102 APPLICATION

The environmental assessment considered three site alternatives that would allow the extension of the existing Zandberg Sand Mine. The following matters contributed to the identification of the preferred development footprint (S3):

1. **Topography** – The topography of S3 gradually rises- up the dune from the lower southern part. The topography of S3 is less dramatic than that of S2, and is suitable for sand mining if the recommendations of the mine planner are followed. The layout will also simplify the configuration of the final mining area should the S102 application be approved.

2. **Visual Characteristics –** The potential visual impact of S3 is deemed to be of medium significance based on the small scale of the proposed operation, proposed progressive rehabilitation, as well as the fact that no infrastructure will be established. Should the rehabilitation measures be implemented very little (if any) residual visual impact is expected upon closure of the mine.

3. **Hydrology** – The infield- and desktop watercourse delineation confirmed the presence of two wetland habitats within the 500 m of S3. The wetlands were classified as an artificial wetland habitat (Unit AW1) and a unchannelled valley bottom wetland (UCVB1). Both AW1 and UCVB1 fall outside the proposed extension areas (S3) and will therefore not be affected by the expansion of the mining footprint. A buffer area of 15 m must be maintained around the footprint of AW1. The WDHA concludes that no watercourse was identified within the footprint of S3, and therefore expanding the mine towards the west into S3 will not result in the transformation of any watercourse. As the groundwater level is ±3 m deep in the valley below the mining area, it is not expected that mining

the sand from S3 will intercept (or come within 1.5 m) the groundwater layer if the mining depth is limited to the underlying sandstone layer.

4. **Biodiversity, Conservation, and Groundcover** – Approximately 148 ha of pristine Breede Sand Fynbos exists on site and the study area is also within a CBA1. About 2.7% of this will thus be transformed by the proposed mining extension. This will not prevent national conservation targets from being achieved. Due to the nature of the sand deposit that is of interest to the applicant, complete avoidance of the Breede Sand Fynbos vegetation is not possible. The fact that rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC, together with the fact that a suitable amount of Breede Sand Fynbos is available on site for biodiversity offsetting, will greatly mitigate the impacts of the proposed mining activities in the long-term. For this project, an area of 169 ha within the farm portion is proposed as the biodiversity offset area that complies with the 30:1 offet ratio. The BSA notes that S3 can be considered as intermediate in mining preference between S1 and S2. One advantage of S3 is that it minimizes edge effects as the perimeter of S3 is the smallest of all three alternative sites. The LLM noted that the current project proposal will assist in aligning the proposal more closely with the Langeberg SDF, 2015 and the WC Rural Development Guidelines, 2019 which aim to minimise loss of habitat and ecosystem functionality in Core 1 SPCs.

5. **Fauna** - Placing the footprint at S3 will ensure connectivity is maintained on the upper regions of the slope and prevent fragmentation of the habitat. The configuration of S3 is preferred. The significance of the impacts on terrestrial animal species (excl. butterflies) can be rated as Low-Moderate, and the offset proposed for vegetation and plant species, i.e. habitat, would be sufficient to cover the terrestrial fauna (excl. butterflies) and would not trigger the need for any additional species offset requirements. No SCC butterflies were recorded within the footprint of S3, even if allowance is made for a 50 m buffer, and the specialist concluded that the mining of S3 will not have any detrimental influence on the known habitat of the SCC butterflies on the site. The overall Red List status of *C. rileyi* will improve if the Zandberg populations can be protected.

6. **Cultural and Heritage Environment** – The HIA concluded that the earmarked extension area is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. The specialists (archaeologist & palaeontologist) are of the opinion that provided the mitigation measures set out in the HIA are implemented, the overall impact of the proposed extension of the mining area will be of low heritage significance and the proposed activity is therefore acceptable.

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.

APPROVED ZANDBERG SAND MINE

Project/site alternatives does not apply to the current Zandberg Sand Mine. The mine's approved EMPR (2014) notes that no alternative has been looked at as this operation has been in existence since 1994.

S102 APPLICATION

Initially (2020), the project team identified one site alternative (±108 ha) with a possibility of two layout alternatives that were assessed during the EIA process. The findings of this assessment was collated in a draft Environmental Impact Assessment Report (DEIAR) that was distributed for public commenting between October and November 2020. Following the publication of the 2020 DEIAR, receipt of the public comments, and subsequent reassessment of the study area, the project proposal was drastically reduced from ±108 ha to 4 ha.

Subsequently the DEIAR report was revised and the following alternative options were assessed upon review of the site specific information, comments received during the public participation process, and the outcomes of the most recent specialist studies.

1. Site Alternative 1 (S1)

Site Alternative 1 entails the extension of the current mining footprint (17.6826 ha) with 4 ha towards the south-west; over Portion 4 of the farm Zandberg Fontein No 97, within the boundaries of the following GPS coordinates.

Table 7: GPS Coordinates of Site Alternative 1.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
p	33º50'47.28"	19º48'37.86"	-33.846466º	19.810516º
N	33º50'51.12"	19º48'38.18"	-33.847532º	19.810605º
q	33º50'51.72"	19º48'42.26"	-33.847701º	19.811738º
r	33º50'57.41"	19º48'34.87"	-33.849280º	19.809685º
s	33º50'53.36"	19º48'30.31"	-33.848156º	19.808420º

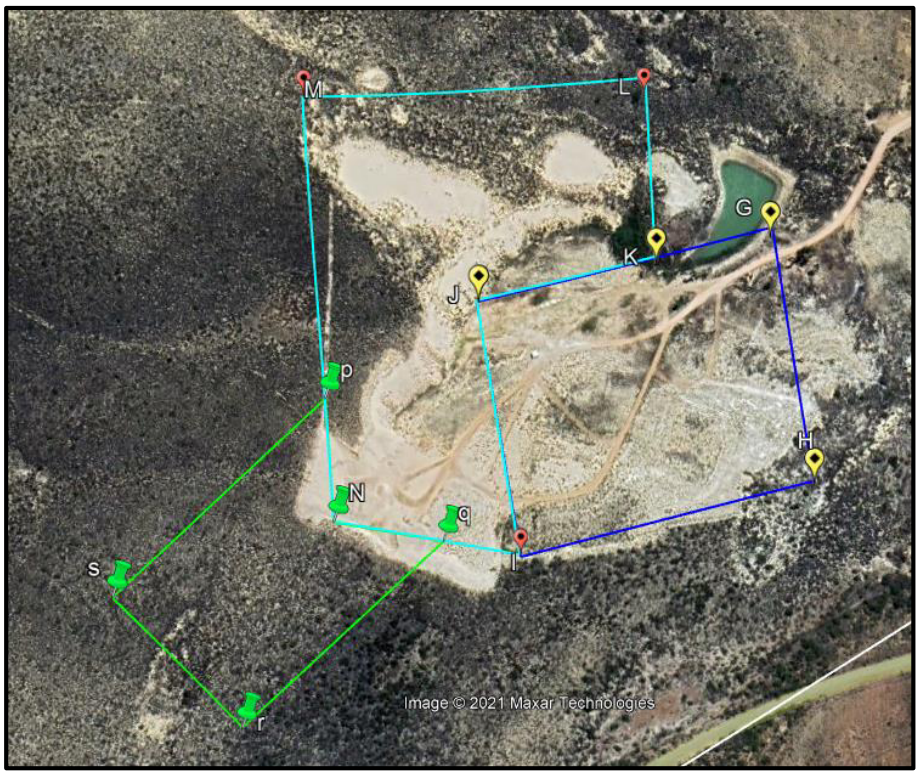


Figure 22: Satellite view showing the position of Site Alternative 1 within the surrounding landscape, where the blue polygons show the current mining footprint, the green polygon shows the proposed extension area and the white lines show the farm boundary. (Image obtained from Google Earth)

The following table lists the aspects that were considered in the assessment of Site Alternative 1:

Table 8: Aspects considered in the assessment of Site Alternative 1

SITE ALTERNATIVE 1		
POTENTIAL POSITIVE ASPECTS	**BIOLOGICAL**	⁎ The footprint of S1 is of mostly uniform vegetation and habitat, and will in contrast to S2 and S3, entail the loss of less SCC. ⁎ S1 (and S3) has a lesser potential for fragmentation of the habitat than S2. ⁎ The loss of the ±4 ha Breede Sand Fynbos in S1, as a result of the mining activity, can be offset at a ratio of 1:30 by the proposed 169 ha protected area to be established on the property. ⁎ The target offset can be fully achieved on the same property with "like-for-like" vegetation.
	MINING	⁎ The extension of the mining area will prolong the lifespan of the Zandberg Sand Mine by ±15 years at the current production rate (which is 14.6 years less than S2, and 7 years less than S3). ⁎ Should the mine plan proposed by MLB be followed, S1 can be mined accountably with regard to slope stability, -geometry, and safety factors. S1 has a gentler slope than the other alternative sites. ⁎ Access into the proposed mining area is possible from the existing sand mine that ultimately uses the farm road with a formal (existing) entrance onto the La Chasseur/Agter-Kliphoogte road.
	CUMULATIVE ASPECTS	⁎ Rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC. ⁎ The biodiversity offset area will conserve at least 148 ha of pristine Breede Sand Fynbos.
POTENTIAL NEGATIVE ASPECTS	**BIOLOGICAL**	⁎ The butterfly survey does not support the mining of S1 because of the importance of the butterfly populations found there.
	MINING	⁎ The MR Holder will be able to mine ±50% less sand per hectare from S1 than from the same size area at S2. ⁎ There is a ±5 m clay layer below the sand resource of S1 that contributes an additional limiting factor to the mining depth.

2. Site Alternative 2 (S2)

Site Alternative 2 entails the extension of the current mining footprint (17.6826 ha) with 4 ha towards the north-west; over Portion 4 of the farm Zandberg Fontein No 97, within the boundaries of the following GPS coordinates.

Table 9: GPS Coordinates of Site Alternative 2.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
P	33º50'32.58"	19º48'33.52"	-33.842384º	19.809310º
Q	33º50'37.44"	19º48'40.83"	-33.843733º	19.811342º
M	33º50'37.87"	19º48'37.00"	-33.843853º	19.810278º
R	33º50'41.46"	19º48'37.27"	-33.844849º	19.810353º
S	33º50'39.40"	19º48'28.76"	-33.844277º	19.807989º

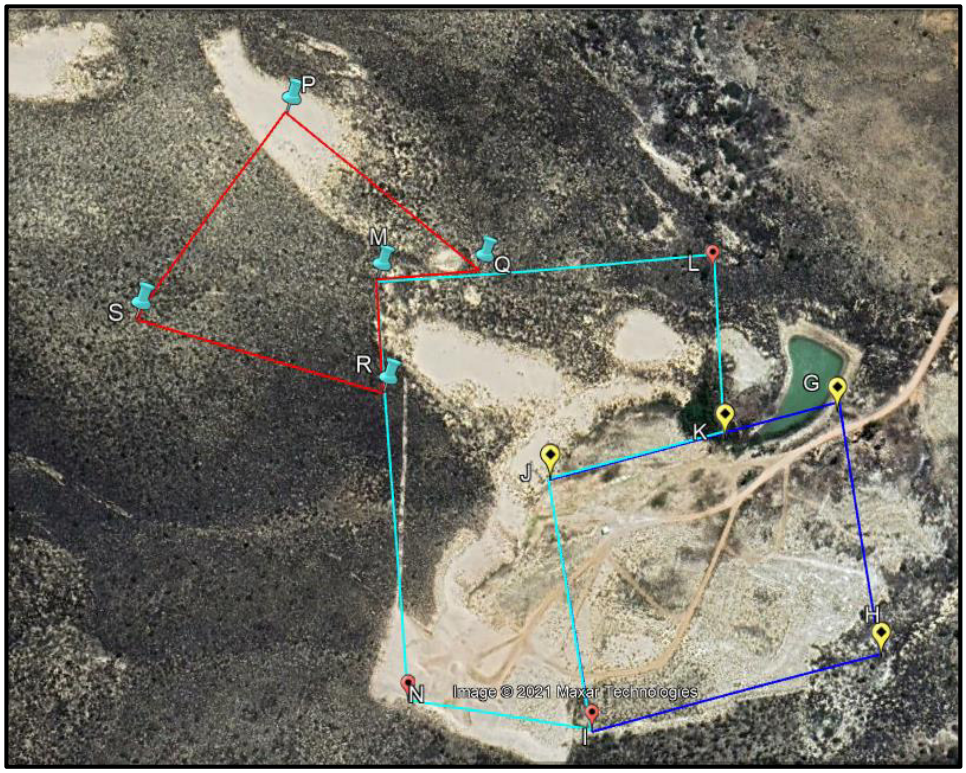


Figure 23: Satellite view showing the position of Site Alternative 2 within the surrounding landscape, where the blue polygons show the current mining footprint, the red polygon shows the proposed extension area. (Image obtained from Google Earth)

The following table lists the aspects that were considered in the assessment of Site Alternative 2:

Table 10: Aspects considered in the assessment of Site Alternative 2

SITE ALTERNATIVE 2		
POTENTIAL POSITIVE ASPECTS	BIOLOGICAL	⁜ The loss of the ±4 ha Breede Sand Fynbos in S2, as a result of the mining activity, could be offset at a ratio of 1:30 by the proposed 169 ha protected area to be established on the property. ⁜ The target offset can be fully achieved on the same property with "like-for-like" vegetation.
	MINING	⁜ MLB reported (2021) that S2 has a sand reserve of ±890 000 m³, compared to the ±450 000 m³ reserve that was determined for S1. This translates to 222 500 m³ of sand per hectare for site alternative 2, while S1 will only yield 112 500 m³/ha. The MR Holder will therefore be able to mine ±50% more sand per hectare from S2 than from the same size area at S1. ⁜ Should the mine plan proposed by MLB be followed, S2 can be mined accountably with regard to slope stability, -geometry, and safety factors. ⁜ No limiting clay layer was identified below the sand resource of S2 as with S1. ⁜ The extension of the mining area will prolong the lifespan of the Zandberg Sand Mine by ±29 years at the current production rate (which is 14 years more than S2, and 7 years more than S3). ⁜ Access into the proposed mining area is possible from the existing sand mine that ultimately uses the farm road with a formal (existing) entrance onto the La Chasseur/Agter-Kliphoogte road.
	CUMULATIVE ASPECTS	⁜ Rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC. ⁜ The biodiversity offset area will conserve at least 148 ha of pristine Breede Sand Fynbos.
POTENTIAL NEGATIVE ASPECTS	BIOLOGICAL	⁜ The BSA reports that the species diversity of S2 is higher than that of S1, and the mining of S2 would therefore entail the loss of a higher number of species of conservation concern. ⁜ The zoologist is of the opinion that S2 will potentially increase the fragmenting of the habitat, while the potential for fragmentation will be less at S1 and S3. ⁜ The butterfly survey does not support the mining of S2 because of the importance of the butterfly populations found there.

3. Site Alternative 3 (S3)

Site Alternative 3 entails the extension of the current mining footprint (17.6826 ha) with 4 ha towards the west; over Portion 4 of the farm Zandberg Fontein No 97, within the boundaries of the following GPS coordinates.

Table 11: GPS Coordinates of Site Alternative 3.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
M	33º50'37.871"	19º48'37.001"	-33.843853º	19.810278º
NN	33º50'50.446"	19º48'38.045"	-33.847346º	19.810568º
P	33º50'50.514"	19º48'33.966"	-33.847365º	19.809435º
Q	33º50'38.648"	19º48'32.933"	-33.844069º	19.809148º

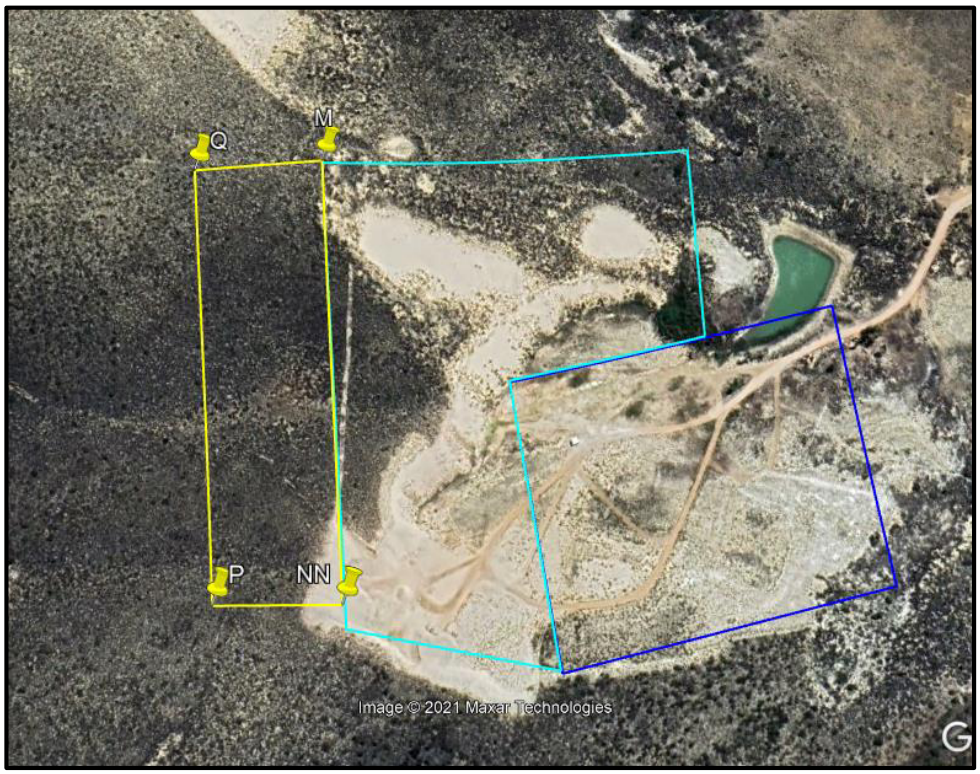


Figure 24: Satellite view showing the position of Site Alternative 3 within the surrounding landscape, where the blue polygons show the current mining footprint, and the yellow polygon shows the proposed extension area (S3). (Image obtained from Google Earth)

The following table lists the aspects that were considered in the assessment of Site Alternative 3:

Table 12: Aspects considered in the assessment of Site Alternative 3

SITE ALTERNATIVE 3 – PREFERRED ALTERNATIVE		
POTENTIAL POSITIVE ASPECTS	**BIOLOGICAL**	⁜ The BSA notes that upon implementation of the specialist mitigation measures, S3 can be considered as intermediate in mining preference between S1 and S2, and is therefore a viable option. The specialist further notes that S3 has the advantage that it has the smallest perimeter of all three the alternatives and will therefore minimise edge effects. ⁜ S3 (and S1) has a lesser potential for fragmentation of the habitat than S2. ⁜ The butterfly survey concluded that the mining of S3 is preferred over S1 and S2, as the mining of this area will not have any detrimental influence on the known habitat of the butterfly species on the property, nor were any of the protected species identified within the proposed footprint. ⁜ The hydrologist confirmed that no drainage line passes through the footprint of S3, and that the mining of this area will therefore not result in the transformation of any watercourse. ⁜ The loss of the ±4 ha Breede Sand Fynbos in S3, as a result of the mining activity, can be offset at a ratio of 1:30 by the proposed 169 ha protected area to be established on the property. ⁜ The target offset can be fully achieved on the same property with "like-for-like" vegetation.
	MINING	⁜ Should the mine plan proposed by MLB be followed, S3 can be mined accountably with regard to slope stability, -geometry, and safety factors. The design of S3 (directly adjacent to the approved mining footprint) also simplifies the ultimate configuration of the Zandberg Sand Mine (should the S102 application be approved). ⁜ The extension of the mining area will prolong the lifespan of the Zandberg Sand Mine by ±22 years at the current production rate (which is 7 years less than S2, but ±8 years more than S1). ⁜ Access into the proposed mining area is possible from the existing sand mine that ultimately uses the farm road with a formal (existing) entrance onto the La Chasseur/Agter-Kliphoogte road.
	CUMULATIVE ASPECTS	⁜ Rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC. ⁜ The biodiversity offset area will conserve at least 148 ha of pristine Breede Sand Fynbos. ⁜ The overall Red List status of *C. rileyi* will improve if the Zandberg populations can be protected. It will also protect the population of the other potential SCC found on the property (*C. pyroeis*).
POTENTIAL NEGATIVE ASPECTS	**MINING**	⁜ The MR Holder will be able to mine 23% less sand from S3 than from the same size area at S1.

4. No-go 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:

Table 13: Aspects considered in the assessment of the no-go alternative

NO-GO ALTERNATIVE		
POTENTIAL POSITIVE ASPECTS	**BIOLOGICAL**	⁜ The vegetation cover surrounding the approved mining area will not be disturbed by mining related activities and should remain intact (bar other disturbance).
POTENTIAL NEGATIVE ASPECTS	**BIOLOGICAL**	⁜ The MR Holder will not have to establish the 169 ha biodiversity offset area, and the opportunity to contribute towards the conserving priority biodiversity and the conservation estate will be lost. ⁜ The butterfly survey notes that there is 17.5 ha of land in total on the earmarked property occupied by SCC butterflies, and if this land could be included in the offset it would significantly improve the Red List status of the SCC *Chrysoritis riley*, and also protect the other potential SCC found on the property *C. pyroeis*. If however, the no-go option is implemented the offset area will not be established and the formal protection of the SCC butterfly habitat will not have to be implemented by the MR Holder.
	MINING	⁜ The MR Holder would not be able to exploit the sand resource on the property, resulting in a loss of potential income. The life of mine of Zandberg Sandput (Pty) Ltd will depend on the availability of sand in the approved mining area. ⁜ The landowner will not receive compensation for the use of the earmarked footprint on the property.
	CUMULATIVE ASPECTS	⁜ Rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC. However, this potential will be greatly reduced should the no-go option be implemented.

5. Summary

The following table provides a summary of the different specialist preferences towards the three proposed site alternatives.

SUMMARY OF SPECIALIST OPINIONS REGARDING THE PROPOSED SITE ALTERNATIVES			
SPECIALIST STUDY	**SITE ALTERNATIVE 1 (S1)**	**SITE ALTERNATIVE 2 (S2)**	**SITE ALTERNATIVE 3 (S3)**
Botanical Study and Assessment	Preferred	Not Preferred	Intermediate - Viable Option
Terrestrial Fauna (excl. Lepidoptera) Assessment	Preferred	Not Preferred	Preferred
Butterfly Survey	Not Preferred	Not Preferred	Preferred
Geology, Geotechnical, and Mining Assessment	Not Preferred	Preferred	Intermediate - Viable Option
Biodiversity Offset Report	Preferred	Not Preferred	Preferred
Watercourse Delineation and Habitat Assessment	All impacts can be reduced to either a negligible or low impact significance, and therefore all three alternatives can meet the environmental requirements as far as watercourses are concerned and could therefore all be considered.		
Floodline Determination Report	All site alternatives under consideration are outside the inundation area, and as such can all remain under consideration provided they are in compliance with findings of other specialist studies.		
Heritage Impact Assessment	No sensitive heritage related environs were identified on the property and therefore all three site alternatives are deemed viable options.		

Key considerations for the preferred alternative from a biodiversity perspective included the following (Eco-Pulse, 2022):

- Limiting disruption to landscape connectivity;
- Avoiding areas with higher plant diversity, and high occurrence of abundance of plant SCC;
- Avoiding areas where populations of butterfly species are confirmed to occur;
- Avoiding any sensitive watercourses;
- Limiting edge effects by expansion of the existing mining areas and considering the configuration of the new mining areas in relation to the mined areas; and
- Limiting edge effects by avoiding areas high up the slope where access would be more difficult.

Taking the above into consideration, operational requirements that were key for the feasibility of the project were as follows (Eco-Pulse, 2022):

- Depth of the deposit;
- Accessibility of the new mining area; and
- Operational aspects such as height of the work face.

From the above, it is deduced that **Site Alternative 3** is the **preferred site alternative** into which the existing mining area should be expanded (if the S102 is approved), as it will best address the potential impacts identified during the EIA.

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).

S102 APPLICATION

During the initial public participation process the stakeholders and I&AP's were informed of the project by means of background information documents that were sent directly to the contact persons. A 30 days commenting period was allowed that expired 02 March 2020. The following table provides a list of the I&AP's and stakeholders that were informed of the project:

Table 14: List of the landowners, I&AP's and stakeholders that were supplied with a copy of the background information document.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: - ZandbergFontein Trust Portion 4 of Zandberg Fontein 97 **Surrounding Landowners and I&AP's:** - Lamaison Goree Trust Portion 0 of Zand Berg 101 - P du Toit Portion 0 of Zandbult 98 - Deorista 113 (Pty) Ltd Portion 0 of Die Gwarries 93 & RE of Laughing Waters 96 - Shalk Colyn Trust Portion 2 (RE) of Klip Berg 136 - Mazi (Pty) Ltd	- Breede-Gouritz Catchment Management Agency; - Cape Winelands District Municipality; - CapeNature; - 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 – Western Cape District Offices; - Department of Social Development; - Department of Transport and Public Works; - Department of Water and Sanitation; - Eskom; - Heritage Western Cape;

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
RE of Farm 194 ᛝ AN Viljoen Portion 2 (RE) of Appels Drift 107 & Portion 0 of Farm 109 ᛝ Deo Volente Sand-mine (I&AP)	ᛝ Langeberg LM: Ward 5 Councillor; ᛝ Langeberg Local Municipality; ᛝ South African Heritage Resources Agency.
I&AP'S AND STAKEHOLDERS THAT REGISTERED / COMMENTED DURING THE INITIAL NOTIFICATION PERIOD	
ᛝ Breede-Gouritz Catchment Management Agency; ᛝ CapeNature; ᛝ Department of Environmental Affairs and Development Planning (DEA&DP); ᛝ Department of Transport and Public Works (DTPW); ᛝ Heritage Western Cape (HWC); ᛝ Langeberg Local Municipality (LLM); ᛝ D Satchel (Deo Volente Sand-mine).	

An advertisement was placed in the Breederivier Gazette on 28 January 2020 and on-site notices were placed on 25 January 2020 at the entrance to the farm and the Agri Express Mark in Robertson. The advertisement, background information document (BID) and on-site notices invited the recipients to register/comment on the project on/before 02 March 2020.

In accordance with the timeframes stipulated in the EIA Regulations, 2014 (as amended by GNR 326 effective 7 April 2017) the Draft Scoping Report (DSR) was compiled to allow perusal of the report by the I&AP's and stakeholders listed above. A 30-day commenting period, ending 17 July 2020, was allowed for perusal of the documentation and submission of comments. The following table provides a list of the I&AP's and stakeholders that were informed of the availability of the DSR:

Table 15: List of the landowners, I&AP's and stakeholders that were invited to comment on the DSR.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: ᛝ ZandbergFontein Trust Portion 4 of Zandberg Fontein 97 **Surrounding Landowners and I&AP's:** ᛝ Lamaison Goree Trust Portion 0 of Zand Berg 101 ᛝ P du Toit Portion 0 of Zandbult 98 ᛝ Deorista 113 (Pty) Ltd Portion 0 of Die Gwarries 93 & RE of Laughing Waters 96	ᛝ Breede-Gouritz Catchment Management Agency; ᛝ Cape Winelands District Municipality; ᛝ CapeNature; ᛝ Department of Agriculture, Forestry and Fisheries; ᛝ Department of Economic Development and Tourism; ᛝ Department of Environmental Affairs and Development Planning; ᛝ Department of Labour; ᛝ Department of Rural Development and Land Reform – Western Cape District Offices; ᛝ Department of Social Development; ᛝ Department of Transport and Public Works;

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
⁎ Shalk Colyn Trust Portion 2 (RE) of Klip Berg 136 ⁎ Mazi (Pty) Ltd RE of Farm 194 ⁎ AN Viljoen Portion 2 (RE) of Appels Drift 107 & Portion 0 of Farm 109 ⁎ Deo Volente Sand-mine (I&AP)	⁎ Eskom; ⁎ Heritage Western Cape; ⁎ Langeberg LM: Ward 5 Councillor; ⁎ Langeberg Local Municipality; ⁎ South African Heritage Resources Agency.
I&AP'S AND STAKEHOLDERS THAT COMMENTED ON THE DSR	
⁎ Department of Environmental Affairs and Development Planning (DEA&DP); ⁎ Department of Transport and Public Works (DTPW); and ⁎ Langeberg Local Municipality (LLM).	

The comments and responses received on the DSR were incorporated into the Final Scoping Report that was submitted to DMRE on 29 July 2020 for decision making. DMRE accepted the FSR on 02 October 2020.

Upon approval of the Final Scoping Report, a Draft Environmental Impact Assessment Report (hereafter referred to as the 2020 DEIAR & EMPR) was compiled that was circulated for public comment for a 30-day commenting period ending on 30 November 2020.

Table 16: List of the landowners, I&AP's and stakeholders that were invited to comment on the 2020 DEIAR.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: ⁎ ZandbergFontein Trust Portion 4 of Zandberg Fontein 97 **Surrounding Landowners and I&AP's:** ⁎ Lamaison Goree Trust Portion 0 of Zand Berg 101 ⁎ P du Toit Portion 0 of Zandbult 98 ⁎ Deorista 113 (Pty) Ltd Portion 0 of Die Gwarries 93 & RE of Laughing Waters 96 ⁎ Shalk Colyn Trust Portion 2 (RE) of Klip Berg 136 ⁎ Mazi (Pty) Ltd RE of Farm 194 ⁎ AN Viljoen Portion 2 (RE) of Appels Drift 107 & Portion 0 of Farm 109 ⁎ Deo Volente Sand-mine (I&AP)	⁎ Breede-Gouritz Catchment Management Agency; ⁎ Cape Winelands District Municipality; ⁎ CapeNature; ⁎ 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 – Western Cape District Offices; ⁎ Department of Social Development; ⁎ Department of Transport and Public Works; ⁎ Eskom; ⁎ Heritage Western Cape; ⁎ Langeberg LM: Ward 5 Councillor; ⁎ Langeberg Local Municipality; ⁎ South African Heritage Resources Agency.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
I&AP'S AND STAKEHOLDERS THAT COMMENTED ON THE 2020 DEIAR & EMPR	
⁎ CapeNature; ⁎ Department of Environmental Affairs and Development Planning (DEA&DP); and ⁎ Department of Transport and Public Works (DTPW).	

The comments received on the draft EIA & EMPR lead to the reduction of the proposed extension area, and subsequent revision of the DEIAR & EMPR. The revised DEIAR & EMPR (2022), was also circulated for public commenting over a 30-day commenting period that ended on 17 February 2022, and the comments received on the 2022 DEIAR & EMPR were incorporated into this report, the final EIA & EMPR, to be submitted for decision making to DMRE.

Table 17: List of the landowners, I&AP's and stakeholders that were invited to comment on the 2022 DEIAR.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: ⁎ ZandbergFontein Trust Portion 4 of Zandberg Fontein 97 **Surrounding Landowners and I&AP's:** ⁎ Lamaison Goree Trust Portion 0 of Zand Berg 101 ⁎ P du Toit Portion 0 of Zandbult 98 ⁎ Deorista 113 (Pty) Ltd Portion 0 of Die Gwarries 93 & RE of Laughing Waters 96 ⁎ Shalk Colyn Trust Portion 2 (RE) of Klip Berg 136 ⁎ Mazi (Pty) Ltd RE of Farm 194 ⁎ AN Viljoen Portion 2 (RE) of Appels Drift 107 & Portion 0 of Farm 109 ⁎ Deo Volente Sand-mine (I&AP)	⁎ Breede-Gouritz Catchment Management Agency; ⁎ Cape Winelands District Municipality; ⁎ CapeNature; ⁎ 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 – Western Cape District Offices; ⁎ Department of Social Development; ⁎ Department of Transport and Public Works; ⁎ Eskom; ⁎ Heritage Western Cape; ⁎ Langeberg LM: Ward 5 Councillor; ⁎ Langeberg Local Municipality; ⁎ South African Heritage Resources Agency.
I&AP'S AND STAKEHOLDERS THAT COMMENTED ON THE 2022 DEIAR & EMPR	
⁎ Breede-Gouritz Catchment Management Agency (BGCMA); ⁎ CapeNature; ⁎ Department of Environmental Affairs and Development Planning (DEA&DP); ⁎ Department of Transport and Public Works (DTPW); ⁎ Eskom; and ⁎ Langeberg Local Municipality (LLM);	

See attached as Appendix H proof that the I&AP's and stakeholders were contacted.

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

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

Table 18: 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**
AFFECTED PARTIES					
Landowner/s					
Portion 4 of Zandberg Fontein 97 ⁒ ZandbergFontein Trust	**X**	-	The landowner is aware of, and supports, the application – refer to Appendix F3 – F5.		
Lawful occupiers/s of the land	No lawful occupiers, other than the landowner, has access to the property.				
N/A	-	-	-	-	-
Landowners or lawful occupiers on adjacent properties	**X**	-	-	-	-
Lamaison Goree Trust ⁒ Portion 0 of Zand Berg 101	**X**	-	No comments were received from the surrounding landowner (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.		
Mr P du Toit (trustee of Lamaison Goree Trust) ⁒ Portion 0 of Zandbult 98	**X**	-	No comments were received from the surrounding landowner (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.		

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
Deorista 113 (Pty) Ltd (Mr J Rabie) ⁎ Remaining Extent of Laughing Waters 96 ⁎ Portion 0 of Die Gwarries 93	**X**	-	No comments were received from the surrounding landowner (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.		
Shalk Colyn Trust (Mr S Colyn) ⁎ Portion 2 (Remaining Extent) of Klip Berg 136	**X**	-	No comments were received from the surrounding landowner (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.		
Mazi (Pty) Ltd (Me A Lambrecht) ⁎ Remaining Extent of Farm 194	**X**	-	No comments were received from the surrounding landowner (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.		
Mr AN Viljoen (trustee of Lamaison Goree Trust) ⁎ Portion 2 (Remaining Extent) of Appels Drift 107 ⁎ Portion 0 of Farm 109	**X**	-	No comments were received from the surrounding landowner (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.		
Municipal councillor Ward 5	**X**	-	No comments were received from the municipal councillor (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.		
Municipality Langeberg Local Municipality (LLM)	**X**	28 January 2020	Me T Brunings commented on behalf of the LLM as follows.	Greenmined responded as listed below on 30 January 2020.	See list below.

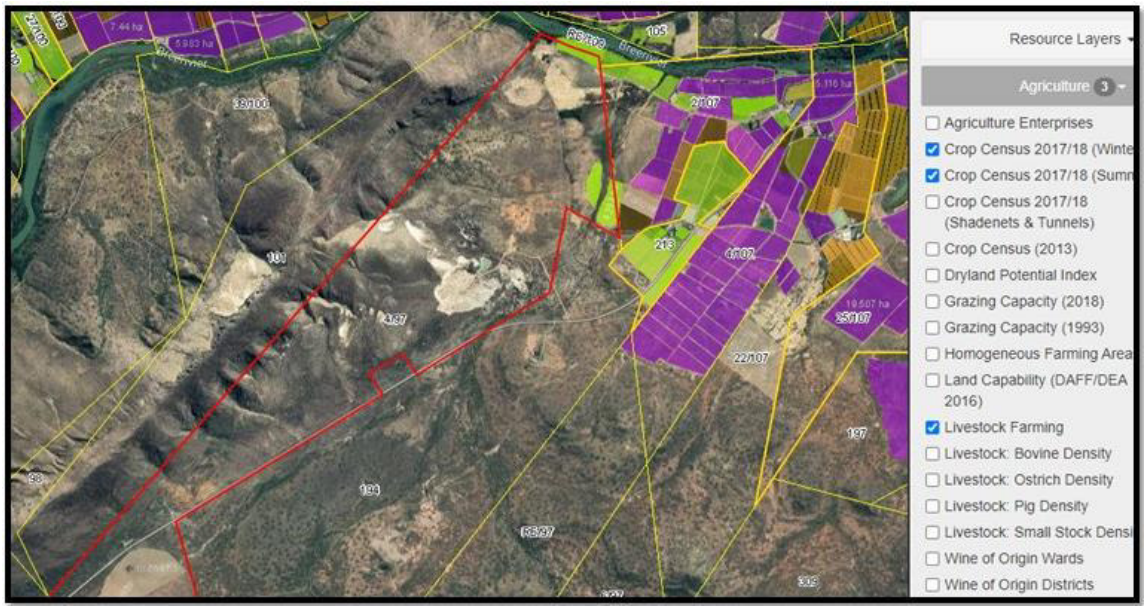
Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues Raised	EAPs response to issues as mandated by the Applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Comments received from Langeberg Local Municipality: The municipality awaits the Application Scoping Report, and requested additional information regarding botanical environmental assessment and the visual impact. The municipality is concerned about: - the scale, and need and desirability of the extension application, - the area is not used for agricultural purposes but is pristine natural vegetation, - natural vegetation should be re-established if the area is permitted to be mined.				
Response to the comments received from the LLM (30 January 2020): "Greenmined Environmental herewith thank you for your interest in the project, and acknowledge receipt of your correspondence received 28 January 2020 regarding the proposed Section 102 amendment application to be submitted on behalf of Zandberg Sandput (Pty) Ltd. We registered the Langeberg Municipality as a stakeholder on the project, and will henceforth keep you posted on the progress of the Environmental Impact Assessment process as well as supply you with a copy of the draft scoping report (DSR) for your perusal. We take note of your concerns as listed in the attached BID. We will include your correspondence in the DSR and assess it as part of the Draft Environmental Impact Assessment Report that will also be available for your perusal. In the interim, please note that although the proposed extension extends over ±108 ha, it is proposed that the current 1 ha strip-mining method continues should the application be approved. In light of this the mined out area (1 ha) will be rehabilitated prior to the mining of a consecutive strip (1 ha). The botanist was tasked to identify sensitive areas where mining should not be allowed. The findings of the specialist will be incorporated into the DEIAR to be distributed for perusal and commenting. We trust you find this in order. Please do not hesitate to contact me in the event of any uncertainties."				
- Part A(1)(d)(ii) Description of the activities to be undertaken – 2. S102 Application. - Part A(1)(f) Need and desirability of the proposed activities. - Part A(1)(g)(iv) The environmental attributes associated with the development footprint alternatives. - Appendix M – Closure Plan.				

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
Comments received from the LLM on the DSR (13 July 2020): "…. The following statistics must be provided with regard to the proposed large scale expansion: • How much of the currently approved 17,65 ha has already been mined? • How many hectares are still available to be mined? • How many years will it take to mine this remaining approved mine area? • Why is such large extension (108,3851ha.) being applied for? (If 17,68ha. was sufficient for sand mining for a 30+yr period, it would seem unnecessary to apply for more than a ±20ha expansion at this stage). The scoping report still refers to the land as being used for agriculture and returning the use after mining to agricultural (pp 19, 38, 63, 71, 75, 81, 82, 87, 90, 97). This is clearly a cut and paste error from another application, and must be corrected throughout the document. Pg 58 summarises the conservation status of the natural vegetation which covers the entire site, and it is clear that there is no agricultural activity on this land and that should mining be permitted, natural vegetation should be re-established in terms of the rehabilitation process, not agricultural crops."				
Response to the DSR comments received from the LLM (14 July 2020): "…. We take note of your request for additional information, and will incorporate and discuss the request in the draft Environmental Impact Assessment Report (DEIAR) to be circulated for public comments upon approval of the final Scoping Report. Regarding your comment about the agricultural use of the property: There was no copy and paste error. The land earmarked for the proposed expansion is currently zoned for agricultural purposes. The Department of Environmental Affairs and Development Planning confirmed on 09 March 2020 that: "*Agricultural Land is defined in the Regulations as being land outside the physical outer edge of the existing urban edge. Whether the land has been cultivated or irrigated in the preceding 10 years is irrelevant in respect of this category of land development*". In light of this, the land use description of the earmarked area cannot be anything other than agriculture even though the footprint is presently covered with natural vegetation. Upon closure of the mine, the use of the mining footprint will be returned to the landowner to allow him to continue farming the property (whether through grazing of natural vegetation or active cultivation). We take note of your suggestion that natural vegetation should be established on the rehabilitated areas. Your request will be forwarded to the botanist responsible for the Botanical Impact Assessment and his suggestions will be incorporated into the Rehabilitation and Closure Plan that will form part of the DEIAR."				

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

Further comments received from the LLM (14 July 2020):

"…I stand by my comments regarding the land use of the property and wish the following noted: The scoping report refers to the land as being used for agricultural purposes and returning the use after mining to agricultural (pp 19, 38, 63, 71, 75, 81, 82, 87, 90, 97). This is misleading to those who read the report as there is no conventional agricultural activity on the portion of land where the mine expansion is proposed, as is clear from the extract below from Cape Farm Mapper, and from a site visit. Whilst the land is zoned Agricultural zone I, and despite the legal definitions of "Agricultural land", the current use of this land is vacant, natural vegetation. Pg 58 of the scoping report summarises the vulnerable conservation status of much of the natural vegetation which covers the site. Accordingly, should mining be permitted, natural vegetation should be re-established in terms of the rehabilitation process. Alternatively, if agricultural crops are proposed to be established, this must be addressed in the EIA in terms of the proposed extent and nature of crops, to enable the relevant Departments to comment meaningfully.



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
Greenmined acknowledged response (14 July 2020) of the comments and confirmed that it will be incorporated into the final Scoping Report and the draft EIAR.				
Me Brunings requested a copy of the FSR section with comments from IAP's on 28 July 2020. Greenmined supplied Me Brunings with a copy of the Comments and Response Report that was attached to the FSR on 29 July 2020.				
Additional response to the comments received from the LLM on the DSR (13 July 2020): ⁜ *How much of the currently approved 17,65 ha has already been mined?* • Approximately 9 ha of the approved mining area has been mined. • Refer to Part A(1)(g)(iv)(a) Type of environment affected by the proposed activity – Visual Characteristics. ⁜ *How many hectares are still available to be mined?* • Approximately 8.6 ha of the approved area is still available to be mined. ⁜ *How many years will it take to mine this remaining approved mine area?* • The MR holder mines approximately 0.5 ha per year depending on market demand and sales. In this circumstance, it should take ±17 years to mine the remaining approved area. • Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Operational Phase. ⁜ *Why is such large extension (108,3851ha.) being applied for? (If 17,68ha. was sufficient for sand mining for a 30+yr period, it would seem unnecessary to apply for more than a ±20ha expansion at this stage).* • Refer to Part A(1)(f) Need and desirability of the proposed activities – Section 102 Amendment Application; • Part A(1)(g)(i) Details of the development footprint alternatives considered – S102 Application; • Part A(1)(g)(x) Statement motivating the alternative development location within the overall site – S102 Application; and • Part A(1)(k)(i) Summary of the key findings of the environmental impact assessment. ⁜ …. natural vegetation should be re-established in terms of the rehabilitation process, not agricultural crops • Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – *2.4 Decommissioning Phase;* • Appendix I1 – Botany Study and Assessment, 2020;				

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
• Appendix M – Closure Plan.				
Additional response to the comments received from the LLM on the DSR (10 January 2022): ⁎ *How much of the currently approved 17,65 ha has already been mined?* • Approximately 10 ha of the approved mining area has been mined. • Refer to Part A(1)(g)(iv)(a) Type of environment affected by the proposed activity – Visual Characteristics. ⁎ *How many hectares are still available to be mined?* • Approximately 7.6 ha of the approved area is still available to be mined. ⁎ *How many years will it take to mine this remaining approved mine area?* • Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Operational Phase. • Refer to Part A(1)(g)(i) Details of the development footprint alternatives considered. ⁎ *Why is such large extension (108,3851ha.) being applied for? (If 17,68ha. was sufficient for sand mining for a 30+yr period, it would seem unnecessary to apply for more than a ±20ha expansion at this stage).* • Refer to Part A(1)(d) Description of the scope of the proposed overall activity. ⁎ …. natural vegetation should be re-established in terms of the rehabilitation process, not agricultural crops • Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – *2.4 Decommissioning Phase;* • Appendix I2 – Botany Study and Assessment, 2021; • Appendix P – Closure Plan.				
Comments received from the LLM on the 2022 DEIAR & EMPR: "The original proposal to expand the Zandberg Sandput mining area by more than 100ha. was not supported (refer to email dated 10/11/2020). The current application for the expansion of the Zandberg Sandput mining area by 4ha. (Alternative Site 1) is supported, subject to compliance with the EMPr and the relevant mitigating measures and monitoring programmes (including buffer areas, rehabilitation requirements and biodiversity offsets). These measures will assist in aligning the proposal more closely with the Langeberg SDF, 2015 and the WC Rural Development Guidelines, 2019 which aim to minimise loss of habitat and ecosystem functionality in Core 1 SPCs. The application in terms of the LLUP Bylaw, 2015 is awaited."				

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
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**	30 January 2020	Mr Lyle Martin confirmed receipt of the BID and informed that the matter is receiving attention and that a further communication will be addressed to us (Greenmined) as soon as circumstances permit.	The comments received from DTPW were incorporated into the DSR. The proposed extension area will make use of access off Divisional Road 1342 (La Chasseur/Agter-Kliphoogte road) as mentioned in the DTPW comments (below).	Appendix H – Proof of Public Participation
		11 March 2020	Ms GD Swanepoel submitted the following comments on the project through regular mail that was received 11 March 2020 although the comments are dated 19 February 2020.		See list below.

Summary of the comments received from DTPW:

In this Branch's (*DTPW*) comment on the land use application, it stipulated the following conditions:

- The necessary right of way servitude be registered prior to the commencement of mining and,
- The access off Divisional Road 1342 at ± km 4.93 be constructed as a Main Farm Access as per the attached standard (see Appendix 5) and provided with a sealed hard-surface.

Provided the same access will be used as detailed in the above paragraph this branch offers no objection to the application.

- Part A(1)(d)(ii) Description of the activities to be undertaken – 1.2.2 Existing Infrastructure.
- Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Existing infrastructure.

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
Comments submitted by the DTPW on the DSR (13 July 2020): "…A fleeting look at the Scoping Report shows that the comment from our letter dated 19 February 2020 has been recorded and noted. The Branch has no further comment at this stage."					
Comments submitted by the DTPW on the FSR (26 August 2020): "…The branch has no additional comment on the Final Scoping Report. Our letter dated 19 February 2020 is still applicable."					
Comments submitted by the DTPW on the 2020 DEIAR & EMPR (07 November 2020): "…It is noted in the DSR that our conditions previously specified in our letter dated 19 February 2020 are being implemented. We have no further comment."					
Comments submitted by the DTPW on the 2022 DEIAR & EMPR: "Cognisance is taken of the draft EIA report. The Branch offers no objection to the proposal to expand the mine."					
Department of Water and Sanitation (DWS)	**X**	28 & 29 January 2020	Me Nelisa Ndobeni and Me Melissa Lintnaar-Strauss responded that the Breede-Gouritz Catchment Management Agency (BGCMA) must be informed of the proposed project.	The BGCMA was informed of the proposed project.	Appendix H – Proof of Public Participation
Eskom Ltd	**X**	25 January 2022	Me Abbygail Botha submitted the following comments on behalf of Eskom on the 2022 DEIAR & EMPR.	Greenmined acknowledged receipt of the comments on 09 February 2022 and replied as follows.	Appendix H – Proof of Public Participation

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

Comments received from Eskom on the 2022 DEIAR & EMPR:

"I hereby inform you that Eskom has no objection to the proposed work indicated on your drawing in principle. This approval [wayleave] is valid for 12 months only, after which reapplication must be made if the work has not been completed.

1. Eskom services are affected by your proposed works and the following must be noted:

a) Eskom has no objection to the proposed work and include a drawing indicating Eskom 11kV/LV underground services in close proximity.
b) Please note that underground services indicated are only approximate and the onus is on the applicant to verify its location.
c) There may be LV overhead services / connections not indicated on this drawing.
d) The successful contractor must apply for the necessary agreement forms and additional cable information not indicated on included drawing, in order to start construction.

Application for Working Permit must be made to: Customer Network Centre: WORCESTER - Adrian Issel….. Include Eskom Wayleave as-built drawings and all documentation, when applying for Working Permit. Should it be necessary to move, relocate or support any existing services for possible future needs, it will be at the developer's cost. Application for relocating services must be made to Sabelo Potela….

2. Underground Services:

The following conditions to be adhered to at all times:

a) Works will be carried out as indicated on plans.
b) No mechanical plant to be used within 3.0 m of Eskom underground cables.
c) All services to be verified on site.
d) Cross trenches to be dug by hand to locate all underground services before construction work commences.
e) If Eskom underground services cannot be located or is grossly misplaced from where the wayleave plan indicates, then all work is to be stopped and Graham Hector from the Land Development Office to be contacted….., to arrange the capturing of such services.
f) In cases where proposed services run parallel with existing underground power cables the greatest separation as possible should be maintained with a minimum of 1000mm.
g) Where proposed services cross underground power cables the separation should be a minimum of 300mm with protection between services and power cables. (Preferably a concrete slab)
h) No manholes; catch- pits or any structure to be built on top of existing underground services.
i) Only walk-behind (2 ton Bomac type) compactors to be used when compacting on top of and 1 metre either side of underground cables.

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

j) If underground services cannot be located then the Customer Network Centre (CNC) should be consulted before commencement of any work.

3. O.H. Line Services:

a) The following building and tree restriction on either side of centre line of overhead power line must be observed:

Voltage	Building restriction either side of centre line
11 / 22kV	9.0 m
66kV	11.0 m
132kV	15.5 m

b) No construction work may be executed closer than 6 (SIX) metres from any Eskom structure or structure-supporting mechanism.
c) No work or no machinery nearer than the following distances from the conductors:

Voltage	Not closer than:
11 / 22kV	3.0 m
66kV	3.2 m
132kV	3.8 m

d) Natural ground level must be maintained within Eskom reserve areas and servitudes.
e) That a minimum ground clearance of the overhead power line must be maintained to the following clearances:

Voltage	Safety clearance above road:
11 / 22kV	6.3 m
66kV	6.9 m
132kV	7.5 m

f) That existing Eskom power lines and infrastructure are acknowledged as established infrastructure on the properties and any rerouting or relocation would be for the cost of the applicant/developer.
g) That Eskom rights or servitudes, including agreements with any of the landowners, obtained for the operation and maintenance of these existing power lines and infrastructure be acknowledged and honoured throughout its lifecycle which include, but are not limited to:
i. Having 24 hour access to its infrastructure according to the rights mentioned in (a) above,
ii. To perform maintenance (structural as well as servitude – vegetation management) on its infrastructure according to its maintenance programmes and schedules,
iii. To upgrade or refurbish its existing power lines and infrastructure as determined by Eskom,

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
iv. To perform any other activity not listed above to ensure the safe operation and maintenance of the Eskom power lines or infrastructure. h) Eskom must have at least a 10m obstruction free zone around all pylons (not just a 10m radius from the centre). i) Eskom shall not be liable for the death or injury of any person, or for loss of or damage to any property, whether as a result of the encroachment or use of the area where Eskom has its services, by the applicant, his/her agent, contractors, employees, successors in title and assignee. j) The applicant indemnifies Eskom against loss, claims or damages, including claims pertaining to interference with Eskom services, apparatus or otherwise. k) Eskom shall at all times have unobstructed access to and egress from its services. l) Any development which necessitates the relocation of Eskom's services will be to the account of the developer. m) Lungile Motsisi, Eskom: Transmission must be contacted…… to comment on behalf of the 400 kV OVERHEAD POWERLINES, NO WORK WITIN THIS SERVITUDE OR UNDERNEATH POWERLINES IS ALLOWED until comment from Eskom Transmission has been obtained. 4. NOTE: Wayleaves, Indemnity form (working permit) and all as-built drawings issued by Eskom to be kept on site at all times during construction period."				
Response from Greenmined sent to Eskom on 02 February 2022: "Thank you for the comments and map that you send regarding this application. The Eskom requirements will be incorporated into the final Environmental Impact Assessment Report of the project, to be submitted to the DMRE for decision making. As interested party, Eskom will be informed of the departmental decision in due course." Additional remark regarding the Eskom comments: ᔑ Refer to Figure 76, as well as Appendix H for a copy of the Eskom map submitted with the above comments. From the map it is clear that there are no power lines (above- or underground) within any of the proposed extension alternative areas (S1/S2/S3), with the nearest power line being >270 m south of the lowest point of S1. In light of this, the comments of Eskom are noted, but not relevant to the specific study area (S1-S3). Care will however be taken when the boundaries of the biodiversity offset area are demarcated not to damage any Eskom property.				
Communities	N/A	No communities border the mining area or were identified within 100 m from the site.		
Dep. Land Affairs	N/A	Not applicable as this is an application for a Section 102 amendment of the approved mining right on the same property.		

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
Traditional Leaders	N/A	No tradition leaders borders the mining area or were identified within 100 m from the site.			
Dept. Environmental Affairs (DEA&DP)	**X**	28 January 2020	Me A La Meyer acknowledged receipt of the BID and registered the DEA&DP as commenting authority.	The DEA&DP was registered as commenting authority on the project and will be supplied with copies of all the public documents.	Appendix H – Proof of Public Participation
		20 July 2020	Mr Gerhard Gerber submitted the below listed comments on the DSR.	Greenmined acknowledged (21 July 2020) receipt of the comments on the draft Scoping Report and confirmed that the comments will be incorporated into the final Scoping Report (FSR), and (upon approval of the FSR) addressed in the draft Environmental Impact Assessment Report that will be published for public commenting. See below for additional response to the comments.	Refer to below listed sections.

Comments received from the DEA&DP on the DSR (20 July 2020):

"1. Directorate: Development Management (Region 1) – Ms Ayesha Hamdulay:

1.1. It is noted that several non-perennial drainage lines traverse the proposed mining right expansion area. Activity 19 of Listing Notice 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) has however not been applied for.

1.2. It is further noted that haul roads may be required. Please be advised that should new roads wider that 4m be established in areas containing indigenous vegetation, Activity 4 of Listing Notice 3 of the NEMA EIA Regulations, 2014 (as amended) will be applicable.

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
1.3. The applicability of Activity 19 of Listing Notice 1 and Activity 4 of Listing Notice 3 of the NEMA EIA Regulations, 2014 (as amended) must be confirmed in the Final Scoping Report ("FSR") to be submitted to the competent authority. Should the mentioned listed activities be applicable to the proposed mine expansion, an amended application form must be submitted to the competent authority and the impacts associated with the listed activities must be assessed and reported on in the Draft EIA Report. 1.4. Following the above, not all the impacts associated with the proposed mine expansion have been identified in the DSR for further assessment in the environmental impact reporting ("EIR") phase. Per paragraph 1.1. above, drainage lines traverse the proposed mine expansion area; however, the impacts on watercourses have not been identified in the DSR for further assessment in the EIA phase. (In this regard, also refer to paragraph 2.1. below.) 1.5. Furthermore, page 53 of the DSR states that "*It is known that the water table in the valley below the mine is ±3 m under the surface.*" The depth of mining and whether the proposed sand mining activities will have an impact on groundwater resources, were not indicated in the DSR. This information must be provided in the Draft EIA Report. 1.6. Per the DSR, the proposed mine expansion area falls within a Critical Biodiversity Area ("CBA"). Please be advised that this Directorate does not support mining within a CBA. The description of alternatives does not clearly illustrate how the mitigation hierarchy was considered when selecting the preferred (and only) site and layout alternatives. Alternatives that avoid CBAs must be further investigated and reported on in the Draft EIA Report. 1.7. It is noted that the Provincial Department of Agriculture ("DoA") has not been included in the list of state Departments to be consulted as part of the EIA process. Please ensure that said Department is consulted for comment. Depending on the comments obtained from the Provincial DoA, an agricultural impact assessment be required. 1.8. The Plan of Study for EIA must be updated to include all the impacts that will be assessed and all the specialist studies that will be undertaken during the EIR phase. 1.9. In terms of GN No. 960 of 5 July 2019, the submission of a report generated from the National Web Based Environmental Screening Tool ("Screening Tool") is a compulsory requirement when applying for environmental in terms of the NEMA EIA Regulations, 2014 (as amended). If not yet undertaken, the EAP is advised to urgently consult the Screening Tool and generate a screening report. Based on the findings of the screening report, the EAP will be required to either appoint additional specialists to undertake the identified specialist studies, or to provide a motivation in the FSR and Plan of Study for EIA why the specialist studies will not be undertaken or deemed necessary for the EIA process. Should additional specialist studies identified by the Screening Tool be undertaken, the Plan of Study for EIA must be amended to indicate which additional specialist studies will be undertaken. 1.10. The EAP is advised to consider the "*Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation*" ("the protocols"), promulgated in GN No. 320 of 20 March 2020, which came into effect on 9 May 2020. If evidence can be provided to the Competent Authority to show that a specialist study for which a protocol has been prescribed was initiated prior to 9 May 2020, then the protocol in question does not have to be complied with. For those specialist studies where no specific protocol has been prescribed, the level of assessment must comply with the requirements of Appendix 6 of the National				

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

Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations, 2014 (as amended). The Final Scoping Report submitted to the Competent Authority, as well as the draft EIA Report once released for comment, must be clear which protocols apply and which do not.

2. Directorate: Pollution and Chemicals Management – Ms Shehaam Brinkhuis:

2.1. Drainage lines and wetlands, including areas identified as National Freshwater Priority Areas which fall within the Breede River catchment, occur within the proposed mining expansion area. This Directorate supports the recommendation of the Breede-Gouritz Catchment Management Agency that an evaluation of watercourses is warranted in the EIR phase of the application. It is further recommended that such evaluation is undertaken by a suitably qualified and experienced freshwater ecologist/specialist. The Plan of Study for EIA should thus be amended to include a Freshwater Impact Assessment.

2.2. Site-specific hydrology and geohydrology has been detailed on pages 66 to 68 of the DSR. The description provided, extracted from previously compiled reports, clearly indicates that the proposed mining expansion area and the establishment of mining activities across a substantial area shall have a significant impact on groundwater resources. Thus, it is recommended that input be obtained from a suitably qualified and experienced geohydrologist to inform the EIR phase. Per paragraph 2.1. above, the Plan of Study for the EIA should be amended to include a Geohydrological Impact Assessment.

2.3. Further to paragraphs 2.1. and 2.2. above, it is noted that the potential impacts of the proposed mine expansion on water resources and freshwater features have not been adequately identified and described during the scoping phase. Sufficient consideration should be given to these potential impacts in the Draft EIA Report.

2.4. Storm-water runoff must be controlled to ensure that on-site activities do not culminate in off-site pollution, erosion or sedimentation. It is recommended that the EIR phase make provision for the inclusion of a storm water management plan. Such a storm water management plan should also describe the proposed methods to prevent contaminated or polluted storm water from being released into the receiving environment, with attention paid to potentially sensitive areas yet to be identified by specialists during investigation of the proposed mine expansion area.

2.5. Although acknowledged that the proposed mining method may limit the pollution potential (as stated on page 27 of the DSR), it is noted that pollution and contamination may still occur and it is recommended that potential pollution impacts due to mining activities, are more thoroughly considered. It is essential that identified pollution impacts are adequately addressed and management measures must be proposed in the Environmental Management Programme ("EMPr") to be submitted with the EIA Report.

3. Directorate: Waste Management – Mr Lance Anders:

3.1. Table 1, page 14 of the DSR indicates the applicable listing notices and listed activities, without providing an explanation of the listed activities. Please discuss or write out each applicable listed activity for better understanding by interested and affected parties of the listed activities.

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
3.2. Page 20 of the DSR indicates that alternative dust suppression methods will be utilised, however these methods were not indicated. Since the Western Cape is a water scarce province, the applicant must ensure that only non-potable water is used for dust suppression. Dust suppression measures must be detailed in the EMPr. 3.3. Waste management impacts, including *inter alia*, the storage, handling, transport and disposal of all waste types, must be addressed in the EMPr. 4. Directorate: Air Quality Management – Ms Gavaza Mhlarhi / Mr Peter Harmse: 4.1 This Directorate awaits the Draft EIA Report and EMPr to provide comment. Please ensure that the EMPr provide management measures for dust and noise impacts associated with the proposed mining operations."				
Greenmined acknowledged (21 July 2020) receipt of the comments on the draft Scoping Report and confirmed that the comments will be incorporated into the final Scoping Report (FSR), and (upon approval of the FSR) addressed in the draft Environmental Impact Assessment Report that will be published for public commenting. In addition to the above, the following comments were elaborated on in the FSR: 1.1. It is noted that several non-perennial drainage lines traverse the proposed mining right expansion area. Activity 19 of Listing Notice 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) has however not been applied for. *As mentioned earlier, the layout of the allowable mining areas, within the footprint of the proposed extension area, will be assessed during the EIA phase upon receipt of the specialist findings. Presently, it is proposed that buffer no-go areas will be demarcated around the drainage lines and no infilling, depositing, dredging, excavation, removal or moving of soil from a drainage line is envisioned. Therefore, the proposed project does not trigger Activity 19 of Listing Notice 1. However, as mentioned in the Plan of Study for the EIA Process the applicability of the listed activities will be confirmed and if needed aligned with the project proposal once the preferred alternative was finalised.* 1.2. It is further noted that haul roads may be required. Please be advised that should new roads wider that 4m be established in areas containing indigenous vegetation, Activity 4 of Listing Notice 3 of the NEMA EIA Regulations, 2014 (as amended) will be applicable. *The comment is noted, however, presently no roads wider than 4 m are proposed.* 1.3. The applicability of Activity 19 of Listing Notice 1 and Activity 4 of Listing Notice 3 of the NEMA EIA Regulations, 2014 (as amended) must be confirmed in the Final Scoping Report ("FSR") to be submitted to the competent authority. Should the mentioned listed activities be applicable to the proposed mine expansion, an amended application form must be submitted to the competent authority and the impacts associated with the listed activities must be assessed and reported on in the Draft EIA Report.				

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

Presently, neither Activity 19 of Listing Notice 1 nor Activity 4 of Listing Notice 3 is deemed applicable to this application.

1.4. Following the above, not all the impacts associated with the proposed mine expansion have been identified in the DSR for further assessment in the environmental impact reporting ("EIR") phase. Per paragraph 1.1. above, drainage lines traverse the proposed mine expansion area; however, the impacts on watercourses have not been identified in the DSR for further assessment in the EIA phase. (In this regard, also refer to paragraph 2.1. below.)

This impact was added to the Scoping Report and will be further assessed in the EIA phase.

1.5. Furthermore, page 53 of the DSR states that "*It is known that the water table in the valley below the mine is ±3 m under the surface.*" The depth of mining and whether the proposed sand mining activities will have an impact on groundwater resources, were not indicated in the DSR. This information must be provided in the Draft EIA Report.

The approximate depth of mining and potential impact on groundwater resources will be discussed in the Draft EIA Report.

1.7. It is noted that the Provincial Department of Agriculture ("DoA") has not been included in the list of state Departments to be consulted as part of the EIA process. Please ensure that said Department is consulted for comment. Depending on the comments obtained from the Provincial DoA, an agricultural impact assessment be required.

The Department of Agriculture (DoA) were supplied with a copy of the background information document as well as invited to comment on the draft Scoping Report (refer to Appendix 5 for proof thereof). To date no feedback/comments was received from the DoA.

1.8. The Plan of Study for EIA must be updated to include all the impacts that will be assessed and all the specialist studies that will be undertaken during the EIR phase.

This request was incorporated into this document, the Final Scoping Report.

1.9. In terms of GN No. 960 of 5 July 2019, the submission of a report generated from the National Web Based Environmental Screening Tool ("Screening Tool") is a compulsory requirement when applying for environmental in terms of the NEMA EIA Regulations, 2014 (as amended). If not yet undertaken, the EAP is advised to urgently consult the Screening Tool and generate a screening report. Based on the findings of the screening report, the EAP will be required to either appoint additional specialists to undertake the identified specialist studies, or to provide a motivation in the FSR and Plan of Study for EIA why the specialist studies will not be undertaken or deemed necessary for the EIA process. Should additional specialist studies identified by the Screening Tool be undertaken, the Plan of Study for EIA must be amended to indicate which additional specialist studies will be undertaken.

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

The abovementioned report generated from the National Web Based Environmental Screening Tool ("Screening Tool") was submitted to the competent authority with the EA Application form. The report was accompanied by a cover letter discussing the specialist studies deemed applicable to this application. However, this information was also added to the final Scoping Report under Section 3(c) Description of aspects to be assessed by specialist.

1.10. The EAP is advised to consider the "*Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation*" ("the protocols"), promulgated in GN No. 320 of 20 March 2020, which came into effect on 9 May 2020. If evidence can be provided to the Competent Authority to show that a specialist study for which a protocol has been prescribed was initiated prior to 9 May 2020, then the protocol in question does not have to be complied with. For those specialist studies where no specific protocol has been prescribed, the level of assessment must comply with the requirements of Appendix 6 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations, 2014 (as amended). The Final Scoping Report submitted to the Competent Authority, as well as the draft EIA Report once released for comment, must be clear which protocols apply and which do not.

The botanical study as well as the archaeological- and palaeontological impact assessments were initiated in April 2020 and will therefore be in accordance with the requirements of Appendix 6 of NEMA EIA Regulations 2014 (as amended). Should any further specialist studies be required for which a protocol has been prescribed then the protocol in question will be complied with.

2.1. Drainage lines and wetlands, including areas identified as National Freshwater Priority Areas which fall within the Breede River catchment, occur within the proposed mining expansion area. This Directorate supports the recommendation of the Breede-Gouritz Catchment Management Agency that an evaluation of watercourses is warranted in the EIR phase of the application. It is further recommended that such evaluation is undertaken by a suitably qualified and experienced freshwater ecologist/specialist. The Plan of Study for EIA should thus be amended to include a Freshwater Impact Assessment.

As mentioned earlier, the layout of the allowable mining areas, within the footprint of the proposed extension area, will be assessed during the EIA phase upon receipt of the specialist findings. Presently, it is proposed that buffer no-go areas will be demarcated around the drainage lines and no mining of the drainage lines are envisioned. Should the drainage lines be excluded from the mining footprint the potential impact of the proposed activity on watercourse is deemed to be of low significance, and in our opinion a Freshwater Impact Assessment is not applicable.

2.2. Site-specific hydrology and geohydrology has been detailed on pages 66 to 68 of the DSR. The description provided, extracted from previously compiled reports, clearly indicates that the proposed mining expansion area and the establishment of mining activities across a substantial area shall have a significant impact on groundwater resources. Thus, it is recommended that input be obtained from a suitably qualified and experienced geohydrologist to inform the EIR phase. Per paragraph 2.1. above, the Plan of Study for the EIA should be amended to include a Geohydrological Impact Assessment.

The approximate depth of mining and potential impact on groundwater resources will be discussed in the Draft EIA Report, and if deemed applicable the opinion of a groundwater specialist will be obtained and added to the DEIAR.

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
2.3. Further to paragraphs 2.1. and 2.2. above, it is noted that the potential impacts of the proposed mine expansion on water resources and freshwater features have not been adequately identified and described during the scoping phase. Sufficient consideration should be given to these potential impacts in the Draft EIA Report. *This impact was added to the Scoping Report and will be further assessed in the EIA phase.* 2.4. Storm-water runoff must be controlled to ensure that on-site activities do not culminate in off-site pollution, erosion or sedimentation. It is recommended that the EIR phase make provision for the inclusion of a storm water management plan. Such a storm water management plan should also describe the proposed methods to prevent contaminated or polluted storm water from being released into the receiving environment, with attention paid to potentially sensitive areas yet to be identified by specialists during investigation of the proposed mine expansion area. *The requested storm water management plan will be incorporated into the DEIAR.* 2.5. Although acknowledged that the proposed mining method may limit the pollution potential (as stated on page 27 of the DSR), it is noted that pollution and contamination may still occur and it is recommended that potential pollution impacts due to mining activities, are more thoroughly considered. It is essential that identified pollution impacts are adequately addressed and management measures must be proposed in the Environmental Management Programme ("EMPr") to be submitted with the EIA Report. *The potential pollution impacts will be further discussed and assessed in the DEIAR, and management measures will be proposed in the EMPR to be submitted with the DEIAR.* 3.1. Table 1, page 14 of the DSR indicates the applicable listing notices and listed activities, without providing an explanation of the listed activities. Please discuss or write out each applicable listed activity for better understanding by interested and affected parties of the listed activities. *A full description of the listed activities was added to this report.* 3.2. Page 20 of the DSR indicates that alternative dust suppression methods will be utilised; however, these methods were not indicated. Since the Western Cape is a water scarce province, the applicant must ensure that only non-potable water is used for dust suppression. Dust suppression measures must be detailed in the EMPr. *The following alternative dust suppression measures were proposed on page 20 of the DSR:* ⁜ *The speed of all mining equipment/vehicles will be restrictions to 20 km/h on the internal farm roads/haul roads to minimize dust generation;* ⁜ *The removal of vegetation will only be done immediately prior to the mining of an area in an attempt to lessen denuded areas (acting as dust source) to the absolute minimum.* *The requirement that only non-potable water may be used for dust suppression was added to the FSR and will also form part of the DEIAR.*				

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
3.3. Waste management impacts, including *inter alia*, the storage, handling, transport and disposal of all waste types, must be addressed in the EMPr. *The requested information will be incorporated in the EMPR that will accompany the DEIAR.*				
Additional response to the comments received from the DEA&DP on the DSR (20 July 2020): ⁜ *1.1 It is noted that several non-perennial drainage lines traverse the proposed mining right expansion area. Activity 19 of Listing Notice 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) has however not been applied for.* ⁜ *2.1. Drainage lines and wetlands, including areas identified as National Freshwater Priority Areas which fall within the Breede River catchment, occur within the proposed mining expansion area. This Directorate supports the recommendation of the Breede-Gouritz Catchment Management Agency that an evaluation of watercourses is warranted in the EIR phase of the application. It is further recommended that such evaluation is undertaken by a suitably qualified and experienced freshwater ecologist/specialist. The Plan of Study for EIA should thus be amended to include a Freshwater Impact Assessment.* • Refer to Part A(1)(g)(i) Details of the development footprint alternatives considered – S102 Application – Layout Alternatives. ⁜ *1.4. Following the above, not all the impacts associated with the proposed mine expansion have been identified in the DSR for further assessment in the environmental impact reporting ("EIR") phase. Per paragraph 1.1. above, drainage lines traverse the proposed mine expansion area; however, the impacts on watercourses have not been identified in the DSR for further assessment in the EIA phase. (In this regard, also refer to paragraph 2.1. below.)* ⁜ *2.3. Further to paragraphs 2.1. and 2.2. above, it is noted that the potential impacts of the proposed mine expansion on water resources and freshwater features have not been adequately identified and described during the scoping phase. Sufficient consideration should be given to these potential impacts in the Draft EIA Report.* • Refer to Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts; • Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk; • 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. ⁜ *1.5. Furthermore, page 53 of the DSR states that "It is known that the water table in the valley below the mine is ±3 m under the surface." The depth of mining and whether the proposed sand mining activities will have an impact on groundwater resources, were not indicated in the DSR. This information must be provided in the Draft EIA Report.* • Refer to Part A(1)(g)(iv)(1)(a) Type of environment to be affected by the proposed activity – Hydrology and Geohydrology; and				

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

- Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Hydrology and Geohydrology.

- *1.6 Per the DSR, the proposed mine expansion area falls within a Critical Biodiversity Area ("CBA"). Please be advised that this Directorate does not support mining within a CBA. The description of alternatives does not clearly illustrate how the mitigation hierarchy was considered when selecting the preferred (and only) site and layout alternatives. Alternatives that avoid CBAs must be further investigated and reported on in the Draft EIA Report.*

- Refer to Part A(1)(g)(i) Details of the development footprint alternatives considered – S102 Application;
- Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Mining and Biodiversity Conservation Areas & Site Specific Vegetation; and
- Appendix I2 for the Botanical Study and Assessment.

- *1.9. In terms of GN No. 960 of 5 July 2019, the submission of a report generated from the National Web Based Environmental Screening Tool ("Screening Tool") is a compulsory requirement when applying for environmental in terms of the NEMA EIA Regulations, 2014 (as amended). If not yet undertaken, the EAP is advised to urgently consult the Screening Tool and generate a screening report. Based on the findings of the screening report, the EAP will be required to either appoint additional specialists to undertake the identified specialist studies, or to provide a motivation in the FSR and Plan of Study for EIA why the specialist studies will not be undertaken or deemed necessary for the EIA process. Should additional specialist studies identified by the Screening Tool be undertaken, the Plan of Study for EIA must be amended to indicate which additional specialist studies will be undertaken.*
- *2.1. Drainage lines and wetlands, including areas identified as National Freshwater Priority Areas which fall within the Breede River catchment, occur within the proposed mining expansion area. This Directorate supports the recommendation of the Breede-Gouritz Catchment Management Agency that an evaluation of watercourses is warranted in the EIR phase of the application. It is further recommended that such evaluation is undertaken by a suitably qualified and experienced freshwater ecologist/specialist. The Plan of Study for EIA should thus be amended to include a Freshwater Impact Assessment.*
- *2.2. Site-specific hydrology and geohydrology has been detailed on pages 66 to 68 of the DSR. The description provided, extracted from previously compiled reports, clearly indicates that the proposed mining expansion area and the establishment of mining activities across a substantial area shall have a significant impact on groundwater resources. Thus, it is recommended that input be obtained from a suitably qualified and experienced geohydrologist to inform the EIR phase. Per paragraph 2.1. above, the Plan of Study for the EIA should be amended to include a Geohydrological Impact Assessment.*

The FSR identified the following specialist studies deemed applicable to this application:

- Botanical Impact Assessment;
- Archaeological Impact Assessment; and
- Palaeontological Impact Assessment.

DMRE approved the FSR on 02 October 2020 and did not request additional specialist studies to be conducted.

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

- *2.4. Storm-water runoff must be controlled to ensure that on-site activities do not culminate in off-site pollution, erosion or sedimentation. It is recommended that the EIR phase make provision for the inclusion of a storm water management plan. Such a storm water management plan should also describe the proposed methods to prevent contaminated or polluted storm water from being released into the receiving environment, with attention paid to potentially sensitive areas yet to be identified by specialists during investigation of the proposed mine expansion area.*

  - Refer to Appendix Q for a copy of the Storm Water Management Plan.

- *2.5. Although acknowledged that the proposed mining method may limit the pollution potential (as stated on page 27 of the DSR), it is noted that pollution and contamination may still occur and it is recommended that potential pollution impacts due to mining activities, are more thoroughly considered. It is essential that identified pollution impacts are adequately addressed and management measures must be proposed in the Environmental Management Programme ("EMPr") to be submitted with the EIA Report.*

  - Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 1.2.5 Waste Management Programme;
  - Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts;
  - Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Waste Management;
  - Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;
  - Part B(1)(d)(ix) Impacts to be mitigated in their respective phases;
  - Part B(1)(g-k) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including monitoring of impact management actions, monitoring and reporting frequency, responsible person, time period for implementing impact management actions, mechanism for monitoring compliance; and
  - Part B(1)(m)(ii) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

- *3.1. Table 1, page 14 of the DSR indicates the applicable listing notices and listed activities, without providing an explanation of the listed activities. Please discuss or write out each applicable listed activity for better understanding by interested and affected parties of the listed activities.*

  - Refer to Part A(1)(d)(i) Listed and specified activities.

- *3.2. Page 20 of the DSR indicates that alternative dust suppression methods will be utilised; however, these methods were not indicated. Since the Western Cape is a water scarce province, the applicant must ensure that only non-potable water is used for dust suppression. Dust suppression measures must be detailed in the EMPr.*

  - Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3.4 Water Use; and
  - Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Air and Noise Quality.

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☒ *3.3. Waste management impacts, including inter alia, the storage, handling, transport and disposal of all waste types, must be addressed in the EMPr.* • Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 1.2.5 Waste Management Programme; • Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts; • Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Waste Management; • Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; • Part B(1)(d)(ix) Impacts to be mitigated in their respective phases; • Part B(1)(g-k) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including monitoring of impact management actions, monitoring and reporting frequency, responsible person, time period for implementing impact management actions, mechanism for monitoring compliance; and • Part B(1)(m)(ii) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.				
Comments received from DEA&DP on the 2020 DEIAR & EMPR: The Draft Scoping Report ("DSR") dated June 2020, the Department's comments thereto dated 20 July 2020, and the e-mail notification of 29 October 2020 regarding the availability of the Draft Environmental Impact Assessment ("EIA") Report, refer. The Department apologises for the slight delay in submitting comments on the Draft EIA Report. Please find consolidated comments from various directorates within the Department on the Draft EIA Report dated October 2020 that was downloaded from the website of the environmental assessment practitioner. 1. Directorate: Development Facilitation – Ms Adri La Meyer: 1.1 It is not apparent from Appendix A1 and Appendix A2 what the extension are of the preferred layout alternative entails. Both mine plans indicate the entire extent of the originally proposed 108.3 ha mining right expansion area, in addition to the existing, approved 17.68 ha mining footprint. The proposed mine design plan included as Appendix C does indicate the proposed extension area of the preferred layout alternative (Layout Alternative 1). Please amend both mine plans to indicate the extent (27 ha) of the preferred layout alternative in relation to the originally proposed 108 ha mining area, i.e. Appendix C must be overlain on the mine plans. A final layout plan must be compiled, which excludes the southern portion of the proposed mining footprint. 1.2 Further to the above, throughout the Draft EIA Report and in Appendices A1 and A2 it is indicated that the mining expansion area is 108.3 ha, thus resulting in a total mining area of 126 ha. The Final EIA Report must clearly indicate that the southern portion (81 ha) of the originally proposed mining expansion area will be excluded from mining activities.				

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1.3 Please note that Appendix F1 only contains the converted mining right for the initial 7.48 ha mining area, which was valid until 28 February 2016. The mining right renewal until May 2047 and the subsequent 10.2 ha extension granted in December 2018 were not included as appendices to the Draft EIA Report.

1.4 Page 26 of the Draft EIA Report indicates that Appendix F2 contains a copy of the rezoning approval by Langeberg Municipality in March 2018. Please be advised that Appendix F2 contains correspondence from the then Breede River Winelands Municipality dated 02 August 2002 in relation to a consent use for existing mining activities.

1.5 Final comment from Heritage Western Cape in response to the Heritage Impact Assessment compiled by ACO Associates CC dated April 2020 must be included in the Final EIA Report to be submitted to the competent authority.

2. Directorate: Development Management (Region 1) – Ms Ayesha Hamdulay:

2.1 Although the area to be mined has been reduced to 27 ha, the area is still located within a Critical Biodiversity Area ("CBA"). As previously indicated in our comments on the DSR, this Directorate does not support mining within a CBA.

2.2 It is noted that an on-site area of 81 ha will be set aside as a biodiversity offset. Please be advised that comments must be obtained from CapeNature regarding the proposed offset and must be included in the Final EIA Report.

2.3 The EMPr must be updated to include fines for non-compliance.

3. Directorate: Pollution and Chemicals Management – Ms. Shehaam Brinkhuis:

3.1 It is essential that the 100 m buffer to the northern drainage line is always treated as a "no-go" area for not only mining, but also any other associated activities, such as gaul roads, lay-down areas, etc. Furthermore, the identified greater "no-go" area of 81 ha should be strictly enforced.

3.2 The Storm Water Management Plan dated October 2020 as contained in Appendix Q must be implemented, with ongoing monitoring of effectiveness and adjustments undertaken where required. The recommendation for the storm water management plan to be reviewed biennially and adjusted to reflect the site- specific conditions relating to the storm water control, is strongly supported.

3.3 Please amend the EMPr to include reference to section 30 of the NEMA, 1998 pertaining to the control of incidents, and not only reference in terms of "housekeeping" and waste management. In the event of a significant accidental spill or leak of hazardous substances during any phase of the proposed activities, such an incident(s) must be reported to all relevant authorities, in accordance with

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section 30 of NEMA, 1998. It is recommended that the final bullet point on page 221 of the EMPr and section 8 of the Emergency Response Procedures be amended to include the requirement that any incident must also be reported to this Directorate.

4. Directorate: Waste Management – Mr Lance Anders:

4.1 This Directorate is satisfied that its comments on the DSR have been adequately addressed in the Draft EIA Report and EMPr.

5. Directorate: Air Quality Management – Ms Gavaza Mhlarhi / Mr Peter Harmse:

5.1 it is noted that fugitive dust emissions will occur from mining activities and the potential establishment of haul roads. The management actions related to dust mitigation indicated in the Draft EIA Report and the mitigation measures relating to dust emissions indicated in the EMPr are supported and must be strictly implemented.

5.2 It is noted that noise generated by the proposed activities will have a limited impact. All noise levels of machinery and work activities on-site must be monitored and controlled on. The sources of impacts during sand mining activities would likely be from operational vehicles and machinery which should be monitored for excessive emissions, as stipulated in the EMPr.

6. The applicant is reminded of its "general duty of care towards the environment" as prescribed in section 28 of NEMA, 1998 which states that "every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or topped, to minimise and rectify such pollution or degradation of the environment."

Additional response to the comments received from the DEA&DP on the 2020 DEIAR (10 January 2022):

1.1 Refer to Appendix A for a copy of the Regulation 2.2 Mine Plan;
1.2 Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – 2. S102 Application;
1.3 Refer to Appendix F1;
1.4 Refer to Appendix F2;
1.5 This will be added to the FEIAR once received;

2.1 Refer to Part A(1)(d)(ii) Description of the activities to be undertaken – Site Specific Mining and Biodiversity Conservation Areas;
2.2 Refer to Part A(1)(g)(iii) Summary of issued raised by I&AP's as well as Appendix H for a copy of the Comments and Response Report;
2.3 Refer to Part B(1)(g-k) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon – List of Non-compliance Penalties.

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
3.1 Refer to Part A(1)(g)(iv)(c) Description of specific environmental features and infrastructure on the site – Site Specific Hydrology and Geohydrology; Appendix G3 for the Wetland Delineation Report; Appendix G4 for the Floodline Determination Report. 3.3 Refer to Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Waste Management; Part B(1)(g-k) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon; Appendix R Emergency Response Procedures;				
Comments received from DEA&DP on the 2022 DEIAR & EMPR (17 February 2022): "….Please find consolidated comments from various directorates within the Department on the Revised Draft EIA Report dated January 2022 that was downloaded from the website of the environmental assessment practitioner. 1. Directorate: Development Management (Region 1) – Ms Ayesha Hamdulay…..: 1.1. This Directorate notes that the proposed mining expansion area has been reduced to approximately 4ha with a proposed 169 ha biodiversity offset area, based on comments received from CapeNature. Final comments from CapeNature must be obtained and included in the Final EIA Report. 1.2. All the mitigation measures as proposed in the various specialist reports must be implemented. 1.3. Should the competent authority grant the amendment of the mining right; it should be noted that this Directorate deems the best practicable environmental option to be Site Alternative 3. 2. Directorate: Development Facilitation – Mr Ralph van Delin….: 2.1. This Directorate notes that its comments on the Draft EIA Report have been adequately responded to and proof of relevant documentation were provided. This Directorate has no further comments on the Revised Draft EIA Report. 3. Directorate: Pollution and Chemicals Management – Ms Shehaam Brinkhuis…..: 3.1. This Directorate previously commented on the Draft EIA Report and notes the responses provided in combination with the additional information, as contained in the Revised Draft EIA Report and Environmental Management Programme ("EMPr"), Comments and Response Report, and additional specialist input, which largely address the comments raised by this Directorate. It is recommended that the proposed mitigation measures be strictly implemented and always adhered to. This Directorate therefore has no further comment at this stage of the application. 4. Directorate: Waste Management – Mr Lance Anders……:				

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
4.1. This Directorate has no further comments on the Revised Draft EIA Report. 5. Directorate: Air Quality Management – Mr Sibusiso Sinuka…..: 5.1. This Directorate notes that all environmental impacts associated with the proposed activity relating to air quality have been adequately addressed. This Directorate has no further comments on the Revised Draft EIA Report. 6. The applicant is reminded of its "general duty of care towards the environment" as prescribed in section 28 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) which states that "Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment….."					
Other Competent Authorities affected	-	-	-	-	-
Breede-Gouritz Catchment Management Agency (BGCMA)	X	26 February 2020	S Lupa commented as follows on the project.	Greenmined responded to the BGCMA on 28 February 2020 as listed below.	Appendix H – Proof of Public Participation
Comments received from BGCMA: "The Breede-Gouritz Catchment Management Agency (BGCMA) has received the Notice of Application as indicated above on 30 January 2020. BGCMA has no objections to the proposed development. However, the following is noted: a) There's little to no stockpiling is required and no washing of sand is needed which means that the sand mining operation will not require the use of water; and b) The mining footprint will expand over an area classified as a phase 2 FEPA (Freshwater Priority Area) according to the National Wetlands and NFEPA map of SANBI. Therefore, the conservation status of the area will be assessed and discussed during the EIA process of this application.					

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Therefore, through acknowledgment of watercourses (drainage lines) in the area earmarked for sand mining expansion, impacts on the watercourses should be evaluated in the EIA process as they will assist in the type of Water Use Authorisation triggered by the proposed sand mining activities. BGCMA would therefore, make final comments when the impacts on the watercourses (drainage lines) have been properly evaluated under the EIA process.

General

- No water must be taken from a water resource for any purpose without authorisation from the National Water Act, 1998 (Act 36 of 1998).
- No water or water containing waste may be disposed without authorisation from the National Water Act, 1998 (Act 36 of 1998) and National Environmental Management: Waste Act, 2008 (Act 59 of 2008).
- No unauthorised activities should take place within a regulated area of a watercourse.
- All relevant sections and regulations of the National Water Act, 1998 (Act 36 of 1998) regarding water use must be adhered to.
- No pollution of surface water or groundwater resources may occur.
- Stormwater management must be addressed in terms of flooding, erosion and pollution potential.
- No stormwater runoff from any premises contain waste, or water containing waste emanating from industrial activities and premises may be discharged into a water resources. Polluted stormwater must be contained.

Please be advised that no activities may commence without the appropriate approvals/authorisations where needed from the responsible authority. The onus remains with the registered property owner to confirm adherence to any relevant legislation that such activities might trigger and/or need authorisation for. This office reserves the right to amend and revise its comments as well as to request any further information."

Response from Greenmined to the comments received:

"Greenmined herewith acknowledge receipt of your correspondence received 27 February 2020 on the proposed Section 102 amendment application of Zandberg Sandput (Pty) Ltd in the Robertson area. We registered the Breede-Gouritz Catchment Management Agency (BGCMA) as a stakeholder on the project, and will henceforth keep you posted on the progress of the Environmental Impact Assessment process as well as supply you with a copy of the draft scoping report (DSR) for your perusal. Your comments will be incorporated and addressed as part of the EIA documents that will all be available for public perusal. We trust you find this in order. Please do not hesitate to contact me in the event of any uncertainties."

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
Comments received from BGCMA on the 2022 DEIAR & EMPR: "BGCMA has no objection to the proposed application; however, has the following comments: ⁎ It is noted that the proposed mine expansion sites are within 500 m radius of wetlands. Please note that any activity within the 1:100 year floodline or within 100 metres of a watercourse (river, spring, natural channel, a lake or am) or within a 500 m radius from the delineated boundary (extent) of any wetland or pan triggers a water use activity in terms of Section 21 (c) & (i) of the National Water Act, 1998 (Act 36 of 1998). A Water Use Authorisation Application needs to be lodged with the Department of Water and Sanitation by following this link: http://www.dwa.gov.za/ewulaasprod/Register.aspx. ⁎ It is noted that there is a dam on site which is not authorised and not registered in BGCMA records. The source of water to fill the dam, the purpose of the dam and size of the dam is not indicated. This information should be submitted to this office before Section 21(c) & (i) Water Uses Authorisation Application is lodged in order to determine if there will be a need to include this water use in the application. ⁎ Disposal of sewage must at all times comply with the requirements of Section 22 and 40 of the National Water Act of 1998 (Act 36 of 1998). ⁎ All relevant sections and regulations of the National Water Act, 1998 (Act 36 of 1998) regarding water use must be adhered to. ⁎ No water must be taken from a water resource for any purpose without authorisation from the National Water Act of 1998 (Act 36 of 1998). ⁎ No waste or water containing waste may be disposed without authorisation from the National Water Act of 1998 (Act 36 of 1998) and National Environmental Management: Waste Act, 2008 (Act 59 of 2008). ⁎ The minimising of waste must be promoted and alternative methods for waste management must be investigated. ⁎ No pollution of pollution of surface water or groundwater resources may occur. ⁎ Stormwater management must be addressed both in terms of flooding, erosion and pollution potential. ⁎ No stormwater runoff from any premises containing waste, or water containing waste emanating from industrial activities and premises may be discharged into a water resource. Polluted stormwater must be contained. Please be advised that no activities may commence without the appropriate approvals/authorisations where needed from the responsible authority. The onus remains with the registered property owner to confirm adherence to any relevant legislation that such activities might trigger and/or need authorisation for."				
Response from Greenmined to BGCMA sent on 17 February 2022: "Greenmined herewith acknowledges, and thank you for, the comments submitted on the DEIAR for the proposed expansion of the Zandberg Sandput (Pty) Ltd mining area on Portion 4 of the farm Zandberg Fontein No 97 in the Robertson area. Your comments will be incorporated into the final Environmental Impact Assessment Report to be submitted to the DMRE for decision making, and will also be shared with the consultants responsible for the Water Use Authorisation Application for their attention and handling in terms of the NWA, 1998."				

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Also refer to the following section of the report in response to the comments received from BGCMA: ⁎ Part B(1)(d)(viii) Has a water use licence been applied for? ⁎ Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Waste Management; ⁎ Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk – Management of Watercourse Habitat; ⁎ Refer to Appendix S for the Storm Water Management Plan.				
Cape Winelands District Municipality (CWDM)	**X**	No comments were received from the CWDM (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.		
CapeNature (CN)	**X**	03 February 2020	Mr Rhett Smart requested a copy of the Scoping Report for the attention of Me Vicki Hudson.	Greenmined acknowledged receipt of the request on 6 February 2020 and supplied CN with a copy of the DSR on 12 June 2020 for their perusal. No additional comments were received from CN.	Appendix H – Proof of Public Participation
Comment received from CN on the DEIAR (01 December 2020): …Please note that our comments only pertain to the biodiversity related impacts and not to the overall disability of the application. **Desktop Information:** The application area for the expansion of the mine is classified as Critical Biodiversity Area (CBA) I across the full extent according to the Western Cape Biodiversity Spatial Plan (WCBSP). There are several minor tributaries mapped originating on the ridge to the west of the site which terminate in the sand dune plume on site. The only wetland mapped on site according to the NFEPA mapping is the artificial dam associate with the existing mining activity and wetlands surrounding this. The vegetation types present according to the National Biodiversity Assessment (NBA) classification are Breede Sand Fynbos (listed as Vulnerable) over most the area with North Sonderend Sandstone Fynbos (listed as Least Concern) along the north western boundary. The listing stayed the same for both vegetation types between the 2011 NEM:BA gazette and the draft 2018 NBA threat assessment.				

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The Upper Breede Fine Scale Planning (FSP) Vegetation Mapping is a finer scale product than the NBA vegetation mapping and has been round-troughed (Helme, 2007). The FSP vegetation types mapped for the site are Mc Gregor Arid Fynbos which more or less corresponds to the North Sonderend Sandstone Fynbos although it extends further on to the site in the north and falls within this vegetation type's broader grouping. The Breede Sand Fynbos is also an FSP vegetation type and occupies most of the area mapped as such by the NBA, except fo the south eastern section, which is classified as Sandberg Arid Alluvium Fynbos, which falls under the Broader Breede Sand Fynbos grouping.

Botanical Assessment

The botanical assessment has provided the desktop information but has not referred to the FSP mapping, although this does not differ much for this site. The botanical assessment for the previous expansion has also been included however the 2020 study is more relevant and the two reports do not contradict one another. The botanical assessment has mapped habitat units across the site consisting of fynbos on stabilised dunes, fynbos on mobile and semi-stabilised dunes, sandstone fynbos and drainage lines. The habitat types have been grouped according to NBA vegetation types with the fynbos on stabilised, semi-stabilised and mobile dunes consisting of Breede Sand Fynbos and the sandstone fynbos consisting of North Sonderend Sandstone Fynbos. The sensitivity of the vegetation across the entire site is classified as high sensitivity. The conservation value of the habitats is rated as high apart from the mobile and semi-stabilised dunes which are moderate-high.

A total of seven plant Species of Conservation Concern (SCCs) were encountered in the field survey. It must however be noted that the fieldwork was not undertaken in an optimal time of year to identify ephemeral seasonal species which are only identifiable in late winter/spring and mya have been dormant. The localities of the SCC populations have not been indicated, which is necessary in order to determine which populations may be affected by the proposed mine expansion.

The conclusion of the botanical assessment states that the classification as CBA I is supported and accordingly the permissible land uses within CBA are referred to, for which mining is not an appropriate land use. The desired management objective for CBA I is to "maintain in a natural or near natural state, with no further loss of natural habitat" (Pool-Stanvliet et al, 2007). The conclusion further states that the northern section is more uniform and hence of lower conservation value and is therefore acceptable for the proposed mining expansion. We wish to query this contradiction, as this are too consists of CBA I and was rated of high sensitivity and high conservation value. The proposal is that the remainder of the area which formed part of the mining application area to the south should be conserved as a biodiversity offset.

Biodiversity Offset

Should a biodiversity offset be considered for the mining proposal, it must comply with the Draft Western Cape Guideline on Biodiversity Offsets (2015) and the Draft National Policy on Biodiversity Offsetting in South Africa (2018). The core principle for the consideration of a biodiversity offset is the mitigation hierarchy, which entails first avoid, then minimize, then mitigate/rehabilitate and only then offset the residual impact if it is of high or medium significance. The first step of avoidance would include investigation of alternative locations, but this is not always possible for mineral deposits, however construction sand is not a rare mineral resource and therefore the importance of this mineral resource relative to other deposits of sand for exploitation would need to be taken into consideration relative to the loss of CBA I habitat.

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Following thorough application of the mitigation hierarchy, including motivation of the need and desirability, a biodiversity offset would need to be implemented should the proposed mining expansion be contemplated further. It should be noted that habitat that is considered irreplaceable is not offsetable. The biodiversity offset would need to aim for "like for like" as far as possible in protecting the same habitat that will be lost. The area which will need to be conserved is determined in accordance with the ratios in the above-mentioned guidelines and policy. The ratios are determined both by the WCBSP category of the habitat and the threat status of the vegetation type. CBA I and Critically Endangered ecosystems require offsets at a ratio of 1:30 meaning the offset must be equivalent to 30 times the size of the habitat lost, although modifiers can be applied depending on other factors.

The biodiversity offset that has been proposed in the botanical assessment is framed as a conservation set-aside whereby the remainder of the application are is proposed for conservation and is typically where the development is on a transformed footprint, unlike this case where a biodiversity offset is a requirement due to loss of valuable habitat. This area could be suitable for the target offset area or part thereof, however the biodiversity offset needs to be determined in accordance with the guidelines as described above. The biodiversity offset should be determined through an independent biodiversity offset specialist study, which must also include operation and implementation. The broad landscape should be included with the investigation of the most suitable target site for the biodiversity offset and should take into consideration existing protected area expansion initiatives and connectivity.

Wetland Delineation Study

A wetland delineation study has been undertaken which describes the importance of groundwater for the dune plume, with the groundwater seeping out at the base of the mine face and is then trenched into the dam directly downstream within the current mining footprint. As described above the watercourse which ordinate on the Sandberg ridge dissipate into the groundwater once they reach the dune plume. The existing mining activity has already modified the surface and ground hydrology.

CapeNature agrees with the evaluation of the wetland conditions being anthropogenically influenced, however an important factor that has not been adequately addressed is the impact of the expansion of mining. As discussed, the freshwater within the dune plume is mainly within the aquifer, therefore the mining could expose the aquifer and will alter the hydrodynamics of both the surface and groundwater. While exposure of groundwater will not directly impact freshwater habitat, it will be essential that mine plan takes groundwater and drainage into account in order to minimise the impact. A stormwater management plan has been compiled and included in an appendix, and must integrated with the rehabilitation and closure plan.

Rehabilitation and Closure

A closure plan has been included as an appendix and the proposed end use of the mine is to return it to natural vegetation, with rehabilitation taking place progressively as mining proceeds. It should however be emphasized that the proposal is not to restore the original vegetation on site but instead to rehabilitate to functional habitat (which would be of lower conservation value than the original vegetation on site), which we agree is a more realistic goal. The design and rehabilitation will also ensure that there is free drainage of water to minimise impacts on hydrology which is supported. CapeNature recommends that a suitably qualified specialist be appointed to undertaken rehabilitation.

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
Conclusion In conclusion, CapeNature does not support the application as currently proposed as it will result in the loss of ±27 ha of CBA I habitat. The localities of the SCC populations need to be indicated in order to assess the impact and a spring survey is required in order to identify any SCCs which may have been dormant when the January survey was undertaken. Should the mining proposal be considered further a biodiversity offset study will need to be undertaken after applying the mitigation hierarchy and need and desirability will need to be motivated.				
Following receipt of the CN comments on the 2020 DEIAR, the project proposal was revisited and subsequently amended to the proposed expansion of the existing mining area with only ±4 ha of which the loss to the CBA will be offset on the remaining natural areas on the property. The amended project proposal and preliminary offset plan was presented, during a virtual meeting, to Mr Smart (CN) on the 16th of November 2021.				
Preliminary comments received from CN on 07 January 2022 regarding the amended project proposal: "CapeNature commented on the Draft EIA Report in which we indicated that we do not support the application as it will result in the loss of approximately 27 ha of Critical Biodiversity Area 1 (CBA), consisting of Breede Sand Fynbos. We further indicated that if the application were to be considered further, a biodiversity offset which complies with the Draft Western Cape Guideline on Biodiversity Offsets (2015) and the Draft National Policy on Biodiversity Offsetting in South Africa (2018) would need to be investigated. A biodiversity offset study was commissioned and a meeting was held with CapeNature on 16 November 2021 to present the proposed offset. This correspondence is based on the presentation and meeting and provides a preliminary recommendation regarding the offset proposal based on the information provided and therefore supplements the comments on the Draft EIA Report. The context of the project was presented with regards to need and desirability as this is an important consideration if a biodiversity offset is to be implemented. It was clarified that there are currently no other operational sand mines within the Central Breede Valley, with closest mine near Worcester (±60 km away) and therefore there is a high demand for use of the product from the current mine and further expansion, which is required for construction. The proposed mining area has been revised as a result of the biodiversity offset study, with the correct implementation of the mitigation hierarchy (avoid, minimize, mitigate/rehabilitate and only then offset the residual impact). As a result, the proposed mining area has been greatly reduced in extent, from 27 ha to 4 ha. It is important to therefore highlight that by undergoing the mitigation hierarchy through the biodiversity offset study that the loss of habitat and impact on biodiversity has been greatly reduced, even without the offset.				

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

In terms of the mitigation hierarchy full avoidance is not possible as the remaining sand resource on site is all located within CBA. In terms minimizing the impact, this was undertaken through refined sensitivity mapping and was informed by the existing specialist studies and amendments, a site visit and additional butterfly and faunal specialist studies. Factors which were included were connectivity, edge effects, more diverse and better condition vegetation communities and threatened butterfly localities. Three alternatives were identified, namely: expansion to the north west; expansion to the south west; and expansion to the west in two sections separated by a watercourse and buffer. The latter has been selected as the preferred alternative. With regards to the third step in the mitigation hierarchy, the end use of the proposed mine is to return to natural vegetation and the site does have rehabilitation potential, although this is dependent on the depth of the sand to the bedrock after mining.

With regards to the offset ratios, a ratio of 1:30 has been proposed, as the site is located within a CBA. According to the National Biodiversity Offset Guideline (March 2021), CBA 1 should be considered irreplaceable and therefore falls under the ambit of ecological compensation whereby the highest ratio applies. As indicated in the presentation, the Western Cape Guidelines (2015) refers to the threat status of the vegetation types for the ratios, and in this case is 1:3 for Breede Sand Fynbos, which was listed as Vulnerable in the 2011 NEMBA gazette of threatened ecosystems and also in the first draft of the revised list of threatened ecosystems (2018) provided to key stakeholders for review. However, the draft revised list of threatened ecosystems in need to protection was released on 5 November 2021, in which Breede Sand Fynbos is not listed as Critically Endangered, although the offset ratios are currently calculated according to the remaining extent and not the threat status. CapeNature supported the use of a ratio of 1:30 in initial engagements and is still endorsed. The highest ratio for the various criteria would always apply. Therefore, the offset requirement for the loss of 4 ha is 120 ha.

Investigation of the proposed target offset site started with remainder of the same property where mining is taking place. As there is a large area of CBA remaining on site for the current mining proposal, the target offset could be fully achieved on the same property (would not have been possible with the original proposal). The proposed offset site was based on the refined mapping from the botanical specialist, with the targeted area being the pristine Breede Sand Fynbos on site, thereby ensuring that the offset targets like for like in the best condition. The proposed offset area incorporates this area along with intervening areas to create a less convoluted conservation area, resulting in a target offset area of 164 ha, which exceeds the offset requirements.

In summary, CapeNature supports this proposal as a preliminary recommendation to inform decision-making. The offset meets the necessary requirements in terms of the biodiversity offset guidelines and will contribute towards the conserving priority biodiversity and the conservation estate. We do however recommend that a full biodiversity offset report is included with the final submission and should provide recommendations for inclusion as conditions of approval in the environmental authorisation (should this be issued). The location of the offset on the same property is potentially easier than off site, in terms of cost, time, practicality and involvement of additional parties.

CapeNature will not comment on the additional faunal and butterfly assessments or the refined botanical sensitivity mapping here, as we would require the full reports in order to do this. Based on the information provided however, it is apparent that the findings of these studies have been incorporated into the biodiversity offset, including habitat provision for threatened butterfly species. As previously indicated, the proposed biodiversity offset must be presented to the CapeNature Protected Area Expansion and Stewardship Review Committee on 2 February 2022, in order to provide a final recommendation, specifically regarding the protected area status. Preliminary costing has been provided for securing the site and for management. Further details regarding the logistics, costs and roles and responsibilities can be finalized in and included in the final submission. The current proposal provides for full responsibility by the applicant and the project team, but certain actions can only be undertaken by the responsible authorities. We recommend that the applicant should provide a written commitment to securing the offset in the submission of the final report."

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
Additional comments received from CN on the DEIAR (2022), as well as during the meeting with the CapeNature Protected Area Expansion and Stewardship Review Committee (02 February 2022) will be incorporated into the FEIAR and EMPR to be submitted to the DMRE for decision making. The recommended written commitment (by the MR Holder) will also for part of the FEIAR and EMPR.				
Comments received from CN on the 2022 DEIAR & EMPR (17 February 2022): "**Background** CapeNature did not support the application as initially presented in the Draft Environmental Impact Assessment (EIA) Report and Environmental Management Programme Report (EMPr) as the proposal would result in the loss of approximately 27 ha of Critical Biodiversity Area (CBA) verified as high sensitivity habitat in the botanical assessment. Subsequent to this a biodiversity offset study was commissioned which has resulted in a revised mining proposal and additional ecological specialist assessments. CapeNature provided a preliminary response regarding the proposed biodiversity offset which has been included in the comments and response report. It should however be noted that our initial comments did not only pertain to the biodiversity offset. As a result of the implementation of the mitigation hierarchy which is central to biodiversity offsets the proposed mining area has been reduced from 108 ha to 4 ha which is a significant reduction. The proposal will still result in the loss of 4 ha of CBA for which a biodiversity offset is proposed. Due to the relatively large remaining extent of natural habitat on the property outside of the current and proposed mining area the proposed offset could be accommodated on the same property. In addition to the reduced area, the mining methodology has been amended to provide for a bench mining method whereby each bench is mined and progressively rehabilitated. **Botanical Assessment** The botanical assessment has been amended to reflect the revised proposal. A second site assessment was undertaken in a more optimal time of year (August) and included the entire property which could also then be used to inform the location of the offset. This resulted in an increase of the plant species list from 63 species to 109 species, with 56 of these species within the Breede Sand Fynbos habitat which is targeted for mining and the offset. Detailed descriptions are however only provided for the habitat units within the Breede Sand Fynbos which would be affected by the mining. Two additional Species of Conservation Concern (SCCs) were encountered, but do not occur within the affected footprint. The botanical assessment recommended that Alternative 1 is the preferred alternative as the fewest individuals of SCCs would be affected, although Alternative 3 would still be acceptable. Alternative 2 is least preferred as this will impact on the highest number of SCCs. We wish to query the impact assessment section for the potential impacts on vegetation and SCCs, which was rated as high negative before mitigation and medium negative after mitigation, which was the same as the previous assessment. The impacts will be reduced compared to the previous proposal as a result of the greatly minimized footprint and the implementation of a biodiversity offset. The proposed mitigation measures in the botanical assessment are supported. Search and rescue of geophytes and succulents through translocation has been included and these specimens should be kept at an on-site nursery and used in the rehabilitation of the mine and other disturbed areas on site. We recommend				

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that the Karoo Botanical Gardens should be contacted to determine if they wish to obtain any plant material for cultivation, in particular SCCs and including collection of cuttings and seed for species which are not suitable for translocation (e.g. the microphyllous shrub SCCs).

Rehabilitation of the mined area will also play an important role in determining the long term impact of the activity. The revised botanical assessment has included rehabilitation specifications which are supported. A list of species has been included, which should be integrated with the search and rescue programme as listed above. Collection of seed and cuttings can be extended beyond the mining footprint, provided the permits are obtained from CapeNature. The rehabilitation would need to take cognisance that pioneer species are required for initial establishment and therefore the SCCs should be carefully located. The closure plan has been amended to include the recommendations of the botanical assessment with the aim of re-establishing Breede Sand Fynbos on the mined area. The report indicates that this is challenging which we agree with. The succession of the vegetation from establishment of pioneer vegetation to the establishment of the original sand fynbos vegetation has not been fully described. We recommend that a restoration specialist should be appointed to advise regarding the rehabilitation on site with the aim of re-establishing Breede Sand Fynbos on site.

Terrestrial Fauna Assessment and Butterfly Survey

A terrestrial fauna assessment was undertaken as a result of the screening tool which identified the possibility of the presence of the following threatened fauna species Black Harrier (*Circus maurus*, Endangered), Verreaux's Eagle (*Aquila verreauxii*, Vulnerable) and Riverine Rabbit (*Bunolagus monticularis*, Critically Endangered). Butterfly species were assessed in a separate assessment. The assessment indicated that the mining footprint is unlikely to provide important habitat for the two bird species as the adjacent mountains are more suitable habitat for the Verreaux's Eagle and the Black Harrier requires relatively dense cover. The mining footprint is small relative to the home ranges of these species and the remaining surrounding habitat. Of the bird species of conservation concern, the Agulhas Long Billed Lark (*Certhilauda brevirostris*) was the only one rated as high likelihood of occurrence. It is noted that the species is largely restricted to the Agulhas Plain and Overberg wheatbelt and reportedly occurs within the Breede Valley to Worcester although this has not been confirmed by bird atlas data (Peacock 2015). All of the mammal species of conservation concern which could occur on the site are rated as low likelihood, which included the Riverine Rabbit. We recommend that the rating for Riverine Rabbit should rather be noted as unknown than low, as consultation with the Endangered Wildlife Trust (EWT) has revealed that the lack of records within the Breede Valley may be as a result of low sampling effort rather than real absence. Previous surveys in 2006 and 2007 resulted in only one unconfirmed debatable sighting. The habitat selection in areas outside the Nama Karoo (e.g. Little Karoo) has revealed a wider range than only riparian vegetation. We therefore recommend that the ecological monitoring requirements for the offset should include an additional activity of camera trap surveys specifically targeted at Riverine Rabbits, but should also include other fauna species. No other faunal groups were highlighted or discussed.

The findings of the fauna assessment are that the proposed mine is acceptable provided the proposed mitigation measures are implemented. CapeNature wishes to recommend that mitigation measures are put in place for fossorial (i.e. burrowing) faunal species in areas proposed to be mined. The preferred alternative is Alternative 3, as this will have reduced edge effects. A separate butterfly assessment was undertaken for *Aloeides lutescens* (Endangered) which was flagged in the screening tool. Four site surveys were undertaken between September and December, including surveys during the flight period of *A. lutescens*, however this species was not encountered. *Chrysoritis rileyi* (Endangered) was however recorded on site, which was not flagged in the screening tool. A second potential SCC occurs on site, namely an undescribed subspecies of *Chrysoritis pyroeis* which has not been evaluated. Detailed surveys for these two species revealed the presence of *C. rileyi* within Alternative 1 and both species in the northern part of Alternative 2, however none were encountered within Alternative 3. The proposed offset area was confirmed to contain habitat for the two butterfly SCC species recorded and is therefore a suitable mitigation measure if Alternative 3 is selected. We wish to note that *Thestor kaplani* (Critically Endangered) was mentioned in the terrestrial fauna

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assessment as a species flagged in the screening tool, however this species is not mentioned in the butterfly survey report. It is noted that there is at least one record of *C. rileyi* within an area disturbed by mining. We recommend that the lepidopterist should be consulted to advise regarding the rehabilitation of the mining area to optimise the rehabilitated area as habitat for the SCC butterfly species occurring on site.

Watercourse Delineation and Habitat Assessment and Floodline Determination Study

A new watercourse delineation and habitat assessment was undertaken in addition to the previous wetland delineation report. The study encompassed the regulated 500 m buffer around the proposed alternative footprints and identified the presence of an artificial wetland within the footprint of the mined area downslope of the proposed extension area leading into an artificial dam. In addition to this, an unchanneled valley bottom wetland was identified to the south of the proposed mining area. The description of the freshwater features within the current mining area in the new watercourse delineation report differs from the previous wetland delineation report. CapeNature supports the findings from the new report as these appear more accurate than the descriptions from the previous report. The new report describes the wetland as artificial as a result of the mining activity which has lowered the ground level exposing the groundwater at the base of the slope, following which the water is then directed to the dam whereas the previous report only referred to artificial trenching of water into the dam. The presence of wetlands within the alternative footprints for expansion was investigated, in particular Alternative 3 which contains the thalweg (lowest point) along the slope with a watercourse mapped dissipating upslope of this. The report states that was no evidence of the presence of wetlands based on soil indicators. The report further indicates that there is no evidence of an episodic drainage line which transports water only during rainfall events (e.g. signs of run-off), due to the sandy substrate which promotes infiltration of water flow into the dune sand and groundwater interflow.

As indicated the other method of wetland delineation apart from soils is the presence of hydrophilic vegetation, particularly in sandy soils which don't always have well developed mottling under wetland conditions. The report indicates that only dryland species were encountered and that "the brown grass contributes to the appearance of a drainage line". It should however be noted that the botanical assessment mapped this as a drainage line, which was one of the three habitat units assessed in detail. The recommendation in the botanical assessment for drainage lines is that they should be regarded as no-go areas unless approved by the hydrologist/wetland specialist. The recommendation of the watercourse delineation and habitat assessment is that all three alternatives are acceptable as they will not impact directly on any watercourses or wetlands. The artificial wetland has resulted due to the mining activities and therefore no specific mitigation measures are proposed. CapeNature wishes to query whether the feature mapped as a drainage line in the botanical assessment requires any specific mitigation in particular related to drainage whether it is defined as a watercourse in terms of the National Water Act or not. A floodline determination study was undertaken which refers to the feature described above as a drainage line however it confirms that this is an ephemeral feature and further that this is not a defined feature. The floodline determination does not further assess the freshwater features or hydrology on site, but instead determines the 1 in 100 year floodline for the Breede River which is a fair distance and elevation downslope from the site which is unsurprisingly well outside of the floodline. We therefore wish to query the discrepancy between the mapping and definition in the botanical assessment, the watercourse delineation and habitat assessment and floodline determination study regarding the potential freshwater feature traversing Alternative 3. The stormwater management plan has been amended from the previous version in accordance with the revised proposal. However, we recommend that this needs to be finalized based on the outcome of the determination of the presence of a drainage line or not, as the run-off from this feature would need to be adequately managed and mitigated.

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Biodiversity Offset Report CapeNature commented previously on the biodiversity offset as referred to above, however prior to the compilation of the biodiversity offset report. The biodiversity offset report has taken into account all of the ecological specialist studies referred to above. Rehabilitation has been discussed as a step in the mitigation hierarchy. The biodiversity offset report has recommended Alternative 3 as the preferred alternative weighing up the various impacts as described above, even although not the preferred alternative from a mining perspective. Alternative 3 has accordingly also been recommended as the overall preferred alternative in the Draft EIA Report/EMPr which CapeNature agrees with pending the outcome from the further investigation regarding the potential drainage line as discussed above. The offset requirements at a ratio of 1:30 for the loss of 4 ha was 120 ha. The area of remaining Breede Sand Fynbos on site apart from the small, degraded patch in the north amounts to ±120 ha. This has been included in the offset area along with adjacent vegetation types to create a less convoluted conservation area configuration resulting in a total offset area of 169 ha. Targeting Breede Sand Fynbos will ensure "like for like" and provide protection for this poorly protected vegetation type under increasing threat and proposed to be listed as Critically Endangered. CapeNature supports the proposed biodiversity offset area as indicated in our initial comments and in the minutes of the stewardship review committee meeting on 1 February 2022. Preliminary costing and proposed conditions of approval have been provided in the offset study. These conditions will ensure that the operational arrangements regarding the implementation of the offset will be realized. This is an important component of the long term feasibility of the offset. CapeNature has clarified that all costs associated with the biodiversity offset are to be provided by the applicant in accordance with the "polluter pays' principle enshrined in NEMA. **Conclusion** CapeNature does not object to the revised development proposal and associated biodiversity offset as currently proposed, which is a significant improvement on the previous proposal. There are however several issues as discussed above that must be addressed before the submission of the Final EIA Report/EMPr. In particular, the presence of the drainage line and associated mitigation measures must be clarified. Should this be satisfactorily addressed, CapeNature agrees with the selection of Alternative 3 as the preferred alternative."				
Response to the comments submitted by CN on the DEIAR & EMPR: **Botanical Assessment** The recommendation that the Karoo Botanical Gardens should be contacted to determine if they wish to obtain any plant material for cultivation, in particular SCCs and including collection of cuttings and seed for species which are not suitable for translocation (e.g. the microphyllous shrub SCCs) was added to the possible mitigation measures listed in this report, as well as the EMPR. Refer to Part A(1)(g)(viii) *The possible mitigation measures that could be applied and the level of risk – Management of Vegetation Removal and Conservation of the CBA*, and Part B(1) *Mechanisms for monitoring*				

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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.

Further to this, the recommendation that a restoration specialist be approached regarding the rehabilitation on site with the aim of re-establishing Breede Sand Fynbos was also incorporated into the FEIAR & EMPR. Refer to Part A(1)(g)(viii) *The possible mitigation measures that could be applied and the level of risk – Landscaping of Mining Area*, and Part B(1) *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.*

Terrestrial Fauna Assessment and Butterfly Survey:

The comment regarding the likelihood of occurrence of the Riverine Rabbit is noted, and was added to the FEIAR under Part A(1)(g)(iv)(c) *Description of specific environmental features and infrastructure on the site – Site Specific Fauna.* The recommended camera trap surveys and mitigation measures regarding fossorial faunal species were incorporated into the FEIAR under Part A A(1)(g)(viii) *The possible mitigation measures that could be applied and the level of risk – Protection of Fauna*, and Part B(1) *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.*

Dr Dave Edge (lepidopterists) confirmed that *Thestor kaplani* is highly unlikely to occur in the Breede River valley, since the only place where it has ever been recorded is near Greyton on the southern slopes of the Riviersonderend mountains. The only commonality between the two habitats is that *Thestor kaplani* occurs in FFs13 North Sonderend Sandstone Fynbos, and this occurs on the north western boundary of the Zandberg site, at higher elevations. However, the areas where the possible mining extensions are planned do not contain this vegetation type, which has a rocky substrate. Further to this, the absence of *T. kaplani* during the various site visits conducted by the specialists to the study area supports the above.

The recommendation regarding the lepidopterist, was incorporated into the FEIAR under Part A A(1)(g)(viii) *The possible mitigation measures that could be applied and the level of risk – Landscaping of Mining Area*, and Part B(1) *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.*

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Watercourse Delineation and Habitat Assessment and Floodline Determination Study: The author is referred to page 47 of the BSA where the botanist notes that: "*Although drainage lines are considered here as no-go areas, the authors of this report would cede such a view if the input of a wetland/water specialist will be obtained. If such a specialist proposes adequate mitigation measures, then alternative area 3 can be considered as intermediate in mining preference between areas 1 and 2*.". The findings of the WDHA therefore supersedes the BSA in all water related matters and the findings and recommendations of Afzelia was likewise employed in this report. The WDHA confirms that there is no watercourse/drainage line within the footprint of S3 (despite the BSA alluding to there being one), and therefore did not propose any watercourse/drainage line specific mitigation measures for the area. The feature (alluded to in the BSA) is not defined as a watercourse in terms of the NWA, 1998. Further to this, the DWS Risk Assessment's outcome showed a risk rating of Low, which qualifies the development (within 500 m of a wetland) for authorisation under the provisions of a General Authorisation in terms of the NWA, 1998 instead of a full Water Use Licence Application to be approved by the BGCMA as the competent authority in all water related matters. **Conclusion:** As mentioned earlier, the hydrologist confirmed that there is no drainage line within the footprint of S3, and therefore no mitigation measures were proposed in this regard. Also note that the WDHA takes precedence over the BSA in all water related matters.					
Department of Agriculture, Forestry and Fisheries (DAFF)	**X**	14 January 2022	Mr Layman requested an electronic/hard copy of the DEIAR & EMPR on behalf of the Department of Agriculture.	Greenmined delivered a memory stick with an electronic copy of the DEIAR & EMPR to DAFF on 18 January 2022, after which no additional comments were received from the DAFF.	Appendix H – Proof of Public Participation
Department of Economic Development and Tourism (DEDT)	**X**	No comments were received from DEDT (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.			
Department of Labour (DoL)	**X**	No comments were received from DoL (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.			
Department of Rural Development and Land Reform (DRDLR)	**X**	No comments were received from DRDLR (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.			

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
Department of Social Development (DSD)	X	No comments were received from DSD (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.			
Heritage Western Cape (HWC)	X	28 January 2020	Me Waseefa Dhansay requested a NID to be submitted to HWC for their perusal.	The NID was submitted to HWC on 10 February 2020.	Appendix H – Proof of Public Participation

On 19 February 2020, HWC responded on the NID as follows:

"Heritage Western Cape is in receipt of your application for the above matter received on 10 February 2020. This matter was discussed at the Heritage Officers meeting held on 17 February 2020. You are hereby notified that, since there is reason to believe that the proposed development will impact on heritage resources, HWC requires that a Heritage Impact Assessment (HIA) that satisfies the provisions of section 38(3) of the NHRA be submitted. This HIA must have specific reference to the following:

- Archaeological Impact Assessment;
- Palaeontological Impact Assessment;

The required HIA must have an integrated set of recommendations. The comments of relevant registered conservation bodies and the relevant Municipality must be requested and included in the HIA where provided. Proof of these requests must be supplied. Please note, should you require the HIA to be submitted as a Phased HIA, a written request must be submitted to HWC prior to submission. HWC reserves the right to determine whether a phased HIA is acceptable on a case by case basis.

This decision is subject to an appeal period of 14 working days. The appeal period shall be taken from the date above. It should be noted that for an appeal to be deemed valid it must refer to the decision, it must be submitted by the due date and it must set out the grounds of the appeal. Appeals must be addressed to the official named above and it is the responsibility of the appellant to confirm that the appeal has been received within the appeal period. Applicants are strongly advised to review and adhere to the time limits contained the Standard Operational Procedure (SOP) between DEADP and HWC. The SOP can be found using the following link http://www.hwc.org.za/node/293.

HWC reserves the right to request additional information as required."

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
Response received from HWC on the DSR notification: "Please note in order for HWC to provide a formal comment the proposal, a formal Notification of Intent to Develop is required to be submitted."					
Greenmined responded on 15 June 2020 as follows: "The NID for the project was already submitted on 10 February 2020, upon which HWC responded with a request for an HIA on 19 February 2020 (see attached). The specialists were accordingly commissioned to do the HIA (inclusive of a palaeontological opinion). However, as HWC is registered as an I&AP on the EIA process the notice that the draft Scoping Report (DSR) is ready for comments were sent to you as a curtsy and to keep you informed on the process. We also loaded the DSR onto the SAHRIS website for ease of reference. As soon as the HIA is ready we will load it onto SAHRIS and notify you accordingly. The HIA will also form part of the draft Environmental Impact Assessment Report to be compiled upon approval of the final Scoping Report."					
HWC responded (15 June 2020) that they will await the submission of the HIA and provide comments thereon.					
ACO Associates CC was appointed to conduct the HIA (inclusive of a palaeontological opinion) that was uploaded onto the SAHRIS website for perusal and commenting of HWC on 27 July 2020. The findings of the HIA was also incorporated into the DEIAR. To date no additional response was received from HWC.					
South African Heritage Resources Agency (SAHRA)	X	No comments were received from SAHRA (on the DEIAR and draft EMPR) that could be incorporated into the final EIAR and EMPR.			
OTHER AFFECTED PARTIES		-	-	-	-
INTERESTED PARTIES		-	-	-	-
Deo Volente Sand-mine (Me Satchel)		10 February 2020	Me Deb Satchel registered as I&AP on the project.	Greenmined acknowledged receipt of Me Satchel's registration on 10 February 2020 and confirmed that she will be notified of the DSR for her perusal. Me Satchel was informed of the availability of the DSR on 12 June 2020. To date no additional comments were received.	Appendix H – Proof of Public Participation

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).

This section describes the pre-mining (in terms of the proposed extension area) biophysical-, cultural- and socio-economic environment of the larger study area. It is important to note that the Zandberg Sand Mine has been operational for approximately 26 years, 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 extension area.

PHYSICAL ENVIRONMENT

CLIMATE

(Information extracted from the Zandberg Sand Mine Floodline Determination Report, 2021)

The Robertson area receives an average of 270 mm of precipitation per year (left chart). The highest rainfall usually occurs in August averaging 49 mm, while the lowest occurs in January with an average of 16 mm. The monthly distribution of average daily maximum temperatures (middle chart) shows that the average midday temperatures range from 16.7˚C in July to 29˚C in February. The region is the coldest during July (4.2°C on average). Consult the chart below (right) for an indication of the monthly variation of average night-time temperatures.

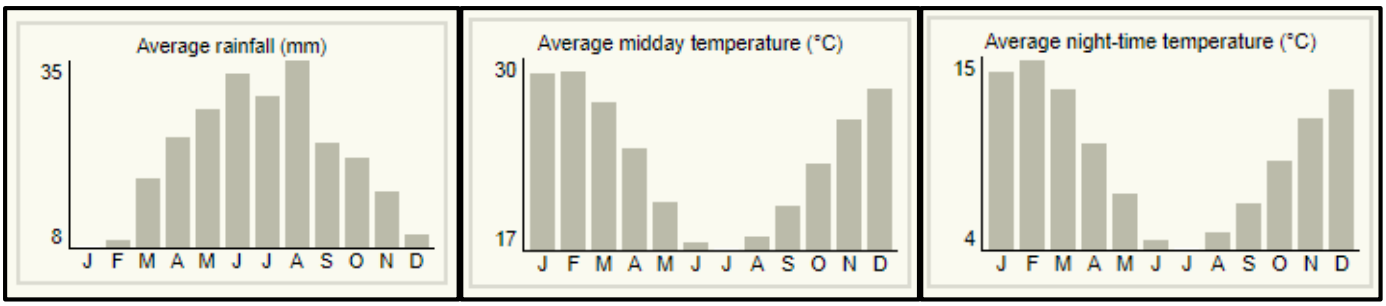

Figure 25: Charts showing the climatic averages of the Robertson area (information obtained from SAExplorer).

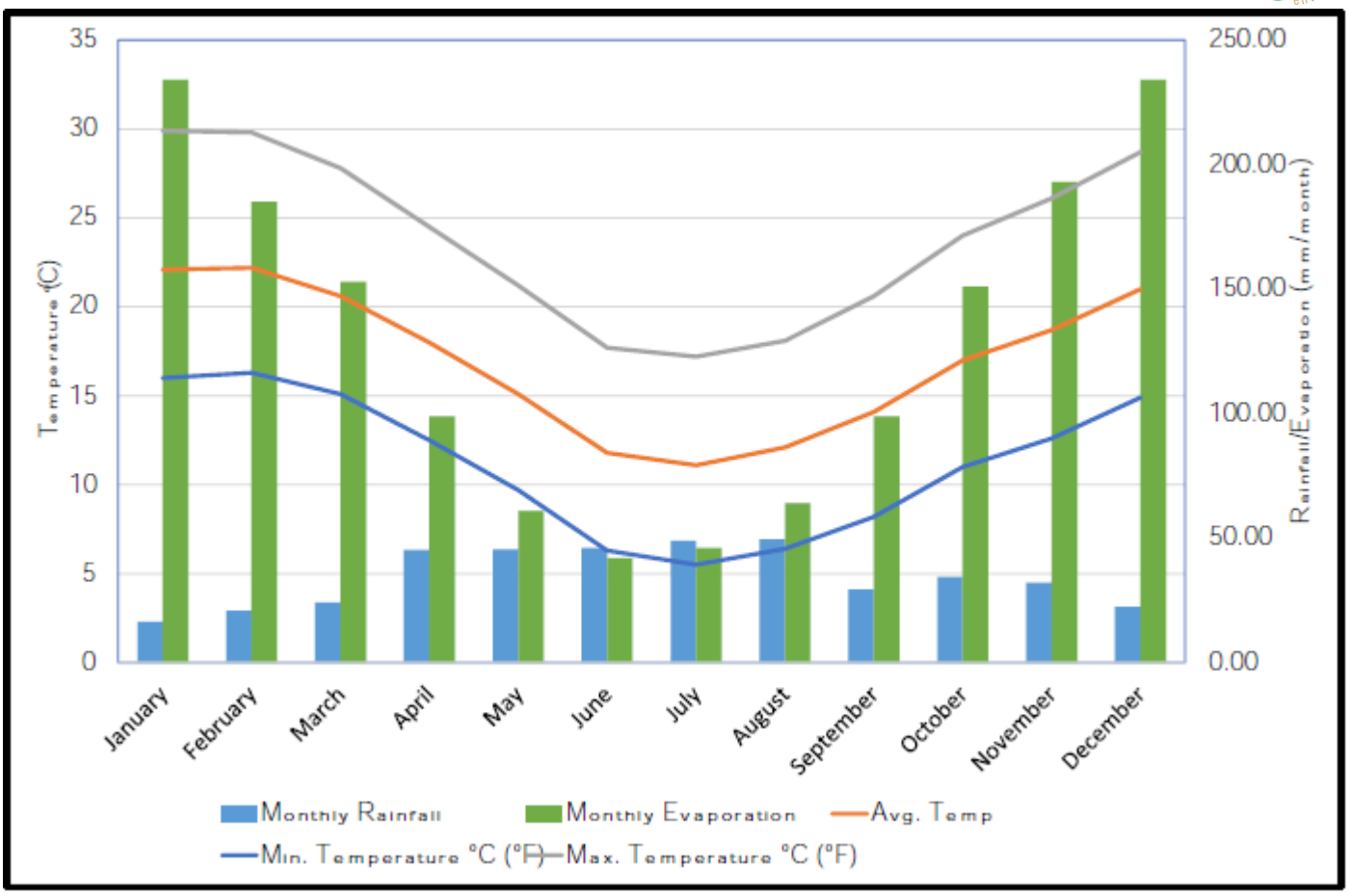

Figure 26: Graph of the study area showing evaporation vs rainfall (image obtained from the Floodline Determination Report).

During the summer/spring months the south to south-eastern wind dominates in the Robertson area (blowing in a northern direction), whilst during the winter/autumn months the west-north-western wind is dominant as presented in the figure below. According to the data of windfinder.com the average wind speeds range from 4 – 6 kts during the year.

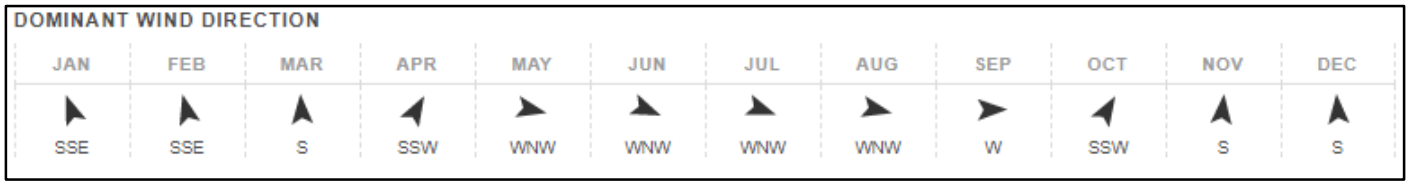

Figure 27: Dominant wind direction of the Robertson area (information obtained from windfinder.com).

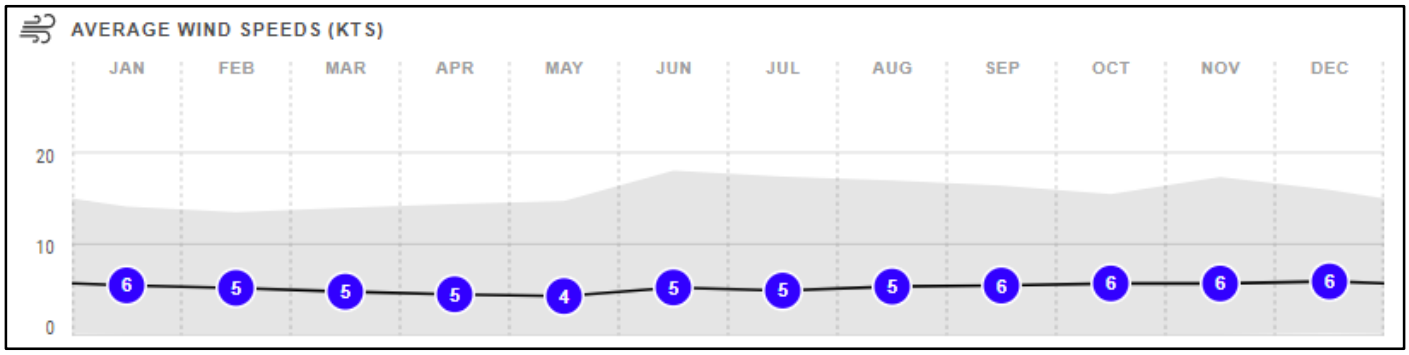

Figure 28: Average wind speeds of the Robertson area (information obtained from windfinder.com).

TOPOGRAPHY

The north-western boundary of the farm Zandberg Fontein extends up the leeward side of the Zandberg mountain that divides the northern Breede River valley from the southern highly undulating area. The topography of the study area is described as a steep to moderately sloping terrain.

The following figure shows the change in elevation when a path is drawn from the highest point (316 masl) of S2 to the lowest corner (238 masl) of this alternative, across the existing mining area towards the lowest point (217 masl) of S1, and finally up to the western and highest corner at 257 masl. The path shows an elevation gain of 44.2 m over the 1.09 km distance, with a maximum slope of 20.2% and an average slope of 10.8%.

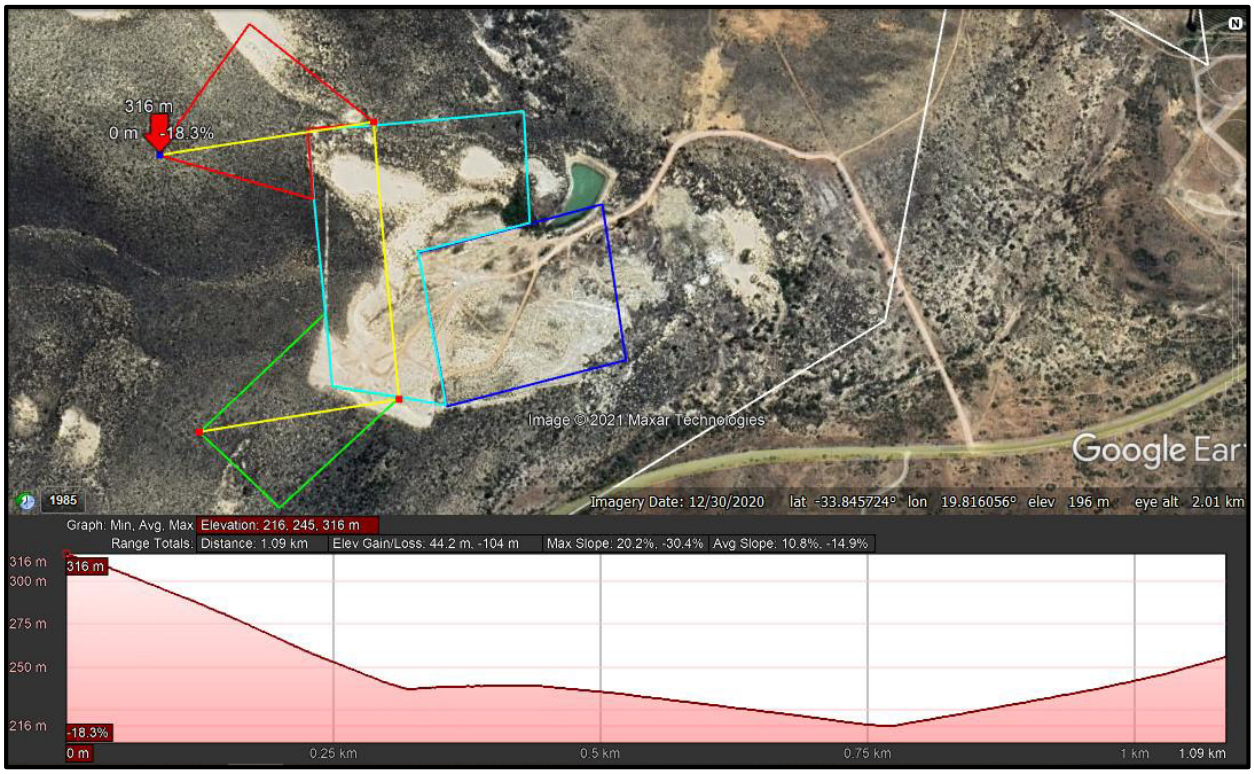

Figure 29: Elevation profile of the study area (image obtained from Google Earth).

VISUAL CHARACTERISTICS

Portion 4 of the farm Zandberg Fontein No 97 is zoned for agricultural use with a mostly undisturbed footprint. Presently, sand mining has been done over approximately 9 ha of the farm with a dam established to the north of the mining area. Owing to the elevation of the site most of the farm is visible from the La Chasseur/Agter-Kliphoogte road passing the farm to Robertson as well as the farms opposite the road. In light of this the proposed extension will be visible from the north, east, south and south-west. The Zandberg screens the operation to the north-west/north.

AIR AND NOISE QUALITY

The air and noise ambiance of the study area was historically representative of an agricultural environment in which farming equipment operated with occasional dust emissions from denuded areas. The surrounding area has since been transformed with the introduction of small scale sand mining, viticulture (nearer to Robertson) and the movement of traffic along the La Chasseur/Agter-Kliphoogte road, all of which affects the air and noise ambiance of the study area. Mining at the Zandberg Sand Mine contributes the emissions of one FEL and ±10 trucks/day to the receiving environment. Should the S102 application be approved, the extension of the footprint will not cause a cumulative impact as mining will gradually progress into the extension area.

GEOLOGY AND SOIL

(Information extracted from the Geology, Geotechnical and Mining Assessment of Zandberg Sandput, 2021)

Regional Geology:

The oldest rocks in the area are the meta-sediments of the Malmesbury Group which are exposed mainly by fault-controlled valleys. Granite plutons of the Cape Granite Suite have intruded into the Malmesbury Group and small outcrops are evident throughout the region. The Cape Supergroup occupies most of the area and was deposited in a trough depositional setting. The Supergroup constitutes the largely arenaceous Table Mountain Group, with sediments dating from the Ordovician, Silurian and Devonian periods. The Table Mountain Group overlies the Malmesbury and Cape Granite rocks (unconformable), and underlies the Bokkeveld Group (composed predominantly of argillaceous beds) and the uppermost Witteberg Group (consisting of alternating shales and sandstones).

To the north of the Breede-Gouritz WMA the basal units of the Karoo Supergroup outcrop and are represented by the basal Dwyka Group (glacial diamictite), the mostly argillaceous Ecca Group and the shales and subordinate sandstones of the Beaufort group. In the Worcester region the conglomerate with interbedded sandstone of the Conglomerate Formation outcrops, occurring primarily along the Worcester fault. There are a number of Tertiary and Quaternary deposits within the Breede-Gouritz WMA and they consist mostly of unconsolidated to semi-consolidated shelly, calcareous sands of the Bredasdorp Formation. There is also a considerable deposit of alluvium consisting of clay, sand, pebbles and boulders which occurs in the valley of the Breede River and its tributaries. There are also limited occurrences of coastal sands deposited mainly between Agulhas and the Breede River Mouth. Apart from the intrusions of the Cape Granite Suite into the Malmesbury Group, a number of mafic dykes have intruded into the Malmesbury Group and Cape Granite Suite-notably in the Cape Peninsula, Worcester, Tulbagh and Wellington areas. The dykes commonly occur with a north-westerly to north-easterly strike direction and in swarms (Le Bron, 2021).

Structural Geology:

The Cape Fold Belt (CFB) is the dominant structural feature in the Breede-Gouritz WMA and the greater Southern and Western Cape area. In the Breede-Gouritz WMA the CFB occurs as a largely east-west striking feature and is composed of sedimentary and metamorphic rocks. Two major Orogenic events have determined the structure of the area, namely the Saldanian and Cape Orogenies. The Saldanian Orogeny refers t the deformation of the pre-Cape Malmesbury starta which resulted in folding, shearing and faulting. There were a number of deformational phases but folding occurred mainly along a north-west trending axis.

Three tectonic domains exist as a result of the Cape Orogeny, namely the Southern Cape Branch to the east, the Cedarberg Branch to the west and the Syntaxis Domain where they meet. The Southern Cape Branch comprises north verging eastward trending folds as well as thrusts and normal faults. The Syntaxis Domain consists of varied northeast striking faults and is defined as the area where the Cedarberg Branches and Southern Cape Branches merge.

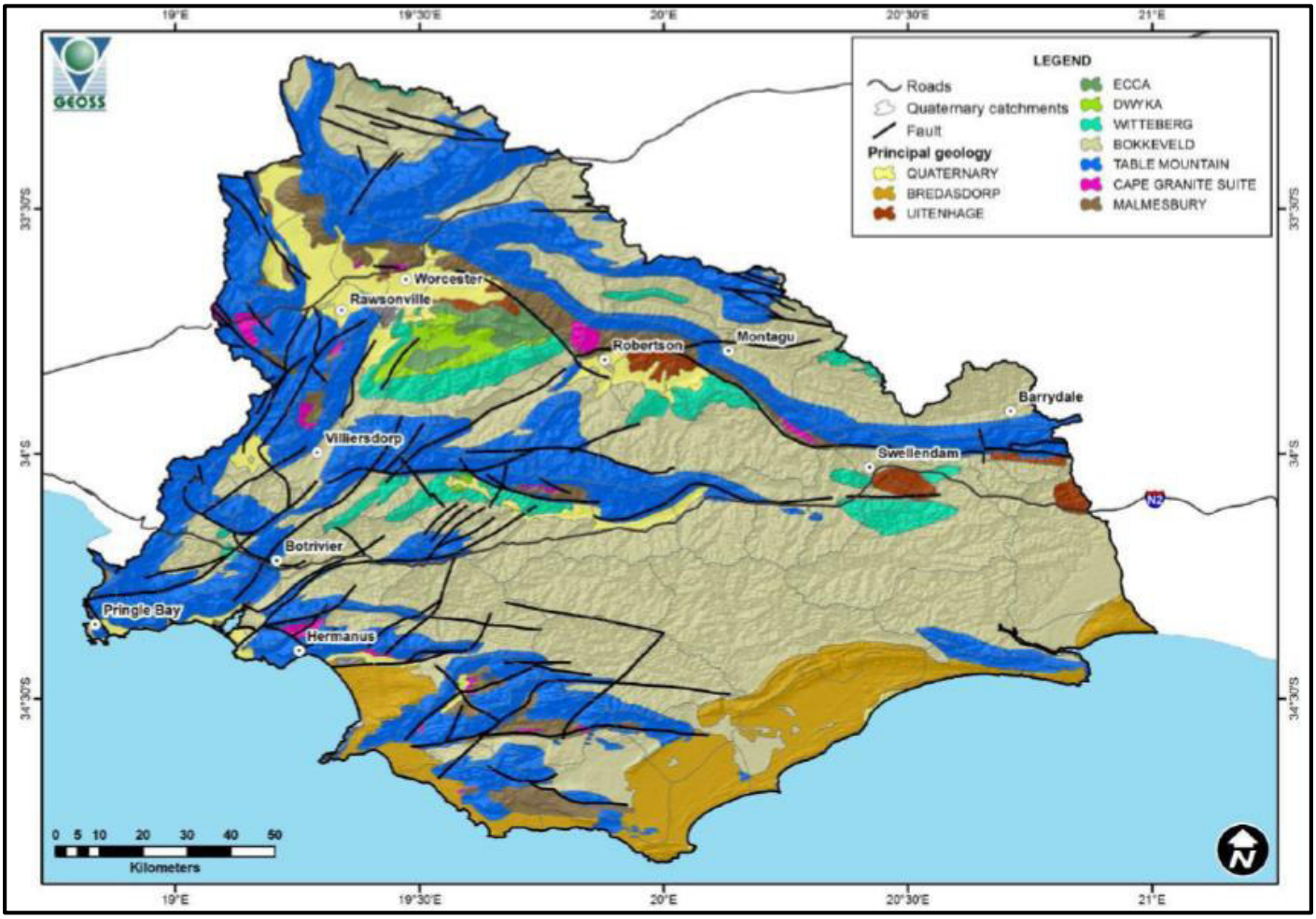

Figure 30: Major geological structures of the Cape Supergroup (image obtained from MLB Consulting).

Seismicity:

The seismically active areas in RSA are broadly divided into two groups, namely those where seismic activity is due to natural seismic events (Zone 1 areas), and those where it is predominantly due to mining activity (Zone 2 areas). Zandberg Sandput is located in an area which is not known to be seismically active, which is also suggested in the plan of earthquakes occurring in the past 100 years produced by Singh et al, 2009 (following figure).

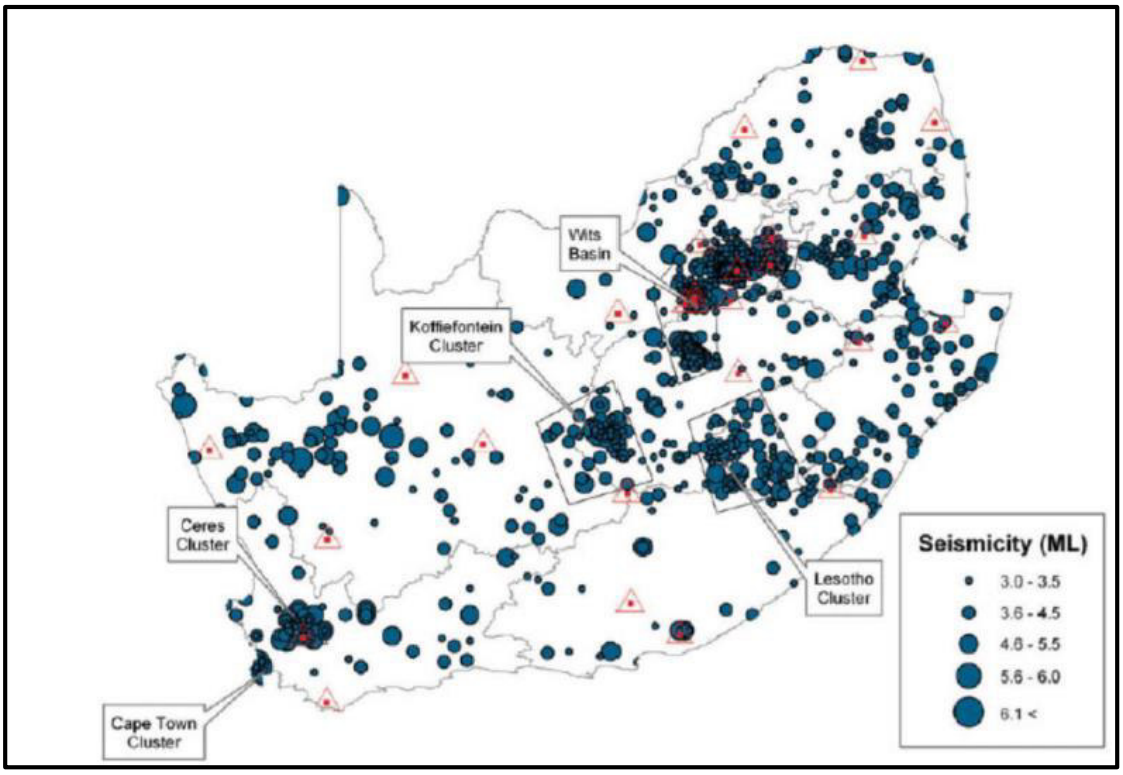

Figure 31: Earthquakes in South Africa for the period 1809 until 2008. The seismic stations are represented by red triangles (image obtained from MLB Consulting).

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

HYDROLOGY AND GEOHYDROLOGY

(Information extracted from the Watercourse Delineation and Habitat Assessment, 2021)

Quaternary Catchment and Drainage Setting:

The study area is located within the Upper Breede Sub-Water Management Area which is managed as part of the Breede-Gouritz Water Management Area by the Department of Water and Sanitation (DWS). Portion 4 of Zandberg Fontein 97 falls within the H40J quaternary catchment. The catchment is drained by the perennial Breede River that is more than a kilometre removed from the study area.

Overland flows within the study area are limited owing to the deep sand of the site. The hydrologist notes that normally, rainfall seeps into the ground and then moves through the landscape as interflow.

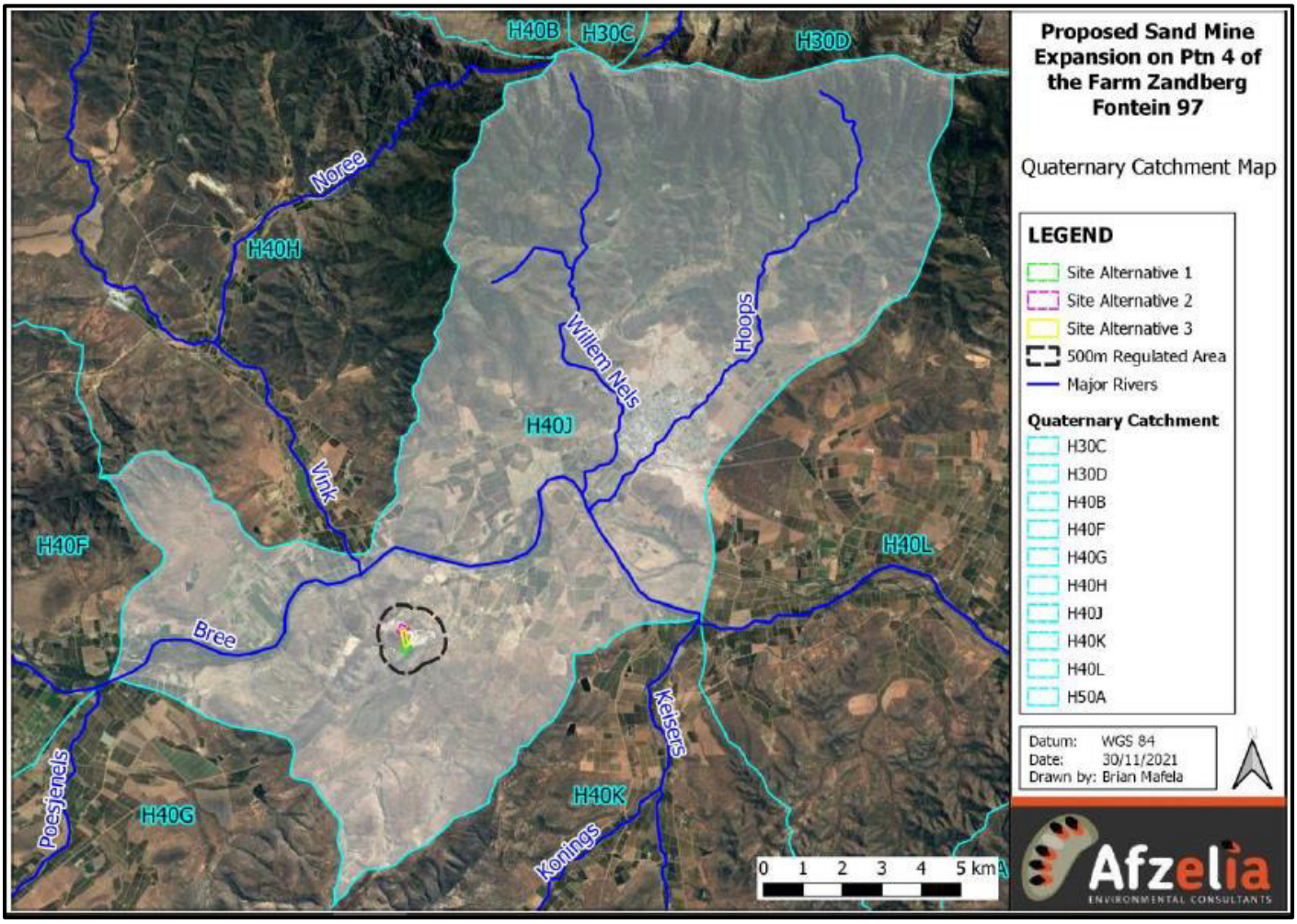

Figure 32: Figure showing the quaternary catchment of the study area (image obtained from Afzelia).

The study area occurs within sub-quaternary catchment No. 9043 identified as a Rehab FEPA (Freshwater Priority Area) which means the catchment is highly suitable for the re-introduction of threatened fish species that once occurred there (Afzelia, 2021). No priority wetlands (Wetland FEPA's) were identified within the 500 m regulated area.

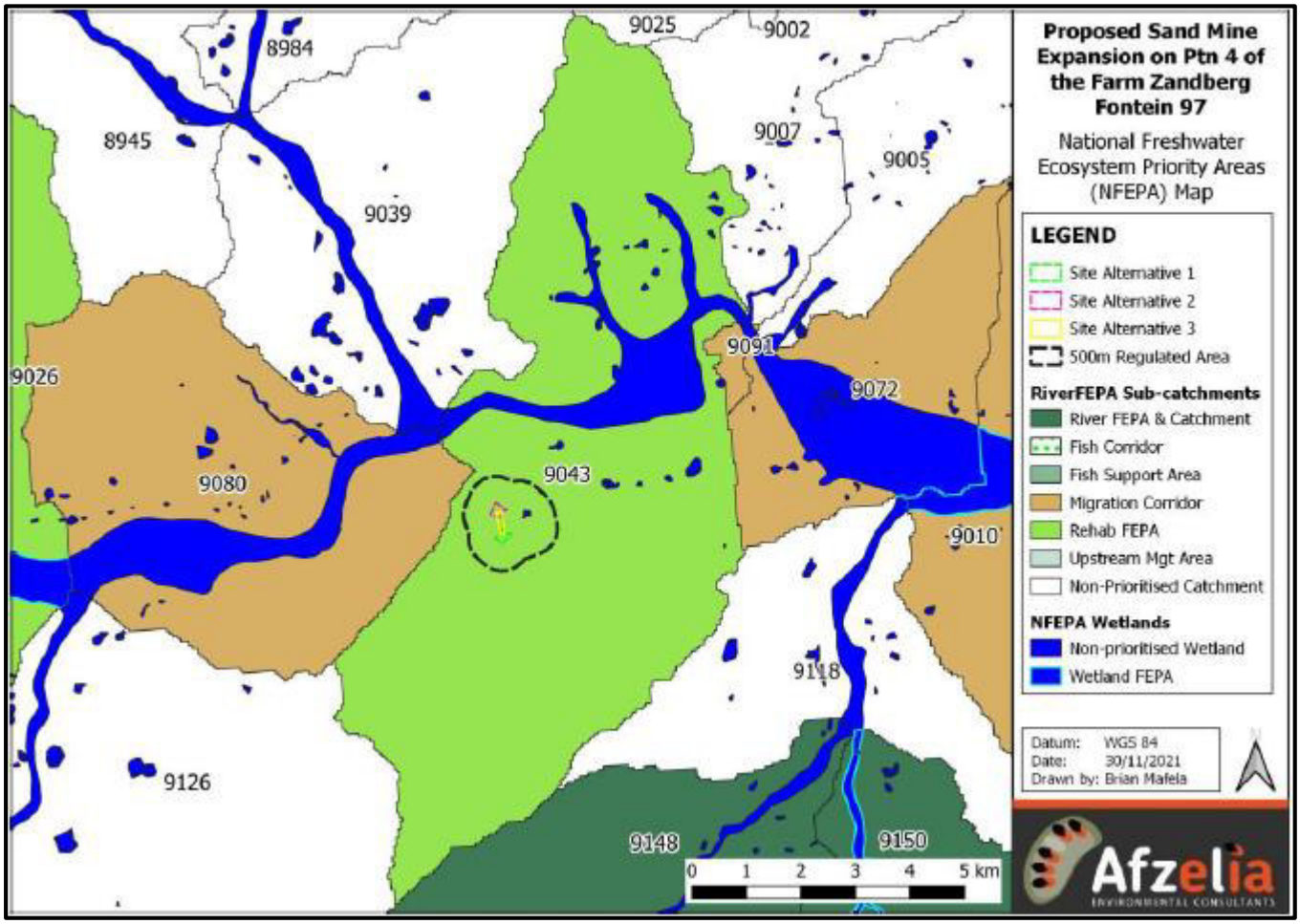

Figure 33: Map showing the position of the study area in relation to the Freshwater Ecosystem Priority Area map. (Image obtained from Afzelia)

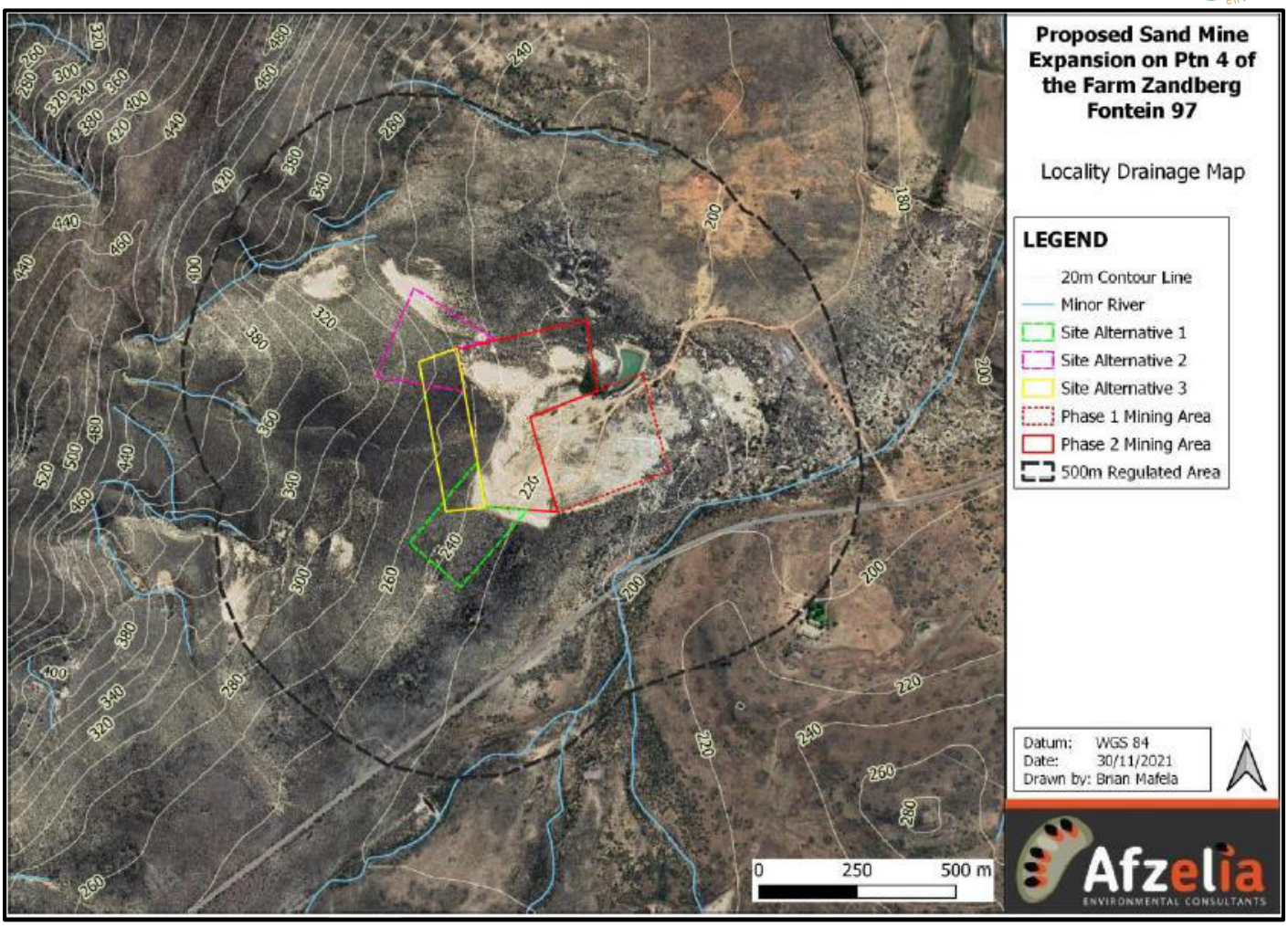

Figure 34: Drainage setting of the study area (image obtained from Afzelia).

It is known that the water table in the valley below the mine is ±3 m under the surface. A borehole in the valley indicated that the groundwater is artesian.

Sustainable Drop Projects studied the potential presence of 1:100 flood lines within the study area in order to fulfil the requirements of the NWA, 1998. The 100-year floodline results of the ensuing hydraulic modelling is presented in the following figure that clearly shows all three site alternatives (S1-S3) being outside the inundation area.

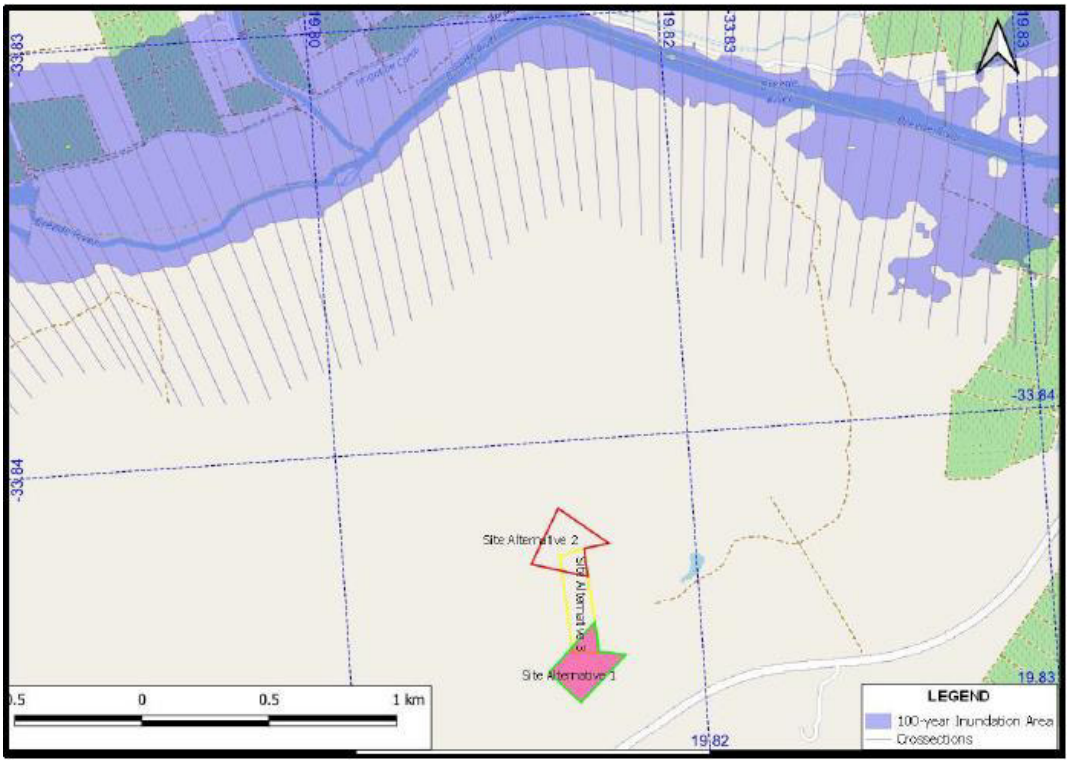

Figure 35: Map showing the 100-year inundation area in relation to the proposed extension areas (S1-S3). (Sustainable Drop Projects, 2021).

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

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 position of the study area is layered over the Mining and Biodiversity Map, as shown in the figure below, all three site alternatives extend across an area of highest biodiversity importance with a corresponding rating of highest risk for mining. The Mining and Biodiversity Guideline's describes areas of highest biodiversity importance as: "*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.

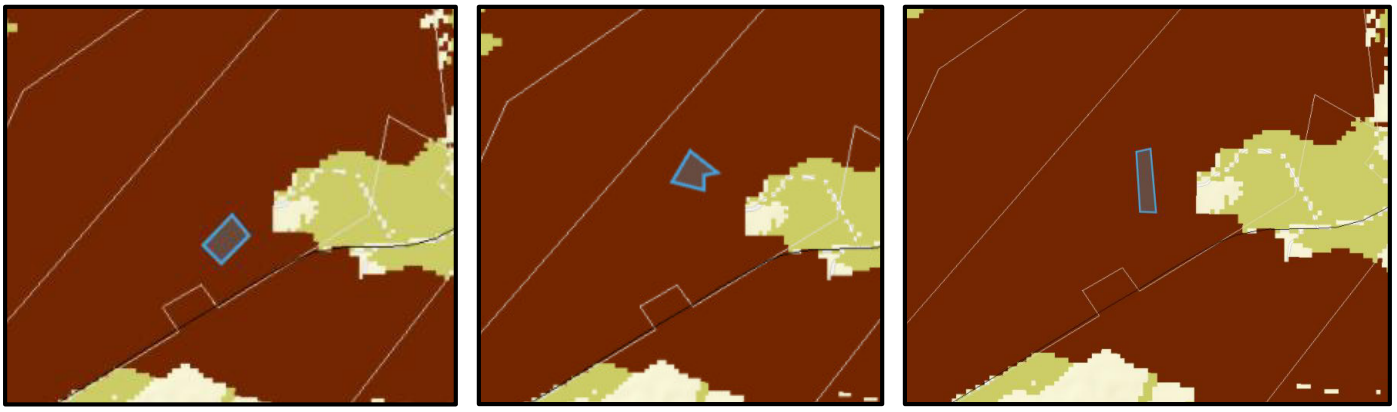

Figure 36: The Mining and Biodiversity importance map overlain by the footprint of S1 (first pane), S2 (second pane), and S3 (third pane). Dark brown – highest biodiversity importance, highest risk for mining, sand colour – moderate biodiversity importance, moderate risk for mining. (Image obtained from the BGIS Map Viewer: Mining Guidelines)

BIODIVERSITY CONSERVATION AREAS

(Refer to the Botanical Study and Assessment for the Zandberg Fontein Sand Mine near Robertson, Western Cape Province – December 2021 attached as Appendix I2)

National Protected Areas Expansion Strategy (NPAES):

The proposed extension area is located outside any NPAES Areas (see figure below), any Formal Protected-, or Informal Protected Areas. The nearest NPAES Area is located approximately 1.03 km south-east (Vrolijkheid), whilst the nearest Informal Protected Area is located ±7.8 km to the south-west (Skuilkrans Private Nature Reserve). The nearest Formal Protected Area, the Langeberg-Wes Mountain Catchment Area, is located 7.6 km north of the project site. Subsequently this development will not have an impact on the national ecosystem-specific protected area targets.

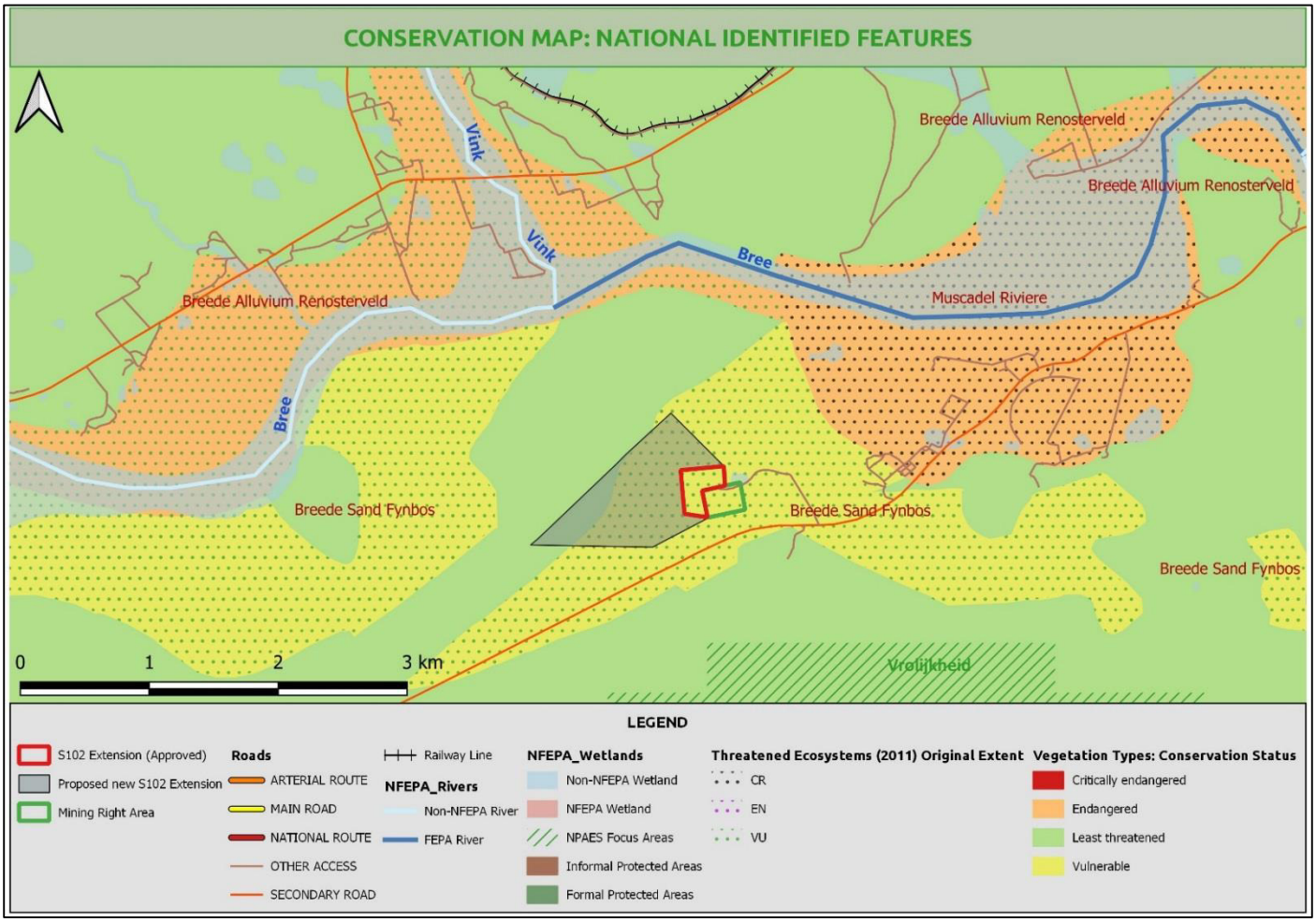

Figure 37: Map illustrating the various conservation priority areas found within the greater surroundings of the proposed mining site (image obtained from Nkurenkuru Ecology & Biodiversity)

National Level of Conservation Priorities (Threatened Ecosystems):

The study area (S1 – S3) is located within one vegetation type (Breede Sand Fynbos), and close by another (North Sonderend Sandstone Fynbos) according to Mucina and Rutherford (2006). Currently, the first unit, namely Breede Sand Fynbos, is classified as Vulnerable, since only 2% is protected in the Hawequas and Quaggas Berg Private Nature Reserves, while none of the unit is conserved in statutory conservation areas, and some 53.4% of the area has been transformed. Thus, the conservation target of 30% is likely attainable, but will probably not be realized since only 2% is currently protected. The second unit, namely North Sonderend Sandstone Fynbos, is classified as Least Threatened, since 21% of the 30% conservation target is statutorily conserved in the Riviersonderend Nature Reserve, with an additional 51% mainly in a private conservation area of the same name, while only low levels of transformation has occurred.

Furthermore, this site falls within a broader area which is also listed within the Threatened Ecosystem List, 2012 (NEM:BA) as a Vulnerable Ecosystem (Breede Sand Fynbos Ecosystem) and correlates with the Breede Sand Fynbos Vegetation Type as classified by Mucina and Rutherford, 2012.

The following figure shows the ecosystem threat status of the earmarked property.

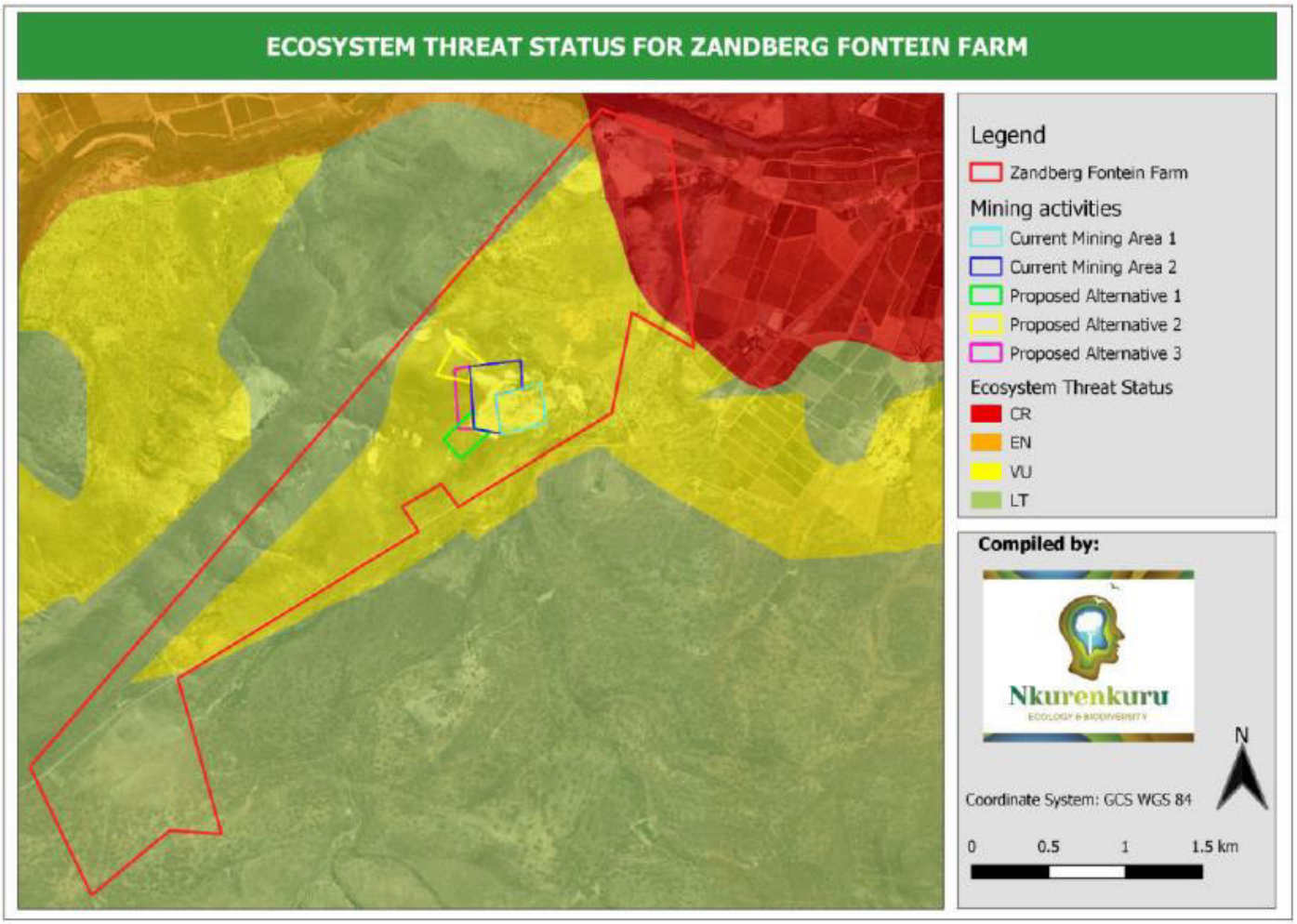

Figure 38: Treat status of ecosystems/vegetation types on Zandberg Fontein farm (image obtained from Nkurenkuru Ecology & Biodiversity)

Critical Biodiversity Areas and Broad Scale Ecological Processes:

Critical Biodiversity Areas (CBA) have been identified for all municipal areas of the Western Cape Province (CapeNature, 2017) and are published by SANBI. According to the 2017 Western Cape Biodiversity Spatial Plan (WCBSP), the Langeberg Critical Biodiversity Area 1 (CBA) extends across the earmarked area (refer to following figure). The WCBSP provides the following information regarding a CBA:

- 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.*"

Figure 39: 2017 Western Cape Biodiversity Spatial Plan showing the footprint of S1, S2, and S3 (blue polygons), in relation to the Langeberg CBA 1: Terrestrial (green). (Image obtained from the BGIS Map Viewer: 2017 Western Cape Biodiversity Spatial Plan)

The BSA confirmed that the mining footprint (S1 – S3) is located almost entirely within a CBA1, together with some randomly scattered pixels of CBA2, and a small unclassified portion. The insignificant and random nature of the CBA2 pixels are likely a side-effect of the algorithm used to generate the CBA spatial layers. Ground-truthing confirmed the both proposed mining areas (S1 – S3) conform to CBA1 criteria, including a portion not originally classified.

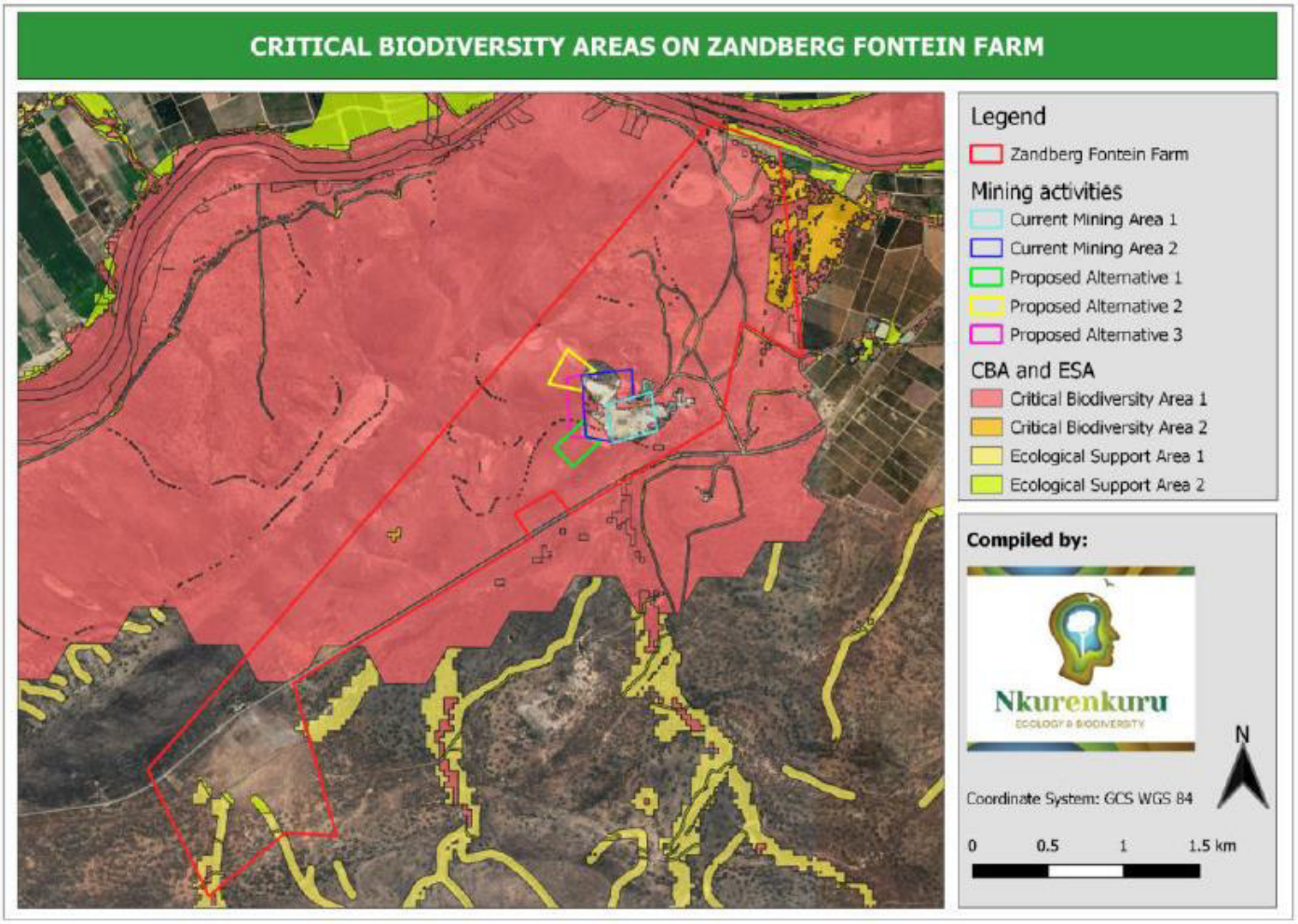

Figure 40: Critical biodiversity areas (CBA) found on Zandberg Fontein farm in relation to the proposed alternative mining areas (image obtained from Nkurenkuru Ecology & Biodiversity).

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

VEGETATION

(Refer to the Botanical Study and Assessment for the Zandberg Fontein Sand Mine near Robertson, Western Cape Province – December 2021 attached as Appendix I2)

The majority of the site is mapped as Breede Sand Fynbos (FFd8), with a smaller section of North Sonderend Sandstone Fynbos (FFS13) towards the western- and south-western boundary, as well as Robertson Karoo (SKv7) to the extreme southwest and Muscadel Riviere (AZi8) to the northeast (Mucina & Rutherford, 2006 and 2018). Only Breede Sand Fynbos and North Sonderend Sandstone Fynbos are described below, since only they will either be directly impacted by (in the former), or are close to (in the latter) to the proposed mining areas (S1 – S3).

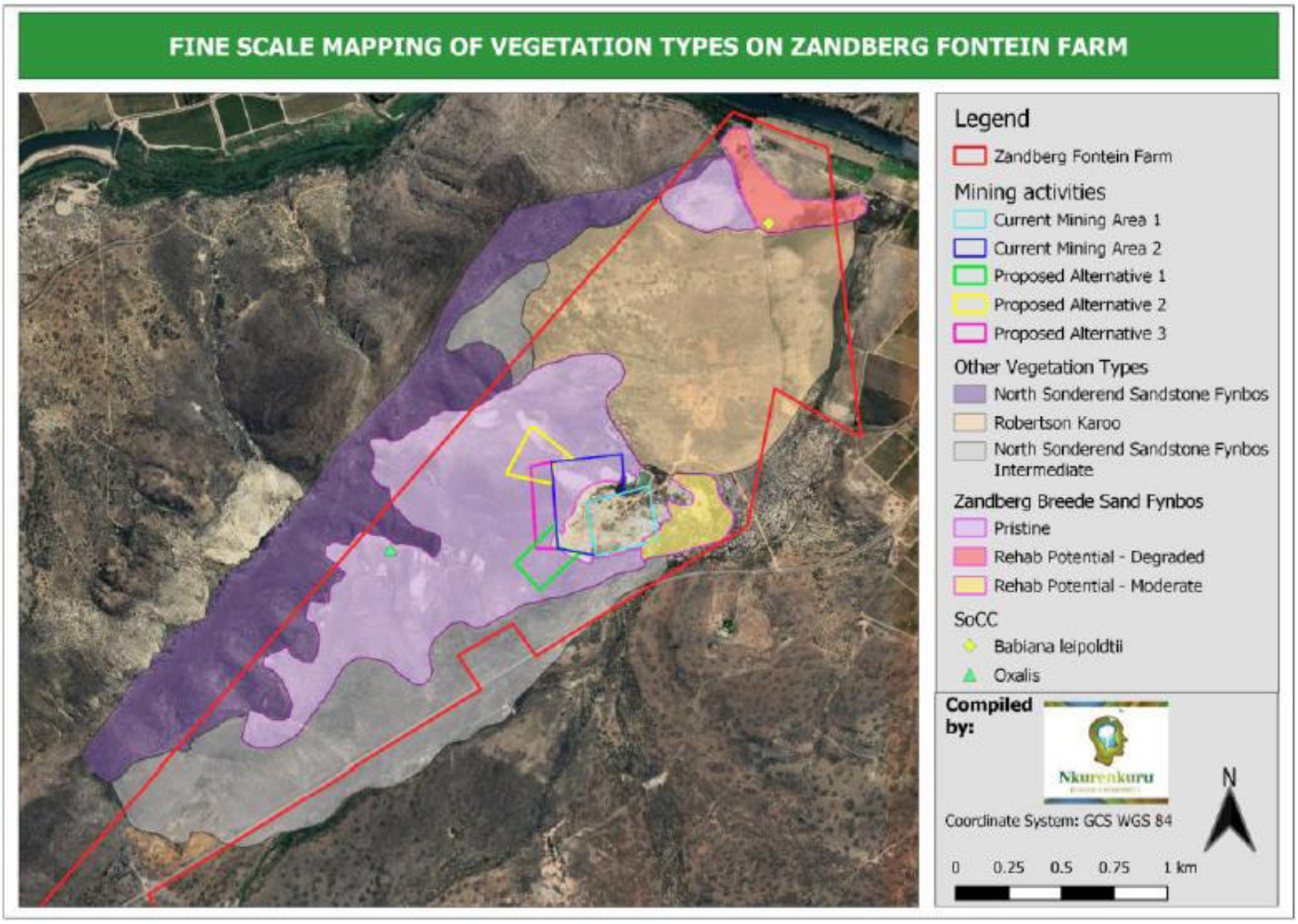

Figure 41: Map illustrating the different vegetation types, according to VegMap 2018, found on Zandberg Fontein farm and in the general region (image obtained from Nkurenkuru Ecology & Biodiversity).

Breede Sand Fynbos (FFd8):

The unit overall is very fragmented, occurring as dune plumes and dune seas in the valley bottoms primarily south of the Breede River, also extending up the sides of adjacent hills. The vegetation is characterised as an open proteoid tall shrubland combined with an open to medium dense restioid herbland in undergrowth (Mucina & Rutherford, 2012). The dominant components are proteoid and restioid fynbos.

The unit is currently mapped to comprise ±97 km² of land area. However, the largest mapped fragment is currently almost entirely inundated by the Theewaterskloof dam, covering a total of 67 km², which leaves at most 30 km² remaining; this is still likely an overestimate, since other mapped fragments have also been affected by transformation (Botha & Keet, 2021).

Breede Sand Fynbos is currently classified as Vulnerable, since its conservation target is 30%, but none of the unit is conserved in statutory conservation areas, while only

2% is protected in the Hawequas and Quaggas Berg Private Natural Reserve. Mucina and Rutherford reported that 53.4% of the area has been transformed mainly for pasture and vineyards, as well as the building of the Brandvlei and Kwaggaskloof Dams. Low levels of infestation by alien *Eucalyptus, Acacia saligna*, and *Hakea sericea* have been recorded.

DOMINANT SPECIES	
Growth Form	**Key Species**
Tall shrubs	*Leucospermum rodolentum (dominant), Metalasia densa, Protea laurifolia*
Low shrubs	*Afrolimon longifolium, Aspalathus heterophylla, Euchaetis pungens, Lachnospermum fasciculatum, Leucadendron brunioides var. brunioides, L. salignum, Wiborgia fusca*
Succulent shrub	*Ruschia caroli*
Herbs	*Pelargonium senecioides*
Geophytic Herb	*Romulea setifolia*
Graminoids	*Cynodon dactylon, Ehrharta villosa var. villosa, Ficinia lateralis, Willdenowia incurvata*
ENDEMIC SPECIES	
Growth Form	**Key Species**
Geophytic herb	*Ixia pumilio*

Figure 42: Key species associated with the Breede Sand Fynbos according to Mucina and Rutherford (2006) (image obtained from Nkurenkuru Ecology & Biodiversity).

North Sonderend Sandstone Fynbos:

This unit is distributed from the northern slopes of the Riviersonderend Mountains from Villiersdopr to Bromberg and Luiperdsberg east of Stormvlei, including Klipberg and Sandberg towards Robertson. This unit consists of gentle to steep north-facing slopes, highly dissected in a few places, with a midslope sandy plateau and extensive gentle lower slopes.

The vegetation type is known as an open, tall, proteoid-leaved evergreen shrubland with a dense moderately tall, ericoid-leaved shrubland as understorey. While extensive proteoid and restioid fynbos dominate the middle slopes, the unit is mainly comprised of asteraceous fynbos on the western and lower slopes. Ericaceous fynbos is restricted to the highest peaks. The deep sandy habitat of the northern plateau is a distinctive feature associated with many endemic species. The unit comprises only

±531 km² of land area and is classified as Least Threatened. The conservation target is 30%, and 21% of the vegetation type is statutorily conserved in the Riviersonderend Nature Reserve, with an additional 51% mainly in a private conservation area of the same name. Mucina and Rutherford reported that ±2% of the area has been transformed by cultivation for protea nurseries and fruit orchards. Alien *Pinus pinaster* and *Hakea sericea* occasionally occur over about half of the area.

DOMINANT SPECIES	
Growth Form	**Key Species**
Small trees	*Acacia karroo, Cunonia capensis, Metrosideros angustifolia, Protea nitida*
Tall shrubs	*Protea neriifolia, P. repens, Polygala fruticosa, Protea laurifolia, Searsia pyroides*
Low shrubs	*Agathosma leptospermoides, Athanasia oocephala, Cliffortia ruscifolia, Elytropappus glandulosus, Erica denticulata, E. globiceps subsp. zeyheri, E. jonasiana, E. lateralis, E. modesta, E. plukenetii subsp. plukenetii, E. serrata, E. taxifolia, E. vestita, Leucadendron laureolum, L. microcephalum, L. salignum, Leucospermum calligerum, Muraltia ferox, Paranomus adiantifolius, P. capitatus, Passerina burchelii, Phaenocoma prolifera, Prismatocarpus lycioides, Protea amplexicaulis, P. cynaroides, P. humiflora, P lorifolia, P. scabra, P. subulifolia, Serurria gremialis, S. viridifolia, Stoebe spiralis*
Succulent shrubs	*Drosanthemum leptum, Ruschia acutangula*
Herbs	*Edmondia sesamoides, Ursinia oreogena*
Geophytic herb	*Gladiolus atropictus*
Graminoids	*Ehrharta ramosa subsp. aphylla, Hypodiscus squamosus, H. striatus, Ischyrolepis capensis, I. distracta, I. gaudichaudiana, Pentaschistis eriostoma, Restio filiformis, Thamnochortus cinereus*
ENDEMIC SPECIES	
Growth Form	**Key Species**
Low shrubs	*Leucadendron burchellii, L. immoderatum, L. nervosum, Leucospermum harpagonatum, Serruria stellata, S. williamsii, Spatalla argentea*

Figure 43: Key species associated with the North Sonderend Sandstone Fynbos according to Mucina and Rutherford (2006) (image obtained from Nkurenkuru Ecology & Biodiversity).

POSA species observations:

The botanist (Dr Keet) obtained a list from the SANBI database (POSA – Plants of Southern Africa) contain all plant species that have been recorded to date from the

surroundings of the study area. Only protected and red data species that may potentially occur in the study area have been listed within the baseline study section of the BSA (2021).

A total of 1 866 species have been recorded within the broader area based on the online plant search (Botha & Keet, 2021). Due to the fact that the impacted habitat type (sand dune) occurs as relatively small, scattered geographical patches within the region, plant species from two similar locations were extracted. The specialist notes that due to the extremely high diversity of vegetation types within the three polygons used for online data gathering, the plant richness estimate (i.e. 1 866 species) is highly likely a gross overestimate, since the great majority of these species would not occur within the site area and vicinity, since they are adapted to other vegetation types and soils.

From online data, the shrub and dwarf shrub layer were well represented with a high species diversity (dwarf shrubs = 426 species; shrubs = 504 species), similarly the lower herb/forb layer was also high in diversity with 397 species recorded in the broad region. The graminoid layer was lower in species diversity and is primarily represented by restioids. Geophytic and succulent growth forms are also a prominent feature within the broader areas (geophytes = 246 species recorded; succulents = 213 species recorded).

Prominent families, in terms of species diversity, recorded within the extracted areas include:

- Asteraceae: 252 species;
- Ericaceae: 162 species;
- Fabaceae: 141 species;
- Iridaeceae: 111 species;
- Proteaceae: 90 species;
- Aizoaceae: 89 species;
- Scrophulariaceae: 62 species; and
- Restionaceae: 54 species

Another unique feature of these areas is the high number of South African endemics with a total of 1 365 (73%) SA endemics recorded. High numbers of endemics were observed with the plant families Aizoaceae, Asphodelaceae, Asteraceae, Ericaceae, Iridaceae, Geraniaceae, Restionaceae, and Proteaceae.

Furthermore, only 39 alien plant species were recorded within the extracted areas with 19 species being invasive. Of these 19 species, 10 species are listed within NEM:BA, 2004 Alien and Invasive Species List, 2016 namely:

- *Acacia saligna*: Category 1b;
- *Echium plantagineum*: Category 1b;
- *Eucalyptus camaldulensis*: Category 1b within fynbos;
- *Leptospermum laevigatum*: Category 1b;
- *Orobanche ramosa*: Category 1b;
- *Ricinus communis*: Category 2;
- *Salsola kali*: Category 1b;
- *Schinus molle*: Category 3;
- *Sesbania punicea*: Category 1b;
- *Xanthium strumarium*: Category 1b.

Species of Conservation Concern:

A total of 173 red data plant species are known to occur in the broad area surrounding the site, as obtained from the SANBI SIBIS database and Threatened Species Programme, Red List of South African Plants (2011). These species of conservation concern are listed in the BSA attached as Appendix I2. The majority of these species are from the families Proteaceae (protea family; 29 species) and Fabaceae (pea family; 21 species). Furthermore, it includes 104 Threatened Species (8 Critically Endangered, 31 Endangered species, 65 Vulnerable). The online list includes a much broader area than the actual site, and as a result, the actual number of species of conservation concern which might occur within the site should be significantly less. However, this precautionary measure of including a larger area allows for adequate information to be extracted and evaluated.

A total of 521 species have been recorded within the extracted areas which are Protected (Schedule 4) within the Nature Conservation Ordinance No. 19 of 1974. The high number of protected flora is mainly due to the fact that all species within the families Amaryllidaceae, Bruniaceae, Ericacea, Iridaceae, Orchidaceae, Proteaceae and Rutaceae are protected and are families which are well represented within this region. Only one national protected tree (under the National Forests Act, 1998 – Act No. 84 of 1998) has been recorded, namely *Podocarpus elongatus*.

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

FAUNA

(Information extracted from the Specialist Vegetation/Ecological Survey prepared by Ian Oliver, 2010 – see Appendix I1; the Terrestrial Fauna (excl. Lepidoptera) Assessment Preliminary Report, Phillips, 2021 – Appendix J1; and the Butterfly Survey, 2021 – Appendix J2)

The mine's EMPR notes that smaller reptiles on site may include the Padloper/Parrot-beaked tortoises (*Homopus* species) and Angulate (Ploegskaarskilpad) tortoise (*Cherisina angulata*). According to the EMPR, the Namaqua Dwarf Chameleon (*Bradypodion occidentale*) should be in the area, especially as there is very little human habitation. Mammals that may exist could include Cape Grey Mongoose (*Herpestes pulverulentus*), Cape Grysbok (*Raphicerus melanotis*) and Porcupine (*Hystrix africaeaustralis*) (Oliver, 2010).

When the screening report for the site environmental sensitivity of the initially proposed 108 ha extension area was generated as required by the EIA Regulations, 2014 (as amended) using the National Web-Based Environmental Screening Tool. The report deemed the Animal Species Theme of the study area (108 ha then) to be of High Sensitivity and listed the possibility of the following species occurring on site:

- High: Black Harrier (*Circus maurus*) EN;
- High: Black Eagle (*Aquila verreauxii*) VU;
- Medium: Riverine Rabbit (*Bunolagus monticularis*) CR;
- Medium: *Thestor kaplani* (Butterfly) CR;
- Medium: *Aloeides lutescens* (Butterfly) EN.

Subsequent to the reduction of the proposed extension footprint (from 108 ha to 4 ha), the screening report (2021) only listed *Circus maurus*, and *Aguila verreauxii* as sensitive features likely to occur on site. According to the 2021 Screening Report, S1 extends over an area of low sensitivity, S2 lays within an area of high sensitivity, and S3 extends over both high and low areas of sensitivity as shown in the following figures.

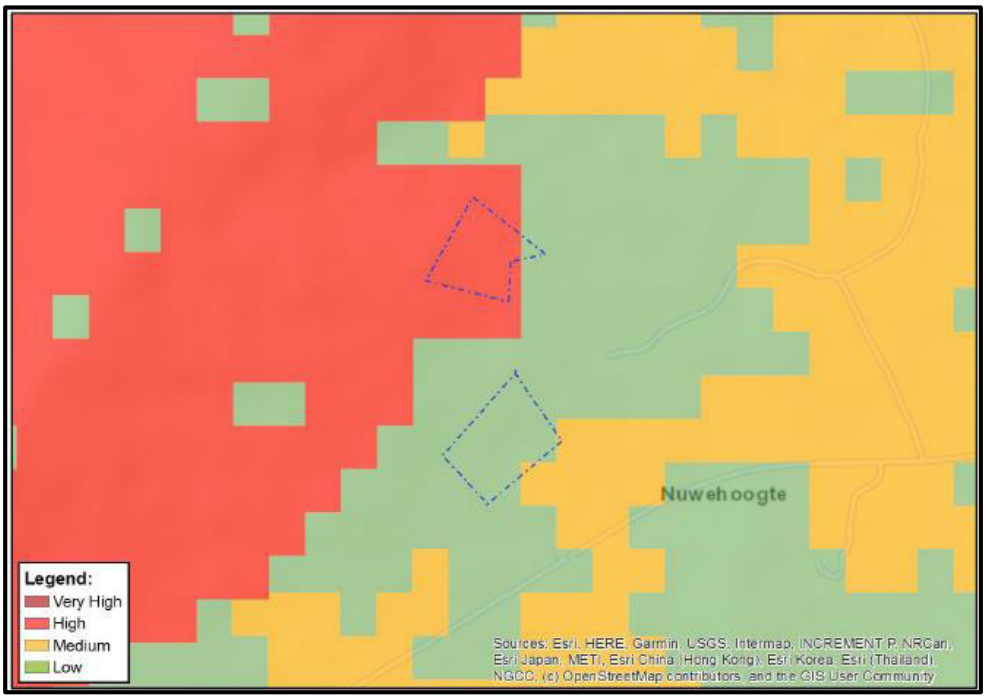

Figure 44: Map of relative animal species theme sensitivity for S1 and S2 (image obtained from the 2021 Screening Report)

Figure 45: Map of relative animal species theme sensitivity for S3 (image obtained from the 2021 Screening Report)

Cossypha Ecological in association with Eco-Pulse Environmental Consulting Services were contracted (2021) to compile a preliminary investigation of the terrestrial fauna on the site, including birds, mammals, and herpetofauna (reptiles and amphibians), excluding the Lepidoptera (butterflies) that was evaluated in a separate report.

Avifauna:

The specialist notes that ±263 bird species are expected to occur in the study area (QDGC 3319DD). Of the total, approximately 70 species are endemic to southern Africa. Only 25 bird species occurring in the QDGC (Quarter Degree Grid Cell) are of conservation concern nationally, and 11 globally (IUCN Red List of Threatened Species, 2021). According to the Southern African Bird Atlas (SABAP2) data, 125 species have been recorded in the pentad (5 min x 5 min coordinate special grid reference) in which the site falls, seven of which are SCC. The following figure (obtained from the terrestrial faunal report) lists the avifaunal SCC that have been recorded within the QDGC (sand deposit and associated vegetation).

Family	Common Name	Scientific Name	Threat Status (RSA/IUCN)	SABAP2 RR%	Likelihood of Occurring on site
Accipitridae	Black Harrier	*Circus maurus*	EN/VU		Medium
Accipitridae	Cape Vulture	*Gyps coprotheres*	EN/VU		Medium
Accipitridae	Martial Eagle	*Polemaetus bellicosus*	EN/VU	7.7	Medium
Turnicidae	Hottentot Buttonquail	*Turnix hottentottus*	EN/LC		Medium
Accipitridae	African Marsh-Harrier	*Circus ranivorus*	EN/LC		Low
Otididae	Southern Black Korhaan	*Afrotis afra*	VU/VU	23.1	Medium-low
Sagittariidae	Secretarybird	*Sagittarius serpentarius*	VU/VU	7.7	Medium-low
Otididae	Denham's Bustard	*Neotis denhami*	VU/NT		Low
Sarothruridae	Striped Flufftail	*Sarothrura affinis*	VU/LC		Low
Rostratulidae	Greater Painted-snipe	*Rostratula benghalensis*	VU/LC		Low
Accipitridae	Verreaux's Eagle	*Aquila verreauxii*	VU/LC	15.4	Medium
Falconidae	Lanner Falcon	*Falco biarmicus*	VU/LC	7.7	Medium
Pelecanidae	Great White Pelican	*Pelecanus onocrotalus*	VU/LC		Low
Ciconiidae	Black Stork	*Ciconia nigra*	VU/LC		Low
Gruidae	Blue Crane	*Anthropoides paradiseus*	NT/VU	30.8	Medium
Picidae	Knysna Woodpecker	*Campethera notata*	NT/NT		Low
Anatidae	Maccoa Duck	*Oxyura maccoa*	NT/NT		Low
Phoenicopteridae	Lesser Flamingo	*Phoeniconaias minor*	NT/NT		Low
Coraciidae	European Roller	*Coracias garrulus*	NT/NT		Low
Chaetopidae	Cape Rockjumper	*Chaetops frenatus*	NT/LC		Low
Motacillidae	African Rock Pipit	*Anthus crenatus*	NT/LC		Low
Alcedinidae	Half-collared Kingfisher	*Alcedo semitorquata*	NT/LC		Low
Otididae	Karoo Korhaan	*Eupodotis vigorsii*	NT/LC		Medium-low
Phoenicopteridae	Greater Flamingo	*Phoenicopterus roseus*	NT/LC		Low
Alaudidae	**Agulhas Long-billed Lark**	***Certhilauda brevirostris***	**NT/NR**	**15.4**	**High**

Figure 46: Avifaunal SCC likely to occur within QDGC 3319DD, including Reporting Rate (RR) for the site's pentad 3350_1945. Birds listed in green are endemic to southern Africa, while those in blue are non-breeding migrants to the region (image obtained from the Terrestrial Fauna Report)

Mammals:

According to the MammalMap project, ±50 mammal species have been reported to occur within QDGC 3319DD (since 1990). Of this total, 6 species are of conservation concern nationally, and 4 globally (IUCN, 2021). The following figure lists the mammal SCC that have been recorded within the QDGC. While *Bunolagus monticularis* (Riverine Rabbit) (CR), has not been recorded within the QDGC by the MammalMap project, it was flagged by the National Web-Based Environmental Screening Tool as possibly occurring in the study area and was therefore included in the table.

Family	Common Name	Scientific Name	Threat Status (RSA/IUCN)	Likelihood of Occurring on site
Leporidae	Riverine Rabbit	*Bunolagus monticularis*	CR/CR	Low
Felidae	Cheetah	*Acinonyx jubatus*	VU/VU	Low
Felidae	Leopard	*Panthera pardus*	VU/VU	Low
Bovidae	Bontebok	*Damaliscus pygargus pygargus*	VU/LC	Low
Bovidae	Grey Rhebok	*Pelea capreolus*	NT/NT	Low
Mustelidae	African Clawless Otter	*Aonyx capensis*	NT/NT	Low
Mustelidae	African Striped Weasel	*Poecilogale albinucha*	NT/LC	Low

Figure 47: Mammal SCC likely to occur within QDGC 3319DD (image obtained from the Terrestrial Fauna Report)

Herpetofauna:

According to FrogMAP (ADU, 2021), the continuation of the Southern African Frog Atlas Project (SAFAP), only 10 amphibian species are likely to occur within QDGC 3319DD. One of these, *Cacosternum platys* (Flat Caco), is of conservation concern (currently listed as NT) both nationally and globally (IUCN, 2021). This species is endemic to the winter-rainfall region of the Western Cape where it is restricted to altitudes below 280 m where it inhabits flat of gently undulating low-lying areas with poorly drained loamy to clay soils. Most of distribution range is situated in the lowlands of the Cape fold mountains, with a small population occurring in the Breede River valley, between Worcester and Tulbagh (Phillips, 2021).

According to ReptileMAP, only 13 terrestrial reptile species have been confirmed to occur within QDGC 3319DD. None of these are of conservation concern either nationally or globally.

Lepidoptera:

The National Web-Based Environmental Screening Tool reported that a butterfly species of conservation concern (SCC) *Aloeides lutescens* could occur on the site, based on its proximity to known records of SCCs, and the physical and biological characteristics of the site, which was therefore rated as being of "Medium" sensitivity for butterflies.

Dave Edge & Associates was subsequently appointed to assess the sensitivity of the area with regard to SCC butterflies. Refer to Part A(1)(g)(iv)(1)(c) *Description of the specific environmental features and infrastructure on the site – Site Specific Fauna* for the site specific findings of the said study.

HUMAN ENVIRONMENT

CULTURAL AND HERITAGE ENVIRONMENT

(Refer to the Heritage Impact Assessment: Proposed Expansion of the Sand Mine on Portion 4 of the farm ZandbergFontein, Robertson, Western Cape – Appendix L)

The study area is situated on a farm approximately 7 km south-west of the town of Robertson. Robertson was founded in 1853, however before the founding of the town, Simon van der Stel developed the farming lands in the region around 1679. Farmers were attracted to the region as it had fertile land and was good for grazing sheep. Wine farming in Robertson picked up speed when the Cogmanskloof pass connected the farmers with Montagu in 1877. By the mid-1800's, sheep and mixed farming was popular in the Robertson district. The MR Holder has been mining sand from the property for the past 26 years. Sand mining, on this property, however commenced in the 1980's with the surrounding areas mainly used for grazing by the landowners.

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 proposed extension area is placed on the PSM, it shows the study area to extend over areas of high (orange) concern as presented in the figure below. In light of this, a palaeontological desktop study is required and based on the outcome of the desktop study, a field assessment is likely.

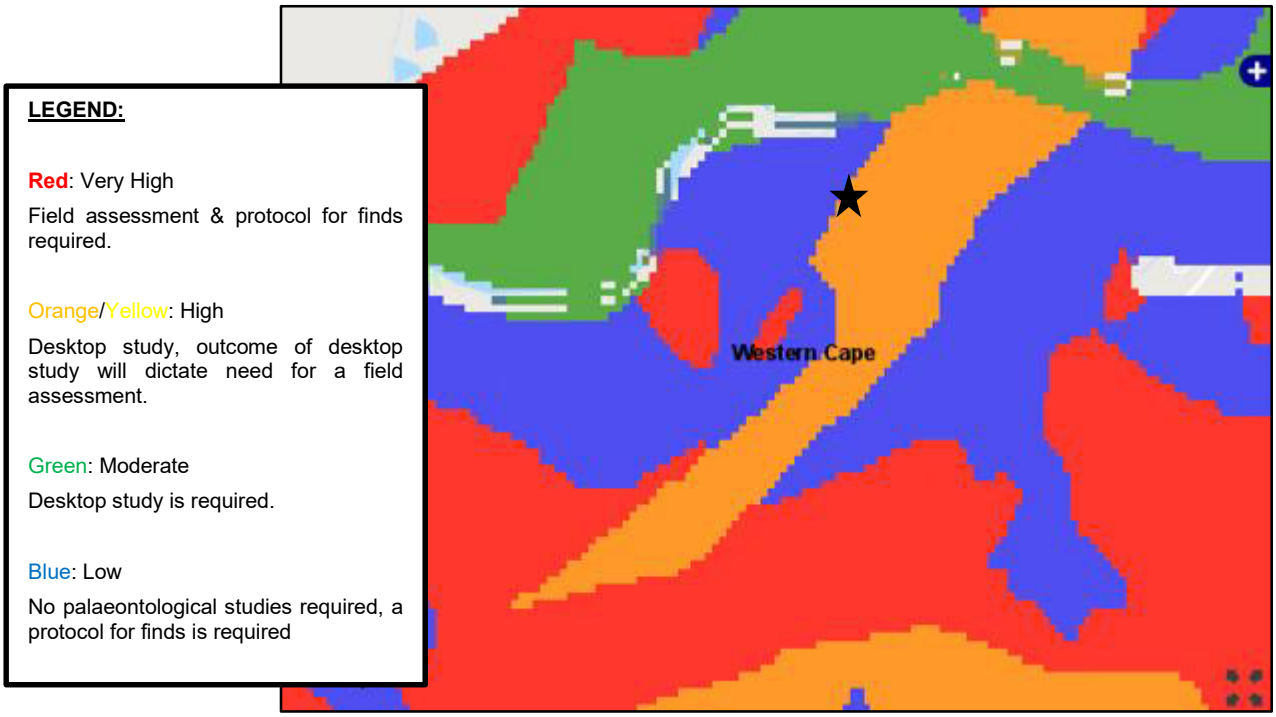

Figure 48: The SAHRA palaeontological sensitivity map shows that the proposed extension footprint (black star) extends over an area of high concern (Orange) (image obtained from the PalaeoSensitivity Map on SAHRIS).

A Notice of Intend to Develop was submitted to Heritage Western Cape on 10 February 2020, upon which an Archaeological Impact Assessment and Palaeontological Impact Assessment were requested (by HWC). The appropriate specialists were appointed and their findings were incorporated into the DEIAR and the HIA was uploaded onto the SAHRIS website. Refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Cultural and Heritage Environment*.

SOCIO-ECONOMIC ENVIRONMENT

(Information extracted from the Social and Labour Plan of the Zandberg Sand Mine)

Portion 4 of Zandberg Fontein No 97 is situated approximately 7 km south-west of Robertson within the Langeberg Local Municipality which is one of the municipalities situated within the Cape Winelands District.

The Langeberg Municipality includes the towns of Ashton, Bonnievale, McGregor, Montagu and Robertson, as well as rural areas adjacent to and between these towns. Robertson is one of the largest wine-producing regions in South Africa. The area is best known for its wine, but a variety of diverse attractions and activities, combined with spectacular scenery and the relaxed hospitality of the people ensure visitors

unforgettable stays and a reason to return. The Robertson Wine Valley forms part of the longest wine route in the world - Route 62.

Langeberg has the smallest population in the Cape Winelands District which, according to the forecasts of the Western Cape Department of Social Development, is estimated to be 103 389 in 2017. This total gradually increases across the 5-year planning cycle and is expected to reach ±108 540 by 2023. This equates to an approximate 5.0% growth off the 2017 base estimate. In 2017, Langeberg's population gender breakdown was relatively evenly split between male (50 427, 48.8%) and female (52 963, 51.2%). For 2023, the split is anticipated to be 52 742 (48.6%) and 55 798 (51.4%) for males and females respectively. The coloured community is the dominant population group in the Langeberg area, accounting for 70% of the population; black Africans comprise 16% of the population while whites account for 12%.

The Robertson area's economy is driven by wholesale, retail, trade, catering and accommodation activities which necessitates the need for a more skilled and semi-skilled labour force that is sources from outside of the region, hence the higher population concentration within the 25-29 and 30-34 age groups (compared to the rest of the age groups). The higher concentration in the 45-49 age groups can in turn potentially be attributed to the growing trend of individuals that retire early or downscale to more rural and tranquil communities.

Economic growth at the municipal level is essential for the attainment of economic development, the reduction of poverty and improved accessibility (forward and backwards linkages between the first and second economy). Fostering this growth requires an in-depth understanding of the economic landscape within which each respective municipality operates.

Langeberg comprised R 4.484 billion (or 10.2%) of the District's total R 44.16 billion GDPR as at the end of 2015. GDP growth averaged 4.0% per annum over the period 2005 - 2015. This is above the District average of 3.5%. Average annual growth of 3.0% in the post-recessionary period remained above the District average of 2.8%. Langeberg employed 13.7% (51 545 labourers) of the Cape Winelands District's labour force in 2015. Employment growth was moderate, averaging 2.5% per annum since 2005, which was above the overall District employment growth rate of 1.9% per annum. Employment growth has nevertheless picked up significantly in the post–recessionary period (2010-2015) averaging 3.7% per annum. Langeberg has experienced significant job losses in the agriculture, forestry and fishing sector and in the

manufacturing sector prior to and during the recession. However, 11 810 (net) additional jobs have been created in total since 2005. The semi-skilled sector employed 21.0% of the Municipality's workforce, and rose by 1.7% per annum on average since 2005. The low-skilled sector (which employs 14 774 workers or 28.7% of the Municipality's workforce) experienced a contraction of 1.7% per annum over the past decade. Most of the job losses experienced during the recession emanated from this sector. The skilled sector employed 4 567 workers (8.9% of the workforce), and grew at a moderate rate of 2.6% per annum since 2005. The majority (41.5% or 21 374 workers) of the formally employed workforce operate within the informal sector, which has grown by 9.1% per annum on average since 2005 and absorbed most of the job losses from the low and semi-skilled sectors.

Literacy rate in Langeberg was recorded at 75.3% in 2011 which is lower than the average literacy rates of the Cape Winelands district (81.7%), the Western Cape (87.2%) as well as the rest of South Africa (80.9%).

The annual income for households living within the Langeberg municipal area shows the proportion of people that fall within the low, middle and high income brackets. Poor households fall under the low income bracket, which ranges from no income to just over R 50 000 annually (R 4 166 per month). An increase in living standards can be evidenced by a rising number of households entering the middle and high income brackets. Approximately 56.9% of households in Langeberg fall within the low income bracket, of which 10.0% have no income. Less than fifty per cent of households fall within the middle to higher income categories, split between 37.9% in the middle income group and 5% in the higher income group. A sustained increase in economic growth within the Langeberg municipal area is needed if the 2030 NDP income target of R 110 000 per person, per annum is to be achieved.

Access to emergency medical services is critical for rural citizens due to rural distances between towns and health facilities being much greater than in the urban areas. Within the Cape Winelands District, Langeberg has 0.77 ambulances per 10 000 populations, higher than the District average of 0.42. At the end of March 2016, anti-retroviral treatment (ART) was provided to over 200 000 persons in the Province, 23 172 of whom were in the Cape Winelands District and 2 160 in the Langeberg municipal area. At the end of March 2016, 372 new ART patients were being treated from 7 treatment sites in the Langeberg municipal area. The most recent information for Langeberg indicates a mother-to-child transmission rate of zero per cent which is lower than the 1.7% District and the 1.4% Provincial rate as well as the medium term annual target for 2015/16 and 2016/17.

In the Langeberg municipal area, 94.7% households have access to flush toilets connected to a sewerage system/flush toilet. Approximately, 4.7% of households must therefore make due with other sources of sanitation, meaning facilities other than flushed and chemical (i.e. pit latrine, ecological toilets and bucket toilets). Access to flush toilets connected to a sewerage system in Langeberg improved by 19.8% from 2011 to 2016 and by 26.0% across the District over the same period.

The majority of households in the Langeberg municipal area has their refuse removed by local authorities at least weekly (79.3%) and a further 3.4% of households have refuse removed by the local authority/private company less often. Refuse removed by local authorities once a week increased by 25.1% from 2011 to 22 2016 and by 21.8% across the District over the same period.

The biggest source of energy for lighting purposes in the Langeberg municipal area in 2016 was electricity whilst 9.1% of households make use of other sources of energy i.e. households that access electricity from a source which they do not pay for, generator, solar home system, battery and other. Access to electricity for lighting purposes improved by 11.1% in 2011 to 18.8% in 2016 across the District over the same period.

(b) Description of the current land uses

Portion 4 of the farm Zandberg Fontein No 97 is situated in a rural setting surrounded by other farming properties. The property is approximately 7 km south-west of Robertson bordering the La Chasseur/Agter-Kliphoogte road that serves the residents of the area. Certain sections of the farm are used for grazing, and sand mining. The earmarked property is zoned Agricultural Zone 1 with a consent use for mining approved for the current mining footprint. Agricultural Zone I has agriculture as primary use. In light of this, a land use application needs to be made in terms of the Langeberg Land Use Planning Bylaw (264/2015) and the Langeberg Municipality – Integrated Zoning Scheme Bylaw (7929/2018) to obtain land use rights for the proposed extension area.

The following table provides a description of the land uses and/or prominent features that currently occur within a 500 m radius of the study area:

Table 19: Land uses and/or prominent features that occur within 500 m radius of the study area.

LAND USE CHARACTER	YES	NO	DESCRIPTION
Natural area	**YES**	-	The proposed site (S1 – S3) is surrounded by natural areas zoned for agricultural use.
Low density residential	-	**NO**	The nearest residential dwelling is ±1.4 km south-east to the mine.
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	**YES**	-	A power line traverses the property and runs parallel with the La Chasseur/Agter-Kliphoogte road. The power line does not enter, or come nearer than 270 m, to the proposed extension areas (S1/S2/S3).
Office/consulting room	-	**NO**	-
Military or police base / station / compound	-	**NO**	-
Spoil heap or slimes dam	-	**NO**	-
Quarry, sand or borrow pit	**YES**	-	This application entails the extension of the current sand mining footprint on the property.
Dam or reservoir	**YES**	-	A farm dam of the property lays ±325 m north-east of S1, ±350 m south-east of S2, and ±352 m east of S3.
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**	-

LAND USE CHARACTER	YES	NO	DESCRIPTION
Agriculture	**YES**	-	The proposed site (S1 – S3) extends over an area zoned as Agriculture I, although the groundcover of the area is highly natural with little to no disturbance, and is representative of the Breede Sand Fynbos vegetation type.
River, stream or wetland	**YES**	**NO**	The Breede River lays ±1.3 km north of the application area, behind the Zandberg. The hydrologist identified an artificial wetland within 500 m of S1, S2, and S3. The unchannelled valley bottom wetland is within 500 m from S1, and S3. No drainage line was identified within S3. The proposed expansion will have a low – insignificant impact on the wetlands should the specialist recommendations be implemented.
Nature conservation area	-	**NO**	-
Mountain, hill or ridge	**YES**	-	S1 and S3 extends up the leeward side of the Zandberg dune found on the property, and S2 is within 500 m of it.
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.

SITE SPECIFIC TOPOGRAPHY

As mentioned earlier, the natural topography of application area can be described as undulating, extending up the southern face of the Zandberg mountain on the property.

The topography of S1 is less dramatic than that of S2 and S2 with the altitude ranging from 217 masl at the lowest point sloping up to 257 masl toward the western corner. The earmarked footprint has an elevation gain of 2.4 m, with a maximum slope of 27%, and an average slope of 12.8% between the lower eastern corner and the higher western corner (distance of 315 m) as shown in the following figure.

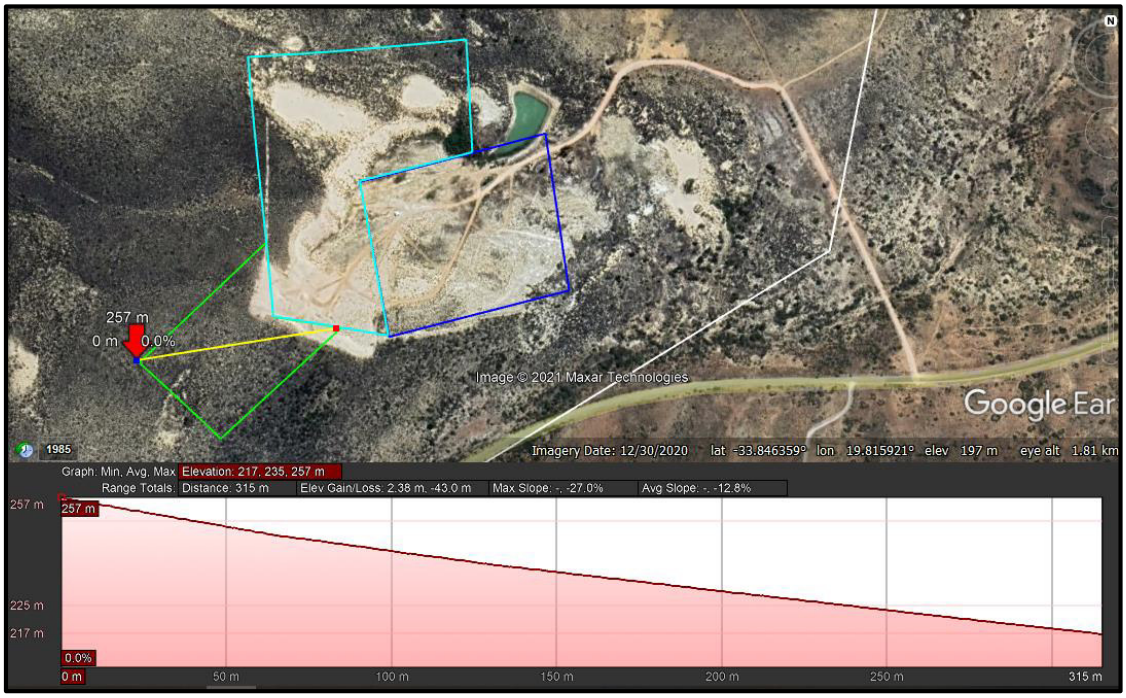

Figure 49: Elevation profile of the Site Alternative 1 (image obtained from Google Earth).

The topography of Site alternative 2 steeply slopes up the dune from the existing mining footprint, from 238 masl (eastern corner) rising to a maximum of 316 masl at the western corner over a distance of 335 m. The earmarked footprint has an elevation gain of 58.7 m, with a maximum slope of 40.4%, and an average slope of 22.8% between the lower eastern corner and the higher western corner as shown in the following figure.

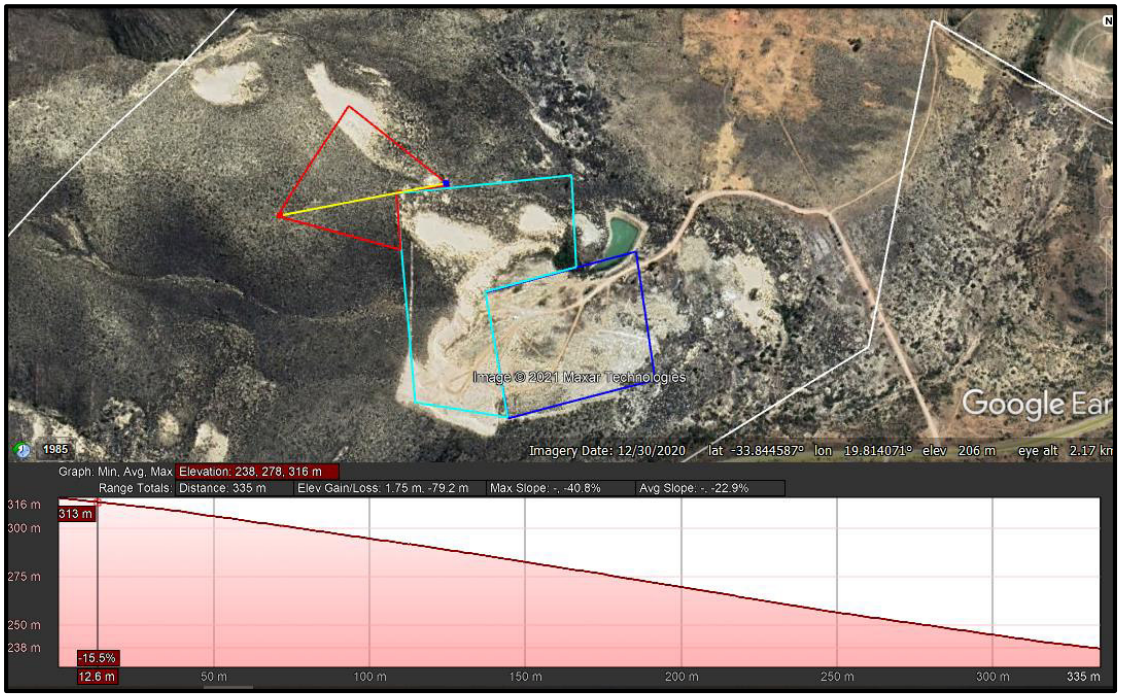

Figure 50: Elevation profile of the Site Alternative 2 (image obtained from Google Earth).

Site alternative 3 gradually rises- up the dune from the lower southern part, from 231 masl (south-eastern corner) rising to a maximum of 289 masl at the north-western corner over a distance of 414 m. The earmarked footprint has an elevation gain of 80.0 m, with a maximum slope of 37.9%, and an average slope of 14.1% between the lower south-eastern corner and the higher north-western corner as shown in the following figure.

Figure 51: Elevation profile of the Site Alternative 3 (image obtained from Google Earth).

SITE SPECIFIC VISUAL CHARACTERISTICS

Following the earlier discussion in this regard, the study area will be visible from the north, east, south and south-west. The figures below show the viewshed analysis for the three proposed site alternatives (S1 – S3) within a ±10 km radius. The green shaded areas show the positions from where the areas will be visible; upon which the following was concluded:

- **Site Alternative 1:** Clearly visible within ±2 km from the proposed footprint towards the SW, S, SE, NE. Thereafter, the area becomes intermittently visible up to ±10 km towards the NE.

- **Site Alternative 2:** Clearly visible within ±3 km from the proposed footprint towards the SW, S, SE, NE. Thereafter, the area becomes intermittently visible up to ±10 km towards the NE.

- **Site Alternative 3:** Clearly visible within ±3 km from the proposed footprint towards the SW, S, SE, NE. Thereafter, the area becomes intermittently visible up to ±10 km towards the NE.

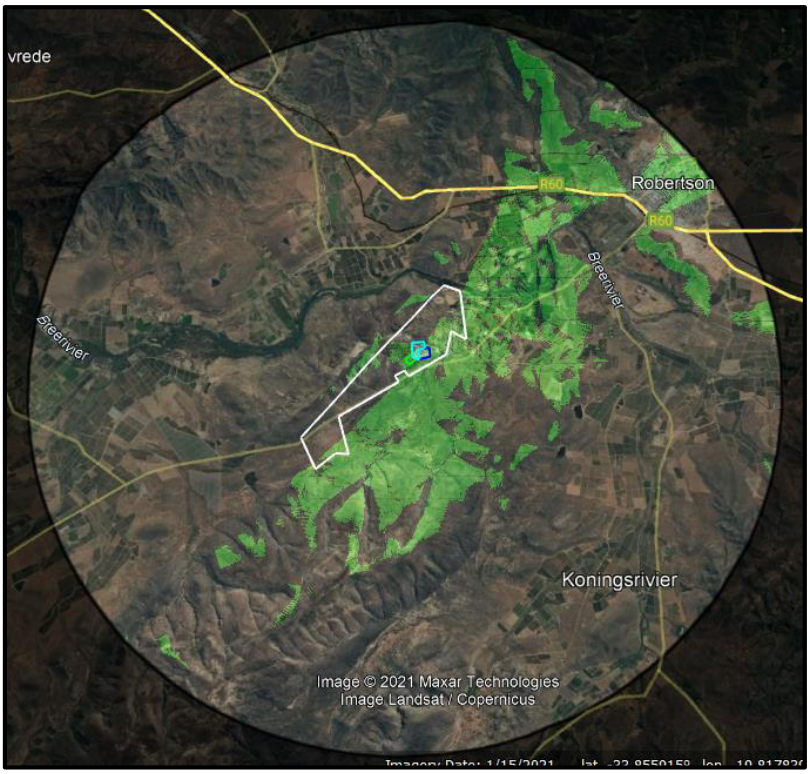

Figure 52: Viewshed analysis of S1 where the green shaded areas show the positions from where the earmarked area will be visible (image obtained from Google Earth).

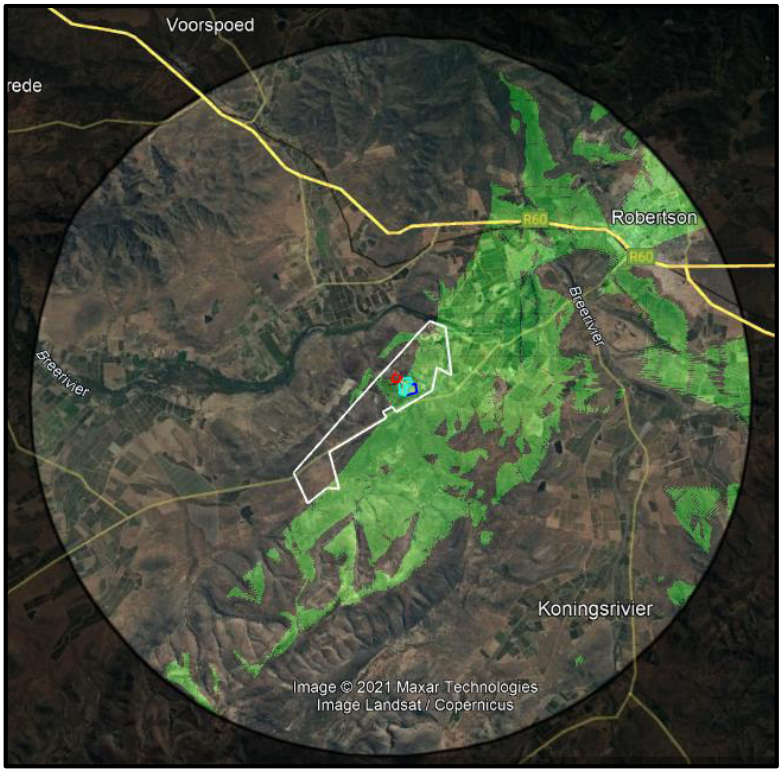

Figure 53: Viewshed analysis of S2 where the green shaded areas show the positions from where the earmarked area will be visible (image obtained from Google Earth).

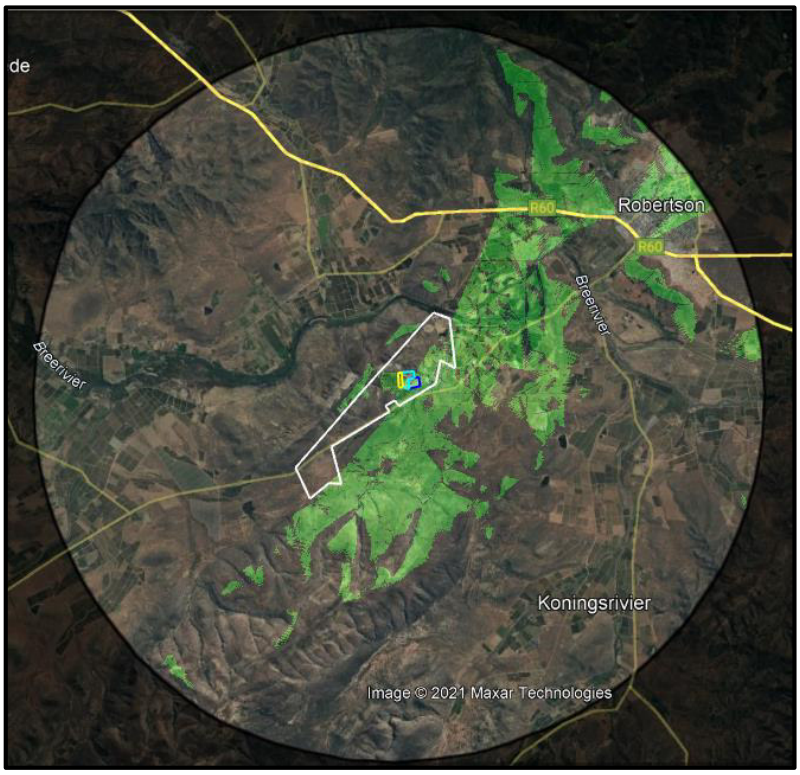

Figure 54: Viewshed analysis of S3 where the green shaded areas show the positions from where the earmarked area will be visible (image obtained from Google Earth).

From the above analysis (Figure 52 - 54), it is deduced that S2 will have a slightly higher visual impact on the surrounding environmental than the other two alternatives. However, the potential visual impact of all three alternatives are deemed to be of medium significance based on the small scale of the proposed operation, proposed progressive rehabilitation, as well as the fact that no infrastructure will be established. Should the rehabilitation measures proposed in this report be implemented very little (if any) residual visual impact is expected upon closure of the mine.

SITE SPECIFIC AIR AND NOISE QUALITY

Emission into the atmosphere is controlled by the National Environmental Management: Air Quality Act, 2004. The Zandberg Sand Mine does not trigger an application in terms of the said act, nor will the proposed extension activity. Emissions generated/to be generated at the mine mainly consist of occasional dust due to the displacement of soil, and transport of the sand from the farm. Due to the small scale of the operation the noise levels generated at the mine is low and mainly stem from the operation of the FEL and trucks visiting the site.

As mentioned earlier, the mine has to date not received any complaints regarding air or noise nuisance. The potential impact of the sand mining activity on the air and/or noise ambiance of the area is deemed to be of low significance as the direction of the

proposed extension is away from the La Chasseur/Agter-Kliphoogte road and any farm residences.

SITE SPECIFIC GEOLOGY

(Information extracted from the Geology, Geotechnical and Mining Assessment of Zandberg Sandput, 2021, and the Heritage Impact Assessment: Proposed Expansion of the Sand Mine on Portion 4 of the farm ZandbergFontein, Robertson, Western Cape – Appendix L)

Zandberg Sandput is located within the Quaternary deposit that consist mostly of unconsolidated to semi-consolidated shelly, calcareous sands. There is also a considerable deposit of alluvium consisting of clay, sand, pebbles and boulders with limited occurrences of coastal sands. Unconformable overlying the Cape Supergroup rocks are the much younger Tertiary to Quaternary Aeolian sands and sand dunes. The sands were probably derived from the weathering of the Cape Supergroup sandstones.

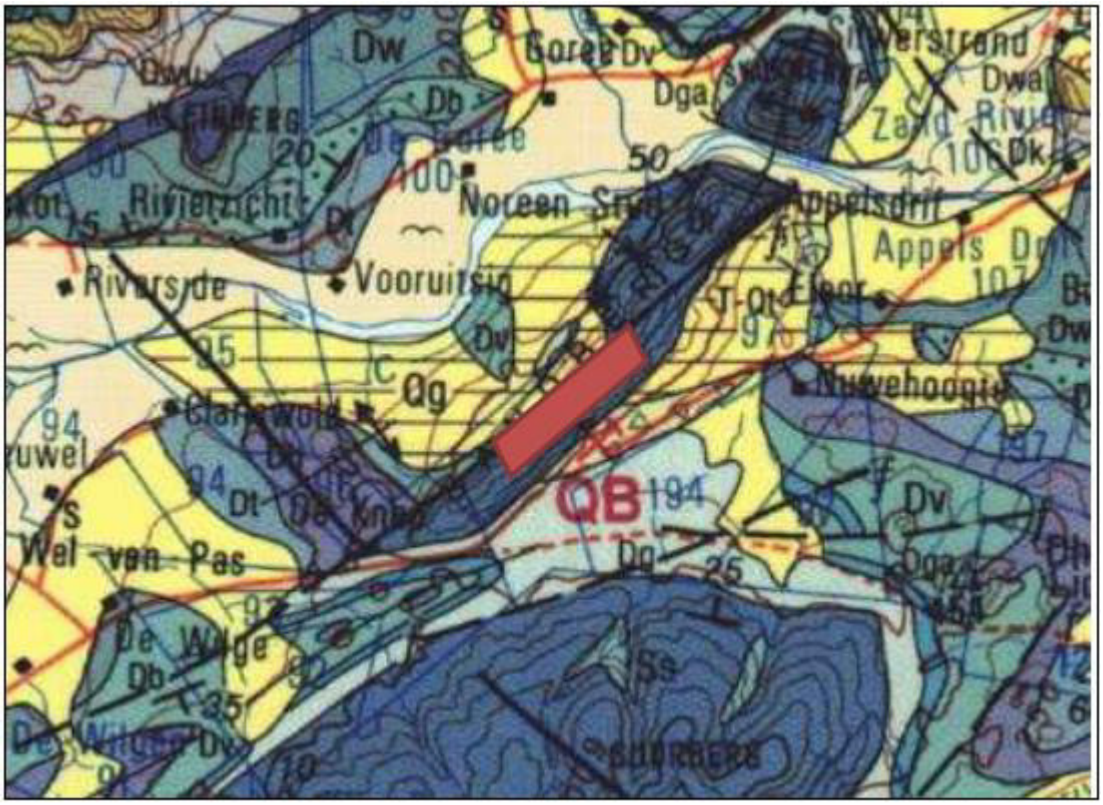

Figure 55: Geological map in the vicinity of the Zandberg Sandput where the mining area is indicate by the red block(image obtained from MLB Consulting).

Two separate ground control districts (GCD) have been identified, which are listed below:

- GCD 1: Topsoil – up to 2 metres in depth, to be used for re-vegetation.
- GCD 2: Sand – material with low cohesion when dry.

The HIA confirms the presence of the sand dune and notes that Tyson (1999:3) defines a sand dune as a hill or ridge of sand that has been piled up by the wind. Of the various types of aeolian dunes, the development of one variety is related to topographical barriers such as hills or mountains. These dunes develop where wind-driven migrating sand is obstructed by and accumulates against the windward side of the topographic barrier and can be either sand ramps or climbing (and falling) dunes. Tyson's (1990) study of the dunes on both the northern and southern slopes of the Zandberg concludes that it can be best described as climbing dunes. These develop on steeper inclines than sand ramps and are more mobile than the latter, allowing the migration of sand across the topographical barrier - if the prevailing wind and sand source are sufficient - to form falling dunes on the far side. Based on the topography of the Zandberg and the prevalence of south-easterly winds in the area, the dune in the mine extension area is probably a climbing dune, and those on the opposite side of the mountain are falling dunes that have developed from sand migrating over the ridge.

Climbing dunes tend to be largely homogenous in their composition, and this is the case with the Zandberg dune. The HIA notes that at the time Tyson (1999) carried out her research, the Zandberg mine was already operating and she was able to access a cross section of the dune, which she measured as having accumulated to a depth of 9.3 m above the underlying bedrock. With minor exceptions the sands of this dune are apedal, containing virtually no discernible structure, another characteristic of a climbing dune rather than a sand ramp (Tyson 1999). Tyson (1999:72) obtained three Optically Stimulated Luminescence (OSL) age determinations from the top, middle and base of the Zandberg dune. These indicate that it was actively accumulating at the start of the Holocene (9.9 ± 0.7 thousand years (ka)) and during the period approaching the last glacial maximum (28.8 ± 5.3 ka). The basal date for the dune of 762.7 ± 104.5 ka is well beyond the accepted limit of OSL and is, at best, a maximum age. It indicates, however, that this dune was accumulating at least 350,000 years ago at a time when the area was occupied by Early Stone Age (ESA) hominins.

MLB Site Inspection Findings:

Following the site inspection, MLB Consulting (MLB) listed the following findings (amongst others):

- The mining area is dominated by a large sand dune which consists out of uniform and homogeneous sand that covers almost the entire extent of the Zandberg Sandput;

- Large deflation hollows are present on the upper slopes of the sand dune;
- Water is not expected to cause problems since mining is being done above the water table;
- No major geological structures have been mapped;
- No surface infrastructure, such as power lines or railways, are present in close proximity to the open pit;
- The mining face angle/bench face angle (of the current mining area) was estimated at ±75° to 85°, with continuous slumping occurring which reduces the bench face angles.

SITE SPECIFIC HYDROLOGY AND GEOHYDROLOGY

(Information extracted from the Environmental Management Programme Report of Zandberg Sand Mine, 2014, Wetland Delineation for the Extension of the ZandbergFontein Sand Mining Operation, 2016, Floodline Determination Report, 2021, Watercourse Delineation and Habitat Assessment, 2021)

Approved Mining Area:

The EMPR of the mine notes that water is in evidence as a leachate at the tow of the dune. This is due to a perched water table caught in the sand overlaying the sandstone formation of the area. The seepage naturally occurs all along the foot of the dune with a clearly defined water course (drainage line) in evidence (opposite the road). According to the EMPR, the sand dune is classified as an unconfined phreatic aquifer located above the regionally extensive aquifer. A feature of phreatic aquifers is that they release large quantities of water by drainage through the pores of the aquifer. In this case the border of the sand dune. Because there is no aquitard confining the water, this drainage typical continues up to the drainable porosity of the aquifer material. The visible effect of drainage is more pronounced in the winter rainy season. No evidence was found that there is a cone of depression in the groundwater formed by the mining activities, normally visible through vegetation distress (or failing of boreholes).

In 2016, the MR Holder applied for water use authorisation for activities that trigger Section 21 (c) and 21(i) of the NWA, 1998. The application was accompanied by a Wetland Delineation Report conducted by WATSAN Africa in 2016. The wetland report had to verify the presence or absence of a wetland within the potential mining area, as well as determine whether the wetland against the lower slope of the Zandberg mountain is indeed a valid wetland in need of protection or whether it has been artificially induced by the mining activities with little if any conservation status. The report stated that the layer of sand and underlying sandstone of the Zandberg stores

groundwater that eventually migrates into the aquifer in the valley below. There is a drainage line south of the Zandberg (opposite the road as presented in the following figure) in the valley that is mostly dry and only contains water when it rains. This line connects to the Breede River.

The wetland report also confirmed that groundwater is emitted at the foot of the body of sand up against the slope of the Zandberg. The pedocrete here is exposed and the water moving through the sand is partially intercepted prior to penetrating the sandstone. Hence a fountain is formed all along the base of the sand dune, as the water surfaces at this interface. It is uncertain if the pedocrete was exposed prior to the onset of mining and if there was a seep at the location. At this very interface, at the foot of the sand dune up the slope of the mountain, a trench of a metre deep was dug to intercept more of the groundwater, not only the part that surfaced, but also more of it that found its way lower down into the sandstone. The trench stretches all the way to the dam on the property (east of the proposed extension area) and the volume of water in the dam bears testimony of a strong supply of groundwater. Ground water surfaced below the trench at various places showing that only a portion of the ground water actually ends up in the dam. The removal of the sand layer in this part of the mined area contributed to the decanting of groundwater. The sand here is now much thinner and the remaining sand cannot hold the original volume of water. Hence it decants rather than entering the semi-saturated sandstone below. The end result is that more water evaporates and less ends up in the aquifer. This is not unique either, as a number of sand mines that WATSAN investigated in the Western Cape result in very much the same ill effect. However, the affected area at Zandberg is small and it is surmised that the effect on the entire aquifer will hardly be noticed.

The soil adjacent and downhill from the trench was noticeably wet during the field visit (2016). In some places water was emitted from the ground. If wetness was to be the sole indicator, this surely could be classified as a wetland. However, these wetland conditions may well be because of the mining, with the removal of sand and subsequent reduced water holding capacity and do not seem to be a natural or historic situation. The specialist did not find any evidence of gleying or blotching of soils that would classify the area as a wetland. The study concluded that the wet area is an anthropologically induced wetland that could perhaps be classified as “incidental” rather than “artificial”. It bears no special or any other conservation status. Because the landscape has been changed as a result of mining, it did not seem feasible to classify the Zandberg Fontein Wetland. If it was nevertheless to be classified, the specialist named it a foot slope seep against a lower mountain side without a discernible channel. The trench is artificial and is nothing that resembles a natural

channel. The area of the mine does not have any connectivity with the drainage line in the valley below (opposite the road). The trench will most likely be destroyed while mining the sand dune against the mountain slope. Once the area has been mined the trench will probably be restored in order to assure a flow of water from the remaining seep into the dam. The report stated that since the trench is entirely artificial with an insignificant conservation status it is of no concern at all and therefore recommended that the mining (approved mining area) should go ahead.

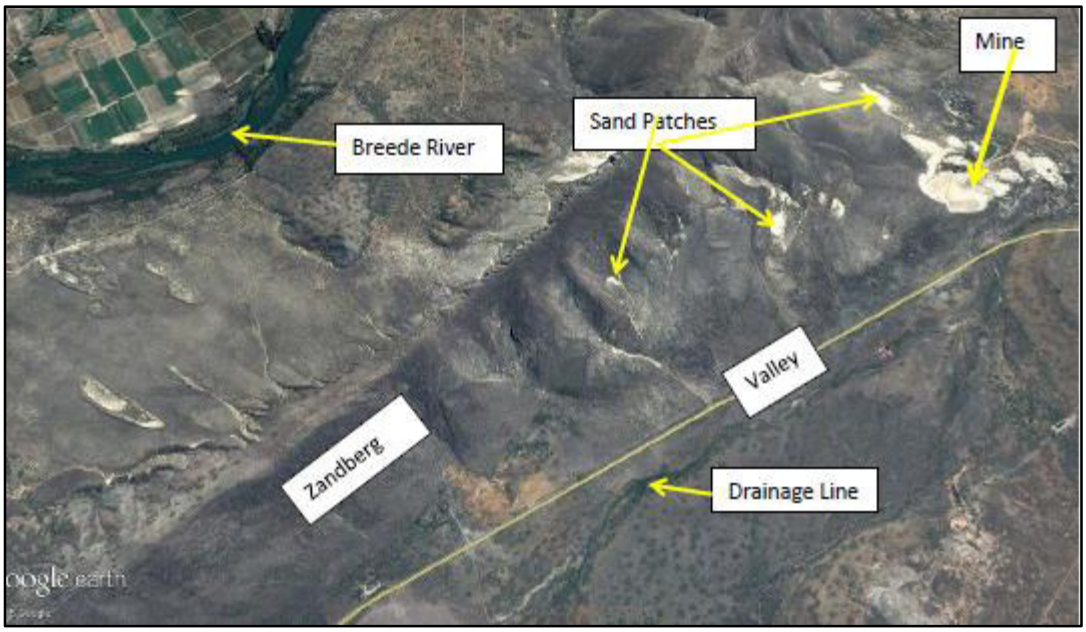

Figure 56: Image obtained from the Wetland Delineation Report that shows the drainage line on the opposite side of the La Chasseur/Agter-Kliphoogte road (WATSAN Africa, 2016).

In April 2018, the general authorisation of Zandberg Sandput (Pty) Ltd was approved and water use certification 29005996 was issued for Section 21 (c) and (i) (NWA) activities.

S102 Application:

In 2021, Afzelia was appointed to undertake a watercourse delineation and habitat assessment (WDHA) (inclusive of a DWS Risk Assessment) of the proposed extension areas (S1 – S3), with the main focus of the study placed on S3.

Wetland Habitat Delineation:

The infield- and desktop watercourse delineation confirmed the presence of two wetland habitats within the 500 m DWS regulated area (see following figure). The wetlands were classified as an artificial wetland habitat (Unit AW1) and a unchannelled valley bottom wetland (UCVB1). The AW1 was evaluated as being at a high risk of being impacted by the proposed development, whilst the UCVB1 was at a low risk.

The specialist also recorded an artificial off-stream dam (AD1) that was being used as a source of water.

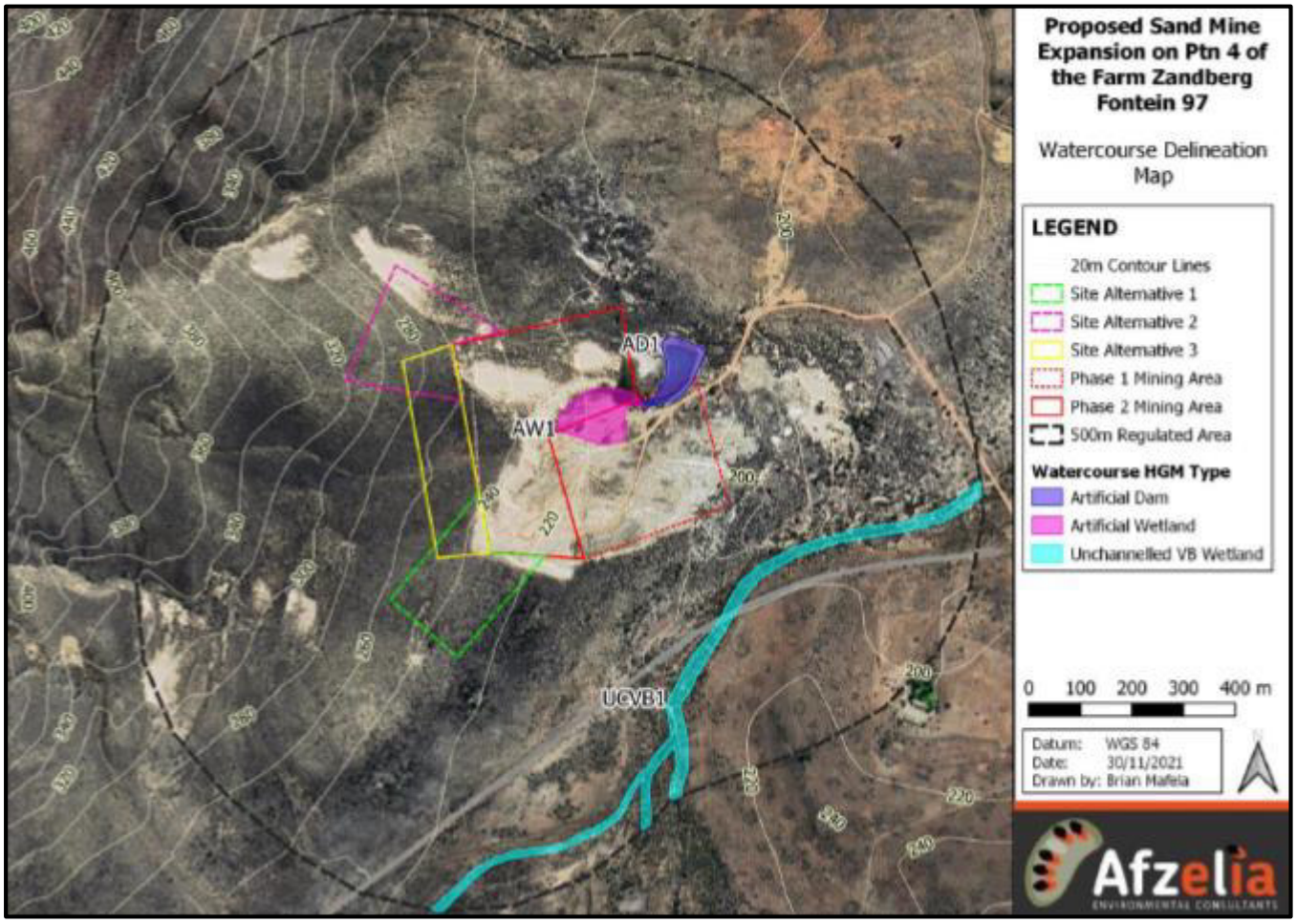

Figure 57: Watercourse delineation and classification map (Afzelia, 2021).

The general characteristics and classification of AW1 and UCV1 are described in the following figures (Table 3.3 and 3.4 of the WDHA attached as Appendix G3).

Level 1	Level 2		Level 3	Level 4: HGM Unit		
System	*DWA Ecoregion*	*NFEPA Wet/Veg Group*	*Landscape Unit*	*4A*	*4B*	*4C*
Inland	19.06 (Southern Folded Mountains)	Southwest Sand Fynbos	Artificial Bench	Artificial wetland	N/A	N/A
Aspect	**Description**					

General Description	Wetland Unit AW1 is an artificial wetland that owes its existence to the exposure of the water table by sand mining activities. Due to sand mining activities the soil profile is now shallow with only a top layer of sand above a weathering Sandstone. Subsurface flows within the wetland area are believed to to be strong particularly during the rainy season in winter.		
Hydrology	***5A: Inundation***	***5B: Saturation***	***5C: Depth of Inundation***
	Never Inundated	Seasonally saturated	N/A
	Inflow drainage characteristics: Interflow and groundwater inflow. **Movement of water through the wetland**: Subsurface and occasionally, diffuse overland flows. **Outflow drainage characteristics**: Infiltration and evapotranspiration.		
Soil	***Upper layer Substratum type***		***Lower layer Substratum type***
	6A: Primary categories	***6B: Secondary categories***	***6A: Primary categories***
	Sand	Sandstone	Sand
	Soil samples extracted from the wetland exhibited low chroma orange soil mottles within the soil matrix. The soil matrix had a golden-brown colour which is indicative of the youthful age of the wetland.		
Vegetation	***Vegetation Form***		***6E: Vegetation Status***
	6B: Primary veg form	***6C***	***6D***
	Herbaceous	Reed and Sedges	N/A	Indigenous
	The wetland was characterised by herbaceous vegetation community with poor ground cover. Typical species recorded include *Phragmites australis, Ficinia radiata, F. truncate* and *Elegia tectorum*.		

Figure 58: General characteristics of infield delineated artificial wetland (Unit AW1) (Afzelia, 2021).

Figure 59: Photograph of the artificial wetland (Unit AW1) (Afzelia, 2021).

Level 1	Level 2		Level 3	Level 4: HGM Unit		
System	*DWA Ecoregion*	*NFEPA Wet/Veg Group*	*Landscape Unit*	*4A*	*4B*	*4C*
Inland	19.06 (Southern Folded Mountains)	Southwest Sand Fynbos	Valley floor	Unchannelled valley-bottom wetland	N/A	N/A
Aspect	**Description**					
General Description	Wetland Unit UCVB1 was identified as an unchannelled valley bottom wetland with a narrow width (2 – 4m wide). The wetland is situated on a low-lying area with very gentle valley side slopes. Some excavation to improve through flows were noted at the road crossing point.					
Hydrology	*5A: Inundation*	*5B: Saturation*	*5C: Depth of Inundation*			
	Never Inundated	Seasonally saturated	N/A			
	Inflow drainage characteristics: Dominated by interflow and groundwater inflow. **Movement of water through the wetland**: Subsurface and diffuse overland flows.					
	Outflow drainage characteristics: Subsurface flows and evapotranspiration.					
Soil	*Upper layer Substratum type*		*Lower layer Substratum type*			
	6A: Primary categories	*6B: Secondary categories*	*6A: Primary categories*			
	Sand	Sandstone	Sand			
	Soil samples extracted from the wetland exhibited low chroma orange soil mottles nested within a grey soil matrix. Recorded soil mottles were moderately sized and in high abundance which is typical of seasonally saturated soils.					
Vegetation	*Vegetation Form*			*6E: Vegetation Status*		
	6B: Primary veg form	*6C*	*6D*			
	Herbaceous	Reed and Sedges	N/A	Indigenous		
	The wetland was characterised by herbaceous vegetation with the most characteristic being *P. australis* and sedges.					

Figure 60: General characteristics of infield delineated unchannelled valley bottom wetland (UCVB1) (Afzelia, 2021).

Figure 61: View looking upstream of Wetland Unit UCVB1 (Afzelia, 2021).

Figure 57 shows that both AW1 and UCVB1 fall outside the proposed extension areas (S1 – S3) and will therefore not be affected by the expansion of the mining footprint (refer to the WDHA attached as Appendix G3 for an assessment of the identified units). Although mining in the extension areas will not affect the identified wetland units, the specialist did propose a buffer area of 15 m that must be maintained around the footprint of AW1 to prevent trucks and/or equipment driving through/parking in the area. This recommendation was added to the mitigation measures proposed in this report.

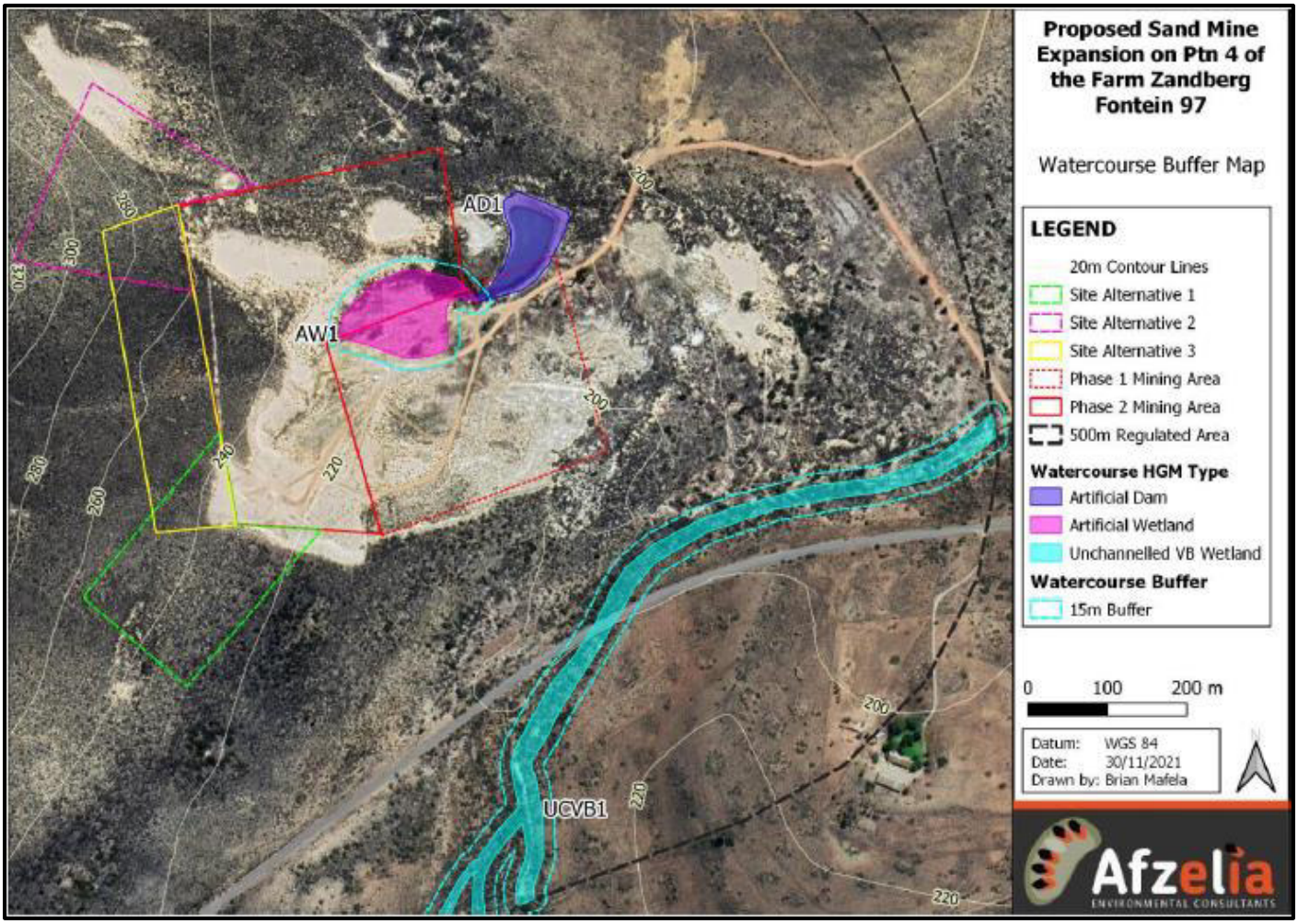

Figure 62: Map showing the 15 m buffer to be maintained around AW1 (Afzelia, 2021).

Watercourse Delineation:

The October 2021 BSA refers to a drainage line within the study area (see Figure 68), for which the site findings were summarised in Table 11 (of the BSA). The botanist notes that the vegetation of the assumed drainage line is dominated by *Galenia africana* (LC), which is not of conservation concern. It is important to note that *G. africana* (Yellow bush, Kraalbos) prefers drier areas, and is not a wetland indicator

species. The BSA states (on page 47) that although drainage lines are considered (by the botanist) as no-go areas, the authors of the BSA would cede such a view if the input of a wetland/water specialist is obtained in the matter.

Subsequently, the wetland specialist of Afzelia visited the study area in order to ascertain the presence of the drainage line alluded to by the botanist. At Site Alternative 3, infield soil sampling was done along transects by the Afzelia specialist to determine the presence of a wetland and or riparian zone. No signs of redoximorphic features (such as mottling and gleying) which result from prolonged anaerobic conditions were found. The lack of redoximorphic features confirmed that the soil is never saturated throughout the year. The soil samples exhibited a dark, organic-rich topsoil layer above a uniform golden-brown colour which is typical of aerobic conditions of terrestrial soils. Furthermore, careful analysis of the topsoil and vegetation within low-lying areas revealed the lack of signs of runoff and alluvium (sand deposited by flowing water). The lack of significant surface runoff was attributed to the high permeability of the dune sand and thick scrub vegetation that characterises the study area. The lack of free-flowing water meant key features typical of river and riparian zones are not present on site. Instead the study area is characterised by a very subtle concave low-lying area.

No hydrophilic plant species, which is a key diagnostic feature of wetlands and riparian zones particularly in sandy landscapes such as coastal aquifers, were recorded on site. The wetland specialist reports that the low-lying areas within S3 were characterised by a terrestrial vegetation community which was the same as the rest of the site made up of dry-land species that do not grow in wetland areas.

Further to this, the DWS Risk Assessment's outcome showed a risk rating of Low, which qualifies the development for authorisation under the provisions of a General Authorisation in terms of the NWA, 1998 instead of a full Water Use Licence Application.

Figure 63: View looking across the face of the mined dune and the vegetation community atop the dune. The yellow dashed line depicts the location of the low-lying area within S3 (Afzelia, 2021).

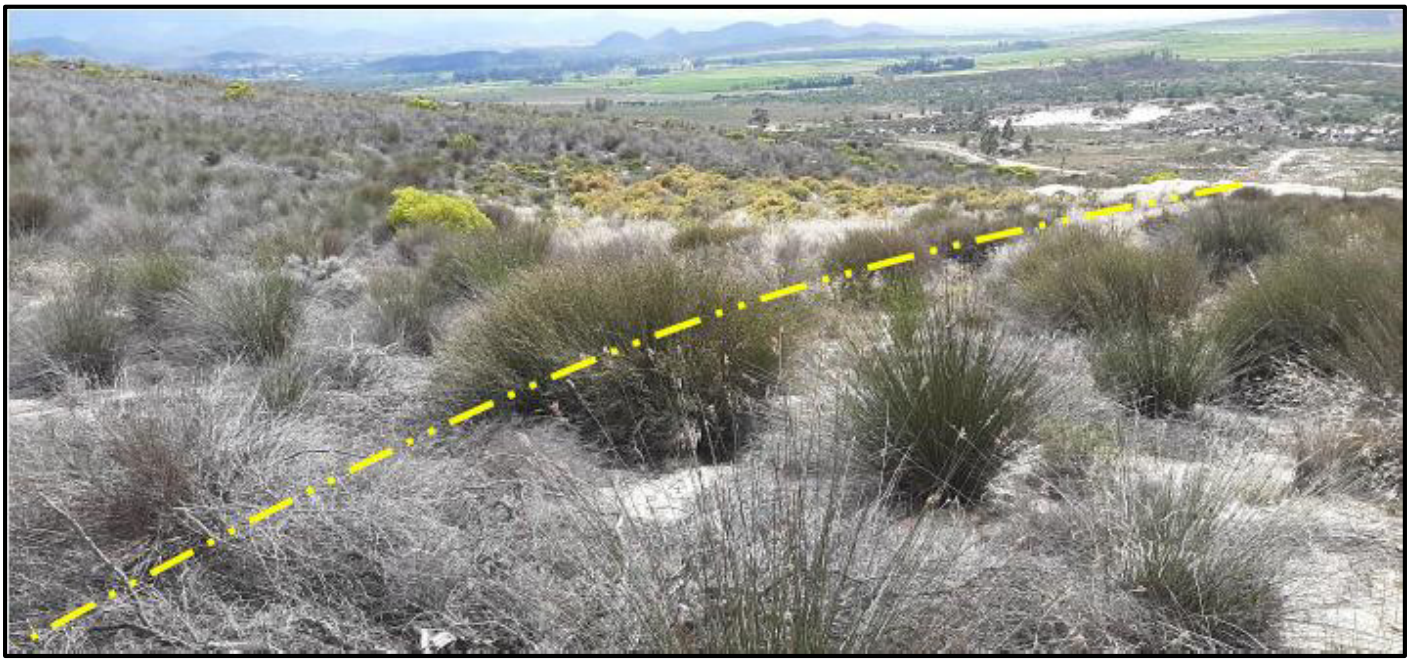

Figure 64: View looking downslope of the low-lying area (yellow dashed line) (Afzelia, 2021).

The WDHA (that supersedes the BSA in all water related matters) concludes that no watercourse/drainage line was identified within the footprint of S3, and therefore expanding the mine towards the west into S3 will not result in the transformation of any watercourse. Afzelia notes that implementation of recommended standard best practice mitigation measures (as included in this report) will reduce the potential impacts to either negligible or low significance. It is the opinion of Afzelia that the proposed expansion of the Zandberg mine meets environmental requirements as far as watercourses are concerned and therefore should be approved provided all other environmental requirements are met.

Groundwater:

If the earlier discussion regarding groundwater is applied to the proposed extension of the mining area (S1-S3), it is noted that the water table, in the valley below the mining area (±197 masl), is ±3 m below ground level. The MR Holder proposes to mine the sand resource up to the underlying sandstone layer that gradually inclines up the hill. The sandstone layer will be the limiting depth of the proposed mining activity, and no mining will be allowed into/below it. In order to avoid impacting on infiltration, groundwater recharge and flow, the Department of Water and Sanitation (DWS) generally stipulates that sand mining not be allowed within 1.5 m of the groundwater level. As the groundwater level is ±3 m deep in the valley below the mining area, it is not expected that mining the sand from the proposed extension area (S2 or S3) will intercept (or come within 1.5 m) the groundwater layer if the mining depth is limited to the underlying sandstone layer.

SITE SPECIFIC MINING AND BIODIVERSITY CONSERVATION AREAS

(Refer to the Botanical Study and Assessment for the Zandberg Fontein Sand Mine near Robertson, Western Cape Province – December 2021 attached as Appendix I2, as well as the Biodiversity Offset Report, January 2022 – Appendix K)

Following the earlier discussion in this regard; when the footprint of all the site alternatives (S1 – S3) are layered over the Mining and Biodiversity Guideline Map it falls over an area of highest biodiversity importance with a corresponding rating of highest risk for mining. The area of highest biodiversity importance also corresponds with the Langeberg CBA as identified in the 2017 Western Cape Biodiversity Spatial Plan.

National Level of Conservation Priorities (Threatened Ecosystems):

The botanist reports that due to the high impact nature of mining activities, which essentially removes all vegetation as well as the majority of topsoil, these activities will result in the local loss of some species, functions and services unless rehabilitated. However, on-site observations show that if an adequate layer of sand is reintroduced after mining, then rehabilitation of the site, with retention of many SCC, is a distinct possibility.

Approximately 148 ha of pristine Breede Sand Fynbos exists on site. About 2.7% of this will thus be transformed by the proposed mining extension. Taking into account the total combined size of all currently mapped Breede Sand Fynbos, an area of less than 1% (0.13% of 3 026 ha) of this vegetation type / ecosystem will be impact by the

proposed mining activity should the application be approved. This will not prevent national conservation targets from being achieved.

Biodiversity Offset

(Information extracted from the Biodiversity Offset Report, Eco-Pulse, 2022 – Appendix K)

The high biodiversity importance of the project area, and the comments received from CapeNature on this project, led to the appointment of Eco-Pulse Environmental Consulting Services (Eco-Pulse) to assist in offset planning for this project.

The offset planning approach adopted for this project was informed by the Western Cape Provincial Guidelines (DEADP, 2015) as well as the Draft National Biodiversity Offset Guidelines (DFFE, 2021). Offset planning was undertaken in an iterative fashion (following figure), with guidance from key stakeholders.

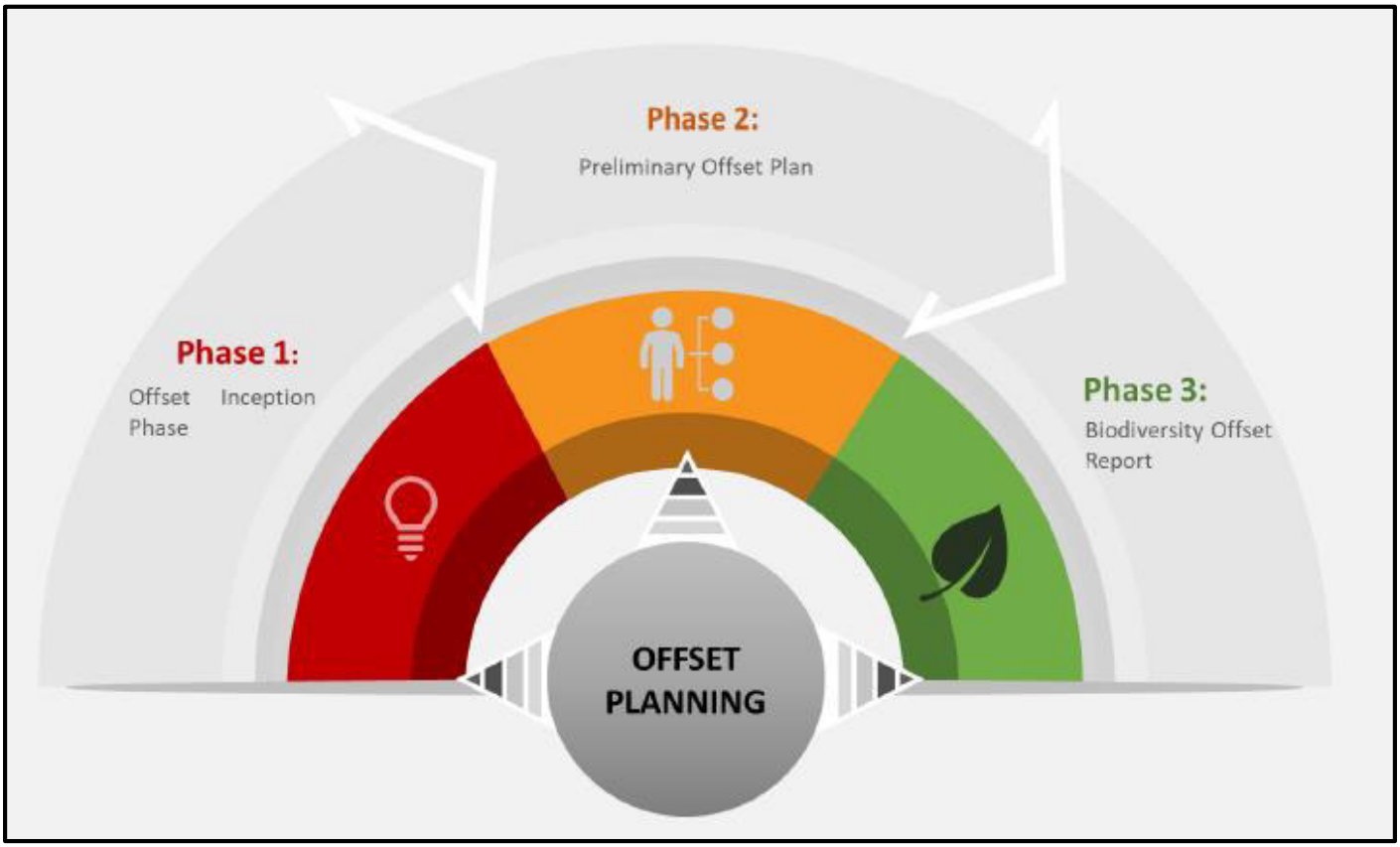

Figure 65: Overview of approach to offset planning (image obtained from Eco-Pulse)

- Phase 1: Obtaining and understanding the ecological context and biodiversity importance of the site to ensure appropriate implementation of the mitigation hierarchy.

- Phase 2: Calculating residual impacts and associated offset targets, and preparing a preliminary offset plan with reference to available biodiversity offset guidelines that was presented to CapeNature (16 November 2021).

- Phase 3: Refining and finalizing the Biodiversity Offset Report that is designed to provide concrete and practical recommendations to compensate for negative impacts of the proposed development on biodiversity.

Best-practice dictates that the offset investigation include a "Mitigation Hierarchy Assessment" (following figure) to determine what additional steps can be put in place before resorting biodiversity offsets.

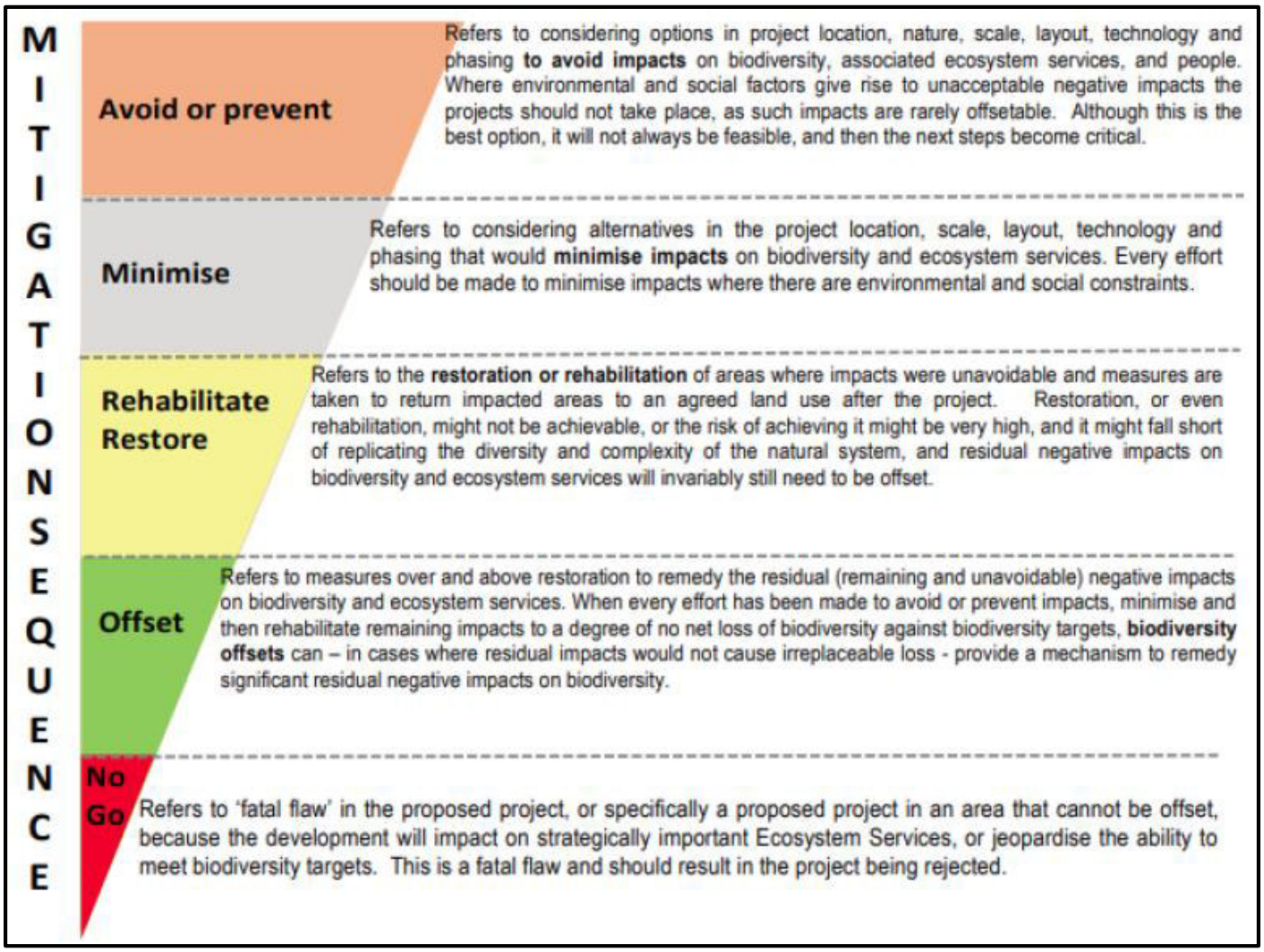

Figure 66: Placing offsets in the environmental impact mitigation sequence in South African (DEA, 2017)

Given that the proposed development will impact on a pristine portion of highly restricted vegetation type, which is classified as a CBA1, certain measures were included in the project planning to reduce the significance of impacts prior to pursuing offset actions.

1. **Avoidance and Minimisation of Impacts**

   Due to the nature of the sand deposit that is of interest to the applicant, complete avoidance of the Breede Sand Fynbos vegetation is not possible. Therefore, the first step was to vastly reduce the proposed extension area from ±27 ha (out of 108 ha) to 4 ha. Subsequently, through an iterative process that considered the site sensitivity at a finer scale, the three site alternatives (S1, S2, S3) were suggested. Refer to Part A(1)(g)(i) *Details of the development footprint alternatives considered.*

2. **Rehabilitation measures to minimise impacts**

   In addition, the most critical mitigation measure will be the rehabilitation of the site once the mining is complete. Refer to Part A(1)(d)(ii) *Description of the activities to be undertaken – 2.4 Decommissioning Phase* as well as the Closure Plan attached as Appendix P. The fact that rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC, together with the fact that suitable amount of Breede Sand Fynbos is available on site for biodiversity offsetting, will greatly mitigate the impacts of the proposed mining activities in the long-term (Eco-Pulse, 2022).

Residual Impacts and Offset Targets

Based on the specialist assessment undertaken, the loss of pristine Breede Sand Fynbos vegetation is a significant negative impact from a botanical and ecological perspective. Impacts to fauna have been flagged as a concern especially butterfly SCC, however these impacts can be reduced significantly by selecting S3, and the vegetation offset was deemed suitable and sufficient to compensate for negative impacts on fauna (Cossypha Ecological, 2021; Dave Edge & Associates, 2021). Residual impacts were therefore calculated on the extent of vegetation that would be impacted by the development (4 ha). The offset target is then calculated by multiplying the residual impact by a ratio of 30:1. This ratio applies for impacts to “Good” condition sites falling within the CBA1 category in terms of the WCBSP. Therefore, the offset target for the proposed development is 120 ha.

Biodiversity Offset Site Selection

For this project, an area of 169 ha within the farm portion is proposed as the biodiversity offset area (Figure 6). The area complies with site selection guidelines and is deemed to be adequate for addressing offset obligations for the following reasons:

- The biodiversity offset site falls entirely within a CBA1 and is priority for conservation action;
- The biodiversity offset site contains 119.23 ha of pristine Breede Sand Fynbos (like for like) and also includes a small (1.48 ha) of degraded Breede Sand Fynbos, with rehabilitation potential;
- The biodiversity offset site also includes approximately 35 ha of North Sonderend Sandstone Fynbos and 12 ha of Robertson Karoo vegetation, which can be considered additional conservation gains; and
- The biodiversity offset site will preserve important populations of butterfly SCC.

In addition to these considerations, a number of practical considerations have also been integrated as part of the site selection process:

- Landownership: The biodiversity offset site is owned by Zandbergfontein Trust. The directors of the Trust have however indicated their willingness to enter into an offset agreement to secure and manage the offset area;

- Vegetation Management: The vegetation within the biodiversity offset site is pristine and existing threats to the site are limited, with very little evidence of encroachment of alien invasive plants in target area;

- Impacts to Farming Practices: The land is currently not used for any active farming activities and as such, would have no material impact on current farming practices;

- Fencing: The farm portion is currently fenced, and the target areas can be demarcated with beacons, therefore no additional fencing is required;

- Overall Management: Future management cost would be low.

Vegetation Characteristics	Area (Ha)
Breede Sand Fynbos - Pristine	119.24
Breede Sand Fynbos - Degraded	1.48
North Sonderend Sandstone Fynbos - Pristine	22.18
North Sonderend Sandstone Fynbos - Intermediate	13.49
North Sonderend Sandstone Fynbos - Degraded	0.62
Robertson Karoo - Intermediate	11.51
Robertson Karoo - Transformed	0.60
Grand Total	**169.12**

Figure 67: Summary of vegetation characteristics associated with the proposed biodiversity offset site (Eco-Pulse, 2022)

Biodiversity Draft Programme for Implementation

It is important that an implementation programme be agreed to and be monitored to ensure that actions are implemented in a timeous fashion. Refer to Page 43 of the Biodiversity Offset Report (Appendix K) for a copy of the preliminary implementation programme that has been prepared for this project. The implementation programme will form part of the final Biodiversity Management Programme to be drafted for the project should the application be approved.

SITE SPECIFIC VEGETATION

(Refer to the Botanical Study and Assessment for the Zandberg Fontein Sand Mine near Robertson, Western Cape Province – December 2021 attached as Appendix I2)

Fine Scale Vegetation Patterns:

The BSA reports that the vegetation of the study site (vicinity of S1 – S3) resembles pristine Breede Sand Fynbos, together with pristine North Sonderend Sandstone Fynbos along the northern part of the farm boundary (Figure 41). In terms of Breede Sand Fynbos, there exists a pristine main continuous unit (in which S1 – S3 are), together with a smaller unit in the north-eastern corner of the farm. Furthermore, two degraded (one moderate, the other heavily) Breede Sand Fynbos units occur on the property (outside the proposed extension areas). The moderately degraded unit has already undergone passive restoration, and shares many elements of the pristine Breede Sand Fynbos. This unit is reported to have been mined by the previous owners many years ago. The extent of the Breede Sand Fynbos was less than what has been mapped according to the Vegetation Map of South Africa (Mucina & Rutherford 2012/2018).

In terms of the Breede Sand Fynbos, there was some variability in habitat types (Figure 68), mostly related to vegetation cover. In other words, the existence of mobile-, or windblown dunes with sparse vegetation cover, are found across the site, which progresses towards semi-mobile dunes with moderate cover, to stabilised dunes with high vegetation cover. These different habitat types do not, vary substantially in species composition, but only in cover. The same suite of species is found in all these types.

The majority of the vegetation was relatively uniform. The tall shrub layer had Proteaceae species alternating in dominance, such as *Protea laurifolia* (especially noticeable near the current mining area and S2), *Leucospermum calligerum, and Leucadendron salignum*, together with scattered individuals of *Wiborgia obcordata.*

The medium to small shrub layer was dominated by *Aspalathus lactea, A. quinquefolia*, *Erica plumose, Erica serrata, Euchaetis pungens,* and *Metalasia adunca.* Although the site had relatively few forb species, smaller shrubs the plants that were abundant included *Aristea dichotoma, Oxalis obtuse, Prismatocarpus brevilobus*, *Wahlenbergia nodosa*, and *Polpoda capensis*. Finally, the graminoid layer was dominated by *Thamnochortus lucens* and *Willdenowia incurvata,* with less dominant *Pentameris pallida* and *Stipagrostis zeyheri*. The vegetation unit in its entirety was pristine, with no signs of previous transformation or secondary vegetation. Also, no invasive alien plant species were observed within the pristine Breede Sand Fynbos units.

In terms of North Sonderend Sandstone Fynbos, the extent of the vegetation unit was also less than what has been mapped according to the Vegetation Map of South Africa (Mucina & Rutherford 2006). The true extent of the North Sonderend Sandstone Fynbos vegetation unit was limited to the northern border of the farm, and is characterised by increase altitude. The vegetation type is thus confined to the steep mountain slopes quite some distance from the current and proposed mining activities, and is unlikely to be affected by it.

The tall shrub layer again included species from the Proteaceae, such as *Protea laurifolium, P. nitida* and *Leucadendron salignum*, together with *Serruria gremialis*, and the rock-loving species *Maytenus oleoides* was observed growing in between many of the exposed sandstone crevices, with other typical species being *Cliffortia ruscifolia*, *Podalyria calyptrata*, *Stayneria neilii*, *Syncarpha canescens* subsp. *canescens*, and *Searsia dissecta*. The medium height shrub layer was dominated by *Aspalathus burchelliana* and *A. hirta*. The graminoid layer was dominated by the grass *Capeochloa cincta*.

The botanist notes that the vegetation of the area is pristine, numerous unique micro-habitats exist, and various important functions and services are provided by these habitats and their vegetation cover. The majority of the site is located within a CBA1, regarded as important for meeting the provincial conservation targets, means that all three alternative sites, as well as the majority of the farm (specifically Breede Sand Fynbos), can be classified as highly sensitive. Thus, these habitats have a high ecological sensitivity and conservation value/importance. The botanist notes that the loss of these habitats would not be acceptable unless appropriate biodiversity offset measures are implemented in order to conserve the remaining vegetation, and rehabilitation is implemented after mining.

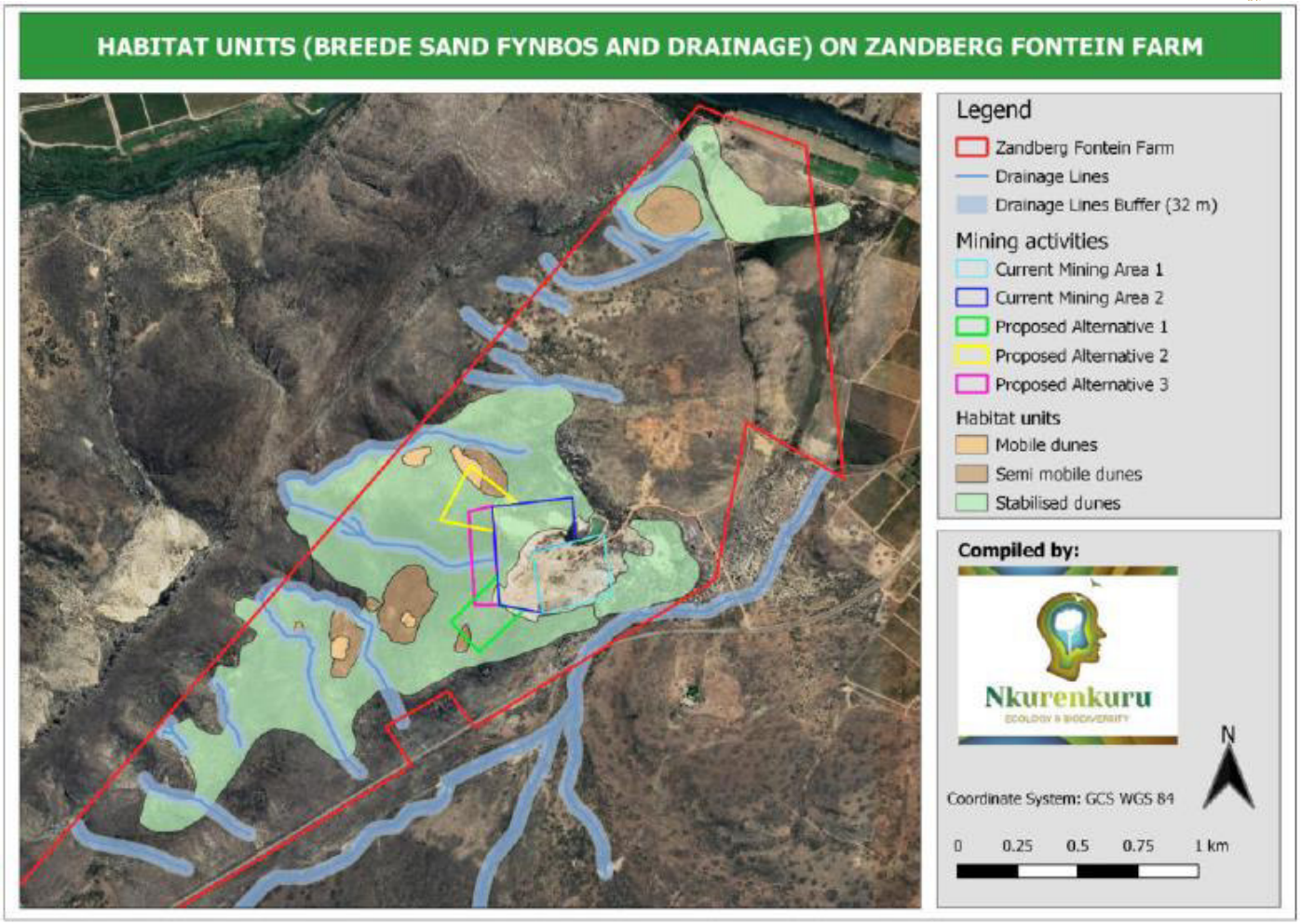

Figure 68: Habitat units (Breede Sand Fynbos and drainage) on Zandberg Fontein farm (image obtained from Nkurenkuru Ecology & Biodiversity)

The botanist proposed that S1 is, in his opinion, the preferred option for mining for the following reasons:

- S1 is of mostly uniform vegetation and habitat, and only slightly intrudes into a semi mobile dune, in contrast to S2, which dissects a large part of mobile/semi mobile dunes towards its northern and north-eastern sides. Thus, mining in S2 would, in the botanist's opinion, have a reducing effect on overall site habitat diversity;
- S1 has a gentler slope, especially towards the south-western and south-eastern edges, which could reduce the potential of erosion, and the collapse of unstable side walls once mining has commenced. It is also lower in overall height compared to the current mining level, and the resulting mining slopes would be gentler. In contracts, S2 covers the main, and one of the highest dune areas on site. As such, the botanist is of the opinion that side wall collapse are bound to be a problem, unless the walls can be stabilised (botanist recommended consultation with a mining technician/engineer). The botanist also postulated that S2 is characterised in the northern part, by an east facing mobile dune with a very steep slope that

could also result in erosion and collapse of the side walls after mining. Side wall collapse of the steep and high slopes of S2 could threaten the integrity of a large part of the main sand dune;

- Since these open, mobile dunes portions are created primarily by wind action, the botanist hypothesised on the possibility that much of the usable sand could already have blown out, and that there might be less usable sand in the eastern part of S2.

Botanist opinion regarding Site Alternative 3:

- The southern part of S3 is similar to S1, and in fact overlaps with it. Likewise, the northern part of S3 overlaps (and is similar) with S2. This means that the levels of SCC abundance are intermediate between these two areas (respectively). At its centre the area is dominated by *Galenia africana* (LC) which is not of conservation concern.
- The botanist notes that should a wetland/water specialist proposed adequate mitigation measures, then S3 can be considered as intermediate in mining preference between S1 and S2.
- One advantage (identified by the botanist) of S3 is that it minimizes edge effects as the perimeter of S3 is the smallest of all three alternative sites: perimeter of ±580 m vs. ±720 m (S2), and ±690 m (S1).

POPSA Species Observations:

Ground truthing of the site confirmed a combined total of 109 plant species present within the proposed alternative sites (S1 – S3), the broader area, and the already mined area, of which 56 occur in Breede Sand Fynbos. A total of 11 species were alien (Botha & Keet, 2021).

Species of Conservation Concern:

Ground truthing confirmed a total of 32 Species of Conservation Concern to be present on site in the Breede Sand Fynbos and North Sonderend Sandstone Fynbos, of which 10 are Red List Species, and 28 are provincially protected species.

Specifically, many of the Breede Sand Fynbos species occurred in large numbers across the site. The Endangered species *Babiana leipoldtii* was found in the degraded Breede Sand Fynbos section in the northern part of the farm (outside the proposed extension areas). Although it was not found in or near any of the proposed site alternatives, it is likely to occur in the vicinity.

Furthermore, 18 of these species were not present in the list obtained online (POPSA) during the desktop phase. This includes 2 Endangered species (*Erica pilosiflora* subsp. *pilosiflora*, *Lachnaea uniflora*), 1 Near Threatened species (*Metalasia adunca*) and 2 Data Deficient species (*Aloe perfoliata* var. *glauca, Rushia pungens*). The botanist notes that *Aspalathus burchelliana*, *Erica pilosiflora* subsp *pilosiflora*, and *Aloe perfoliata* var. *glauca* are species of North Sonderend Sandstone Fynbos, and would likely not be impacted by the proposed mining area extension, which are restricted to Breed Sand Fynbos and are quite some distance to the nearest start of North Sonderend Sandstone Fynbos.

An interesting find, made by the botanist, was the presence of an unknown Oxalis species. Currently, the species does not seem to have been described before (personal communication Dr Kenneth Oberlander, Oxalis taxonomist); however, this would need to be confirmed by more extensive studies. The species was found away from the proposed site alternatives, on the higher slopes of the Breede Sand Fynbos close to its border with Northern Sonderend Sandstone Fynbos in the north-west, and would likely not be impacted by the proposed developments, since it occurred at least 600 m away from S1.

Table 20: Plant species of conservation concern recorded on the farm Zandberg Fontein, specifically within Breede Sand Fynbos and North Sonderend Sandstone Fynbos (Table extracted from the BSA, 2021).

Family	Species	Conservation Status	
		IUCN Red List	WCNCO (Schedule 4)
Fabaceae	*Aspalathus burchelliana*	EN	
Iridaceae	*Babiana leipoldtii*	EN	Yes
Aizoaceae	*Stayneria neilii*	VU	Yes
Ericaceae	*Erica pilosiflora subsp. pilosiflora*	VU	Yes
Fabaceae	*Aspalathus lactea subsp. breviloba*	VU	
Rutaceae	*Euchaetis pungens*	VU	Yes
Thymelaeaceae	*Lachnaea uniflora*	VU	
Asteraceae	*Metalasia adunca*	NT	
Aizoaceae	*Ruschia pungens*	DD	Yes
Asphodelaceae	*Aloe perfoliata var. glauca*	DD	Yes
Aizoaceae	*Carpobrotus edulis subsp. edulis*	LC	Yes
Aizoaceae	*Ruschiella argentea*	LC	Yes
Aizoaceae	*Tetragonia fruticosa*	LC	Yes
Amaryllidaceae	*Brunsvigia orientalis*	LC	Yes
Apocynaceae	*Eustegia minuta*	LC	Yes
Ericaceae	*Erica imbricata*	LC	Yes
Ericaceae	*Erica plumosa*	LC	Yes
Ericaceae	*Erica serrata*	LC	Yes
Ericaceae	*Erica similis*	LC	Yes

Family	Species	Conservation Status	
		IUCN Red List	WCNCO (Schedule 4)
Ericaceae	*Erica sonderiana*	LC	Yes
Fabaceae	*Podalyria calyptrata*	LC	Yes
Iridaceae	*Aristea dichotoma*	LC	Yes
Iridaceae	*Babiana ringens subsp. ringens*	LC	Yes
Iridaceae	*Gladiolus carinatus*	LC	Yes
Orchidaceae	*Disperis capensis*	LC	Yes
Proteaceae	*Leucadendron brunioides var. brunioides*	LC	Yes
Proteaceae	*Leucadendron salignum*	LC	Yes
Proteaceae	*Leucospermum calligerum*	LC	Yes
Proteaceae	*Paranomus dispersus*	LC	Yes
Proteaceae	*Protea laurifolia*	LC	Yes
Proteaceae	*Serruria gremialis*	LC	Yes
Rutaceae	*Agathosma stipitata*	LC	Yes

The three site alternatives share a very similar suite of species, since all three areas are fully within Breede Sand Fynbos. They are thus similar in terms of the species identified of both SCC and Least Threatened species. However, in the botanist's opinion, S1 is characterised by a higher dominance of proteoid species, specifically *Protea laurifolia, Leucadendron salignum*, and *Leucospermum calligerum*. Although these species are protected, they are very widespread and not threatened. Their dominance in S1 also means that the abundances of other Red List species are less than in S2 (even though the same species occur in both areas). S3 is intermediate between S1 and 2 as the southern section has lower abundance of Red List species, while the northern part has a higher abundance. For these reasons, the botanist preferred S1, since it would entail destroying a lower number of plants of Red List species/SCC.

The botanist however notes that S3 is also a viable option although a higher number of SCC plants would be destroyed, the area has the advantage of minimizing edge effects.

Alien Plant Species:

The pristine Breede Sand Fynbos (and North Sonderend Sandstone Fynbos) areas were free of any alien plants. However, 11 alien plants were recorded in and around the current mining areas as presented in the following figure, of which 9 species are listed as invasive species in the NEM:BA Alien & Invasive Species Regulations, 2016.

Family	Species	NEM:BA Category
Arecaceae	*Livistona chinensis*	-
Asparagaceae	*Yucca gloriosa*	-
Cactaceae	*Opuntia ficus-indica*	See text for details.
Casuarinaceae	*Casuarina equisetifolia*	2
Fabaceae	*Acacia cyclops*	1b
Fabaceae	*Acacia saligna*	1b
Myrtaceae	*Eucalyptus cladocalyx*	1b (also see text for details)
Pinaceae	*Pinus roxburghii*	2
Poaceae	*Pennisetum setaceum*	1b (Sterile cultivars or hybrids are not listed)
Scrophulariaceae	*Myoporum laetum*	3
Solanaceae	*Nicotiana glauca*	1b

Figure 69: Alien plant species recorded in and around the current mining areas (image obtained from Nkurenkuru Ecology & Biodiversity)

Vegetation related cumulative impacts:

The BSA notes that ecosystems consist of a mosaic of various vegetation/habitat zones or "patches". The size of natural patches affects the diversity (richness and abundance) of species they contain. At the periphery of patches, influences of neighbouring patches become apparent, known as "edge effects". Edges seldom contain species that are rare, habitat specialists, or that require large tracts of undisturbed core habitat. Fragmentation due to development reduces the size of core habitats, while greatly increasing edge habitats. This causes species compositional shifts, which in turn adds extra pressure on ecosystem dynamics and functionality (Perlman & Milder, 2005). The cumulative impact of developments on species population viability can significantly be reduced if new developments arise as close as possible to existing developed and/or transformed areas.

The botanist notes that a total of at least 0.13% (4 ha of 3 026 ha) of Breede Sand Fynbos will be impacted by the proposed mining activities. However, if an appropriate size (120 ha; 1:30 ratio) of pristine Breede Sand Fynbos, of which ±148 ha exists on the earmarked farm, is allocated as a biodiversity offset, then the 4 ha can be regarded as acceptable loss for the development (Botha & Keet, 2021).

The specialist further notes that excessive clearing of vegetation can and will influence runoff and stormwater flow patterns and dynamics, which could greatly accelerate the erosion of plains and intermittent drainage lines, which could also have detrimental effects on the lower-lying areas. Thus:

- All drainage lines must be regarded as no-go areas, unless approved by a hydrologist/wetland specialist. *This is not applicable as there is no drainage line within the application area.*;
- Rehabilitation and revegetation of all surfaces disturbed or altered during the operational phase is highly desirable. *To be implemented through progressive rehabilitation*.
- A regular monitoring and eradication protocol must be part of all the developments' long-term management plans. *To be implemented as stipulated in the EMPR.*

SITE SPECIFIC FAUNA

Avifauna:

Following the earlier discussion regarding the faunal species of the study area, the Screening Tool (of initial 108 ha area) identified the possibility of *Circus maurus* (Black Harrier) and *Aquila verreauxii* (Verreaux's Eagle) occurring in the area. The Black Harrier has not been recorded within the pentad by SABAO2, while Verreaux's Eagle has been encountered 15% of the total times the pentad has been surveyed. These species and certain other SCC occurring in the region were given a medium or medium-low likelihood of occurring on the site (refer to Figure 46). Such species are mostly associated either with Karoo habitat (such as that occurring across the road to the south of the proposed site), or rocky habitats such as the mountain slopes within the study area and other mountainous regions within the pentad. The specialist notes that while these species may be encountered within the study area, it's unlikely that the site provides critical habitat for these species.

Only *Certhilauda brevirostris* (Agulhas Long-billed Lark), endemic to the region and currently classified as Near Threatened, was given a high likelihood of occurring on the site. The species occurs in Renosterbos shrubland and favours open habitats with scattered bush cover and low structurally diverse vegetation.

Mammals:

The Riverine Rabbit inhabits dense riparian growth on alluvial soils adjacent to seasonal rivers and occurs mainly in the central Karoo (Nama-Karoo shrubland), with a small sub-population occurring in the Breede Valley. The zoologist notes that it is unlikely that the site provides suitable habitat for this species, and it and the other mammal SCC (Fig. 47) were given a low likelihood of occurring on the site.

CN (CapeNature) however commented that the rating for Riverine Rabbit should rather be noted as unknown than low, as consultation with the Endangered Wildlife Trust (EWT) has revealed that the lack of records within the Breede Valley may be as a result of low sampling effort rather than real absence. Previous surveys in 2006 and 2007 resulted in only one unconfirmed debatable sighting. The habitat selection in areas outside the Nama Karoo (e.g. Little Karoo) has revealed a wider range than only riparian vegetation. CN recommend that the ecological monitoring requirements for the offset should include an additional activity of camera trap surveys specifically targeted at Riverine Rabbits, but should also include other fauna species.

Herpetofauna:

The specialist concluded that it is unlikely that the Flat Caco (*Cacosternum platys*) will occur on the study area.

Cossypha Ecological Site Visit Findings:

The following figure lists the faunal species recorded in the study area and surroundings during the site visit of the specialist.

Scientific Name	Common Name	Conservation Status	
		National	Global (IUCN)
Chrysochloris asiatica	Cape Golden Mole	LC	LC
Sylvicapra grimmia	Common Duiker	LC	LC
Raphicerus campestris	Steenbok	LC	LC
Canis mesomelas / Vulpes chama	Black-backed Jackal / Cape Fox	LC	LC
Genetta sp.	Genet sp.	LC	LC
Georychus capensis	Cape Mole-rat	LC	LC
Gerbilliscus afra	Cape Gerbil	LC	LC
Rhabdomys pumilio	Four-striped Grass Mouse	LC	LC
Hystrix africaeaustralis	Porcupine	LC	LC
Lepus saxatilis	Cape/Scrub Hare	LC	LC
Felis silvestris	African Wild Cat	LC	LC
Oreotragus oreotragus	Klipspringer (on higher rocky slopes)	LC	LC

Figure 70: Fauna recorded8 in the study area and surrounds during the site visit (image obtained from the Terrestrial Fauna Report)

The specialist notes that while it is evident that the site surrounds an array of terrestrial fauna, no SCC were recorded during the preliminary site visit. However, as mentioned earlier, it is possible that the Agulhas Long-billed Lark (*Certhilauda brevirostris*) (NT) could occur on site.

The specialist notes that the study area is in a natural condition and provides for an array of terrestrial faunal species. Habitat heterogeneity and connectivity is provided by both habitat types in the landscape (Breede Sand Fynbos on sandy substrate and North Sonderend Fynbos on the higher rocky slopes). The current (approved) mining footprint does not completely fragment the habitat of the sand fynbos as it is confined to the lower slopes of the sand deposit.

According to the report the impacts on the fauna (excluding butterflies), including SCC can be minimised through reducing the mining footprint, careful placement of the expanded area, phasing mining activities, and ensuring effective rehabilitation of mined areas.

- A large mining footprint is not acceptable but limiting the proposed mining footprint expansion to 4 ha or less is considered more acceptable. The proposed biodiversity offset is therefore supported (by the specialist) and must be made a condition should authorisation be granted.

- The placement of the new proposed are is important to avoid fragmenting the habitat. Placing the new footprint up the slope from the currently authorised area (S2) will increase the potential for fragmenting the dune vegetation. Placing the footprint to the side and/or lower down the slope of the current mining area (i.e. S1 & S3) will ensure connectivity is maintained on the upper regions of the slope. Removing the vegetation and sand on the upper slope will not fragment the habitat completely but will limit movement of fauna through a narrow band of vegetation and san compared to the removal of vegetation and sand on the lower slope. The latter will maintain the current amount of vegetation and burrowing habitat above the current mining area. S1 and S3 are therefore preferred to S2.

- Placing the proposed new area further down the slope where it is not as steep will help minimise the height of the cut face to be exposed during and after mining operations. It will also allow more easy access compared to the areas higher up the slope, where a new access route would likely be required.

- While S1 and S3 are equivalent in area, the configuration of S3 is preferred. With its position being a narrow band along the length of the western border of the approved mining area, it expands the mining footprint in a uniform and consolidated block, as opposed to an additional piece projecting out further into the natural areas, as with S1.

- Phasing of development through strip mining and restoring previously disturbed areas will also help minimise impacts and increase recovery.

- Rehabilitation is a critical element on the mitigation hierarchy, and opportunities to strengthen rehabilitation should be actively explored. Significant considerations for fauna include the characteristics of the substrate and presence of water. Preliminary observations on site suggest that areas with reasonable sand cover become colonised with indigenous vegetation more easily. Reinstatement of 30-50 cm sand layer above the rocky substrate may be sufficient to facilitate natural recovery of dune vegetation and would also provide habitat for animal species currently making use of sandy dune deposits.

The specialist concludes that if the above-mentioned conditions are met, the significance of the impacts on terrestrial animal species (excl. butterflies) can be rated as Low-Moderate, and the offset proposed for vegetation and plant species, i.e. habitat, would be sufficient to cover the terrestrial fauna (excl. butterflies) and would not trigger the need for any additional species offset requirements. The offset proposed for vegetation and plant species would also serve to improve the regional conservation of faunal species in Breede Sand Fynbos.

Lepidoptera:

(Information extracted from the Butterfly Survey attached as Appendix J2)

As mentioned earlier, Dave Edge & Associates was appointed to do a butterfly sensitivity study for the Zandberg Sand Mine project. Following a desktop study and preliminary site visit, as well as a Phase 2 survey and terrestrial biodiversity impact assessment, the specialists noted the following:

- *Aloeides lutescens* does not occur on the site;
- *Chrysoritis rileyi* (Endangered) occurs in both S1 and S2, as well as in the already approved extension area S102;
- Another potential SCC was located in S2 represented by an undescribed subspecies of *C. pyroeis*.
- S1 and S2 are of High Sensitivity for butterflies, although S1 would do less damage than S2.
- If S1 is selected it is possible that suitable offset area(s) could be found on the owner's property which contain butterfly populations sufficient enough to compensate for the damage done by mining at S1.

Upon receipt of the above findings, a Third Phase survey was conducted by the specialists of the potential offset areas and the footprint of S3. The following figure shows the prime search areas that the specialists focussed on during the third site visit.

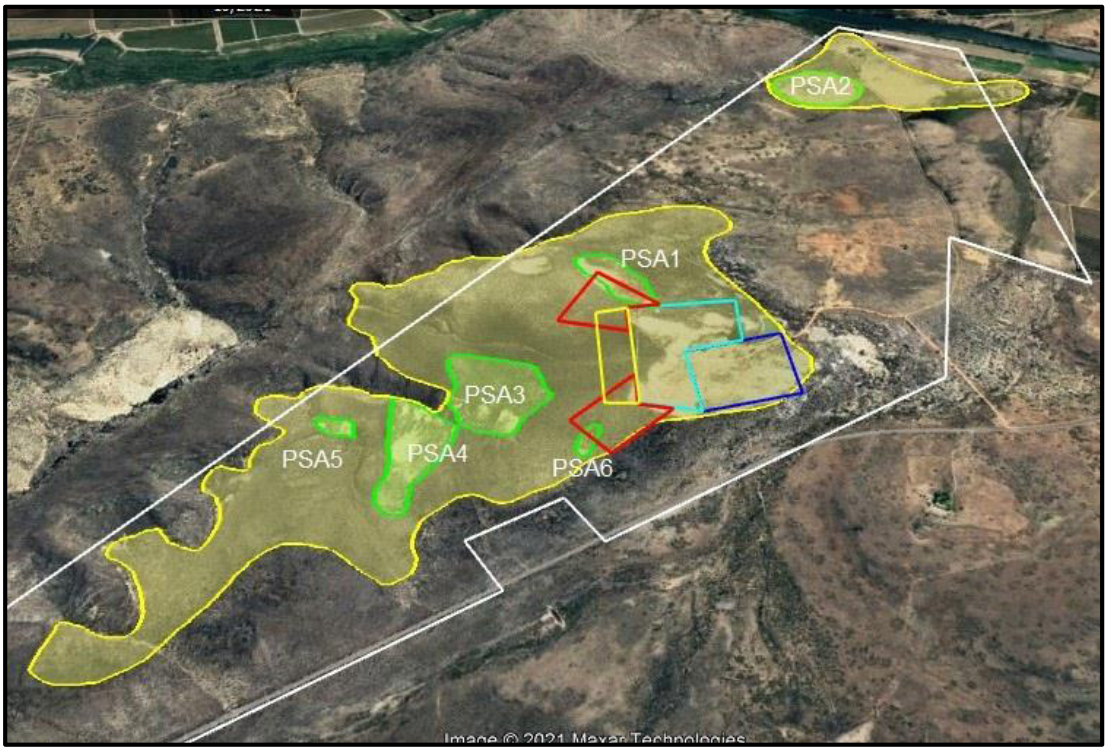

Figure 71: Prime search areas for C. pyroeis and C. rileyi, outlined and filled with green (Edge, 2021).

The specialists recorded *C. rileyi* and *C. pyroeis* in close proximity to S1 and S2, as indicated in the following figures. The discovery of a number of male *C. rileyi* at S1 indicates that the females found previously (October 2021) in this area were not just passing through but that there is a breeding population there. One species of *Aloeides* was found, but it was not the endangered *Aloeides lutescens*, but rather the more common *Aloeides thyra thyra*. A third species of *Chrysoritis* was found, *Chrysoritis brooksi brooksi*, which is not an SCC.

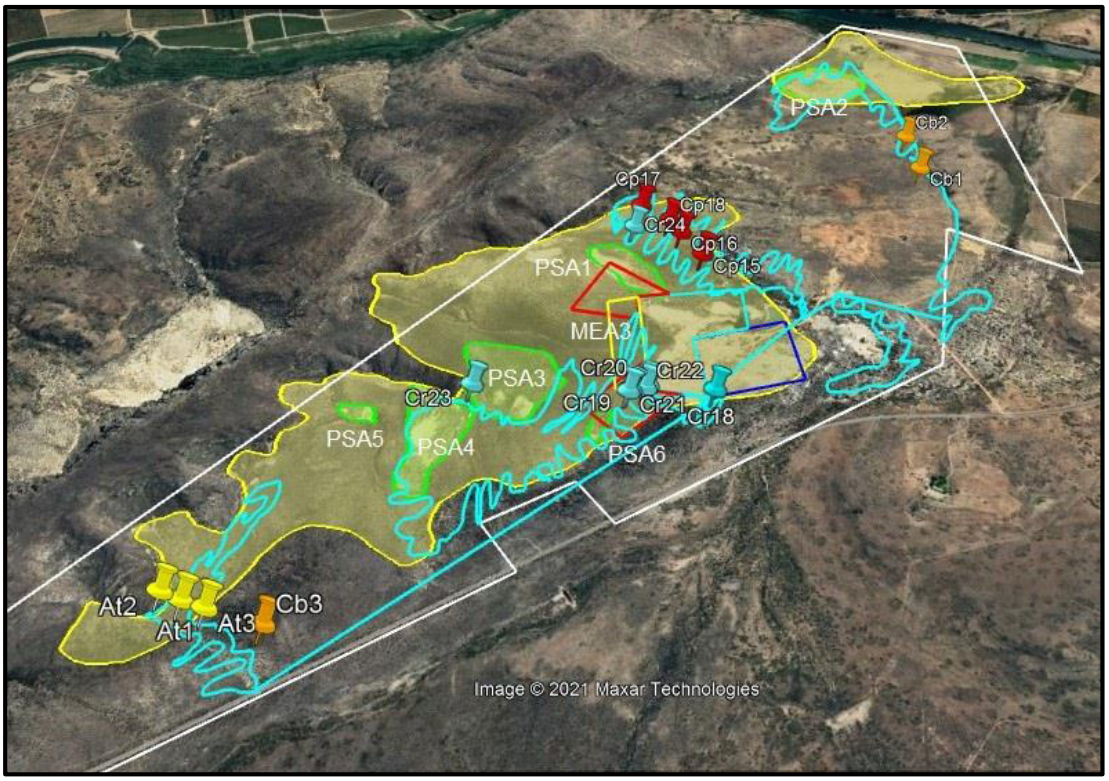

Figure 72: Tracks followed on 8th & 10th December are shown in pale blue, as are the places where butterflies (At = Aloeides t. thyra – yellow; Cb = Chrysoritis b. brooksi – orange; Cp = Chrysoritis p. pyroeis – red and Cr = Chrysoritis rileyi – pale blue) were recorded (Edge, 2021).

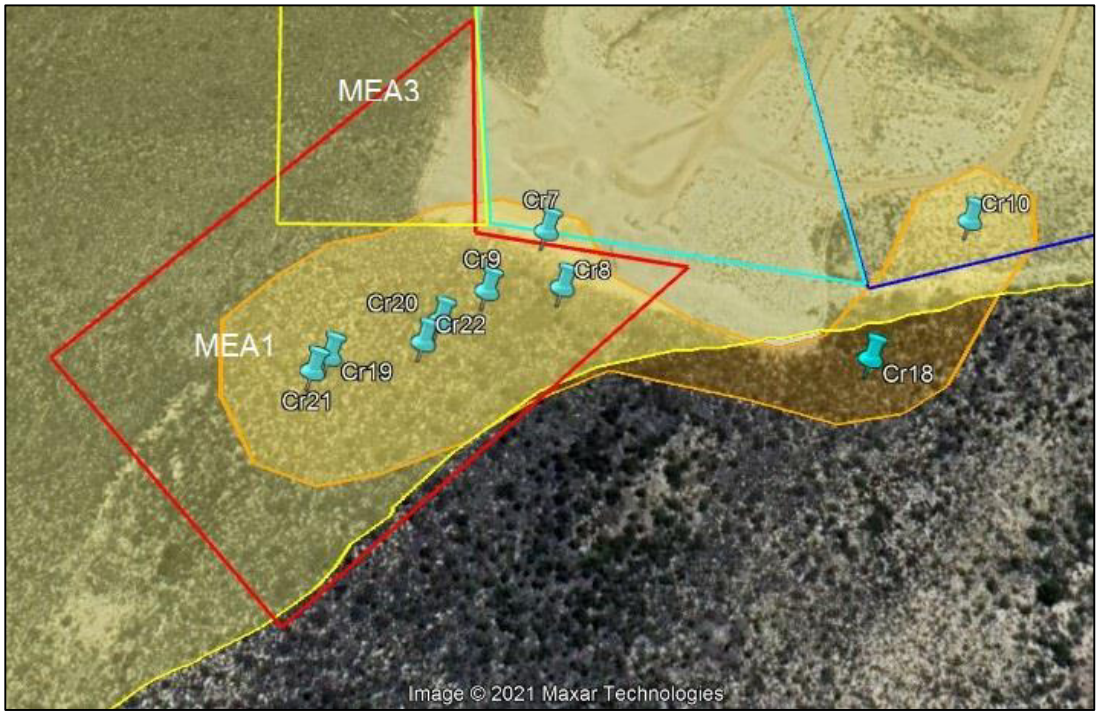

Figure 73: Butterfly records in vicinity of S1 (area of occupancy 3 ha) (Edge, 2021).

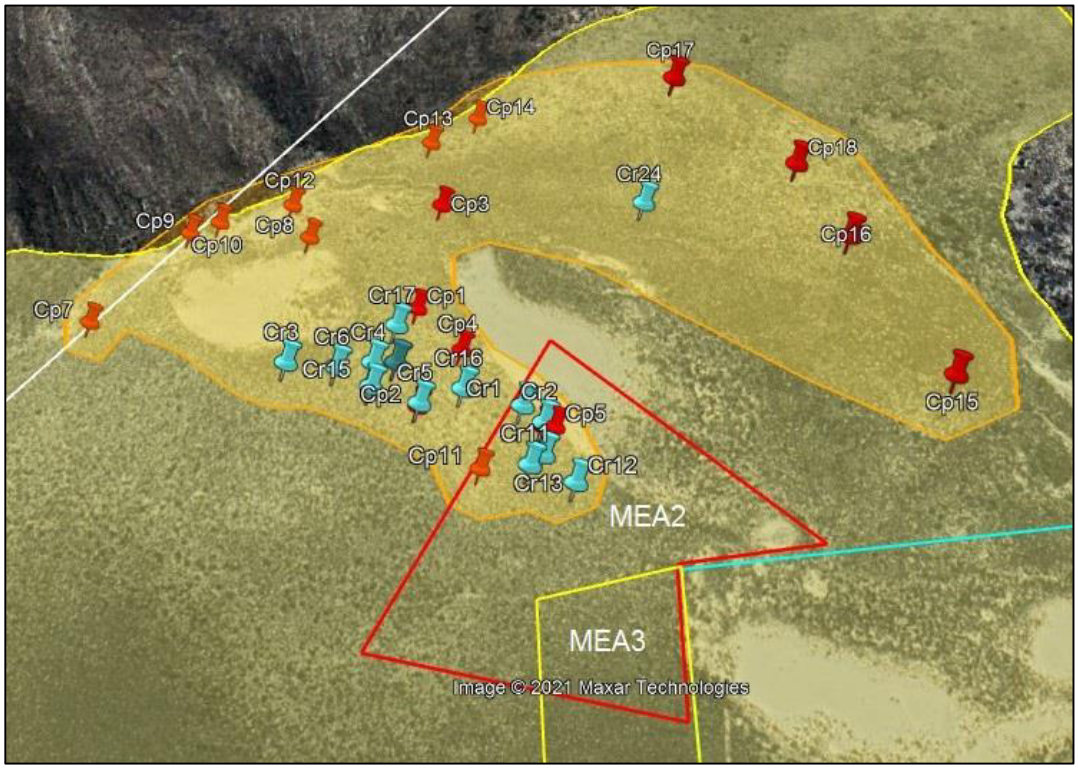

Figure 74: Butterfly records in vicinity of S2 (area of occupancy 13.8 ha) (Edge, 2021).

The specialists found that the butterfly populations on the property is quite substantial and viable, with many hundreds of individuals per brood. The viability of the populations of *C. rileyi* at Zandberg has been inferred by comparison with the known populations of this taxon in the vicinity of the Brandvlei and Quaggasfontein dams near Worcester. Although the Zandberg population of *C. pyroeis* is unique, it can be inferred from the number of observations that it is at least as viable as the *C. rileyi* population. There is no connectivity to other populations as the Worcester populations of *C. rileyi* are >60 km away. The area of occurrence on the earmarked property is 17.5 ha, shown in Figure 72 as an orange polygon around the actual records obtained; this area also allows for a 50 m buffer zone (Edge, 2021). *C. rileyi* is listed in Appendix 7 of SANBI (2021) as currently having an extent of occurrence of 93 ha (the Worcester populations).

No SCC butterflies were recorded within the footprint of S3, even if allowance is made for a 50 m buffer, and the specialist therefore concluded that the mining of S3 will not have any detrimental influence on the known habitat of the SCC butterflies on the site. The study notes that it is of critical importance that the butterfly populations shown in Figures 72 (within S1 and S2) are conserved, since *C. rileyi* has a Global Red List status of Endangered, and the *C. pyroeis* ssp. may represent a newly discovered taxon, with a high Red List status. Given the small global extent and population size of potentially both of these taxa, conserving the populations at Zandberg would

significantly reduce their risk of extinction, since the Worcester populations of *C. rileyi* are threatened from several causes. The overall Red List status of *C. rileyi* will improve if the Zandberg populations can be protected (Selb, 2020).

The report concludes with following findings and recommendations:

- Butterfly surveys (December 2021), which searched in suitable habitat across more than 22 ha of the Zandberg property, have only found one additional small locality for *C. rileyi*.
- The surveys did however find many more occurrences of the two SCC butterflies *C. rileyi* and *C. pyroeis* in and around the mining extension areas S1 and S2, and this confirms that these alternatives should basically be ruled out.
- No SCC butterflies were found in the third alternative mining extension area (S3).
- There is 17.5 ha of land in total on the Zandberg property occupied by SCC butterflies, and if this land can be included in the offset it would significantly improve the Red List status of the SCC *C. rileyi*, and also protect the other potential SCC found on the property, *C. pyroeis*.
- The mining extension areas S1 and S2 are not suitable for sand mining because of the importance of the butterfly populations found there. Mining extension area S3 would have only a minimal impact on the SCC butterflies.
- There are no cumulative impacts that the specialist is aware of.

SITE SPECIFIC CULTURAL AND HERITAGE ENVIRONMENT

(Information extracted from the Heritage Impact Assessment: Proposed Expansion of the Sand Mine on Portion 4 of the farm ZandbergFontein, Robertson, Western Cape – Appendix L)

Archaeological Assessment:

The HIA notes that although Later Stone Age (LSA) sites and materials are to be expected in the Breede River valley, the desktop study did not find record of such archaeological material. Similarly, although historical records confirm that the Breede River valley was visited by Khoekhoen pastoralist groups during the 18th century, their settlements have not been traced. Deacon (2007:2) notes that the gravels of the Breede River are associated with ESA artefacts, with reports of these artefacts being widely encountered in the plough zones of vineyards in the area. The presence of ESA artefacts, has been confirmed by various HIA and/or NID studies in the surrounding areas.

During the site survey (108.4 ha), the specialist found no evidence of archaeological sites or material on the surface of the earmarked dune. Deflation hollows often contain archaeological material – the result both of people in the past making use of the shelter

these hollows provide and the exposure of previously buried archaeological material as the hollow develops. A number of the deflation hollows within the mine expansion area were visited but even in instances where it had deflated to the level of the gravel underlying the dune sand no archaeological material was noted in any of the hollows.

Given the documented and widespread occurrence of ESA and MSA artefacts in the region, it is possible that archaeological material is present on or in earlier soils under the dune sand in the mine expansion area on Zandberg Fontein. The apparent age of the dune – in excess of 200,000 years according to the OSL age determinations obtained by Tyson (1999) – suggests that if such material is present on the underlying slope, it is likely to consist of ESA lithics, as the dune would already have been present and developing during most or all of the MSA.

The specialist did not find any historic buildings or structures, cemeteries or graves within the surveyed area.

Palaeontological Assessment:

According to the desktop palaeontological assessment conducted by Dr Bamford the bedrock in this area is part of the Cape Supergroup, composed of siliciclastic sediments deposited in a passive margin basin with strata that are up to 10 km deep and spanning about 170 million years of earth history between the Early Ordovician circa 500 million years ago (Ma) and the Early Carboniferous circa 330 Ma. Although the subsequent Cape Orogeny has deformed these strata, there is lateral continuity in the Western Cape of over 1000 km of the three subdivisions of this group of sediments (Thamm and Johnson, 2006).

The lowest and oldest group is the Table Mountain Group, with sediments dating from the Ordovician, Silurian and Devonian periods. The middle, Devonian, Bokkeveld Group is divided into two subgroups: the lower Ceres Subgroup and the upper Bidouw Subgroup. The youngest Cape Supergroup sediments are the Witteberg Group, with two subgroups in the Western Cape: the Weltevrede and Lake Mentz Subgroups (Thamm and Johnson, 2006).

The Table Mountain Group is a typical cratonic sheet sandstone and is represented in the wider project area by only the uppermost Rietvlei Formation that is a shallow marine sandstone. The Bokkeveld Group is represented here by three formations in the Ceres Subgroup and two from the Bidouw Subgroup, particularly the Wupperthal Formation, indicating a cyclic alternation of fine-grained sandstone (delta front) and

mudrock (offshore shelf) units (Thamm and Johnson, 2006). Unconformable overlying the Cape Supergroup rocks are the much younger, mainly Quaternary aeolian sands and dunes that characterise the mine expansion area and which were described above.

A refined study of the SAHRIS palaeo-sensitivity map (see figure below) indicates that the bulk of the mine expansion area (108 ha during the compilation of the study) is of low palaeontological sensitivity (blue) and this applies to the Tertiary-Quaternary aeolian sands, grit and scree. There is a small chance that marine fossils might have been entrapped in these aeolian sands that were derived from older sandstones but because of the transported and abrasive nature of the sands, any fossils will have been highly fragmented and no longer recognisable (Roberts et al., 2006). From photographs taken during the site survey the sands are very uniform in colour and texture, with no indication of inclusions of different material, so it is very unlikely that they have preserved fossils.

Along the north-western margin of the mine expansion area, on the upper slopes of the Sandberg, the palaeo-sensitivity map indicates the presence of a narrow band of high sensitivity (brown). According to the palaeontological assessment this is an outcrop of Bokkeveld Group Wupperthal Formation which is composed of micaceous sandstones and siltstones and could contain marine or near shore fossils such as brachiopods, bivalves and other marine shells (Penn-Clarke et al., 2018).

Where this rock is exposed on the surface there will be no impact from mining operations due to the absence of the target resource. Where it is covered by the dune, mining will cease at the sand/bedrock interface and any potential impacts will be minimal.

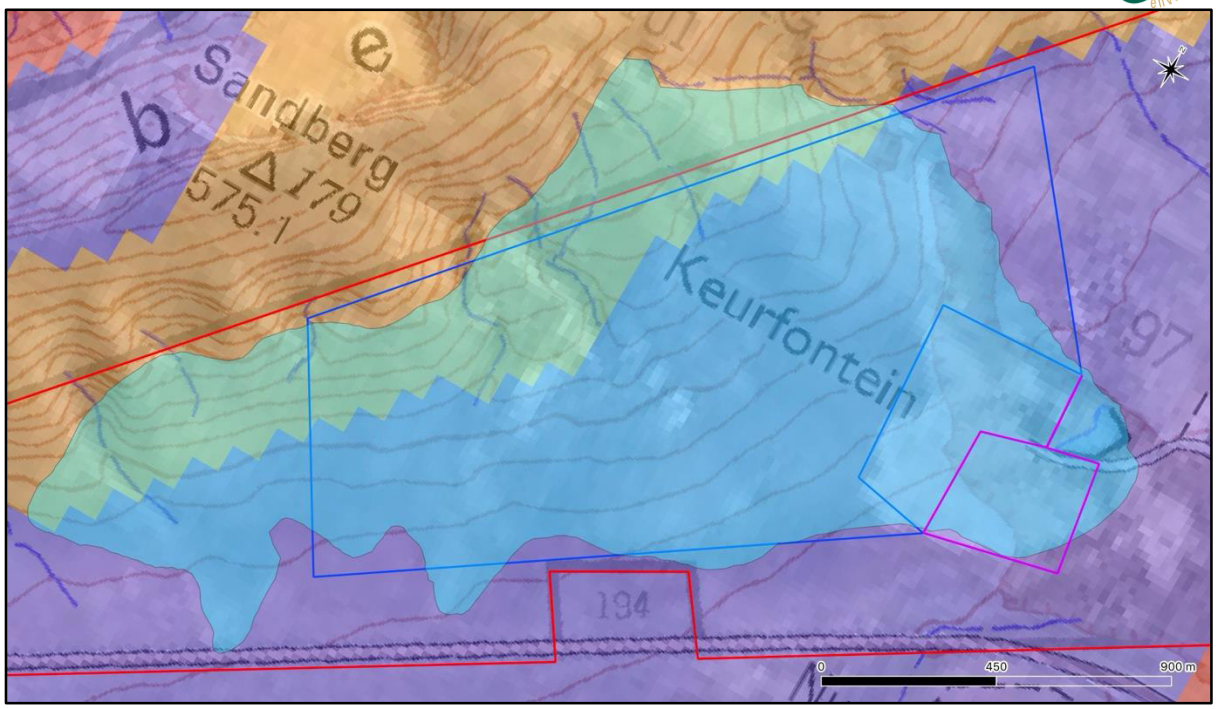

Figure 75: Overlay of mine extension area (blue polygon) (108.4 ha at the time of the study) on the SAHRIS palaeo-sensitivity map of the site. The background colours indicate the following degrees of sensitivity: brown = high and blue = low and the approximate extent of the sand dune on the site is shaded blue (Source: https://sahris.sahra.org.za/map/palaeo & HIA).

Conclusion:

The HIA found that the study area (108.4 ha at the time of the study) is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. The specialists (archaeologist & palaeontologist) are of the opinion that provided the mitigation measures set out in the HIA (and incorporated into the DEIAR) are implemented, the overall impact of the proposed extension of the mining area will be of low heritage significance and the proposed activity is therefore acceptable.

SITE SPECIFIC SOCIO-ECONOMIC ENVIRONMENT

(Information extracted from the Social and Labour Plan of Zandberg Sandput (Pty) Ltd attached as Appendix O)

A Social and Labour Plan (SLP) was submitted as part of the S102 amendment application of the MR holder. The SLP forms the basis for the implementation of programmes and projects as key activity drivers of the development and operation of the mining activity in the Robertson area. It offers the building blocks for future economic development and growth of the local area. The scope of the document offers the MR holder a platform to engage in the development of the local economy and community through a basis of human resource development, economic delivery, business development and community participation. The nature of the document is

therefore aimed at the widest possible comprehension and stimulation for inputs. The following was extracted from the SLP of the mine, highlighting some of the commitments of the mine towards improving the socio-economic status of the receiving environment.

Human Resource Development Programme:

As this report forms part of a S102 amendment application to expand the current mining footprint, the number of employees will not increase, and the operation will still remain very small and consequently will not have the capacity or structure to be comparative in terms of Training and Development and Social Responsibilities, to that of other larger mining operations. Although training initiatives are somewhat restricted due to the size and financial constraints of the operation, the company has fully embraced the concept of sectoral training and has access to the activities of SETA (Sector Education and Training Authority) and MQA (Mining Qualifications Authority). The mine will continue to pay the skills development levies of all its employees to the South African Receiver of Revenue as a legal requirement. The objectives of the skills development plans for Zandberg Sand Mine are as follows:

- Ensure that all employees have the ongoing skills required for successful continuation of the mining operations (workplace skills).
- To implement plans to ensure succession of management and career development is achieved through the identification of talent and development of the identified talent.
- Develop plans to provide all employees with both life skills and portable skills that they may need either upon closure of the mine or should they choose to leave the employment of the mine.
- Provide ABET training to ensure all employees have the opportunity to obtain an education level up to ABET 4.

Zandberg Sand Mine intends to implement regular awareness programs to inform all employees of the benefits of good nutrition, balanced diets, correct method of food preparation to maximize nutritional benefits of food as well as Water and Sanitation when preparing food, including the use of nutritional diets in the management of HIV/Aids and Tuberculosis. Zandberg Sand Mine will provide employee transport to and from the site at no cost to the employee. The employees will also undergo annual medical check-ups, at the expense of Zandberg Sand Mine.

Local Economic Development Plan (LED):

The LED project allocated to Zandberg Sandput (Pty) Ltd and approved by the municipality is the installation of block paving/cement slabs at the Willem Buchaltz School, La Chasseur Robertson, which is a small local farming school and therefore does not have many financial resources. The area allocated for this project is 260 m² that will be implemented in two phases. This project is sustainable in that no upkeep will be necessary by Willem Buchaltz school after implementation and finalisation of the project. This project will lead to upliftment of the local school on scholars, in that the area surrounding the school will no longer be muddy during rainy weather, nor dusty during windy/dry weather.

SITE SPECIFIC EXISTING INFRASTRUCTURE

Apart from the power line that follows the La Chasseur/Agter-Kliphoogte road just inside the farm boundary (following figure) that is >270 m removed from the lowest point of S1, no other infrastructure has been established on the property that can be affected by the proposed extension development.

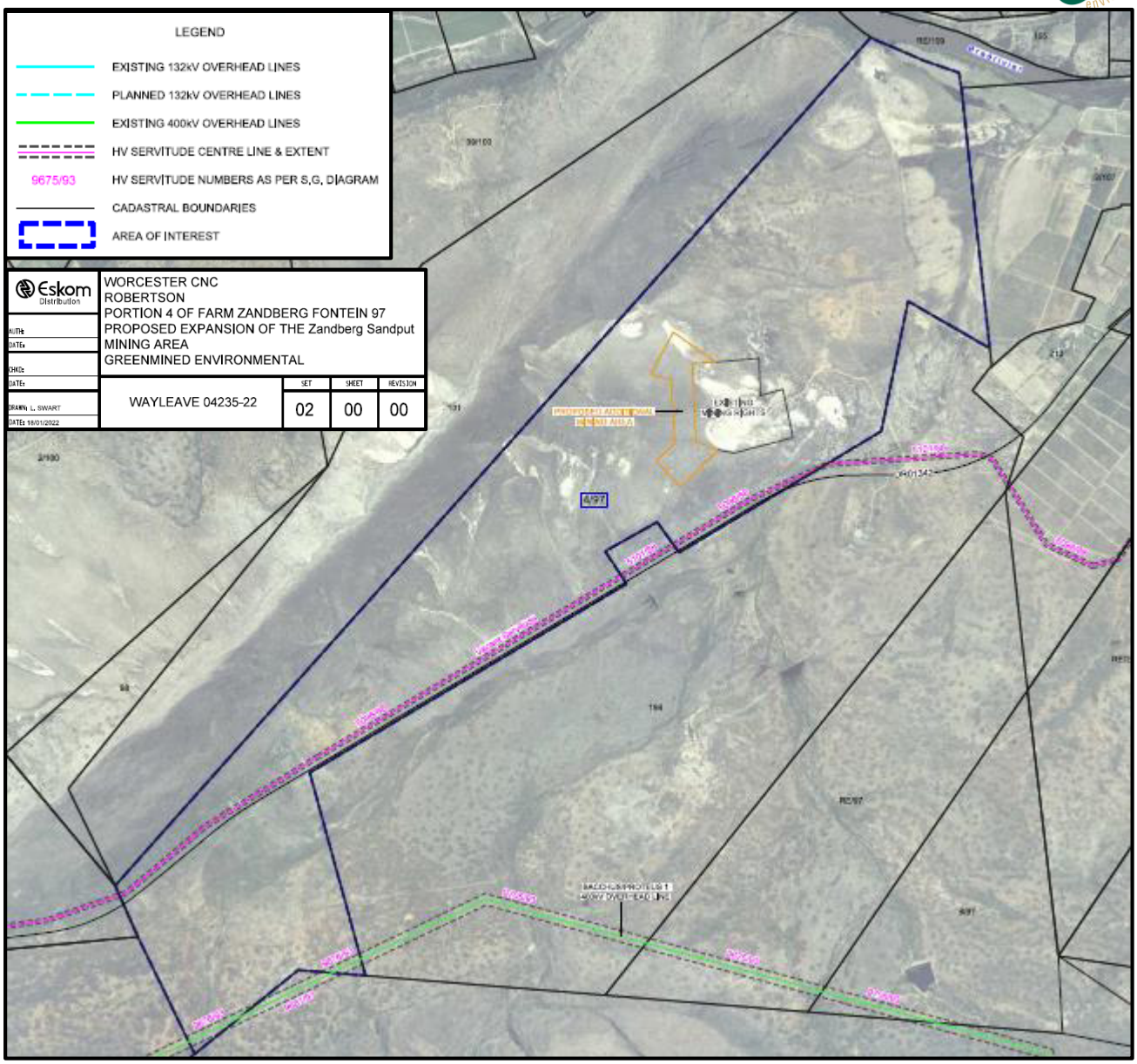

Figure 76: Map received from Eskom showing the position the nearby power lines to the proposed mining areas.

(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 D.

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 the Zandberg Sand Mine has been operational for the past 26 years, the impacts associated with the approved mining area were 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 proposed S102 extension area 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.

STRIPPING AND STOCKPILING OF TOPSOIL

Alteration of the agricultural sense of place

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	5	4	**10.4**
Rating: Medium			**Site Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	5	4	**10.4**
Rating: Medium			**Site Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	5	4	**10.4**

Loss of agricultural land for duration of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1**		**Degree of Mitigation: Partial**		
1	5	1	2.3	5	5	5	**11.5**
Rating: Medium			**Site Alternative 2**		**Degree of Mitigation: Partial**		
1	5	1	2.3	5	5	5	**11.5**
Rating: Medium			**Site Alternative 3**		**Degree of Mitigation: Partial**		
1	5	1	2.3	5	5	5	**11.5**

Visual intrusion as a result of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**		**Degree of Mitigation: Partial**		
2	5	2	3	5	5	5	**15**
Rating: Medium-High			**Site Alternative 2**		**Degree of Mitigation: Partial**		
2	5	3	3.3	5	5	5	**16.5**
Rating: Medium-High			**Site Alternative 3**		**Degree of Mitigation: Partial**		
2	5	2	3	5	5	5	**15**

Potential impact on vegetation and species of conservation concern

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**		**Degree of Mitigation: Partial**		
3	5	5	4.3	5	2	3.5	**15.1**
Rating: Medium-High			**Site Alternative 2**		**Degree of Mitigation: Partial**		
5	5	5	5	5	2	3.5	**17.5**
Rating: Medium-High			**Site Alternative 3**		**Degree of Mitigation: Partial**		
4	5	5	4.6	5	2	3.5	**16.1**
BSA Significance Rating: High							

Loss of topsoil and fertility during mining and stockpiling

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

Infestation of the topsoil heaps and mining area with invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
4	5	4	4.3	4	2	3	**12.9**
Rating: Medium			**Site Alternative 2**		**Degree of Mitigation: Full**		
4	5	4	4.3	4	2	3	**12.9**
Rating: Medium			**Site Alternative 3**		**Degree of Mitigation: Full**		
4	5	4	4.3	4	2	3	**12.9**
BSA Significance Rating: Medium							
Wetland Study Significance Rating: Medium							

Potential impact on local fauna (excluding butterflies) due to disturbance and loss of available habitat and migration routes

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
4	4	4	4	2	2	2	**8**
Rating: Medium			**Site Alternative 2**		**Degree of Mitigation: Full**		
4	4	4	4	4	2	3	**12**
Rating: Low-Medium			**Site Alternative 3**		**Degree of Mitigation: Full**		
4	4	4	4	2	2	2	**8**
BSA Significance Rating: Medium							
Faunal Study Significance Rating S1 & S3: Low							
Faunal Study Significance Rating S2: Medium							

Potential impact on SCC butterflies and available habitat

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**		**Degree of Mitigation: No Mitigation**		
4	5	5	4.6	5	2	3.5	**16.1**
Rating: Medium-High			**Site Alternative 2**		**Degree of Mitigation: No Mitigation**		
5	5	5	5	5	2	3.5	**17.5**
Rating: Low			**Site Alternative 3**		**Degree of Mitigation: No Mitigation**		
4	5	5	4.6	1	1	1	**4.6**
Butterfly Study Significance Rating S1: Medium-High							
Butterfly Study Significance Rating S2: High							
Butterfly Study Significance Rating S3: Low							

Dust nuisance as a result of the mining activities

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

Noise nuisance as a result of the mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1**		**Degree of Mitigation: Partial**		
2	4	2	2.6	2	5	3.5	**9.1**
Rating: Low-Medium			**Site Alternative 2**		**Degree of Mitigation: Partial**		
2	4	2	2.6	2	5	3.5	**9.1**
Rating: Low-Medium			**Site Alternative 3**		**Degree of Mitigation: Partial**		
2	4	2	2.6	2	5	3.5	**9.1**

Potential impact on archaeological artefacts

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Site Alternative 2**		**Degree of Mitigation: Full**		
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Site Alternative 3**		**Degree of Mitigation: Full**		
5	5	4	4.6	2	1	1.5	**6.9**

Direct disturbance of watercourse habitat

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

Potential increased erosion risk and destabilisation of the dune plume

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**		**Degree of Mitigation: Full**		
5	4	2	3.6	4	5	4.5	**16.2**
Rating: Medium-High			**Site Alternative 2**		**Degree of Mitigation: Full**		
5	4	2	3.6	5	5	5	**18**
Rating: Medium-High			**Site Alternative 3**		**Degree of Mitigation: Full**		
5	4	2	3.6	4	5	4.5	**16.2**
BSA Significance Rating S1: Medium							
BSA Significance Rating S2: High							
BSA Significance Rating S3: High							

EXCAVATION OF SAND FROM THE MINING FOOTPRINT AND LOADING ONTO TRUCKS

Visual intrusion associated with the extraction of the mineral

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**		**Degree of Mitigation: Partial**		
2	5	2	3	5	5	5	**15**
Rating: Medium-High			**Site Alternative 2**		**Degree of Mitigation: Partial**		
2	5	3	3.3	5	5	5	**16.5**
Rating: Medium-High			**Site Alternative 3**		**Degree of Mitigation: Partial**		
2	5	2	3	5	5	5	**15**

Creating steep slopes and uneven surfaces

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**		**Degree of Mitigation: Full**		
5	4	2	3.6	4	5	4.5	**16.2**
Rating: Medium-High			**Site Alternative 2**		**Degree of Mitigation: Full**		
5	4	2	3.6	5	5	5	**18**
Rating: Medium-High			**Site Alternative 3**		**Degree of Mitigation: Full**		
5	4	2	3.6	4	5	4.5	**16.2**

Soil contamination from hydrocarbon spills

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
4	5	1	3.3	3	2	2.5	**8.3**
Rating: Low-Medium			**Site Alternative 2**		**Degree of Mitigation: Full**		
4	5	1	3.3	3	2	2.5	**8.3**
Rating: Low-Medium			**Site Alternative 3**		**Degree of Mitigation: Full**		
4	5	1	3.3	3	2	2.5	**8.3**
Wetland Study Significance Rating: Medium							

Disturbance to fauna (including SCC butterflies) due to mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**		**Degree of Mitigation: Partial**		
4	5	5	4.6	5	2	3.5	**16.1**
Rating: Medium-High			**Site Alternative 2**		**Degree of Mitigation: Partial**		
5	5	5	5	5	2	3.5	**17.5**
Rating: Low			**Site Alternative 3**		**Degree of Mitigation: Full**		
4	5	5	4.6	1	1	1	**4.6**

Dust nuisance as a result of the mining activities

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

Noise nuisance as a result of the mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1**		**Degree of Mitigation: Partial**		
2	4	2	2.6	2	5	3.5	**9.1**
Rating: Low-Medium			**Site Alternative 2**		**Degree of Mitigation: Partial**		
2	4	2	2.6	2	5	3.5	**9.1**
Rating: Low-Medium			**Site Alternative 3**		**Degree of Mitigation: Partial**		
2	4	2	2.6	2	5	3.5	**9.1**

Potential impact associated with littering at the mining area

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

Potential impact on areas of palaeontological concern

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Site Alternative 2**		**Degree of Mitigation: Full**		
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Site Alternative 3**		**Degree of Mitigation: Full**		
5	5	4	4.6	2	1	1.5	**6.9**

Facilitation of erosion and increased sediment input in watercourses

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

TRANSPORTING OF MINERAL

Dust nuisance caused by vehicles transporting the mineral

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

Degradation of the access road

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
2	5	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Site Alternative 2**		**Degree of Mitigation: Full**		
2	5	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Site Alternative 3**		**Degree of Mitigation: Full**		
2	5	1	2.6	4	5	4.5	**11.7**

Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity

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

CUMULATIVE IMPACTS

Reduced ability to meet conservation obligations and targets

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Site Alternative 1**		**Degree of Mitigation: Partial**		
3	5	5	4.3	4	5	4.5	**19.4**
Rating: High			**Site Alternative 2**		**Degree of Mitigation: Partial**		
4	5	5	4.6	5	5	5	**23**
Rating: Medium-High			**Site Alternative 3**		**Degree of Mitigation: Partial**		
3	5	5	4.3	4	5	4.5	**19.4**
Rating: High			**Site Alternative 1 with other projects in the area**		**Degree of Mitigation: Partial**		
3	5	5	4.3	5	5	5	**23**
Rating: High			**Site Alternative 2 with other projects in the area**		**Degree of Mitigation: Partial**		
5	5	5	5	5	5	5	**25**
Rating: High			**Site Alternative 3 with other projects in the area**		**Degree of Mitigation: Partial**		
3	5	5	4.3	5	5	5	**23**
BSA Significance Rate S1 – S3: Medium							
BSA Significance Rate S1 – S3 with other projects: Medium							

Impact the broad-scale ecological processes

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1**		**Degree of Mitigation: Partial**		
1	5	1	2.3	4	5	4.5	**10.4**
Rating: Medium			**Site Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Site Alternative 3**		**Degree of Mitigation: Partial**		
1	5	1	2.3	4	5	4.5	**10.4**
Rating: Medium-High			**Site Alternative 1 with other projects in the area**		**Degree of Mitigation: Partial**		
2	5	2	3	5	5	5	**15**
Rating: Medium-High			**Site Alternative 2 with other projects in the area**		**Degree of Mitigation: Partial**		
3	5	2	3.3	5	5	5	**16.5**
Rating: Medium-High			**Site Alternative 3 with other projects in the area**		**Degree of Mitigation: Partial**		
2	5	2	3	5	5	5	**15**
BSA Significance Rate S1 – S3: Medium							
BSA Significance Rate S1 with other projects: Medium							
BSA Significance Rate S2 & S3 with other projects: High							

Rehabilitated areas facilitating the persistence of Breede Sand Fynbos SCC **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium (+)			**Site Alternative 1**		**Degree of Mitigation: N/A**		
4	5	5	4.6	4	2	3	**13.8**
Rating: Medium (+)			**Site Alternative 2**		**Degree of Mitigation: N/A**		
4	5	5	4.6	4	2	3	**13.8**
Rating: Medium (+)			**Site Alternative 3**		**Degree of Mitigation: N/A**		
4	5	5	4.6	4	2	3	**13.8**

Conservation of ±148 ha pristine Breede Sand Fynbos through biodiversity offset **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: High (+)			**Site Alternative 1**		**Degree of Mitigation: N/A**		
4	5	5	4.6	5	5	5	**23**
Rating: High (+)			**Site Alternative 2**		**Degree of Mitigation: N/A**		
4	5	5	4.6	5	5	5	**23**
Rating: High (+)			**Site Alternative 3**		**Degree of Mitigation: N/A**		
4	5	5	4.6	5	5	5	**23**

Improved Red List status of *C. rileyi* and protection of other potential SCC butterfly **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: High (+)			**Site Alternative 1**		**Degree of Mitigation: N/A**		
4	5	5	4.6	5	5	5	**23**
Rating: High (+)			**Site Alternative 2**		**Degree of Mitigation: N/A**		
4	5	5	4.6	5	5	5	**23**
Rating: High (+)			**Site Alternative 3**		**Degree of Mitigation: N/A**		
4	5	5	4.6	5	5	5	**23**

Cumulative impact of projects on palaeontological resources

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Site Alternative 2**		**Degree of Mitigation: Full**		
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Site Alternative 3**		**Degree of Mitigation: Full**		
5	5	4	4.6	2	1	1.5	**6.9**
Rating: Low-Medium			**Site Alternative 1 with other projects in the area**		**Degree of Mitigation: Full**		
5	5	5	5	2	1	1.5	**7.5**
Rating: Low-Medium			**Site Alternative 2 with other projects in the area**		**Degree of Mitigation: Full**		
5	5	5	5	2	1	1.5	**7.5**
Rating: Low-Medium			**Site Alternative 3 with other projects in the area**		**Degree of Mitigation: Full**		
5	5	5	5	2	1	1.5	**7.5**

SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)

Erosion of returned topsoil after rehabilitation

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

Infestation of the reinstated area with invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
4	5	4	4.3	4	2	3	**12.9**
Rating: Medium			**Site Alternative 2**		**Degree of Mitigation: Full**		
4	5	4	4.3	4	2	3	**12.9**
Rating: Medium			**Site Alternative 3**		**Degree of Mitigation: Full**		
4	5	4	4.3	4	2	3	**12.9**

Potential impact associated with litter left at the mining area

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

Uneven surfaces or steep slopes left upon closure of the site

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Site Alternative 1**		**Degree of Mitigation: Full**		
3	4	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Site Alternative 2**		**Degree of Mitigation: Full**		
3	4	1	2.6	4	5	4.5	**11.7**
Rating: Medium			**Site Alternative 3**		**Degree of Mitigation: Full**		
3	4	1	2.6	4	5	4.5	**11.7**

Return of the mining area to agricultural use upon closure **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High (+)			**Site Alternative 1**		**Degree of Mitigation: N/A**		
1	5	5	3.6	5	5	5	**18**
Rating: Medium-High (+)			**Site Alternative 2**		**Degree of Mitigation: N/A**		
1	5	5	3.6	5	5	5	**18**
Rating: Medium-High (+)			**Site Alternative 3**		**Degree of Mitigation: N/A**		
1	5	5	3.6	5	5	5	**18**

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).

APPROVED ZANDBERG SAND MINE

The following generic criteria was used, in the 2014 EMPR, to describe magnitude and significance of impacts in a systematic manner.

The criteria are:

- extent or spatial scale of the impact;
- intensity or severity of the impact;
- duration of the impact;
- mitigation potential;

- acceptability;
- degree of certainty;
- status of the impact; and
- legal requirements.

Ratings are assigned for each criterion. The significance of impacts of the proposed project is assessed both with and without mitigation action.

IMPACT MAGNITUDE AND SIGNIFICANCE RATING	
HIGH	Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. In the case of beneficial impacts, the impact is of a substantial order within the bounds of impacts that could occur.
MEDIUM	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible. Social, cultural and economic activities of communities are changed, but can be continued (albeit in a different form). Modification of the project design or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural and economic activities of communities can continue unchanged. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming.
NO IMPACT	Zero impact.

Extent and Spatial Scale

Extent or spatial scale of the impact description will be provided as to whether impacts are either limited in extent or affect a wide area or group of people.

RATING	DESCRIPTION
HIGH	Widespread. Far beyond site boundary. Regional / National / International Scale
MEDIUM	Beyond site boundary. Local area.
LOW	Within site boundary.

Intensity or Severity of Impacts

A description will be provided as to whether the intensity of the impact is high, medium, low or has no impact in terms of its potential for causing negative or positive effects.

RATING	DESCRIPTION
HIGH	Disturbance of pristine areas that have important conservation value. Destruction of rare or endangered species.
MEDIUM	Disturbance of areas that have potential conservation value or are of use as resources. Complete change in species occurrence or variety.
LOW	Disturbance of degraded areas, which have little conservation value. Minor change in species occurrence or variety.

Duration of the Impact

The duration of the impact will be classified as short term (0 to 5 years), medium term (5 to 15 years), long term (more than 15 years, with the impact ceasing after the operational life of the development) or considered permanent.

RATING	DESCRIPTION
HIGH (Long Term)	Permanent. Beyond decommissioning. Long term (More than 15 years).
MEDIUM (Medium Term)	Reversible over time. Lifespan of the project. Medium term (5 - 15 years)
LOW (Short Term)	Quickly reversible. Less than the project lifespan. Short term (0 - 5 years).

Mitigation Potential

The potential to mitigate the negative impacts and enhance the positive impacts will be determined. For each identified impact, mitigation objectives that would result in a measurable reduction in impact should be provided. Management actions that could enhance the condition of the environment (i.e. potential positive impacts of the proposed project) will be identified. Performance criteria for reviewing or tracking the effectiveness of the proposed mitigation action will be provided where appropriate.

RATING	DESCRIPTION
HIGH	High potential to mitigate negative impacts to the level of insignificant effects.
MEDIUM	Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative effects.
LOW	Little or no mechanism to mitigate negative impacts.

Acceptability

The level of acceptability often depends on the stakeholders, particularly those directly affected by the proposed project, legal limits, guidelines and industry standards.

RATING	DESCRIPTION
HIGH (Unacceptable)	Abandon project in part or in its entirety. Redesign project to remove or avoid impact.
MEDIUM (Manageable)	With regulatory controls. With project proponent's commitments.
LOW (Acceptable)	No risk to public health.

Degree of Certainty

A description is to be provided of the degree of certainty of the impact actually occurring as unsure, possible, probable, or definite (impact will occur regardless of prevention measures).

RATING	DESCRIPTION
DEFINITE	More than 90% sure of a particular fact. Substantial supportive data exist to verify the assessment.
PROBABLE	Over 70% sure of a particular fact or of the likelihood of that impact occurring.
POSSIBLE	Only over 40% sure of a particular fact or of the likelihood of an impact occurring.
UNSURE	Less than 40% sure of a particular fact or the likelihood of an impact occurring. No risk to public health.

SECTION 102 APPLICATION

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:

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
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
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 of 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)

APPROVED ZANDBERG SAND MINE

Project/site alternatives does not apply to the current Zandberg Sand Mine. The mine's approved EMPR (2014) notes that no alternative has been looked at as this operation has been in existence since 1994.

POSITIVE IMPACTS ASSOCIATED WITH THE ZANDBERG SAND MINE

(Information obtained from the Environmental Management Programme Report of Zandberg Sand Mine, 2014)

- Socio Economic – The mine will supply sand to the local building industry which will result in a positive economic impact.

NEGATIVE IMPACTS ASSOCIATED WITH THE ZANDBERG SAND MINE

(Information obtained from the Environmental Management Programme Report of Zandberg Sand Mine, 2014)

- Geology – The removal of material from the geological profile of the site;
- Topography – The mine will cause the formation of a local depression in the topographical profile;
- Soil Description – The removal of the sand will change the soil structure of the mine site;
- Land Capability – The excavation to be left as part of the mining activities will alter the land capability for the section temporarily;
- Land Use – The active mining area will temporarily be sterilized in terms of land use while the mined sections of the site will be rehabilitated;
- Natural Vegetation – The current vegetation on the mine site area will be impacted on, in the short term on the mine site;
- Animal Life – The animal species (if any) will temporarily be displaced from the mine site due to the destruction of habitat and the mine related activities;
- Air Quality – Dust – The mine has the potential to cause dust pollution during high wind conditions;
- Visual Aspects – The mine will have very limited visual aspects.

S102 APPLICATION

SITE ALTERNATIVE 1

Site Alternative 1 (S1) entails the extension of the current mining footprint (17.6826 ha) with 4 ha towards the south-west; over Portion 4 of the farm Zandberg Fontein No 97. Refer to Table 8 for a list of the aspects considered in the assessment of S1.

SITE ALTERNATIVE 2

Site Alternative 2 (S2) entails the extension of the current mining footprint (17.6826 ha) with 4 ha towards the north-west; over Portion 4 of the farm Zandberg Fontein No 97. Refer to Table 10 for a list of the aspects considered in the assessment of S2.

SITE ALTERNATIVE 3 – PREFERRED ALTERNATIVE

Site Alternative 3 (S3) entails the extension of the current mining footprint (17.6826 ha) with 4 ha towards the west; over Portion 4 of the farm Zandberg Fontein No 97. Refer to Table 12 for a list of the aspects considered in the assessment of S3. Site alternative 3 was identified as the preferred alternative for which approval is requested.

NO-GO ALTERNATIVE

The no-go alternative entails no change to the *status quo*. Refer to Table 13 for a list of the aspects considered in the assessment of the no-go alternative.

POSITIVE AND NEGATIVE IMPACTS ASSOCIATED WITH S1-3

The following table shows the potential positive and negative impacts associated with the three identified site alternatives.

Table 30: Positive and negative impacts associated with the three site alternatives

POTENTIAL POSITIVE IMPACTS		
ACTIVITY	**IMPACT**	**RELEVANT ALTERNATIVE**
Cumulative	⁜ Rehabilitated areas facilitating the persistence of Breede Sand Fynbos SCC	⁜ S1 ⁜ S2 ⁜ S3
Cumulative	⁜ Conservation of ±148 ha pristine Breede Sand Fynbos through biodiversity offset	⁜ S1 ⁜ S2 ⁜ S3
Cumulative	⁜ Improved Red List status of *C. rileyi* and protection of other potential SCC butterfly.	⁜ S3
Sloping and landscaping	⁜ Return of the mining area to agricultural use upon closure	⁜ S1 ⁜ S2 ⁜ S3

POTENTIAL NEGATIVE IMPACTS			
ACTIVITY	**POTENTIAL IMPACT**	**SIGNIFICANCE (BEFORE MITIGATION**	**SIGNIFICANCE (AFTER MITIGATION)**
⁜ Stripping and stockpiling of topsoil	⁜ Alteration of the agricultural sense of place. ⁜ Loss of agricultural land for duration of mining.	⁜ Medium (S1-S3) ⁜ Medium (S1-S3)	⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3)
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks	⁜ Visual intrusion as a result of mining. ⁜ Visual intrusion associated with the extraction of the material.	⁜ Medium-High (S1-S3 ⁜ Medium-High (S1-S3)	⁜ Medium (S1-S3) ⁜ Low-Medium (S1, S3) Medium (S2
⁜ Stripping and stockpiling of topsoil	⁜ Potential impact on vegetation and species of conservation concern.	⁜ Medium-High (S1-S3)	⁜ Low-Medium (S1-S3)

POTENTIAL NEGATIVE IMPACTS			
ACTIVITY	**POTENTIAL IMPACT**	**SIGNIFICANCE (BEFORE MITIGATION**	**SIGNIFICANCE (AFTER MITIGATION)**
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and landscaping	⁜ Loss of topsoil and fertility during mining and stockpiling. ⁜ Erosion of returned topsoil after rehabilitation.	⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3)	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and Landscaping.	⁜ Infestation of the topsoil heaps and mining area with invader plant species. ⁜ Infestation of the reinstated area with invader plant species	⁜ Medium (S1-S3) ⁜ Medium (S1-S3)	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks	⁜ Potential impact on local fauna (excluding butterflies) due to disturbance and loss of available habitat and migration routes. ⁜ Potential impact on SCC butterflies and available habitat. ⁜ Disturbance to fauna (including SCC butterflies) due to mining activities	⁜ Low-Medium (S1, S3); Medium (S2) ⁜ Medium-High (S1, S2); Low (S3) ⁜ Medium-High (S1, S2); Low (S3)	⁜ Low (S1, S3); Low-Medium (S2) ⁜ Medium-High (S1, S2); Low (S3) ⁜ Medium-High (S1, S2); Low (S3)
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks ⁜ Transport of mineral	⁜ Dust nuisance as a result of the mining activities. ⁜ Dust nuisance caused by vehicles transporting the mineral.	⁜ Low-Medium (S1-S3) ⁜ Medium (S1-S3)	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Noise nuisance as a result of the mining activities	⁜ Low-Medium (S1-S3)	⁜ Low (S1-S3)
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the	⁜ Potential impact on archaeological artefacts. ⁜ Potential impact on areas of palaeontological concern.	⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3)	⁜ Low (S1-S3) ⁜ Low (S1-S3)

POTENTIAL NEGATIVE IMPACTS			
ACTIVITY	**POTENTIAL IMPACT**	**SIGNIFICANCE (BEFORE MITIGATION**	**SIGNIFICANCE (AFTER MITIGATION)**
mining footprint and loading onto trucks.			
⁜ Stripping and stockpiling of topsoil	⁜ Direct disturbance of watercourse habitat.	⁜ Low-Medium (S1-S3)	⁜ Low (S1-S3)
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential increased erosion risk and destabilisation of the dune plume. ⁜ Facilitation of erosion and increased sediment input in watercourses.	⁜ Medium-High (S1-S3) ⁜ Medium (S1-S3)	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping	⁜ Creating steep slopes and uneven surfaces ⁜ Uneven surfaces or steep slopes left upon closure of the site.	⁜ Medium-High (S1-S3) ⁜ Medium (S1-S3)	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping	⁜ Soil contamination from hydrocarbon spills. ⁜ Potential impact associated with littering at the mining site. ⁜ Potential impact associated with litter left at the mining area.	⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3)	⁜ Low (S1-S3) ⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Transporting of material	⁜ Degradation of the access road ⁜ Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	⁜ Medium (S1-S3) ⁜ Low-Medium (S1-S3)	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Cumulative Impacts	⁜ Reduced ability to meet conservation obligations and targets.	⁜ High (S1-S3)	⁜ Medium (S1, S3); Medium-High (S2)
⁜ Cumulative Impacts	⁜ Impact the broad-scale ecological processes	⁜ Medium-High (S1-S3)	⁜ Medium (S1-S3)
⁜ Cumulative Impacts	⁜ Cumulative impact of projects on palaeontological resources	⁜ Low-Medium (S1-S3)	⁜ Low (S1-S3)

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 Zandberg Sand Mine on the surrounding environment:

TOPOGRAPHY

Landscaping of Mining Area:

- The bench height may not exceed 10 m, the width must be 20 m, and an overall slope angle of ~16° must be maintained (bench face angle of ~27°).
- To ensure minimum impact on drainage, it is essential that no depressions are left in the mining floor. A surface slope (even if minimal) must be maintained across the mining floor in the drainage direction, so that all excavations are free draining. This means that mining depths must be controlled on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area.
- No mining may extend into/below the underlying sandstone layer.
- Compacted areas, as a result of mining activities, must be loosened to promote self-vegetation, and any ruts created by accessing or leaving the site must be filled to prevent future erosion.
- A restoration specialist must be appointed to advise on the rehabilitation of the mining area with the aim of re-establishing Breede Sand Fynbos.
- The input of a lepidopterist must be obtained on the rehabilitation of the mining area to optimise it as habitat for SCC butterfly species occurring on site.

VISUAL CHARACTERISTICS

Visual Mitigation:

- The site must have a neat appearance and be kept in good condition at all times.
- Mining equipment must be stored neatly in a dedicated area with a sealed drip tray underneath when not in use.
- Concurrent rehabilitation must be done as mining progress to limit the visual impact on the aesthetic value of the area.
- The MR holder must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area.

- Upon closure the site must be rehabilitated and levelled to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.

AIR AND NOISE QUALITY

Fugitive Dust Emission Mitigation:

- The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products).
- The site manager must ensure continuous assessment of the dust suppression equipment to confirm its effectiveness in addressing dust suppression.
- Speed on the access road 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.
- Loads must be flattened to prevent spillage of sand during transportation, also minimising windblown dust.
- Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts.
- 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, loading, and transporting of the sand from the site to minimize potential dust impacts.
- No potable water may be used for dust suppression purposes.

Noise Handling:

- The MR holder must ensure that the employee and visitors to the site conduct themselves in an acceptable 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).
- Best practice measures shall be implemented in order to minimize potential noise impacts.

GEOLOGY AND SOIL

Topsoil Management:

- A layer of topsoil, of the area to be mined, must be stripped (preferably between 500 – 1 000 mm deep) 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. No topsoil may be stockpiled in undisturbed areas.
- Topsoil stockpiles must be protected against losses by water- and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants on the stockpiles will help to prevent erosion.
- Topsoil heaps may not exceed 2 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.
- The MR 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, irrigated and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production, and any soil deficiencies must be corrected, based on a chemical analysis of the re-spread soil (if deemed necessary). 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.
- 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 Management:

- Soil that are to be removed must be done so at right angles to the slope, as this will slow down surface runoff and help to prevent erosion.

- No mining may extend into/below the underlying sandstone layer.
- When mining within steep slopes, it must be ensured that adequate slope protection is provided in consultation with a mining expert.
- Storm water must be diverted around the topsoil heaps and mining areas to prevent erosion.
- During mining, the outflow of run-off water from the mining excavation must be controlled to prevent down-slope erosion. This must be done by way of the construction of temporary banks and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur.
- Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place.
- Phased mining and vegetation clearance must be done, wherein small strips (±0.25 ha) are mined. No vegetation outside of the active strips may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a strip, immediate rehabilitation must occur wherein a stable vegetation cover is established with at least a grass cover.
- Roads and other disturbed areas within the project area must be regularly monitored for erosion and problem areas must receive follow-up monitoring to assess the success of the remediation.
- Any erosion problems within the mining area as a result of the mining activities observed must be rectified immediately (within 48 hours) and monitored thereafter to ensure that it does not re-occur.
- Silt/sediment traps/barriers must be used where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. These sediment/silt barriers must regularly be maintained and cleared so as to ensure effective drainage of the areas.
- Stockpiles must be protected from erosion, stored on flat areas where possible, and be surrounded by appropriate berms (if applicable).
- Construction of gabions and other stabilisation features must be undertaken to prevent erosion, where deemed necessary.
- 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.

Management of Watercourse Habitat:

- A 15 m buffer must be implemented and demarcated for the all wetland units on the property, to be approved by the ECO. The demarcation must be maintained throughout the operational phase of the project.
- No heavy equipment may be used within the identified wetlands.
- The MR Holder must adhere to all the requirements of the DWS General Authorisation.
- No water may be taken from a water resource for any purpose without authorisation in terms of the NWA, 1998.

MINING, BIODIVERSITY CONSERVATION AREAS, AND VEGETATION

Management of Vegetation Removal and Conservation of the CBA:

- Institutional and financial arrangements must be formalised through appropriate legal agreements to ensure that the applicant can meet offset obligations. Such agreements must be checked and approved by CapeNature prior to development commencing.
- The Offset Implementation Programme must be incorporated into the EMPR to monitor compliance with EA conditions.
- A biodiversity offset site as indicated in Figure 6, and securing a minimum of 120 ha of Breede Sand Fynbos must be formally proclaimed as a Nature Reserve prior to development commencing.
- A Biodiversity Offset Management Plan must be prepared and approved by CapeNature prior to development commencing.
- The MR Holder must be responsible for all financial costs associated with the offset establishment and effective management for a minimum of 30 years, or until receipt of a closure certificate in terms of the MPRDA, 2002.
- The Biodiversity Offset Area, of appropriate size (1:30 ratio), must be demarcated with visible beacons.
- The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area.

- A pre-commencement walk-through of the final mining footprint, must be done by a suitably qualified botanist, for species of conservation concern that would be affected (also to comply with the Western Cape Nature Conservation Ordinance and DEA&DP permit conditions).
- Permits for the removal of protected plant species (if required) must be kept on-site and in the possession of the flora search and rescue team at all times.
- A pre-commencement environmental induction for all staff on site must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc.
- The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place.
- Clearing of vegetation must be limited to the approved mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place.
- Phased mining and vegetation clearance must be done. No vegetation outside of the active areas may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a layer, immediate rehabilitation must occur wherein a stable vegetation cover is established.
- The Karoo Botanical Gardens must be contacted to determine if they wish to obtain any plant material for cultivation, in particular SCC's.
- All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed.
- No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the ECO and without the relevant permits.
- No fires must be allowed on-site.

Management of Invasive Plant Species:

- An invasive plant species management plan (Appendix N) 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.
- No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed.

- 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 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.

Cumulative Impacts - Ecological:

- A Biodiversity Offset Area, of appropriate size (preferable 1:30), must be delineated as a conservation compensation for the area that will be mined.
- The activity footprints of various proposed mining locations and other development proposals in the area must be kept to a minimum and a stable vegetation must be encouraged to return during the post-operational phase.
- The footprint of mining areas within sensitive habitat types must be reduced as much as possible.

FAUNA

Protection of Fauna:

- A Biodiversity Offset Area, of appropriate size (preferable 1:30), must be delineated as a conservation compensation for the area that will be mined.
- Ecological monitoring requirements for the offset should include camera trap surveys with specific focus on Riverine Rabbits.
- The site manager must ensure no fauna is caught, killed, harmed, sold or played with.
- Any fauna directly threatened by the operational activities must be removed to a safe location by the ECO or other suitably qualified person.
- All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. 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.
- All vehicles must adhere to a low speed limit (20 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises.
- When possible, no activity must be undertaken at the site between sunset and sunrise, except for security personnel guarding the operation (if needed).
- No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed from the mining area.

- A 50 m buffer, as stipulated in the Butterfly Report (Appendix J2), must be implemented around the areas where the SCC butterflies were found.
- Ensure that a reasonable sand cover (500 mm – 1 000 mm) is restored over mined areas to as to speed up the recolonising of rehabilitated areas.
- Just prior to vegetation clearing, the site must be searched for active burrows. If no active / occupied burrows are found, then vegetation clearing can commence. If active / occupied burrows are found, then a suitably qualified zoologist must be consulted for the appropriate course of action for the species detected.

CULTURAL AND HERITAGE ENVIRONMENT

Archaeological, Heritage and Palaeontological Aspects:

- 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.
- The Fossil Chance Find Protocol attached as part of the HIA (Appendix L) must be implemented for the duration of the operational phase.

LAND USE

Loss of agricultural land for duration of mining:

- The temporary loss of agricultural land for the duration of the mining period is acceptable to the landowner.

EXISTING INFRASTRUCTURE

Access Road Mitigation:

- 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 MR Holder.
- Overloading of the trucks must be prevented.
- The MR Holder must adhere to the DTPW conditions submitted as part of the land use application.

GENERAL

Waste Management:

- Regular vehicle maintenance, repairs and services may only take place at the off-site workshop and service area. 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 closed container/bin to be removed from the emergency service area (same day) to the workshop (off-site) in order to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. The safe disposal certificates must be filed for auditing purposes.
- Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be anchored (to prevent blowing/falling over) and shall be serviced at least once a month for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes.
- 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 MR holder.
- Disposal of sewerage must at all times comply with the requirements of Section 22 and 40 of the NWA, 1998.
- 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 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. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the off-site workshop, where it is incorporated into the hazardous waste removal system as discussed above.
- 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 safe disposal certificates must be filed for auditing purposes.

- An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to follow when a spill occurs as well as the application of the spill kit.
- Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized 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 at the offices on the farm. No general waste may be burned or buried on the farm, but must be disposed of at the Robertson landfill site.
- No waste may be stored, buried or burned on the site.
- It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the DWS, DEA&DP, and other relevant authorities. The affected area must be cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned.
- Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area.
- All employees must be aware of the Emergency Response Procedures attached to this document as Appendix R.
- No waste or water containing waste may be disposed without authorisation from the NWA, 1998 and NEM:WA, 2008.
- The minimising of waste must be promoted and alternative methods for waste management must be investigated.

Management of Health and Safety Risks:

- Access to the mining area by unauthorised persons is to be prevented by the Mine Manager, as far as is reasonably practical.
- Adequate ablution facilities and water for human consumption must daily be available on site.
- Sanitary facilities must be located within 100 m from any point of work.
- Worker(s) 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).

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)

Refer to Part A(1)(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*.

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 sand mining operation were separated into the impacts associated with **the Approved Zandberg Sand Mine**, and those associated with the **S102 Application**.

APPROVED ZANDBERG SAND MINE

The following impacts are those listed in the 2014 EMPR of the mine. The impact significance was determined for each impact after brining 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. Zandberg Sand Mine is now in the operational phase.

OPERATIONAL PHASE

The current EMPR (2014) identified the following impacts as being directly or indirectly associated with the mining operation.

Table 31: Impact / Aspect Register from the Zandberg Sand Mine approved EMPR (2014).

GEOLOGY	The removal of material from the geological profile of the site.
TOPOGRAPHY	The mine will cause the formation of a local depression in the topographical profile
SOIL DESCRIPTION	The removal of the sand will change the soil structure of the mine site
LAND CAPABILITY	The excavation to be left as part of the mining activities will alter the land capability for that section temporarily.
LAND USE	The active mining area will temporarily be sterilized in terms of land use while the mined sections of the site will be rehabilitated.
NATURAL VEGETATION	⋉ The current vegetation on the mine site area will be impacted on, in the short term on the mine site. ⋉ The area will be restored to natural vegetation.
ANIMAL LIFE	The animal species (if any) will temporarily be displaced from the mine site due to the destruction of habitat and the mine related activities.
SURFACE WATER	The mining operations will not impact on surface water due to the sandy nature of the soil.
GROUND WATER	The groundwater regime will not be impacted upon by the mining operations other than the leaching of a limited amount of water out of the geological profile.
AIR QUALITY – DUST	The mine has the potential to cause dust pollution during high wind conditions.
AIR QUALITY – EMISSIONS	⋉ All vehicles will be professionally maintained and serviced to ensure that engine emissions are within the accepted limits. ⋉ No fires will be allowed on site
ARCHAEOLOGY	Should any artefacts be uncovered by the mining operations it will be reported to the relevant authority (South African Heritage Resources Agency (SAHRA)).
SENSITIVE LANDSCAPES	The proposed mine is not located within a designated sensitive areas.
VISUAL ASPECTS	⋉ The mine will have very limited visual aspects. ⋉ Rehabilitation will mitigate the impact
SOCIO-ECONOMIC	The mine will supply sand to the local building industry which will result in a positive economic impact.
INTERESTED & AFFECTED PARTIES	The impact of the mine on I&AP's will be based on ongoing consultation with the owners and neighbouring farmers.

ENVIRONMENTAL IMPACT ASSESSMENT RESULTS

(According to the 2014 EMPR)

The 2014 EMPR assessed the environmental related impacts as listed in the table below.

Table 32: Environmental Impact Assessment Results from the Zandberg Sand Mine approved EMPR (2014).

Impact	Impact Magnitude & Significance	Spatial Scale of Impact	Impact Severity / Intensity	Duration of Impact	Mitigation Potential	Acceptability of Impacts	Certainty of Impacts
IMPACT ON THE PHYSICAL AND CHEMICAL COMPONENTS							
Geology	Low	Low	Low	Medium	Medium	Low	Definite
Air Quality – Dust	Low	Medium	Low	Low	Low	Low	Definite
Air Quality – Emissions	Low	Low	Low	Low	Low	Low	Probable
Groundwater	Low	Low	Low	Medium	Low	Low	Probable
Visual Aspects	Low	Low	Low	Medium	Low	Low	Definite
Surface Water	Low	Low	Low	Medium	Low	Low	Probable
Topography	Low	Low	Low	Medium	Low	Low	Definite
IMPACT ON THE BIOLOGICAL AND ECOLOGICAL COMPONENTS							
Natural Vegetation	Medium	Low	Medium	Medium	High	Medium	Definite
Soils	Low	Low	Low	Low	High	Low	Definite
Sensitive Landscapes	Low	Low	Low	Low	High	Low	Definite
Land Use	Low	Low	Low	Medium	High	Low	Definite
Land Capability	Low	Low	Low	Low	High	Low	Definite
Animal Life	Low	Low	Low	Low	High	Low	Probable
IMPACT ON SOCIOLOGICAL AND CULTURAL COMPONENTS							
Interested and Affected Parties	Low	Low	Low	Medium	High	Low	Probable
Archaeological Artefacts	Low	Low	Low	High	Low	Medium	Possible

Impact	Impact Magnitude & Significance	Spatial Scale of Impact	Impact Severity / Intensity	Duration of Impact	Mitigation Potential	Acceptability of Impacts	Certainty of Impacts
Noise	Low	Low	Low	Low	High	Low	Probable
IMPACT ON ECONOMICAL AND OPERATIONAL COMPONENTS							
Regional Socio Economic Structure	Low (Positive)	Low	Low	Medium	High	High	Definite

SECTION 102 APPLICATION

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 three identified site alternatives (S1 – S3) 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.

STRIPPING AND STOCKPILING OF TOPSOIL

Alteration of the agricultural sense of place

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
1	5	1	2.3	3	5	4	**9.2**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
1	5	1	2.3	3	5	4	**9.2**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
1	5	1	2.3	3	5	4	**9.2**

Loss of agricultural land for duration of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
1	4	1	2	5	2	3.5	**7**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
1	4	1	2	5	2	3.5	**7**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
1	4	1	2	5	2	3.5	**7**

Visual intrusion as a result of mining

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	4	2	2.6	3	5	4	**10.4**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	4	2	2.6	4	5	4.5	**11.7**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	4	2	2.6	3	5	4	**10.4**

Potential impact on vegetation and species of conservation concern

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	4	1	2.3	5	2	3.5	**8.1**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	4	1	2.6	5	2	3.5	**9.1**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	4	1	2.3	5	2	3.5	**8.1**
BSA Significance Rating: Medium							

Loss of topsoil and fertility during mining and stockpiling

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

Infestation of the topsoil heaps and mining area with invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Alternative 1**		**Degree of Mitigation: Full**		
2	1	1	1.3	2	2	2	**2.6**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Full**		
2	1	1	1.3	2	2	2	**2.6**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Full**		
2	1	1	1.3	2	2	2	**2.6**
BSA Significance Rating: Low							
Wetland Study Significance Rating: Low							

Potential impact on local fauna (excluding butterflies) due to disturbance and loss of available habitat and migration routes

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Alternative 1**		**Degree of Mitigation: Full**		
1	4	2	2.3	2	1	1.5	**3.5**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Full**		
2	4	2	2.6	3	1	2	**5.2**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Full**		
1	4	2	2.3	2	1	1.5	**3.5**
BSA Significance Rating: Low							
Faunal Study Significance Rating S1 & S3: Low							
Faunal Study Significance Rating S2: Medium							

Potential impact on SCC butterflies and available habitat

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Alternative 1**		**Degree of Mitigation: No Mitigation**		
4	5	5	4.6	5	2	3.5	**16.1**
Rating: Medium-High			**Alternative 1**		**Degree of Mitigation: No Mitigation**		
5	5	5	5	5	2	3.5	**17.5**
Rating: Low			**Alternative 3**		**Degree of Mitigation: No Mitigation**		
4	5	5	4.6	1	1	1	**4.6**
Butterfly Study Significance Rating S1: Medium-High							
Butterfly Study Significance Rating S2: High							
Butterfly Study Significance Rating S3: Low							

Dust nuisance as a result of the mining activities

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

Noise nuisance as a result of the mining activities

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

Potential impact on archaeological artefacts

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Alternative 1**		**Degree of Mitigation: Full**		
5	5	4	4.6	1	1	1	**4.6**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Full**		
5	5	4	4.6	1	1	1	**4.6**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Full**		
5	5	4	4.6	1	1	1	**4.6**

Direct disturbance of watercourse habitat

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

Potential increased erosion risk and destabilisation of the dune plume

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Alternative 1**		**Degree of Mitigation: Full**		
2	2	1	1.6	2	2	2	**3.2**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Full**		
2	2	1	1.6	2	2	2	**3.2**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Full**		
2	2	1	1.6	2	2	2	**3.2**
BSA Significance Rating S1: Low							
BSA Significance Rating S2: Medium							
BSA Significance Rating S3: Medium							

EXCAVATION OF SAND FROM THE MINING FOOTPRINT AND LOADING ONTO TRUCKS

Visual intrusion associated with the extraction of the mineral

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	4	2	2.6	2	5	3.5	**9.1**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	4	3	3	3	5	4	**12**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	4	3	2.6	2	5	3.5	**9.1**

Creating steep slopes and uneven surfaces

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

Soil contamination from hydrocarbon spills

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Alternative 1**		**Degree of Mitigation: Full**		
2	1	1	1.3	2	2	2	**2.6**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Full**		
2	1	1	1.3	2	2	2	**2.6**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Full**		
2	1	1	1.3	2	2	2	**2.6**
Wetland Study Significance Rating: Low							

Disturbance to fauna (including SCC butterflies) within the footprint area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	5	4.3	4	2	3	**12.9**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
4	5	5	4.6	4	2	3	**13.8**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Full**		
4	5	5	4.6	1	1	1	**4.6**

Dust nuisance as a result of the mining activities

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

Noise nuisance as a result of the mining activities

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

Potential impact associated with littering at the mining area

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

Potential impact on areas of palaeontological concern

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

Facilitation of erosion and increased sediment input in watercourses

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

TRANSPORTING OF MINERAL

Dust nuisance caused by vehicles transporting the mineral

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

Degradation of the access road

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

Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity

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

CUMULATIVE IMPACTS

Reduced ability to meet conservation obligations and targets

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	4	5	3.6	2	5	3.5	**12.6**
Rating: Medium-High			**Alternative 2**		**Degree of Mitigation: Partial**		
3	4	5	4	3	5	4	**16**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	4	5	3.6	2	5	3.5	**12.6**
Rating: Medium			**Alternative 1 with other projects in the area**		**Degree of Mitigation: Partial**		
2	4	5	3.6	3	5	4	**14.4**
Rating: Medium-High			**Alternative 2 with other projects in the area**		**Degree of Mitigation: Partial**		
3	4	5	4	4	5	4.5	**18**
Rating: Medium			**Alternative 3 with other projects in the area**		**Degree of Mitigation: Partial**		
2	4	5	3.6	3	5	4	**14.4**
BSA Significance Rate S1 – S3: Medium							
BSA Significance Rate S1 – S3 with other projects: Medium							

Impact the broad-scale ecological processes

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
1	5	1	2.3	3	5	4	**9.2**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	5	4	**10.4**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
1	5	1	2.3	3	5	4	**9.2**
Rating: Medium			**Alternative 1 with other projects in the area**		**Degree of Mitigation: Partial**		
2	5	2	3	4	5	4.5	**13.5**
Rating: Medium			**Alternative 2 with other projects in the area**		**Degree of Mitigation: No Mitigation**		

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
3	5	2	3.3	4	5	4.5	**14.9**
Rating: Medium			**Alternative 3 with other projects in the area**			**Degree of Mitigation: Partial**	
2	5	2	3	4	5	4.5	**13.5**
BSA Significance Rate S1 – S3: Medium							
BSA Significance Rate S1 with other projects: Medium							
BSA Significance Rate S2 & S3 with other projects: High							

Rehabilitated areas facilitating the persistence of Breede Sand Fynbos SCC **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium (+)			**Alternative 1**			**Degree of Mitigation: N/A**	
4	5	5	4.6	4	2	3	**13.8**
Rating: Medium (+)			**Alternative 2**			**Degree of Mitigation: N/A**	
4	5	5	4.6	4	2	3	**13.8**
Rating: Medium (+)			**Alternative 3**			**Degree of Mitigation: N/A**	
4	5	5	4.6	4	2	3	**13.8**

Conservation of ±148 ha pristine Breede Sand Fynbos through biodiversity offset **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: High (+)			**Alternative 1**			**Degree of Mitigation: N/A**	
4	5	5	4.6	5	5	5	**23**
Rating: High (+)			**Alternative 2**			**Degree of Mitigation: N/A**	
4	5	5	4.6	5	5	5	**23**
Rating: High (+)			**Alternative 3**			**Degree of Mitigation: N/A**	
4	5	5	4.6	5	5	5	**23**

Improved Red List status of *C. rileyi* and protection of other potential SCC butterfly **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: High (+)			**Alternative 1**			**Degree of Mitigation: N/A**	
4	5	5	4.6	5	5	5	**23**
Rating: High (+)			**Alternative 2**			**Degree of Mitigation: N/A**	
4	5	5	4.6	5	5	5	**23**
Rating: High (+)			**Alternative 3**			**Degree of Mitigation: N/A**	
4	5	5	4.6	5	5	5	**23**

Cumulative impact of projects on palaeontological resources

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**Alternative 1**			**Degree of Mitigation: Full**	
4	5	4	3	1	1	1	**3**
Rating: Low			**Alternative 2**			**Degree of Mitigation: Full**	
4	5	4	3	1	1	1	**3**
Rating: Low			**Alternative 3**			**Degree of Mitigation: Full**	
4	5	4	3	1	1	1	**3**
Rating: Low			**Alternative 1 with other projects in the area**			**Degree of Mitigation: Full**	
4	5	5	4.6	1	1	1	**4.6**
Rating: Low			**Alternative 2 with other projects in the area**			**Degree of Mitigation: Full**	
4	5	5	4.6	1	1	1	**4.6**
Rating: Low			**Alternative 3 with other projects in the area**			**Degree of Mitigation: Full**	
4	5	5	4.6	1	1	1	**4.6**

SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)

Erosion of returned topsoil after rehabilitation

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

Infestation of the reinstated area with invader plant species

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

Potential impact associated with litter left at the mining area

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

Uneven surfaces or steep slopes left upon closure of the site

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

Return of the mining area to agricultural use upon closure **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**Alternative 1**		**Degree of Mitigation: N/A**		
1	5	5	3.6	5	5	5	**18**
Rating: Medium-High			**Alternative 2**		**Degree of Mitigation: N/A**		
1	5	5	3.6	5	5	5	**18**
Rating: Medium-High			**Alternative 3**		**Degree of Mitigation: N/A**		
1	5	5	3.6	5	5	5	**18**

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 33: Assessment of each identified potentially significant impact and risk.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
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.)	(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, air pollution, etc…etc…etc.)		In which impact is anticipated. (E.g. Construction, commissioning, operational Decommissioning closure, post closure.)	If not mitigated.	(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.	If mitigated.
APPROVED ZANDBERG SAND MINE						
Sand mining.	⁜ Impact on the physical and chemical components.	⁜ Geology. ⁜ Air Quality – Dust. ⁜ Air Quality – Emissions. ⁜ Groundwater. ⁜ Visual Aspects. ⁜ Topography.	Operational Phase	⁜ Low ⁜ Low ⁜ Low ⁜ Low ⁜ Low ⁜ Low	<u>Control & Remedy:</u> Proper housekeeping and implementation of the proposed mitigation measures.	⁜ Low ⁜ Low ⁜ Low ⁜ Low ⁜ Low ⁜ Low
Sand mining.	⁜ Impact on the biological and	⁜ Natural Vegetation. ⁜ Soils.	Operational Phase	⁜ Medium ⁜ Low	<u>Control & Remedy:</u> Proper housekeeping and implementation	⁜ Medium ⁜ Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	ecological components.	⁜ Sensitive Landscapes. ⁜ Land Use. ⁜ Land Capability. ⁜ Animal Life.		⁜ Low ⁜ Low ⁜ Low ⁜ Low	of the proposed mitigation measures.	⁜ Low ⁜ Low ⁜ Low ⁜ Low
Sand mining.	⁜ Impact on sociological and cultural components.	⁜ Interested and Affected Parties. ⁜ Archaeological Artefacts. ⁜ Noise.	Operational Phase	⁜ Low ⁜ Low ⁜ Low	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ Low ⁜ Low ⁜ Low
Sand mining.	⁜ Impact on economical and operational components.	⁜ Regional Socio Economic Structure.	Operational Phase	⁜ Low (Positive)	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ Low (Positive)
SECTION 102 APPLICATION						
⁜ Demarcation of site with visible beacons.	⁜ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	N/A	Site Establishment phase	N/A	Control: Implementation of proper housekeeping and site management.	N/A
⁜ Stripping and stockpiling of topsoil.	⁜ Alteration of the agricultural sense of place.	The impact affects the agricultural operations of the property.	Site Establishment- & Operational Phase	⁜ Medium (S1-S3) ⁜ Medium (S1-S3)	Control: Proper site management, and adherence to legislated conditions as presented in the EA, and SPLUMA.	⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	⁜ Loss of agricultural land for duration of mining.					
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Visual intrusion as a result of mining. ⁜ Visual intrusion associated with the extraction of the mineral.	The visual impact may affect the aesthetics of the landscape.	Site Establishment- & Operational Phase	⁜ Medium-High (S1-S3 ⁜ Medium-High (S1-S3)	<u>Control:</u> Proper housekeeping and implementation of progressive rehabilitation.	⁜ Medium (S1-S3) ⁜ Low-Medium (S1, S3) Medium (S2
⁜ Stripping and stockpiling of topsoil.	⁜ Potential impact on vegetation and SCC.	This will impact on the biodiversity of the receiving environment.	Site Establishment- & Operational Phase	⁜ Medium-High (S1-S3)	<u>Modify & Control</u>: Implementing S3 instead of S2, keeping mining operations to the approved boundaries, and setting up the biodiversity offset area.	⁜ Low-Medium (S1-S3)
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and landscaping (medium- & long term).	⁜ Loss of topsoil and fertility during mining and stockpiling. ⁜ Erosion of returned topsoil after rehabilitation.	Loss of topsoil will affect the rehabilitation success upon closure of the mine.	Site Establishment, Operational- and Decommissioning Phase	⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3)	<u>Control & Remedy:</u> Proper housekeeping and storm water management.	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and landscaping (medium- & long term).	⁜ Infestation of the topsoil heaps and mining area with invader plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational-, and Decommissioning Phase	⁜ Medium (S1-S3) ⁜ Medium (S1-S3)	<u>Control:</u> Implementing soil- and invader plant control/management.	⁜ Low (S1-S3) ⁜ Low (S1-S3)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	⁜ Infestation of the reinstated area with invader plant species.					
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential impact on local fauna (excluding butterflies) due to disturbance and loss of available habitat and migration routes. ⁜ Potential impact on SCC butterflies and available habitat. ⁜ Disturbance to fauna (including SCC butterflies) due to the mining activities.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	⁜ Low-Medium (S1, S3); Medium (S2) ⁜ Medium-High (S1, S2); Low (S3) ⁜ Medium-High (S1, S2); Low (S3)	Modify, Control & Stop: Implementing good management practices, and expanding the area into the footprint of S3.	⁜ Low (S1, S3); Low-Medium (S2) ⁜ Medium-High (S1, S2); Low (S3) ⁜ Medium-High (S1, S2); Low (S3)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Transporting of mineral.	⁜ Dust nuisance as a result of the mining activities. ⁜ Dust nuisance caused by vehicles transporting the mineral.	Increased dust will impact on the air quality of the receiving environment.	Site Establishment- & Operational Phase	⁜ Low-Medium (S1-S3) ⁜ Medium (S1-S3)	Control: Dust suppression methods and proper housekeeping.	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Noise nuisance as a result of the mining activities.	Should the noise levels become excessive it may have an impact on the noise ambiance of	Site Establishment- and, Operational Phase	⁜ Low-Medium (S1-S3)	Control: Noise suppression methods and proper housekeeping.	⁜ Low (S1-S3)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
		the receiving environment.				
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential impact on archaeological artefacts. ⁜ Potential impact on areas of palaeonological concern.	This could impact on the cultural and heritage legacy of the receiving environment.	Site Establishment- and, Operational Phase	⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3)	Control & Stop: Implementation of a chance-find procedure.	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Stripping and stockpiling of topsoil.	⁜ Direct disturbance of watercourse habitat.	This impact could affect the hydrology of the surrounding environment.	Site Establishment- and, Operational Phase	⁜ Low-Medium (S1-S3)	Control: Implementing the mitigation measures proposed by the hydrologist.	⁜ Low (S1-S3)
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential increased erosion risk and destabilisation of the dune plume. ⁜ Facilitation of erosion and increased sediment input in watercourses.	Erosion of the mining area will complicate rehabilitation.	Site Establishment, Operational- and Decommissioning Phase	⁜ Medium-High (S1-S3) ⁜ Medium (S1-S3)	Control & Remedy: Proper housekeeping and storm water management.	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping (medium- & long term).	⁜ Creating steep slopes and uneven surfaces. ⁜ Uneven surfaces or steep slopes left upon closure of the site.	The impact will prevent or hinder the rehabilitation of mined areas.	Operational-, and Decommissioning Phase	⁜ Medium-High (S1-S3) ⁜ Medium (S1-S3)	Control: Effective rehabilitation according to the closure plan.	⁜ Low (S1-S3) ⁜ Low (S1-S3)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscapting (medium- & long terrm).	⁜ Soil contamination from hydrocarbon spills. ⁜ Potential impact associated with littering at the mining area. ⁜ Potential impact associated with litter left at the mining area.	Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the MR Holder. .	Operational-, and Decommissioning Phase	⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3) ⁜ Low-Medium (S1-S3)	Control & Remedy: Proper housekeeping and implementation of the emergency response procedures and waste management registers.	⁜ Low (S1-S3) ⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Transporting of mineral.	⁜ Degradation of the access roads. ⁜ Traffic impact on the bordering La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	Collapse of the internal road infrastructure will affect the landowner negatively, and if the mine negatively affect public traffic it may incur additional costs and complaints from the public.	Operational Phase	⁜ Medium (S1-S3) ⁜ Low-Medium (S1-S3)	Control & Remedy: 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.	⁜ Low (S1-S3) ⁜ Low (S1-S3)
⁜ Cumulative Impacts	⁜ Reduced ability to meet conservation obligations and targets.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	⁜ High (S1-S3)	Modify & Control: Implementing S3 and setting up the biodiversity offset area.	⁜ Medium (S1, S3); Medium-High (S2)
⁜ Cumulative Impacts	⁜ Impact the broad-scale ecological processes.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	⁜ Medium-High (S1-S3)	Modify & Control: Implementing S3 and setting up the biodiversity offset area.	⁜ Medium (S1-S3)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
⁜ Cumulative Impacts	⁜ Cumulative impact of projects on palaeontological resources.	This could impact on the cultural and heritage legacy of the receiving environment.	Operational Phase	⁜ Low-Medium (S1-S3)	Control & Stop: Implementation of a chance-find procedure.	⁜ Low (S1-S3)

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

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 34: 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
Heritage Impact Assessment: Heritage Impact Assessment: Proposed Expansion of the Sand Mine on Portion 4 of the farm ZandbergFontein, Robertson, Western Cape. April 2020 *(See Appendix L for a full copy of the assessment)* Conducted in accordance with the requirements of Appendix 6 of the	**Palaeontology – Mitigation Measures:** In respect of mitigation measures, the PIA recommends the inclusion of a Fossil Chance Find Protocol in the EMPr. This will ensure that in the unlikely event of fossils being encountered during mining, they will be rescued and a palaeontologist called to assess and collect a representative sample. **Other Heritage Resources – Mitigation Measures:** Should any human remains be encountered at any stage during the construction or earthworks associated with the project, mining in the vicinity must cease immediately, the remains must be left in situ but made secure and the project archaeologist and HWC must be notified immediately.	All the recommendations proposed by the specialist are implemented on site.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: *Cultural and Heritage Environment.* Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: *Archaeological, Heritage and Paleontological Aspects.* Part A(1)(u)(i)(2) Impact on any national estate referred to in section 3(2) of the NHRA.

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
NEMA EIA Regulations 2014 (as amended).			

Botanical Study and Assessment
 	
Proposed expansion of the sand mine area on Portion 4 of the farm Zandberg Fontein 97, South of Robertson, Western Cape Province.
 	
December 2021
 	
(See Appendix I2 for a full copy of the document)
 	
Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).
	Important recommendations and mitigation measures:
	
	- Since the applicant is applying for a total of 4 ha for proposed mining activities, a total of 120 ha of Breede Sand Fynbos should be used as biodiversity offset.
	- Phased mining and vegetation clearance should be done. All vegetation outside of the active mining benches should not be disturbed until it is time for that specific area to be mined. Furthermore, upon progressing from one mining bench to the next, immediate rehabilitation should start on the mined bench.
	- The following aspects should be noted regarding the rehabilitation of sand fynbos:
	  • Sand Fynbos occurs on acidic, deep, loose, sandy soils which are easily destabilized and prone to wind erosion.
	  • Wind-blown sand damages vegetation and makes it difficult to establish vegetation cover, therefore anti-soil erosion measures may be required.
	  • Disturbed areas are slow to self-repair, therefore active restoration (e.g. sowing and planting) will be required.
	  • Ecological restoration does not substitute for sustainably managing and protecting intact native ecosystems.
	  • Fynbos ecosystems are prone to invasion by alien species and alien plant invasion is the second biggest cause of biodiversity loss after direct habitat loss. The management and eradication of Invasive Alien Plants (IAPs) are
		All the recommendations proposed by the specialist were incorporated into this document.	Part A(1)(d)(ii) Description of the activities to be undertaken: 2. S102 Application.
			
			Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Vegetation.
			
			Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Site Specific Vegetation.
			
			Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation.
			
			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: Section 102 Application.

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
	therefore a critical portion of the rehabilitation process and a detailed IAP Management Plan is should be in place.		
Terrestrial Fauna (excluding Lepidoptera) Assessment Preliminary Report Proposed expansion of the Zandberg Sand Mine near Robertson, Western Cape. November 2021 *(See Appendix J1 for a full copy of the document)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	**Recommendations:** Impacts to terrestrial fauna (excl. butterflies), including SCC can be minimised through reducing the mining footprint, careful placement of the expanded area, phasing mining activities, and ensuring effective rehabilitation of mined areas. - The amount of habitat provided by the sand fynbos is already limited (on site and regionally) due to the fragmented nature of the deposits. A large mining footprint it therefore not acceptable but limiting the proposed mining footprint expansion to 4 ha or less may be considered more acceptable. The proposed biodiversity offset is therefore supported and must be made a condition should authorisation be granted. - The placement of the new proposed are to be mined is important to avoid fragmenting the habitat. Placing the new footprint up the slope from the currently authorised area will increase the potential for fragmenting the dune vegetation. Placing the footprint to the side and/or lower down the slope of the current mining area (i.e. S1 and S3) will ensure connectivity is maintained on the upper regions of the slope. Removing the vegetation and sand on the upper slope will not fragment the habitat completely but will limit movement of fauna through a narrow band of vegetation and sand compared to the removal of vegetation and sand on the lower slope. The latter will maintain the current amount of vegetation and burrowing above the current mining area. Alternatives 1 and 3 are therefore preferred to Alternative 2. - Placing the proposed new area further down the slope where it is not as steep will help minimise the height of the cut face to	All the recommendations proposed by the specialist were incorporated into this document.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Fauna. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Site Specific Fauna. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Fauna 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: Section 102 Application.

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
	be exposed during and after mining operations. It will also allow more easy access compared to the areas higher up the slope, where a new access route would likely be required. - While Alternatives 1 and 3 are equivalent in area, the configuration of Alternative 3 is preferred. With its position being a narrow band along the length of the western border of the approved mining area, it expands the mining footprint in a uniform and consolidated block, as opposed to an additional piece projecting out further into the natural area, as with Alternative 1. - Phasing of development through strip mining and restoring previously disturbed areas will also help minimise impacts and increase recovery. - Rehabilitation is a critical element on the mitigation hierarchy, and opportunities to strengthen rehabilitation should be actively explored. Significant considerations for fauna include the characteristics of the substrate and presence of water. Preliminary observations on site suggest that areas with reasonable sand cover become colonised with indigenous vegetation more easily. Reinstatement of 30-50 cm sand layer above the rocky substrate may be sufficient to facilitate natural recovery of dune vegetation and would also provide habitat for animal species currently making use of sandy dune deposits.		
Butterfly Survey Zandberg Sand Mine – Potential Offset Area, Zandberg Sand Mine Extension, Robertson, Western Cape Province.	**<u>Conclusion and Recommendations:</u>** - Butterfly surveys, which searched in suitable habitat across more than 22 ha of the Zandberg property, have only found one additional small locality for *C. rileyi*. - The surveys did however find many more occurrences of the two SCC butterflies *C. rileyi* and *C. pyroeis* in and around the	All the recommendations proposed by the specialist were incorporated into this document.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Fauna. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and

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
December 2021 *(See Appendix J2 for a full copy of the document)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	mining extension areas MEA1 (S1) and MEA2 (S2), and this confirms that these alternatives are basically ruled out. ⁜ No SCC butterflies were found in the third alternative mining extension area MEA3 (S3), although both the south end of this area is uncomfortably close to where SCCs have been recorded. ⁜ There are 17.5 hectares of land in total on the Zandberg property occupied by SCC butterflies, and if this land could be included in the offset it would significantly improve the Red List status of the SCC *C. rileyi*, and also protect the other potential SCC found on the property, *C. pyroeis*.		infrastructure on the site: Site Specific Fauna. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Fauna 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: Section 102 Application.
Geology, Geotechnical and Mining Assessment Zandberg Sandput. October 2021 & January 2022 Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	**<u>Recommendations:</u>** The final pit geometry must comply with the following: ⁜ Bench height – 10 m; ⁜ Bench width – 20 m; ⁜ Bench face angle – ~27°; ⁜ Overall slope angle – ~16° After mining has been completed, the below rehabilitation activities should be undertaken: ⁜ All mobile equipment/foreign matter should be removed from the site; ⁜ The entire disturbed area should be inspected for any signs of pollution (as a result of mining activities) and if identified it should be removed and disposed of in a registered landfill site; ⁜ Stockpiled overburden/topsoil should be backfilled into the excavations and any steep walls should be sloped to a safe	All the recommendations proposed by the specialist were incorporated into this document.	Part A(1)(d)(ii) Description of the activities to be undertaken: 2. S102 Application. Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Geology and Soil. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Site Specific Geology and Soil. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk.

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
	angle and aesthetic rounding to be applied where applicable to restore natural landforms; - The disturbed area should be reseeded and alien vegetation should be controlled until the site is successfully revegetated; - Areas compacted as a result of mining activities undertaken should be loosened to promote self-vegetation, and any ruts created by accessing or leaving the site will be filled to ensure that no future erosion shall emanate from the site; - The landowner should be requested to inspect the success of the rehabilitation.		
Watercourse Delineation and Habitat Assessment Proposed sand mine expansion on Portion 4 of the farm Zandberg Fontein 97 situated in Robertson town within the Robertson District Municipality, Western Cape Province. December 2021 *(See Appendix G3 for a full copy of the document)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	**<u>Special Conditions for the General Authorisation:</u>** - The water user must ensure that the slope of the sand dune following completion of sand mining: i. Is structurally stable; ii. Does not induce sedimentation or erosion. - Prior to the carrying out of any works, the water user must ensure that all persons entering the construction site, including contractors and casual labourers, are made fully aware of the conditions and related management measures specified in the GA, EA, EMPR. - The water user must ensure that a 15 m buffer is maintained around Wetland Unit AW1. - The water user must ensure that any construction camp, storage, washing and maintenance of equipment, storage of construction materials, or chemicals, as well as any sanitation and water management facilities: i. Are located outside the 1 in 100-year flood line or 30 m from any delineated wetland habitat; and ii. Are removed within 30 days after the completion of any works.	The recommendations proposed by the specialist is applicable to the General Authorisation Application to be submitted to the DWS. The following recommendations were however also incorporated into this EIAR: - The water user must ensure that the slope of the sand dune following completion of sand mining: i. Is structurally stable; ii. Does not induce sedimentation or erosion. - Prior to the carrying out of any works, the water user must ensure that all persons entering the construction site, including contractors and casual labourers, are made fully aware of the conditions and related management measures specified in the GA, EA, EMPR. - The water user must ensure that a 15 m buffer is maintained around Wetland Unit AW1.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Hydrology and Geohydrology Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Site Specific Hydrology and Geohydrology. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Hydrology and Geohydrology. 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

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
	⋉ The water user must ensure that adequate erosion control measures (bund, berms, sand bags etc.) are installed on all areas susceptible to erosion or runoff. ⋉ During the construction phase of the project, the water user must appoint an Environmental Control Officer to undertake monthly site visits. The environmental audit report must discuss non-compliance of the GA, EA, and the approved EMPR. ⋉ During the construction phase of the project, the appointed ECO must take monthly fixed-point photographs. ⋉ All environmental audit reports must be made available to the responsible authority upon written request.	⋉ The water user must ensure that adequate erosion control measures (bund, berms, sand bags etc.) are installed on all areas susceptible to erosion or runoff.	site layout plan) through the life of the activity: Section 102 Application.
Biodiversity Offset Report Proposed expansion of the Zandberg Sand Mine near Robertson, Western Cape. January 2022 *(See Appendix K for a full copy of the document)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	**<u>Recommended Offset Actions:</u>** <u>Offset Establishment:</u> ⋉ <u>Formalising boundaries</u>: Preparation of an SG approved "proclamation diagram" by a registered land surveyor to delineate the earmarked offset area; ⋉ <u>Biodiversity Offset Management Plan</u>: Preparation of an operational management plan for the biodiversity offset site in line with the NEM:PAA requirements; ⋉ <u>Formalising Biodiversity Offset Implementation Agreement between Applicant and Landowner:</u> Compilation of an agreement that formalises the institutional and financial arrangements prior to development commencing. The biodiversity offset implementation agreement must comply with the requirements of the draft National Biodiversity Offset Guidelines (DFFE, 2021a) as listed in the Biodiversity Offset Report (pg 39).	All the recommendations proposed by the specialist were incorporated into this document.	Part A(1)(d)(ii) Description of the activities to be undertaken: 2. S102 Application. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Site Specific Mining and Biodiversity Conservation Areas Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity Conservation Areas, and Vegetation. Part A(1)(p)(ii)(1) Specific conditions to be included into the compilation and approval of the EMPR.

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
	⁎ Technical Support and Application for Protected Area (PA) Establishment: Compilation of documentation necessary for PA application and submission to MEC for gazetting; ⁎ Submission to Deeds Office: Attorney to prepare notarial deeds for submission to Deeds office; ⁎ Public Participation: Advertising intention to declare area as a protected area in two newspapers; ⁎ Demarcation of the Biodiversity Offset Site: Demarcation of offset area with suitable concrete markers. ⁎ Ecological Monitoring: Expected to include visual habitat assessments and targeted monitoring of butterfly species on an infrequent (e.g. 5-year) basis. Offset Management: ⁎ Management Planning: Updating the Biodiversity Offset Management Plan regularly as required; ⁎ Management Support: Oversight of site management including maintain site demarcations, managing activities on the site and preventing illegal activities as outlined in the Management Plan; ⁎ Equipment – Vehicles: It has been assumed that no vehicles would be required to oversee management as the site is only accessible by foot.		

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
	⁎ Equipment - Management: As above, there is no need for additional equipment to ensure effective management of the biodiversity offset site. ⁎ Invasive Plant Control: Apart from some targeted clearing of degraded areas, alien clearing costs are expected to be very limited as the IAP infestation levels are very low. A walkthrough of the area twice a year to hand-pull any seedlings has however been included for budgetary purposes. ⁎ Ecological Monitoring: Vegetation and other monitoring required as per the management plan. ⁎ Management Review and Reporting: METT Assessment to be undertaken in collaboration with CapeNature.		

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 extension of the mining area entail the following:

Project proposal:

- Zandberg Sandput (Pty) Ltd submitted a S102 amendment application (June 2020) to add 108.3851 ha to the current 17.6826 ha mining footprint. Since then, the extension footprint was reduced from ±108 ha to 4 ha to accommodate the biodiversity sensitive matters of the property. Three site alternatives (S1-S3) were investigated during the EIA phase, of which S3 is the preferred alternative.
- Should the S102 application be approved, mining will advance into the extension area as the current mining footprint (±17.7 ha) is mined.
- Due to the position of the proposed extension area the mining method needs to be slightly amended, when the mine reaches the extension area, from strip mining to the Doze Push Method.

Topography:

- The topography of S3 gradually rises- up the dune from the lower southern part. The topography of S3 is less dramatic than that of S2, and is suitable for sand mining if the recommendations of the mine planner are followed. The layout will also simplify the configuration of the final mining area should the S102 application be approved.

Visual Characteristics:

- The potential visual impact of S3 is deemed to be of medium significance based on the small scale of the proposed operation, proposed progressive rehabilitation, as well as the fact that no infrastructure will be established. Should the rehabilitation measures be implemented very little (if any) residual visual impact is expected upon closure of the mine.

Air and Noise Quality:

- The prevalent wind direction of the study area is in a northern direction during the summer/spring months, changing to a west-north-western wind

(blowing east-south-east) during winter/autumn, highly reducing the potential of dust blowing from the operation towards the surrounding landowners.

- The potential impact of the sand mining activity on the air and/or noise ambiance of the area is deemed to be of low significance as the direction of the proposed extension is away from the La Chasseur/Agter-Kliphoogte road and any farm residences.

Geology:

- A dune-like layer of sand, several meters thick, is found against the southern slope of the Zandberg. The sand layer is exposed in certain areas (blow-outs), but mainly covered by natural vegetation along the extend of the mountainside. A layer of pedocrete separates the bedrock from the sand. All of these layers are porous and water moves readily through the sand, while the downward movement is somewhat slowed by the pedocrete.

Hydrology:

- The wetland report (WATSAN 2016) concluded that the impact of the Zandberg sand mine on the infiltration of groundwater is small and that the effect on the entire aquifer will hardly be noticed. The study further confirmed that no natural wetlands were present within the approved mining area.
- The infield- and desktop watercourse delineation (2021) confirmed the presence of two wetland habitats within the 500 m of all three alternatives. The wetlands were classified as an artificial wetland habitat (Unit AW1) and a unchannelled valley bottom wetland (UCVB1). Both AW1 and UCVB1 fall outside the proposed extension areas (S1-S3) and will therefore not be affected by the expansion of the mining footprint. A buffer area of 15 m that must be maintained around the footprint of AW1.
- The WDHA concludes that no watercourse was identified within the footprint of S3, and therefore expanding the mine towards the west into S3 will not result in the transformation of any watercourse.
- As the groundwater level is ±3 m deep in the valley below the mining area, it is not expected that mining the sand from S3 will intercept (or come within 1.5 m) the groundwater layer if the mining depth is limited to the underlying sandstone layer.

Biodiversity, Conservation, and Groundcover:

- All three alternatives fall within an area classified as CBA1.
- Approximately 148 ha of pristine Breede Sand Fynbos exists on site. About 2.7% of this will be transformed by the proposed mining extension. This will not prevent national conservation targets from being achieved.
- Due to the nature of the sand deposit that is of interest to the applicant, complete avoidance of the Breede Sand Fynbos vegetation is not possible.
- The fact that rehabilitated areas can facilitate the natural colonisation and persistence of Breede Sand Fynbos SCC, together with the fact that suitable amount of Breede Sand Fynbos is available on site for biodiversity offsetting, will greatly mitigate the impacts of the proposed mining activities in the long-term.
- For this project, an area of 169 ha within the farm portion is proposed as biodiversity offset area that complies with the 30:1 ratio.
- The BSA notes that S3 can be considered as intermediate in mining preference between S1 and S2. One advantage of S3 is that it minimizes edge effects as the perimeter of S3 is the smallest of all three alternative sites.
- The LLM noted that the current project proposal will assist in aligning the proposal more closely with the Langeberg SDF, 2015 and the WC Rural Development Guidelines, 2019 which aim to minimise loss of habitat and ecosystem functionality in Core 1 SPCs.

Fauna:

- Placing the footprint at S3 will ensure connectivity is maintained on the upper regions of the slope and prevent fragmentation of the habitat.
- The configuration of S3 is preferred with regard to faunal related impacts (excl. butterflies).
- The significance of the impacts on terrestrial animal species (excl. butterflies) can be rated as Low-Moderate, and the offset proposed for vegetation and plant species, i.e. habitat, would be sufficient to cover the terrestrial fauna (excl. butterflies) and would not trigger the need for any additional species offset requirements.
- No SCC butterflies were recorded within the footprint of S3, even if allowance is made for a 50 m buffer, and the specialist concluded that the

mining of S3 will not have any detrimental influence on the known habitat of the SCC butterflies on the site.

- The overall Red List status of *C. rileyi* will improve if the Zandberg populations can be protected.

Cultural and Heritage Environment:

- The HIA concluded that the earmarked extension area is not a sensitive heritage environment and that with the possible exception of palaeontological material, impacts on heritage resources arising from expanded mining operations are unlikely. The specialists (archaeologist & palaeontologist) are of the opinion that provided the mitigation measures set out in the HIA are implemented, the overall impact of the proposed extension of the mining area will be of low heritage significance and the proposed activity is therefore acceptable.

Socio-Economic Environment:

- The proposed extension of the mining area will not require an increase in the number of employees. The company has fully embraced the concept of sectoral training and has access to the activities of SETA (Sector Education and Training Authority) and MQA (Mining Qualifications Authority). The mine will continue to pay the skills development levies of all its employees to the South African Receiver of Revenue as a legal requirement.
- The LED project allocated to Zandberg Sandput (Pty) Ltd and approved by the municipality is the installation of block paving/cement slabs at the Willem Buchaltz School, La Chasseur Robertson.

Existing Infrastructure:

- Apart from the power line that follows the La Chasseur/Agter-Kliphoogte road just inside the farm boundary (>270 m from the extension areas), no other infrastructure has been established on the property that can be affected by the proposed extension development.

Land Use:

- Mining will temporarily affect ±22 ha of the earmarked property if the S102 application is approved.

- The mine will continue with the progressive rehabilitation of mined areas to in the end restore the entire mining footprint to facilitate the establishment of indigenous vegetation that can once again be zoned for agriculture.

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 map showing the site activities attached as Appendix C.

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

S102 APPLICATION:

The positive impacts associated with the proposed extension of the mining area in terms of S1 – S3 include the following (also refer to Tables 8, 10, 12, 13).

- Rehabilitated areas facilitating the persistence of Breede Sand Fynbos SCC.
- Conservation of ±148 ha pristine Breede Sand Fynbos through biodiversity offset.
- Improved Red List status of *C. rileyi* and protection of other potential SCC butterfly.
- Return of the mining area to agricultural use upon closure.

The following table shows the potential negative impacts associated with the proposed S102 Application that were deemed to have a Low-Medium or higher significance/risk:

Table 35: List of potential impacts deemed to have a low-medium or higher significance/risk.

ACTIVITY	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE MITIGATION	SIGNIFICANCE (AFTER MITIGATION)
• Stripping and stockpiling of topsoil	• Alteration of the agricultural sense of place. • Loss of agricultural land for duration of mining.	• Medium (S1-S3) • Medium (S1-S3)	• Low-Medium (S1-S3) • Low-Medium (S1-S3)
• Stripping and stockpiling of topsoil	• Visual intrusion as a result of mining. • Visual intrusion associated with the extraction of the material.	• Medium-High (S1-S3	• Medium (S1-S3)

ACTIVITY	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE MITIGATION	SIGNIFICANCE (AFTER MITIGATION)
⁜ Excavation of sand from the mining footprint and loading onto trucks		⁜ Medium-High (S1-S3)	⁜ Low-Medium (S1, S3); Medium (S2
⁜ Stripping and stockpiling of topsoil	⁜ Potential impact on vegetation and species of conservation concern.	⁜ Medium-High (S1-S3)	⁜ Low-Medium (S1-S3)
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks	⁜ Potential impact on local fauna (excluding butterflies) due to disturbance and loss of available habitat and migration routes. ⁜ Potential impact on SCC butterflies and available habitat. ⁜ Disturbance to fauna (including SCC butterflies) due to mining activities	⁜ Low-Medium (S1, S3); Medium (S2) ⁜ Medium-High (S1, S2); Low (S3) ⁜ Medium-High (S1, S2); Low (S3)	⁜ Low (S1, S3); Low-Medium (S2) ⁜ Medium-High (S1, S2); Low (S3) ⁜ Medium-High (S1, S2); Low (S3)
⁜ Cumulative Impacts	⁜ Reduced ability to meet conservation obligations and targets.	⁜ High (S1-S3)	⁜ Medium (S1, S3); Medium-High (S2)
⁜ Cumulative Impacts	⁜ Impact the broad-scale ecological processes	⁜ Medium-High (S1-S3)	⁜ Medium (S1-S3)

l) 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…* thee site alternative were considered. The footprint of Site Alternative 3 is deemed the preferred site alternative to allow the expansion of the current sand mine. See the final site map attached as Appendix C.

m) 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 36: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
TOPOGRAPHY Landscaping of Mining Area	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Restoration specialist to advise on the rehabilitation actions. Lepidopterist advising on the efficient rehabilitation of the area with regard to SCC butterflies. Compliance to be monitored by the Environmental Control Officer.	⁎ Keep bench heights to 10 m, width to 20 m, and overall slope angle of ~16° (bench face angle of ~27°) ⁎ Ensure no depressions are left in the mining floor to minimize the impact on drainage. Maintain a surface slope (even if minimal) across the mining floor in the drainage direction, so that all excavations are free draining. Control mining depths on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. ⁎ Limit mining to the underlying sandstone layer. ⁎ Loosen compacted areas and fill ruts to prevent erosion. ⁎ Engage a restoration specialist to advise on the rehabilitation of the mining area with the aim of re-establishing Breede Sand Fynbos.	⁎ Effectively restoring each mined layer to allow the return of natural vegetation.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		⁎ Obtain the input of a lepidopterist on the rehabilitation of the mining area to optimise it as habitat for SCC butterfly species occurring on site.	
VISUAL CHARACTERISTICS Visual Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁎ Ensure that the site have a neat appearance and is kept in good condition at all times. ⁎ Store mining equipment neatly in a dedicated area with a sealed drip tray underneath when not in use. ⁎ Do concurrent rehabilitation as mining progress to limit the visual impact on the aesthetic value of the area. ⁎ Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area. ⁎ Rehabilitate and level the site upon closure to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.	⁎ 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.
AIR AND NOISE QUALITY Dust Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁎ 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. ⁎ Flatten loads to ensure minimal spillage of material takes place during transportation, also preventing windblown dust. ⁎ Consider weather conditions upon commencement of daily operations.	⁎ Dust prevention measures are applied to minimise the generation of dust.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		⁎ 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, loading, and transporting of sand from the site to minimize potential dust impacts. ⁎ Do not use potable water for dust suppression purposes.	
AIR AND NOISE QUALITY Noise Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁎ Ensure that employee and visitors to the site conduct themselves in an acceptable manner while on site. ⁎ Do not permit loud music 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. ⁎ Implement best practice measures to minimise potential noise impacts.	⁎ Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.
GEOLOGY AND SOIL Topsoil Handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁎ Strip and stockpile the upper 500 mm – 1 000 mm of topsoil 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. Do not stockpile topsoil in undisturbed areas. ⁎ Protect topsoil stockpiles against losses by water- and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establish plants on the stockpiles to prevent erosion.	⁎ Adequate fertile topsoil is available to rehabilitate each mined layer.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		⁎ Ensure that topsoil heaps do not exceed 2 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. ⁎ Spread the topsoil evenly, to a depth of 500 mm – 1 000 mm, 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. ⁎ Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement.	
HYDROLOGY Erosion Control and Storm Water Management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁎ Remove soil at right angles to the slope, as this will slow down surface runoff and help to prevent erosion. ⁎ Limit mining to the underlying sandstone layer. ⁎ Ensure adequate slope protection is provided when mining within steep slopes; in consultation with a mining expert. ⁎ Divert storm water around the topsoil heaps and mining areas to prevent erosion. ⁎ During mining, control the outflow of run-off water from the mining excavation to prevent down-slope erosion. If needed, construct temporary banks and ditches that will direct run-off water. These	⁎ Impact to the environment caused by storm water discharge is avoided and erosion is managed.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		must be in place at any points where overflow out of the excavation might occur. - Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. - Implement phased mining and vegetation clearance, wherein small strips are mined. Do not disturb vegetation outside of the active strips until it is time for that specific area to be mined. Immediately rehabilitate a finished layer with a stable vegetation cover. - Regularly monitor roads and other disturbed areas within the project area for erosion problems and conduct follow-up monitoring of problem areas to assess the success of the remediation. - Rectify any erosion problems within the mining area as a result of the mining activities immediately (within 24 hours) and monitor it thereafter to ensure that it does not re-occur. - Use silt/sediment traps/barriers where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. Regularly maintain and clean these sediment/silt barriers to ensure effective drainage of the areas. - Protect stockpiles from erosion, stored on flat areas where possible, and be surrounded by appropriate berms (if applicable). - Undertake construction of gabions and other stabilisation features to prevent erosion, where deemed necessary. - Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.	
HYDROLOGY	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.	- Implement and demarcate a 15 m buffer for all wetland units on the property. ECO to approve demarcation. - Do not allow any heavy equipment within the identified wetlands.	- Watercourses protected from any impact as a result of mining.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
Management of Watercourse Habitat	Compliance to be monitored by the Environmental Control Officer.	⁎ Adhere to the requirements of the DWS General Authorisation. ⁎ Do not take any water for any purpose without authorisation in terms of the NWA, 1998.	
MINING, BIODIVERSITY CONSERVATION AREAS AND VEGETATION Management of Vegetation Removal and Conservation of the CBA.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Botanist to assist with the relocation of plants of importance (when needed). Compliance to be monitored by the Environmental Control Officer.	⁎ Finalise institutional and financial arrangements through appropriate legal agreements to ensure that the applicant can meet offset obligations. Submit the agreements for approval to CapeNature prior to development commencing. ⁎ Incorporate the Offset Implementation Programme into the EMPR. ⁎ Secure a minimum of 120 ha of Breede Sand Fynbos (Figure 6) as biodiversity offset site, and formally proclaim it as a Nature Reserve prior to commencing with development. ⁎ Prepare/obtain a Biodiversity Offset Management Plan that was approved by CapeNature prior to commencing with development. ⁎ Assume responsibility for the financial costs associated with the offset establishment and effective management for a minimum of 30 years, or until receipt of a closure certificate in terms of the MPRDA, 2002. ⁎ Demarcate the Biodiversity Offset Area or appropriate size (1:30), with visible beacons. ⁎ Clearly demarcate the mining boundaries and contain all operations to the approved mining area. ⁎ Arrange a pre-commencement walk-through of the final mining footprint by a suitably qualified botanist, for species of conservation concern that would be affected. ⁎ Keep permits for the removal of protected plant species (if required) on-site and in the possession of the flora search and rescue team at all times. ⁎ Conduct a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to.	⁎ Vegetation clearing is restricted to the authorised development footprint of the mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. - Ensure that the on-site ECO provide supervision and oversee vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place. - Limit clearing of vegetation to the approved mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. - Implement phased mining and vegetation clearance. Do not disturb vegetation outside of the active areas until it is time for that specific area to be mined. Upon finishing a layer, immediate rehabilitate and establish a stable vegetation cover. - Contact the Karoo Botanical Gardens to determine if they wish to obtain any plant material for cultivation, in particular SCC's. - Keep all vehicles on demarcated roads and prevent unnecessary driving in the veld outside these areas. - Do not translocate plants or otherwise uprooted or disturbed it for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. - Do not allow fires on-site.	
MINING, BIODIVERSITY AND VEGETATION Management of Invasive Plant Species	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	- Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. - Implement an invasive plant species management plan 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, 2004. Do	- Mining area is kept free of invasive plant species.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		weed/alien removal on an ongoing basis throughout the life of the mining activities. - Keep all stockpiles (topsoil & overburden) free of invasive plant species. - Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose. - Control declared invader or exotic species on the rehabilitated areas.	
MINING, BIODIVERSITY AND VEGETATION Cumulative Impacts	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	- Establish a Biodiversity Offset Area or appropriate size (1:30), as a conservation compensation for the area that will be mined. - Keep the activity footprints of various proposed mining locations and other development proposals in the area to a minimum and encourage a stable vegetation to return during the post-operational phase. - Reduce the footprint of mining areas within sensitive habitat types as much as possible.	- Mining area does not affect the conservation obligations and targets of the CBA or impact on the broad-scale ecological processes.
FAUNA Protection of Fauna	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Zoologist to advise on the monitoring with regard to Riverine Rabbits and burrowing animals. Compliance to be monitored by the Environmental Control Officer.	- Establish a Biodiversity Offset Area or appropriate size (1:30), as a conservation compensation for the area that will be mined. - Include camera trap surveys with specific focus on Riverine Rabbits as an ecological monitoring requirement for the offset. - Ensure no fauna is caught, killed, harmed, sold or played with. - Arrange the ECO or other suitably qualified person to remove any fauna directly threatened by the operational activities to a safe location. - Conduct environmental induction with all personnel regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often	- Disturbance to fauna is minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		persecuted out of superstition. 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. - Ensure all vehicles adhere to a low speed limit (20 km/h) to avoid collisions with susceptible species such as snakes and tortoises. - When possible, prevent activity at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). - Prevent litter, food or other foreign material being thrown or left around the site. Keep such items in the site vehicles and daily remove it from the mining area. - Adhere to the 50 m buffer proposed in the Butterfly Report (Appendix J2). - Ensure that a reasonable sand cover (500 mm – 1 000 mm) is restored over mined areas to as to speed up the recolonising of rehabilitated areas. - Prior to vegetation clearing, search the area for active burrows. If active/occupied burrows are found, consult a suitably qualified zoologist for the appropriate course of action.	
CULTURAL AND HERITAGE ENVIRONMENT Archaeological, Heritage and Palaeontological Aspects	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Archaeologist to comment should any features of importance be unearthed. Compliance to be monitored by the Environmental Control Officer.	- Confine all mining to the development footprint area. - Implement the following change find procedure when discoveries are made on site: ▪ 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	- Impact to cultural/heritage resources is avoided or at least minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		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 Heritage Western Cape (HWC). ▪ Work may only continue once the go-ahead was issued by HWC. ⁜ Implement the Fossil Chance Find Protocol attached as part of the HIA (Appendix L) for the duration of the operational phase.	
EXISTING INFRASTRUCTURE Access Road Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁜ 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. ⁜ Repair rutting and erosion of the access road caused as a direct result of the mining activities. ⁜ Prevent the overloading of the trucks. ⁜ Adhere to the DTPW conditions submitted as part of the land use application.	⁜ The access road remains accessible to the landowner during the operational phase, and upon closure, the road is returned in a better, or at least the same state as received by the right holder.
GENERAL Waste Management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	⁜ Ensure regular vehicle maintenance, repairs and services only take place at the off-site workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste	⁜ Wastes are appropriately handled and safely disposed of at recognised waste facilities.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		handling facility, alternatively arrange collection by a registered hazardous waste handling contractor. File safe disposal certificates for auditing purposes. - Provide ablution facilities in the form of a chemical toilet. Anchor the chemical toilet and arrange that it be serviced at least once a month by a registered liquid waste handling contractor for the duration of the mining activities. File the safe disposal certificates for auditing purposes. - Ensure that the use of any temporary, chemical toilet facilities does not cause pollution to water sources or pose a health hazard. In addition, prevent any form of secondary pollution from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately. - Ensure that sewerage disposal complies at all times with the requirements of Section 22 and 40 of the NWA, 1998. - If a diesel bowser is used on site, equip it with a drip tray at all times. Ensure that drip trays are used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. - Clean drip trays after use. Do not use dirty drip trays. Dispose of the dirty rags used to clean the drip trays as hazardous waste into a designated bin at the off-site workshop, and incorporate it into the hazardous waste removal system. - Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. File the safe disposal certificates for auditing purposes. - Obtain an oil spill kit, and train the employees in the emergency procedures to be followed when a spill occurs as well as the application of the spill kit.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		⁎ Should spillage occur, such as oil or diesel leaking from a burst pipe, collect the contaminated soil, within the first hour of occurrence, in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a recognized 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 at the offices on the farm. Do not burn or bury general waste on the farm, but dispose of it at the Robertson landfill site. ⁎ Prevent the storage, burning or burying of waste on site. ⁎ Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the DWS, DEA&DP, and other relevant authorities. Arrange that the affected area is cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned. ⁎ Implement the use of waste registers to keep record of the waste generated and removed from the mining area. ⁎ Ensure all employees are aware of the Emergency Response Procedures attached to this document as Appendix R. ⁎ Do not dispose any waste or water containing waste without authorisation from the NWA, 1998 and NEM:WA, 2008. ⁎ Promote the minimising of waste and investigate alternative methods for waste management.	
GENERAL Management of Health and Safety Risks	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Health and safety representative to manage H&S aspects at the mine.	⁎ Prevent access to the mining area by unauthorised persons as far as is reasonably practical. ⁎ Ensure adequate ablution facilities and water for human consumption are daily available on site. ⁎ Ensure sanitary facilities is located within 100 m from any point of work.	⁎ Employees work in a healthy and safe environment.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
	Compliance to be monitored by the Environmental Control Officer.	⁒ 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).	

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)(M) 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 60 of the Langeberg Land Use Planning By-Law of 2015 (PN 264/2015) must be approved for the proposed extension of the mining area on Portion 4 of Zandberg Fontein No 97.
- A land development application in terms of the Spatial Planning and Land Use Management Act, 2013 (Act No 16 of 2013) must be approved for the proposed extension of the mining area on Portion 4 of Zandberg Fontein No 97.
- An application water authorisation in terms of the National Water Act, 1998 (Act No 36 of 1998) must be approved by the DWS.
- The biodiversity offset obligations as described in the Biodiversity Offset Report (Page 44 of Appendix K) must be implemented prior to the development of the extension area.

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 the MR Holder, as well as site inspections, and background information. No uncertainty regarding the proposed project or the receiving environment could be identified at this stage.

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.

Zandberg Sand Mine has been operational for 26 years and this report accompanies a Section 102 amendment application to expand the existing mining boundaries. Should the MR Holder commit to implementing Site

Alternative 3 and the associated Biodiversity Offset Site, and 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* were included into the compilation of the EMPr, and should be considered for approval by the competent authority.

Further to this, the Biodiversity Offset Report lists the following specific conditions to be reviewed and refined by the competent authority if a decision is taken to grant authorisation for this project:

- A biodiversity offset site as indicated in Figure 6 and securing a minimum of 120 ha of Breede Sand Fynbos must be formally proclaimed as a Contract Nature Reserve prior to the development commencing.
- Institutional and financial arrangements must be formalised through appropriate legal agreements to ensure that the applicant can meet offset obligations. Such agreements must be checked and approved by CapeNature prior to development commencing.
- Relevant actions from the draft offset implementation programme must be incorporated into the EMPr to monitor compliance with EA Conditions.
- A Biodiversity Offset Management Plan must be prepared and approved by CapeNature prior to development commencing.
- The Applicant is responsible for all financial costs associated with offset establishment and effective management for a minimum of 30 years or until receipt of a closure certification, as contemplated in the MPRDA, 2002.

(2) Rehabilitation requirements

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

Once the entire mining area was rehabilitated the MR Holder is required to submit a closure application to the Department of Mineral Resources and Energy 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 MR Holder requested that the Environmental Authorisation be valid for the duration of the mining right (at least until 2047).

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 310 000. Please see the explanation as to how this amount was derived at attached as Appendix Q – 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).

Zandberg Sandput (Pty) Ltd is responsible for the financial and technical aspects of the mining project. The operating expenditure is provided for as such in the Financial and Technical Ability attached as Appendix Q 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).

No deviation from the methodology used in determining the significance of potential environmental impacts and risks were deemed necessary. The methodology described in the Scoping Report was also used in the Environmental Impact Assessment Report.

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:

- **Visual intrusion associated with the mining:**

  The removal of the vegetation cover to access the sand will impact on the visual character of the study area. However, the small scale of the

proposed operation, proposed progressive rehabilitation, as well as the fact that no infrastructure will be established assist in mitigating the visual impact of the proposed development on the surrounding environment. Very little (if any) residual visual impact is expected upon closure of the mine and therefore this impact is deemed to be of medium significance.

- **Impact on the air quality and noise ambiance of the study area:**

  Dust may be generated as a result of the sand mining operation. The mine also contributes the noise of one FEL and ±10 trucks per day to the receiving environment. The proposed expansion of the mining footprint will take place as the current mining area is mined and therefore this application does not entail an additional impact but merely the continuation of the status quo. The potential impact of the sand mining activity on the air and/or noise ambiance of the area is deemed to be of low significance as the direction of the proposed extension is away from the La Chasseur/Agter-Kliphoogte road and any farm residences.

(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).

The specialists did not identify the presence of national estate as referred to in section 3(2) of the NHRA, 1999 within the earmarked footprint of the proposed extension 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 associated with the proposed extension of the mining area, investigated during the impact assessment process, were done at the hand of information obtained during the site investigation, public participation process, specialist studies 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 current mining footprint with 4 ha towards the south-west; over Portion 4 of the farm Zandberg Fontein No 97.

2. Site Alternative 2 – Extension of the current mining footprint with 4 ha towards the north-west; over Portion 4 of the farm Zandberg Fontein No 97.

3. Site Alternative 3 – Extension of the current mining footprint with 4 ha towards the west; over Portion 4 of the farm Zandberg Fontein No 97.

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 Fouché 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 U 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* the map was compiled and is attached as Appendix C.

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 and Energy.
- Shape and contour disturbed areas in compliance with the EMPR.
- Ensure that permanent changes in topography (due to mining) are sustainable and do not cause erosion or the damming of surface water.
- Use the topsoil effectively to promote the re-establishment of vegetation.
- Ensure that all rehabilitated areas are stable and self-sustaining in terms of vegetation cover.
- Eradicate all weeds/invader plant species by intensive management of the mine site.

The site-specific closure objectives are discussed in detail in the attached Closure Plan (Appendix P), however, a summary of the closure objectives for the Zandberg Sand Mine were included below.

The decommissioning phase will entail the rehabilitation of the final mined layers and the removal of the excavator and FEL from the mining footprint. The MR Holder proposes the following regarding the rehabilitation of the mined layers:

- The mining plan will be such that topsoil is stockpiled for the minimum possible time through rehabilitating different mining layers progressively as mining continues.
- To ensure minimum impact on drainage, the applicant will take care not to leave any depressions in the mining floor. A surface slope (even if minimal) will be maintained across the mining floor in the drainage direction, so that all excavations are free draining.
- After mining, any steep slopes at the edges of excavations will be reduced to a minimum and profiled to blend with the surrounding topography.
- The stockpiled topsoil will then be evenly spread over the entire mining area, so that there is a depth of 500 – 1 000 mm of sandy topsoil above the underlying soil. The depth will be monitored during spreading to ensure that coverage is adequate and even.
- The MR Holder will strive to (when possible) spread topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, is minimized.

- A cover crop will be planted and established immediately after spreading of topsoil to stabilize the soil and protect it from erosion in accordance with the recommendations of the BSA (Appendix I2) and Closure Plan (Appendix P).
- The rehabilitated area as well as the land down slope of it will monthly be monitored for erosion, and appropriately stabilized if any erosion occurs.
- The MR Holder will ensure monthly monitoring of weeds/invader plants that may germinated within the rehabilitated areas. The invasive plant species management plan (Appendix N) will constantly be implemented on site

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

Rehabilitation of the excavated area:

- No waste may be permitted to be deposited in the mining area.
- 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 six months from closure of the site.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMRE) 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 (DMRE).

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 N) 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.

Due to the nature of the sand 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.

All employees must be trained in the Emergency Response Procedures attached to this document as Appendix R.

iii) Potential risk of Acid Mine Drainage.

(Indicate whether or not the mining can result in acid mine drainage).

Not applicable.

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 – 1.2.6 Water Management*, the sand mine does not require processing water and due to the nature of the sand being mined (heavy), very little to no water is needed as dust levels are typically low. Dust generated on the access road is, as far as possible, managed through alternative dust suppression methods to minimise water use. The FEL operator (and excavator operatore when applicable), daily, brings his own potable water to site. No potable water will be used for dust suppression purposes.

viii) Has a water use license been applied for?

In 2016, the MR Holder applied for water use authorisation for activities that trigger Section 21 (c) and 21(i) of the NWA, 1998 as the mining footprint is within 500 m of a wetland. DWS issued the General Authorisation in September 2017 and the Water Certificate was received in 2018.

Afzelia Environmental Consultants was appointed to prepare the relevant water use application (regarding the S102 application) in terms of the NWA, 1998 that will be submitted to the BGCMA (as the competent authority of the region) in due course.

ix) Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

Table 37: Impact to be mitigated in their respective phases

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
(as listed in 2.11.1)	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.
APPROVED ZANDBERG SAND MINE					
Sand Mining.	Operational Phase	±17.6826 ha	⁎ Dust suppression must be active in order to prevent dust pollution. ⁎ No open fires may be allowed on the site. ⁎ Alien vegetation needs to be eradicated. ⁎ Topsoil management and re-use must be a priority. ⁎ Rehabilitation must occur concurrent to progress of the mining.	⁎ NEM:AQA. 2004 Regulation 6(1) ⁎ National Dust Control Regulations, GN No R827 ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ NEMA, 1998 ⁎ MPRDA, 2002 ⁎ Closure Plan (Appendix P)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SECTION 102 APPLICATION					
⁎ Demarcation of site with visible beacons.	Site Establishment phase	21.6826 ha 4 ha (S102 extension footprin to be demarcatedt)	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.	Mining is only allowed within the boundaries of the approved area. ⁎ MPRDA, 2002 ⁎ NEMA, 1998	Beacons need to be in place throughout the life of the mine.
⁎ Stripping and stockpiling of topsoil.	Site Establishment- & Operational Phase	4 ha	**<u>Loss of agricultural land for duration of mining:</u>** ⁎ The temporary loss of agricultural land for the duration of the mining period is acceptable to the landowner.	Use of agricultural land must be managed in accordance with the: ⁎ CARA, 1983 ⁎ Closure Plan (Appendix P)	Throughout the site establishment- and operational phases.
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment- & Operational Phase	±3 ha	**<u>Visual Mitigation:</u>** ⁎ The site must have a neat appearance and be kept in good condition at all times. ⁎ Mining equipment must be stored neatly in a dedicated area with a sealed drip tray underneath when not in use. ⁎ Concurrent rehabilitation must be done as mining progress to limit the visual impact on the aesthetic value of the area. ⁎ The MR holder must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area.	Management of the mining activities must be in accordance with the: ⁎ 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
			⁎ Upon closure the site must be rehabilitated and levelled to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.		
⁎ Stripping and stockpiling of topsoil.	Site Establishment- & Operational Phase	±3 ha 169 ha Biodiversity Offset Area	**<u>Management of vegetation Removal and Conservation of the CBA:</u>** ⁎ Institutional and financial arrangements must be formalised through appropriate legal agreements to ensure that the applicant can meet offset obligations. Such agreements must be checked and approved by CapeNature prior to development commencing. ⁎ The Offset Implementation Programme must be incorporated into the EMPR to monitor compliance with EA conditions. ⁎ A biodiversity offset site as indicated in Figure 6, and securing a minimum of 120 ha of Breede Sand Fynbos must be formally proclaimed as a Nature Reserve prior to development commencing. ⁎ A Biodiversity Offset Management Plan must be prepared and approved by CapeNature prior to development commencing. ⁎ The MR Holder must be responsible for all financial costs associated with the offset establishment and effective management for a minimum of 30 years, or until receipt of a closure certificate in terms of the MPRDA, 2002. ⁎ The Biodiversity Offset Area, of appropriate size (1:30 ratio), must be demarcated with visible beacons.	Natural vegetated areas must be managed in accordance with the: ⁎ NEM:BA 2004 ⁎ Western Cape Biodiversity Spatial Plan ⁎ NEM:PAA, 2003 ⁎ Western Cape Biodiversity Offset Guideline, 2005 (as amended) ⁎ Biodiversity Offset Management Plan	Throughout the site establishment- and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			⁎ The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area. ⁎ A pre-commencement walk-through of the final mining footprint, must be done by a suitably qualified botanist, for species of conservation concern that would be affected (also to comply with the Western Cape Nature Conservation Ordinance and DEA&DP permit conditions). ⁎ Permits for the removal of protected plant species (if required) must be kept on-site and in the possession of the flora search and rescue team at all times. ⁎ A pre-commencement environmental induction for all staff on site must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. ⁎ The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place. ⁎ Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place. ⁎ Phased mining and vegetation clearance must be done. No vegetation outside of the active		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			areas may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a layer, immediate rehabilitation must occur wherein a stable vegetation cover is established. - The Karoo Botanical Gardens must be contacted to determine if they wish to obtain any plant material for cultivation, in particular SCC's. - All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed. - No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. - No fires must be allowed on-site.		
- Stripping and stockpiling of topsoil.	Site Establishment, Operational- and Decommissioning Phase	±3 ha	**Topsoil Management:** - A layer of topsoil, of the area to be mined, must be stripped (preferably between 500 – 1 000 mm deep) 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.	Topsoil stripping must be managed in accordance with the: - CARA, 1983 - NEM:BA, 2004 - MPRDA, 2002 - Closure Plan (Appendix P) - Western Cape Noise Control Regulations (PN 200/2013), June 2013	Throughout the site establishment- and operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			⁎ The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas. ⁎ Topsoil stockpiles must be protected against losses by water- and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants on the stockpiles will help to prevent erosion. ⁎ Topsoil heaps may not exceed 2 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. ⁎ The MR 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, irrigated and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production, and any soil deficiencies must be corrected, based on a chemical analysis of the re-spread soil (if		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			deemed necessary). 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. - The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.		
- Stripping and stockpiling of topsoil. - Sloping and landscaping (medium- & long term).	Site Establishment & Operational-, and Decommissioning Phase	±3 ha	**Management of Invader Plant Species:** - An invasive plant species management plan (Appendix N) 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. - No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed. - 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 completely.	Invader plants must be managed in accordance with the: - CARA, 1983 - NEM:BA 2004 - Invasive Plant Species Management Plan (Appendix N)	Throughout the site establishment-, operational, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			▪ 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.		
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment & Operational Phase	±3 ha	**<u>Protection of Fauna:</u>** ⁎ A Biodiversity Offset Area, of appropriate size (preferable 1:30), must be delineated as a conservation compensation for the area that will be mined. ⁎ Ecological monitoring requirements for the offset should include camera trap surveys with specific focus on Riverine Rabbits. ⁎ The site manager must ensure no fauna is caught, killed, harmed, sold or played with. ⁎ Any fauna directly threatened by the operational activities must be removed to a safe location by the ECO or other suitably qualified person. ⁎ All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. 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. ⁎ All vehicles must adhere to a low speed limit (20 km/h is recommended) to avoid collisions with	Fauna must be managed in accordance with the: ⁎ 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
			susceptible species such as snakes and tortoises. • When possible, no activity must be undertaken at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). • No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed from the mining area. • A 50 m buffer, as stipulated in the Butterfly Report (Appendix J2), must be implemented around the areas where the SCC butterflies were found. • Ensure that a reasonable sand cover (500 mm – 1 000 mm) is restored over mined areas to as to speed up the recolonising of rehabilitated areas. • Just prior to vegetation clearing, the site must be searched for active burrows. If no active / occupied burrows are found, then vegetation clearing can commence. If active / occupied burrows are found, then a suitably qualified zoologist must be consulted for the appropriate course of action for the species detected.		
• Stripping and stockpiling of topsoil. • Excavation of sand from the mining footprint and	Site Establishment- & Operational Phase	±3 ha	**<u>Dust Mitigation:</u>** • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying	Dust generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1) • National Dust Control Regulations, GN No R827 • ASTM D1739 (SANS 1137:2012)	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
loading onto trucks. - Transporting of mineral.			agents that contains no PCB's (e.g. DAS products). - The site manager must ensure continuous assessment of the dust suppression equipment to confirm its effectiveness in addressing dust suppression. - Speed on the access road 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. - Loads must be flattened to prevent spillage of sand during transportation, also minimising windblown dust. - Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts. - 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, loading, and transporting of the sand from the site to minimize potential dust impacts. - No potable water may be used for dust suppression purposes.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment- and, Operational Phase	±3 ha	**Noise Handling:** ⁎ The MR holder must ensure that the employee and visitors to the site conduct themselves in an acceptable 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). ⁎ Best practice measures shall be implemented in order to minimize potential noise impacts.	Noise generation must be managed in accordance with the: ⁎ NEM:AQA. 2004 Regulation 6(1) ⁎ NRTA, 1996 ⁎ Western Cape Noise Control Regulations (PN 200/2013), June 2013	Throughout the site establishment-, and operational phase.
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment- and, Operational Phase	±3 ha	**Archaeological, Heritage and Palaeontological Aspects:** ⁎ 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	Cultural/heritage aspects must be managed in accordance with the: ⁎ NHRA, 1999	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			extent of the find, and confirm the extent of the work stoppage in that area. ᴎ 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). ᴎ Work may only continue once the go-ahead was issued by HWC. ᴎ The Fossil Chance Find Protocol attached as part of the HIA (Appendix L) must be implemented for the duration of the operational phase.		
ᴎ Stripping and stockpiling of topsoil.	Site Establishment- and, Operational Phase	±3 ha	**<u>Mitigating the Impact on Watercourse Habitat:</u>** ᴎ A 15 m buffer must be implemented and demarcated for the all wetland units on the property, to be approved by the ECO. The demarcation must be maintained throughout the operational phase of the project. ᴎ No heavy equipment may be used within the identified wetlands. ᴎ The MR Holder must adhere to all the requirements of the DWS General Authorisation. ᴎ No water may be taken from a water resource for any purpose without authorisation in terms of the NWA, 1998.	Watercourses must be protected in accordance with the: ᴎ NWA, 1998	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Excavation of sand from the mining footprint and loading onto trucks. ⁎ Sloping and landscaping (medium- & long term).	Operational-, and Decommissioning Phase	±3 ha	**<u>Landscaping of Mining Area:</u>** ⁎ The bench height may not exceed 10 m, the width must be 20 m, and an overall slope angle of ~16° must be maintained (bench face angle of ~27°). ⁎ To ensure minimum impact on drainage, it is essential that no depressions are left in the mining floor. A surface slope (even if minimal) must be maintained across the mining floor in the drainage direction, so that all excavations are free draining. This means that mining depths must be controlled on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. ⁎ No mining may extend into/below the underlying sandstone layer. ⁎ Compacted areas, as a result of mining activities, must be loosened to promote self-vegetation, and any ruts created by accessing or leaving the site must be filled to prevent future erosion. ⁎ A restoration specialist must be appointed to advise on the rehabilitation of the mining area with the aim of re-establishing Breede Sand Fynbos. ⁎ The input of a lepidopterist must be obtained on the rehabilitation of the mining area to optimise it as habitat for SCC butterfly species occurring on site.	Management of the mining area must be in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ MPRDA, 2002 ⁎ Closure Plan (Appendix P)	Throughout the operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Excavation of sand from the mining footprint and loading onto trucks. ⁎ Sloping and landscapting (medium- & long terrm).	Operational-, and Decommissioning Phase	±3 ha	**Waste Management:** ⁎ Regular vehicle maintenance, repairs and services may only take place at the off-site workshop and service area. 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 closed container/bin to be removed from the emergency service area (same day) to the workshop (off-site) in order to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. The safe disposal certificates must be filed for auditing purposes. ⁎ Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be anchored (to prevent blowing/falling over) and shall be serviced at least once a month for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes. ⁎ 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	Mining related waste must be managed in accordance with the: ⁎ NWA, 1998 ⁎ NEM:WA, 2008 ⁎ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ⁎ NEMA, 1998 (Section 30)	Throughout the site establishment-, operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			problems arising from the above are to be addressed immediately by the MR holder. - Disposal of sewerage must at all times comply with the requirements of Section 22 and 40 of the NWA, 1998. - 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 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. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the off-site workshop, where it is incorporated into the hazardous waste removal system as discussed above. - 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 safe disposal certificates must be filed for auditing purposes. - An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to be followed when a spill occurs as well as the application of the spill kit. - Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			disposal at a recognized 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 at the offices on the farm. No general waste may be burned or buried on the farm, but must be disposed of at the Robertson landfill site. - No waste may be stored, buried or burned on the site. - It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the DWS, DEA&DP, and other relevant authorities. The affected area must be cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned. - Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area. - All employees must be aware of the Emergency Response Procedures attached to this document as Appendix R. - No waste or water containing waste may be disposed without authorisation from the NWA, 1998 and NEM:WA, 2008. - The minimising of waste must be promoted and alternative methods for waste management must be investigated.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Transporting of mineral.	Operational Phase	±1 km	**Access Road Mitigation:** ⁎ 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 MR Holder. ⁎ Overloading of the trucks must be prevented. ⁎ The MR Holder must adhere to the DTPW conditions submitted as part of the land use application.	The access road must be managed in accordance with the: ⁎ NRTA, 1996	Throughout the operational phase.
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks. ⁎ Sloping and landscaping during rehabilitation.	Site establishment-, Operational- and Decommissioning Phase.	±3 ha	**Erosion Control and Storm Water Mitigation:** ⁎ Soil that are to be removed must be done so at right angles to the slope, as this will slow down surface runoff and help to prevent erosion. ⁎ When mining within steep slopes, it must be ensured that adequate slope protection is provided. ⁎ No mining may extend into/below the underlying sandstone layer. ⁎ Storm water must be diverted around the topsoil heaps and mining areas to prevent erosion. ⁎ During mining, the outflow of run-off water from the mining excavation must be controlled to prevent down-slope erosion. This must be done by way of the construction of temporary banks	Storm water must be managed in accordance with the: ⁎ CARA, 1983 ⁎ NEMA, 1998 ⁎ NWA, 1998	Throughout the site establishment-, operational- and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur. - Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place. - Phased mining and vegetation clearance must be done, wherein small strips are mined. No vegetation outside of the active strips may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a strip, immediate rehabilitation must occur wherein a stable vegetation cover is established with a grass cover. - Roads and other disturbed areas within the project area must be regularly monitored for erosion problems and problem areas must receive follow-up monitoring to assess the success of the remediation. - Any erosion problems within the mining area as a result of the mining activities observed must be rectified immediately (within 24 hours) and monitored thereafter to ensure that it does not re-occur. - Silt/sediment traps/barriers must be used where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. These sediment/silt barriers must regularly be maintained and cleared so as to ensure effective drainage of the areas.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			⁜ Stockpiles must be protected from erosion, stored on flat areas where possible, and be surrounded by appropriate berms. ⁜ Construction of gabions and other stabilisation features must be undertaken to prevent erosion, where deemed necessary. ⁜ 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.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Cumulative Impacts.	Site Establishment Phase	±3 ha 169 ha Biodiversity Offset Area	**<u>Cumulative Impacts - Ecological:</u>** ⁎ A Biodiversity Offset Area, of appropriate size (preferable 1:30), must be delineated as a conservation compensation for the area that will be mined. ⁎ The activity footprints of various proposed mining locations and other development proposals in the area must be kept to a minimum and a stable vegetation must be encouraged to return during the post-operational phase. ⁎ The footprint of mining areas within sensitive habitat types must be reduced as much as possible.	Management of the mining area must be in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ MPRDA, 2002 ⁎ Closure Plan ⁎ Western Cape Biodiversity Spatial Plan ⁎ NEM:PAA, 2003 ⁎ Western Cape Biodiversity Offset Guideline, 2005 (as amended) ⁎ Biodiversity Offset Management Plan	Throughout the operational-, and decommissioning phase.
⁎ Cumulative Impacts	Operational Phase	±3 ha	**<u>Cumulative Impacts - Palaeontological:</u>** ⁎ The MR Holder must implement a Fossil Chance Find Protocol in the EMPR (see HIA for the protocol).	Management of the mining area must be in accordance with the: ⁎ NHRA, 1999 ⁎ Fossil Chance Find Protocol	Throughout the operational phase.
⁎ Stipping and stockpiling of topsoil. ⁎ Excavation of sand rom the mining footprint and loading onto trucks.	Site Establishment-, Operational- and Decommissioning Phase	±3 ha	**<u>Management of Health and Safety Risks:</u>** ⁎ Access to the mining area by unauthorised persons is to be prevented by the Mine Manager, as far as is reasonably practical. ⁎ Adequate ablution facilities and water for human consumption must daily be available on site. ⁎ Sanitary facilities must be located within 100 m from any point of work.	Management of the mining activity must be in accordance with the: ⁎ MHSA, 1996	Throughout the operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
⁎ Transporting of material. ⁎ Sloping and landscaping.			⁎ Worker(s) 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).		

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ()):

Table 38: Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
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.)	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)		In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))	(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 • Remedy through rehabilitation.	(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
APPROVED ZANDBERG SAND MINE					
Sand mining.	⁜ Impact on the physical and chemical components.	⁜ Geology. ⁜ Air Quality – Dust. ⁜ Air Quality – Emissions. ⁜ Groundwater. ⁜ Visual Aspects. ⁜ Topography.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ NEM:AQA. 2004 Regulation 6(1) ⁜ National Dust Control Regulations, GN No R827 ⁜ NWA, 1998
Sand mining.	⁜ Impact on the biological and ecological components.	⁜ Natural Vegetation. ⁜ Soils.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ NEMA, 1998

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
		⁜ Sensitive Landscapes. ⁜ Land Use. ⁜ Land Capability. ⁜ Animal Life.			⁜ MPRDA, 2002
Sand mining.	⁜ Impact on sociological and cultural components.	⁜ Interested and Affected Parties. ⁜ Archaeological Artefacts. ⁜ Noise.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ NEMA, 1998 ⁜ NHRA, 1999 ⁜ NEM:AQA. 2004 Regulation 6(1)
Sand mining.	⁜ Impact on economical and operational components.	⁜ Regional Socio Economic Structure.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	⁜ MPRDA, 2002 ⁜ NEMA, 1998
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⁜ Demarcation of site with visible beacons.	⁜ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	N/A	Site Establishment phase	Control: Implementation of proper housekeeping and site management.	Mining is only allowed within the boundaries of the approved area. ⁜ MPRDA, 2002 ⁜ NEMA, 1998
⁜ Stripping and stockpiling of topsoil.	⁜ Alteration of the agricultural sense of place.	The impact affects the agricultural operations of the property.	Site Establishment- & Operational Phase	Control: Proper site management, and adherence to legislated conditions as presented in the EA, and SPLUMA.	Use of agricultural land must be managed in accordance with the: ⁜ CARA, 1983

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	⁜ Loss of agricultural land for duration of mining.				⁜ Closure Plan (Appendix P)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Visual intrusion as a result of mining. ⁜ Visual intrusion associated with the extraction of the mineral.	The visual impact may affect the aesthetics of the landscape.	Site Establishment- & Operational Phase	Control: Proper housekeeping and implementation of progressive rehabilitation.	Management of the mining activities must be in accordance with the: ⁜ MPRDA, 2002 ⁜ NEMA, 1998
⁜ Stripping and stockpiling of topsoil.	⁜ Potential impact on vegetation and SCC.	This will impact on the biodiversity of the receiving environment.	Site Establishment- & Operational Phase	Modify & Control: Implementing S3 instead of S2, keeping mining operations to the approved boundaries, and setting up the biodiversity offset area.	Natural vegetated areas must be managed in accordance with the: ⁜ NEM:BA 2004 ⁜ Western Cape Biodiversity Spatial Plan ⁜ NEM:PAA, 2003 ⁜ Western Cape Biodiversity Offset Guideline, 2005 (as amended) ⁜ Biodiversity Offset Management Plan
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and landscaping (medium- & long term).	⁜ Loss of topsoil and fertility during mining and stockpiling. ⁜ Erosion of returned topsoil after rehabilitation.	Loss of topsoil will affect the rehabilitation success upon closure of the mine.	Site Establishment, Operational- and Decommissioning Phase	Control & Remedy: Proper housekeeping and storm water management.	Topsoil stripping must be managed in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ MPRDA, 2002 ⁜ Closure Plan (Appendix P)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
					⁜ Western Cape Noise Control Regulations (PN 200/2013), June 2013
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and landscaping (medium- & long term).	⁜ Infestation of the topsoil heaps and mining area with invader plant species. ⁜ Infestation of the reinstated area with invader plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational-, and Decommissioning Phase	Control: Implementing soil- and invader plant control/management.	Invader plants must be managed in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA 2004 ⁜ Invasive Plant Species Management Plan (Appendix N)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential impact on local fauna (excluding butterflies) due to disturbance and loss of available habitat and migration routes. ⁜ Potential impact on SCC butterflies and available habitat. ⁜ Disturbance to fauna (including SCC butterflies) due to the mining activities.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	Modify, Control & Stop: Implementing good management practices, and expanding the area into the footprint of S3.	Fauna must be managed in accordance with the: ⁜ NEM:BA 2004

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Transporting of mineral.	⁜ Dust nuisance as a result of the mining activities. ⁜ Dust nuisance caused by vehicles transporting the mineral.	Increased dust will impact on the air quality of the receiving environment.	Site Establishment- & Operational Phase	Control: Dust suppression methods and proper housekeeping.	Dust generation must be managed in accordance with the: ⁜ NEM:AQA. 2004 Regulation 6(1) ⁜ National Dust Control Regulations, GN No R827 ⁜ ASTM D1739 (SANS 1137:2012)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Noise nuisance as a result of the mining activities.	Should the noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Site Establishment- and, Operational Phase	Control: Noise suppression methods and proper housekeeping.	Noise generation must be managed in accordance with the: ⁜ NEM:AQA. 2004 Regulation 6(1) ⁜ NRTA, 1996 ⁜ Western Cape Noise Control Regulations (PN 200/2013), June 2013
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential impact on archaeological artefacts. ⁜ Potential impact on areas of palaeonological concern.	This could impact on the cultural and heritage legacy of the receiving environment.	Site Establishment- and, Operational Phase	Control & Stop: Implementation of a chance-find procedure.	Cultural/heritage aspects must be managed in accordance with the: ⁜ NHRA, 1999
⁜ Stripping and stockpiling of topsoil.	⁜ Direct disturbance of watercourse habitat.	This impact could affect the hydrology of the surrounding environment.	Site Establishment- and, Operational Phase	Control: Implementing the mitigation measures proposed by the hydrologist.	Watercourses must be protected in accordance with the: ⁜ NWA, 1998

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential increased erosion risk and destabilisation of the dune plume. ⁜ Facilitation of erosion and increased sediment input in watercourses.	Erosion of the mining area will complicate rehabilitation.	Site Establishment, Operational- and Decommissioning Phase	Control & Remedy: Proper housekeeping and storm water management.	Management of the mining area must be in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ MPRDA, 2002 ⁜ Closure Plan (Appendix P)
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping (medium- & long term).	⁜ Creating steep slopes and uneven surfaces. ⁜ Uneven surfaces or steep slopes left upon closure of the site.	The impact will prevent or hinder future cultivation.	Operational-, and Decommissioning Phase	Control: Effective rehabilitation according to the closure plan.	Management of the mining area must be in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ MPRDA, 2002 ⁜ Closure Plan (Appendix P)
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscapting (medium- & long terrm).	⁜ Soil contamination from hydrocarbon spills. ⁜ Potential impact associated with littering at the mining area. ⁜ Potential impact associated with litter left at the mining area.	Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the MR Holder. .	Operational-, and Decommissioning Phase	Control & Remedy: Proper housekeeping and implementation of the emergency response procedures and waste management registers.	Mining related waste must be managed in accordance with the: ⁜ NWA, 1998 ⁜ NEM:WA, 2008 ⁜ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ⁜ NEMA, 1998 (Section 30)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
⁜ Transporting of mineral.	⁜ Degradation of the access roads. ⁜ Traffic impact on the bordering La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	Collapse of the internal road infrastructure will affect the landowner negatively, and if the mine negatively affect public traffic it may incur additional costs and complaints from the public.	Operational Phase	Control & Remedy: 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
⁜ Cumulative Impacts	⁜ Reduced ability to meet conservation obligations and targets.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	Modify & Control: Implementing S3 and setting up the biodiversity offset area.	The cumulative impacts must be managed in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ Closure Plan ⁜ Western Cape Biodiversity Spatial Plan ⁜ NEM:PAA, 2003 ⁜ Western Cape Biodiversity Offset Guideline, 2005 (as amended) ⁜ Biodiversity Offset Management Plan
⁜ Cumulative Impacts	⁜ Impact the broad-scale ecological processes.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	Modify & Control: Implementing S3 and setting up the biodiversity offset area.	The cumulative impacts must be managed in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
					⁜ Closure Plan ⁜ Western Cape Biodiversity Spatial Plan ⁜ NEM:PAA, 2003 ⁜ Western Cape Biodiversity Offset Guideline, 2005 (as amended) ⁜ Biodiversity Offset Management Plan
⁜ Cumulative Impacts	⁜ Cumulative impact of projects on palaeontological resources.	This could impact on the cultural and heritage legacy of the receiving environment.	Operational Phase	Control & Stop: Implementation of a chance-find procedure.	Management of the mining area must be in accordance with the: ⁜ NHRA, 1999 ⁜ Fossil Chance Find Protocol

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 39: Impact Management Actions

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
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.)	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)	(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 • Remedy through rehabilitation.	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.	(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)
APPROVED ZANDBERG SAND MINE				
Sand mining.	⁎ Impact on the physical and chemical components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	⁎ NEM:AQA. 2004 Regulation 6(1) ⁎ National Dust Control Regulations, GN No R827 ⁎ NWA, 1998
Sand mining.	⁎ Impact on the biological and ecological components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ NEMA, 1998 ⁎ MPRDA, 2002

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Sand mining.	⁜ Impact on sociological and cultural components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	⁜ NEMA, 1998 ⁜ NHRA, 1999 ⁜ NEM:AQA. 2004 Regulation 6(1)
Sand mining.	⁜ Impact on economical and operational components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	⁜ MPRDA, 2002 ⁜ NEMA, 1998
S102 APPLICATION				
⁜ Demarcation of site with visible beacons.	⁜ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	Control: Implementation of proper housekeeping and site management.	Beacons need to be in place throughout the life of the mine.	Mining is only allowed within the boundaries of the approved area. ⁜ MPRDA, 2002 ⁜ NEMA, 1998
⁜ Stripping and stockpiling of topsoil.	⁜ Alteration of the agricultural sense of place. ⁜ Loss of agricultural land for duration of mining.	Control: Proper site management, and adherence to legislated conditions as presented in the EA, and SPLUMA.	Throughout the site establishment- and operational phases.	Use of agricultural land must be managed in accordance with the: ⁜ CARA, 1983 ⁜ Closure Plan (Appendix P)
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Visual intrusion as a result of mining. ⁜ Visual intrusion associated with the extraction of the mineral.	Control: Proper housekeeping and implementation of progressive rehabilitation.	Throughout the site establishment, and operational phase.	Management of the mining activities must be in accordance with the: ⁜ MPRDA, 2002 ⁜ NEMA, 1998

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
⁎ Stripping and stockpiling of topsoil.	⁎ Potential impact on vegetation and SCC.	Modify & Control: Implementing S3 instead of S2, keeping mining operations to the approved boundaries, and setting up the biodiversity offset area.	Throughout the site establishment-, and operational phase.	Natural vegetated areas must be managed in accordance with the: ⁎ NEM:BA 2004 ⁎ Western Cape Biodiversity Spatial Plan ⁎ NEM:PAA, 2003 ⁎ Western Cape Biodiversity Offset Guideline, 2005 (as amended) ⁎ Biodiversity Offset Management Plan
⁎ Stripping and stockpiling of topsoil. ⁎ Sloping and landscaping (medium- & long term).	⁎ Loss of topsoil and fertility during mining and stockpiling. ⁎ Erosion of returned topsoil after rehabilitation.	Control & Remedy: Proper housekeeping and storm water management.	Throughout the site establishment-, and operational phase.	Topsoil stripping must be managed in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA, 2004 ⁎ MPRDA, 2002 ⁎ Closure Plan (Appendix P) ⁎ Western Cape Noise Control Regulations (PN 200/2013), June 2013
⁎ Stripping and stockpiling of topsoil. ⁎ Sloping and landscaping (medium- & long term).	⁎ Infestation of the topsoil heaps and mining area with invader plant species. ⁎ Infestation of the reinstated area with invader plant species.	Control: Implementing soil- and invader plant control/management.	Throughout the site establishment-, operational-, and decommissioning phase.	Invader plants must be managed in accordance with the: ⁎ CARA, 1983 ⁎ NEM:BA 2004 ⁎ Invasive Plant Species Management Plan (Appendix N)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	⁎ Potential impact on local fauna (excluding butterflies) due to disturbance and loss of available habitat and migration routes. ⁎ Potential impact on SCC butterflies and available habitat. ⁎ Disturbance to fauna (including SCC butterflies) due to the mining activities.	Modify, Control & Stop: Implementing good management practices, and expanding the area into the footprint of S3.	Throughout the site establishment-, and operational phase.	Fauna must be managed in accordance with the: ⁎ NEM:BA 2004
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks. ⁎ Transporting of mineral.	⁎ Dust nuisance as a result of the mining activities. ⁎ Dust nuisance caused by vehicles transporting the mineral.	Control: Dust suppression methods and proper housekeeping.	Throughout the site establishment-, and operational phase.	Dust generation must be managed in accordance with the: ⁎ NEM:AQA. 2004 Regulation 6(1) ⁎ National Dust Control Regulations, GN No R827 ⁎ ASTM D1739 (SANS 1137:2012)
⁎ Stripping and stockpiling of topsoil. ⁎ Excavation of sand from the mining footprint and loading onto trucks.	⁎ Noise nuisance as a result of the mining activities. ⁎ Noise nuisance as result of the mining activities.	Control: Noise suppression methods and proper housekeeping.	Throughout the site establishment-, and operational phase.	Noise generation must be managed in accordance with the: ⁎ 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
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential impact on archaeological artefacts. ⁜ Potential impact on areas of palaeonological concern.	Control & Stop: Implementation of a chance-find procedure.	Throughout the site establishment-, and operational phase.	Cultural/heritage aspects must be managed in accordance with the: ⁜ NHRA, 1999
⁜ Stripping and stockpiling of topsoil.	⁜ Direct disturbance of watercourse habitat.	Control: Implementing the mitigation measures proposed by the hydrologist.	Throughout the site establishment-, and operational phase.	The wetland (AW1) must be protected in accordance with the: ⁜ NWA, 1998
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks.	⁜ Potential increased erosion risk and destabilisation of the dune plume. ⁜ Facilitation of erosion and increased sediment input in watercourses.	Control & Remedy: Proper housekeeping and storm water management.	Throughout the site establishment-, and operational phase.	Management of the mining area must be in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ MPRDA, 2002 ⁜ Closure Plan (Appendix P)
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping (medium- & long term).	⁜ Creating steep slopes and uneven surfaces. ⁜ Uneven surfaces or steep slopes left upon closure of the site.	Control: Effective rehabilitation according to the closure plan.	Throughout the operational-, and decommissioning phase.	Management of the mining area must be in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ MPRDA, 2002 ⁜ Closure Plan (Appendix P)
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscapting (medium- & long terrm).	⁜ Soil contamination from hydrocarbon spills. ⁜ Potential impact associated with littering at the mining area.	Control & Remedy: Proper housekeeping and implementation of the emergency response procedures and waste management registers.	Throughout operational and decommissioning phases.	Mining related waste must be managed in accordance with the: ⁜ NWA, 1998 ⁜ NEM:WA, 2008

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	⁜ Potential impact associated with litter left at the mining area.			⁜ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ⁜ NEMA, 1998 (Section 30)
⁜ Transporting of mineral.	⁜ Degradation of the access roads. ⁜ Traffic impact on the bordering La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	Control & Remedy: 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.	Throughout the operational phase.	The access road must be managed in accordance with the: ⁜ NRTA, 1996
⁜ Cumulative Impacts	⁜ Reduced ability to meet conservation obligations and targets.	Modify & Control: Implementing S3 and setting up the biodiversity offset area.	Throughout the decommissioning phase.	The cumulative impacts must be managed in accordance with the: ⁜ CARA, 1983 ⁜ NEM:BA, 2004 ⁜ Closure Plan ⁜ Western Cape Biodiversity Spatial Plan ⁜ NEM:PAA, 2003 ⁜ Western Cape Biodiversity Offset Guideline, 2005 (as amended) ⁜ Biodiversity Offset Management Plan
⁜ Cumulative Impacts	⁜ Impact the broad-scale ecological processes.	Modify & Control: Implementing S3 and setting up the biodiversity offset area.	Throughout the decommissioning phase.	The cumulative impacts must be managed in accordance with the: ⁜ CARA, 1983

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
				⁎ NEM:BA, 2004 ⁎ Closure Plan ⁎ Western Cape Biodiversity Spatial Plan ⁎ NEM:PAA, 2003 ⁎ Western Cape Biodiversity Offset Guideline, 2005 (as amended) ⁎ Biodiversity Offset Management Plan
⁎ Cumulative Impacts	⁎ Cumulative impact of projects on palaeontological resources.	Control & Stop: Implementation of a chance-find procedure.	Throughout the operational phase.	Management of the mining area must be in accordance with the: ⁎ NHRA, 1999 ⁎ Fossil Chance Find Protocol

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.

The preferred post-mining land use for the Zandberg Sand Mine is to rehabilitate the mined areas and return the zoning to Agriculture.

As a layer is mined the area will be rehabilitated as mining progress into the consecutive layer. The stockpiled topsoil will be spread over the mined area to a depth of at least 500 mm.

Final rehabilitation will entail the removal of all equipment from the site. Final landscaping, levelling and top dressing will be done on all areas. Site management will implement an invasive plant species management plan (see Appendix N) during the 12 months' aftercare period to address germination of problem plants in the area. The MR Holder will comply with the minimum closure objectives as prescribed by DMRE.

(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

This report, the final EIAR & EMPr, includes all the environmental objectives in relation to closure and was available for perusal by the landowner, I&AP's and stakeholders over a 30-days commenting period. The comments received on the draft EIAR were incorporated into the Final EIAR & EMPr.

(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 plan is attached as Appendix E.

(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 the Zandberg sand mining footprint. The rehabilitation of the mining area as indicated on the rehabilitation map attached as Appendix E will comply with the minimum closure

objectives as prescribed by DMRE and detailed below, and therefore is deemed compatible:

Rehabilitation of the excavated area:

- No waste may be permitted to be deposited in the mining area.
- 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 six months from closure of the site.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMRE) 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 (DMRE).

(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 the approved Zandberg Sand Mine and the proposed extension area.

Mine type and saleable mineral by-product

According to Tables B.12, B.13 and B.14

Mine type	Sand
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

Level of information

According to Step 4.2:

Level of information available	Extensive

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)	-	NO
2(A)	Demolition of steel buildings and structures	-	NO
2(B)	Demolition of reinforced concrete buildings and structures	-	NO
3	Rehabilitation of access roads	-	NO
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	-	NO
6	Opencast rehabilitation including final voids and ramps	YES	-
7	Sealing of shafts, adits and inclines	-	NO
8(A)	Rehabilitation of overburden and spoils	-	NO
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	NO
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	NO
9	Rehabilitation of subsided areas	-	NO
10	General surface rehabilitation, including grassing of all denuded areas	-	NO
11	River diversions	-	NO
12	Fencing	-	NO
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	YES	-

Unit rates for closure components

According to Table B.6 master rates and multiplication factors for applicable closure components. The master rate from the DMRE Master Rates table for financial provision of 2021 was used.

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	-
2(A)	Demolition of steel buildings and structures	-	-
2(B)	Demolition of reinforced concrete buildings and structures	-	-
3	Rehabilitation of access roads	-	-
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	-	-

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
6	Opencast rehabilitation including final voids and ramps	268 200	0.04
7	Sealing of shafts, adits and inclines	-	-
8(A)	Rehabilitation of overburden and spoils	-	-
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	-
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	-	-
11	River diversions	-	-
12	Fencing	-	-
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	18 849	1.00

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 40: Calculation of closure cost

CALCULATION OF THE QUANTUM							
Mine:	**Zandberg Sand Mine**			**Location:**	**Robertson**		
Evaluators:	**C Fouché**			**Date:**	**08 December 2021**		
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	0	18	1.00	1.10	R 0.00
2(A)	Demolition of steel buildings and structures	m^2	0	256	1.00	1.10	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	0	377	1.00	1.10	R 0.00
3	Rehabilitation of access roads	m^2	0	46	1.00	1.10	R 0.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	444	1.00	1.10	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	242	1.00	1.10	R 0.00
5	Demolition of housing and/or administration facilities	m^2	0	512	1.00	1.10	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	4	268 200	0.04	1.10	R 47 203.20
7	Sealing of shaft, audits and inclines	m^3	0	137	1.00	1.10	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	0	178 800	1.00	1.10	R 0.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0	222 692	1.00	1.10	R 0.00

8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	646 804	0.51	1.10	R 0.00
9	Rehabilitation of subsided areas	ha	0	149 718	1.00	1.10	R 0.00
10	General surface rehabilitation	ha	0	141 640	1.00	1.10	R 0.00
11	River diversions	ha	0	141 640	1.00	1.10	R 0.00
12	Fencing	m	0	162	1.00	1.10	R 0.00
13	Water Management	ha	0	53 855	0.17	1.10	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	1	18 849	1.00	1.10	R 20 733.90
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 67 937.10
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R 67 937.10		**Sub Total 1**	R 71 333.96

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 <R100 000 000.00	R 4 280.04
		12% of Subtotal 1 if Subtotal 1 >R100 000 000.00	-
2	Contingency	10.0% of Subtotal 1	R 7 133.40
		Sub Total 2 (Subtotal 1 plus management and contingency)	R 82 747.39
		Vat (15%)	R 12 412.11
		GRAND TOTAL (Subtotal 3 plus VAT)	**R 95 159.50**

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 95 159.50. The MR Holder currently has a financial guarantee to the value of R 110 000 lodged with the DMRE.

(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 41: 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
⁜ Demarcation of site with visible beacons.	⁜ Maintenance of beacons	⁜ Visible beacons need to be established at the corners of the mining area and the Biodiversity Offset Area.	Role: ⁜ 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 biennial environmental audit. Responsibility: ⁜ Ensure beacons are in place throughout the life of the mine.	Applicable throughout site establishment-, operational-, and decommissioning phases. ⁜ Daily compliance monitoring by site management. ⁜ Biennial 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
⁜ Stripping and stockpiling of topsoil.	Land Use ⁜ Loss of agricultural land for duration of mining.	⁜ Mining schedule	Role: ⁜ 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 biennial environmental audit. Responsibility: ⁜ If needed, sign mined/rehabilitated areas back to agricultural use once the cover crop stabilised.	Applicable throughout site establishment- and operational phases. ⁜ Daily compliance monitoring by site management. ⁜ Biennial compliance monitoring of site by an Environmental Control Officer.
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks.	Visual Characteristics ⁜ Visual intrusion as a result of mining. ⁜ Visual intrusion associated with the extraction of material.	⁜ Formal parking area for equipment.	Role: ⁜ 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 biennial environmental audit. Responsibility: ⁜ Ensure that the site have a neat appearance and is kept in good condition at all times. ⁜ Store mining equipment neatly in a dedicated area with a sealed drip tray underneath when not in use. ⁜ Do concurrent rehabilitation as mining progress to limit the visual impact on the aesthetic value of the area. ⁜ Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area.	Applicable throughout site establishment-, operational-, and decommissioning phases. ⁜ Daily compliance monitoring by site management. ⁜ Biennial 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
			⁜ Rehabilitate and level the site upon closure to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.	
⁜ Stripping and stockpiling of topsoil.	<u>Mining, Biodiversity Conservation Areas and Vegetation</u> ⁜ Potential impact on vegetation and SCC.	⁜ Biodiversity Offset Agreement between the Landowner and MR Holder. ⁜ Biodiversity Management Plan and Offset Implementation Programme. ⁜ Formal proclamation of the offset area as a Nature Reserve. ⁜ Financial ability to implement and manage the offset requirements. ⁜ Visible beacons indicating the Biodiversity Offset Area. ⁜ Pre-commencement walkthrough with botanist.	<u>Role:</u> ⁜ 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 biennial environmental audit. <u>Responsibility:</u> ⁜ Finalise institutional and financial arrangements through appropriate legal agreements to ensure that the applicant can meet offset obligations. Submit the agreements for approval to CapeNature prior to development commencing. ⁜ Incorporate the Offset Implementation Programme into the EMPR. ⁜ Secure a minimum of 120 ha of Breede Sand Fynbos (Figure 6) as biodiversity offset site, and formally proclaim it as a Nature Reserve prior to commencing with development. ⁜ Prepare/obtain a Biodiversity Offset Management Plan that was approved by CapeNature prior to commencing with development. ⁜ Assume responsibility for the financial costs associated with the offset establishment and effective management for a minimum of 30 years, or until receipt of a closure certificate in terms of the MPRDA, 2002. ⁜ Demarcate the Biodiversity Offset Area or appropriate size (1:30), with visible beacons.	Applicable throughout site establishment-, and operational phases. ⁜ Daily compliance monitoring by site management. ⁜ Biennial 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
		⁜ Removal permit should protected or red data species be relocated. ⁜ Cover crop to seed reinstated areas.	⁜ Clearly demarcate the mining boundaries and contain all operations to the approved mining area. ⁜ Arrange a pre-commencement walk-through of the final mining footprint by a suitably qualified botanist, for species of conservation concern that would be affected. ⁜ Keep permits for the removal of protected plant species (if required) on-site and in the possession of the flora search and rescue team at all times. ⁜ Conduct a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. ⁜ Ensure that the on-site ECO provide supervision and oversee vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place. ⁜ Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. ⁜ Implement phased mining and vegetation clearance. Do not disturb vegetation outside of the active areas until it is time for that specific area to be mined. Upon finishing a layer, immediate rehabilitate and establish a stable vegetation cover. ⁜ Contact the Karoo Botanical Gardens to determine if they wish to obtain any plant material for cultivation, in particular SCC's. ⁜ Keep all vehicles on demarcated roads and prevent unnecessary driving in the veld outside these areas.	

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
			⁜ Do not translocate plants or otherwise uprooted or disturbed it for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. ⁜ Do not allow fires on-site.	
⁜ Stripping and stockpiling of topsoil.	<u>Geology and Soil:</u> ⁜ Loss of topsoil and fertility during mining and stockpiling.	⁜ Earthmoving equipment to reinstate mined areas. ⁜ Cover crop to be established on reinstated areas. ⁜ Erosion control infrastructure (if necessary).	<u>Role:</u> ⁜ 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 biennial environmental audit. <u>Responsibility:</u> ⁜ Strip and stockpile the upper 500 mm – 1 000 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. Do not stockpile topsoil in undisturbed areas. ⁜ Protect topsoil stockpiles against losses by water- and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establish plants on the stockpiles to prevent erosion. ⁜ Ensure that topsoil heaps do not exceed 2 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.	Applicable throughout site establishment-, and operational phases. ⁜ Daily compliance monitoring by site management. ⁜ Biennial 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
			⁜ Divert storm- and runoff water around the stockpile area to prevent erosion. ⁜ Spread the topsoil evenly, to a depth of 500 mm – 1 000 mm, 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. ⁜ Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement.	
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping (Medium- & long term).	<u>Hydrology:</u> ⁜ Potential increased erosion risk and destabilisation of the dune plume. ⁜ Facilitation of erosion. ⁜ Erosion of returned topsoil after rehabiliation.	⁜ Earthmoving equipment to reinstate mined areas. ⁜ Cover crop to be established on reinstated areas. ⁜ Erosion control infrastructure (if necessary).	<u>Role:</u> ⁜ 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 biennial environmental audit. <u>Responsibility:</u> ⁜ Remove soil at right angles to the slope, as this will slow down surface runoff and help to prevent erosion. ⁜ Ensure adequate slope protection when mining within steep slopes. ⁜ Limit mining to the underlying sandstone layer.	Applicable throughout site establishment-, and operational phases. ⁜ Daily compliance monitoring by site management. ⁜ Biennial 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
			⁜ Divert storm water around the topsoil heaps and mining areas to prevent erosion. ⁜ During mining, control the outflow of run-off water from the mining excavation to prevent down-slope erosion. If needed, construct temporary banks and ditches that will direct run-off water. These must be in place at any points where overflow out of the excavation might occur. ⁜ Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. ⁜ Implement phased mining and vegetation clearance, wherein small strips are mined. Do not disturb vegetation outside of the active strips until it is time for that specific area to be mined. Immediately rehabilitate a finished layer with a stable vegetation cover. ⁜ Regularly monitor roads and other disturbed areas within the project area for erosion problems and conduct follow-up monitoring of problem areas to assess the success of the remediation. ⁜ Rectify any erosion problems within the mining area as a result of the mining activities immediately (within 24 hours) and monitor it thereafter to ensure that it does not re-occur. ⁜ Use silt/sediment traps/barriers where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. Regularly maintain and clean these sediment/silt barriers to ensure effective drainage of the areas. ⁜ Protect stockpiles from erosion, stored it on flat areas, and surround it by appropriate berms where possible. ⁜ Undertake construction of gabions and other stabilisation features to prevent erosion, where deemed necessary.	

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
			⁜ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.	
⁜ Stripping and stockpiling of topsoil. ⁜ Sloping and landscaping (Medium- & Long Term).	<u>Mining, Biodiviersity and Vegetation:</u> ⁜ Infestation of the topsoil heaps and mining area with invader plant species. ⁜ Infestation of the reinstated area with invader plant species.	⁜ Designated team to cut or pull out invasive plant species that germinated on site. ⁜ Herbicide application equipment.	<u>Role:</u> ⁜ 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 biennial environmental audit. <u>Responsibility:</u> ⁜ Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. ⁜ Implement an invasive plant species management plan 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, 2004. Do weed/alien clearing on an ongoing basis throughout the life of the mining activities. ⁜ Keep all stockpiles (topsoil & overburden) free of invasive plant species. ⁜ Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose. ⁜ Control declared invader or exotic species on the rehabilitated areas.	Throughout the site establishment-, and operational phase. ⁜ Daily compliance monitoring by site management. ⁜ Biennial compliance monitoring of site by an Environmental Control Officer.
⁜ Strippping and stockpiling of topsoil.	<u>Fauna:</u> ⁜ Potential impact on local fauna due to disturbance and	⁜ Toolbox talks to educate employees how to handle fauna that enter the work areas.	<u>Role:</u> ⁜ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.	Applicable throughout site establishment-, and operational phases. ⁜ 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
⁜ Excavation of sand from the mining footprint and loading onto trucks.	loss of available habitat and migration routes. ⁜ Disturbance to fauna within the footprint area.	⁜ Beacons to demarcate the 50 m buffer area. ⁜ Zoologist to advise on the monitoring with regard to Riverine Rabbits and burrowing animals.	⁜ Compliance to be monitored by the independent Environmental Control Officer during the biennial environmental audit. <u>Responsibility:</u> ⁜ Establish a Biodiversity Offset Area or appropriate size (1:30), as a conservation compensation for the area that will be mined. ⁜ Include camera trap surveys with specific focus on Riverine Rabbits as an ecological monitoring requirement for the offset. ⁜ Ensure no fauna is caught, killed, harmed, sold or played with. ⁜ Arrange the ECO or other suitably qualified person to remove any fauna directly threatened by the operational activities to a safe location. ⁜ Conduct environmental induction with all personnel regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. 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. ⁜ Ensure all vehicles adhere to a low speed limit (20 km/h) to avoid collisions with susceptible species such as snakes and tortoises. ⁜ When possible, prevent activity at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). ⁜ Prevent litter, food or other foreign material being thrown or left around the site. Keep such items in the site vehicles and daily remove it from the mining area. ⁜ Adhere to the 50 m buffer proposed in the Butterfly Report (Appendix J2).	⁜ Biennial 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
			⁜ Ensure that a reasonable sand cover (500 mm – 1 000 mm) is restored over mined areas to as to speed up the recolonising of rehabilitated areas. ⁜ Prior to vegetation clearing, search the area for active burrows. If active/occupied burrows are found, consult a suitably qualified zoologist for the appropriate course of action.	
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Transporting of material.	<u>Air and Noise Quality:</u> ⁜ Dust nuisance as a result of the mining activities. ⁜ Dust nuisance as a result of the mining actvities. ⁜ Dust nuisance caused by vehicles transporting the material.	⁜ Dust suppression equipment such as a water car. ⁜ Signage that clearly reduce the speed on the access roads.	<u>Role:</u> ⁜ 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 biennial environmental audit. <u>Responsibility:</u> ⁜ 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. ⁜ Flatten loads to ensure minimal spillage of material takes place during transportation, also preventing windblown dust. ⁜ Consider weather conditions upon commencement of daily operations.	Applicable throughout site establishment-, operational-, and decommissioning phases. ⁜ Daily compliance monitoring by site management. ⁜ Biennial 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
			⁜ 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, loading, and transporting of sand from the site to minimize potential dust impacts. ⁜ Do not use potable water for dust suppression purposes.	
⁜ Stripping and stockpiling of topsoil ⁜ Excavation of sand from the mining footprint and loading onto trucks.	<u>Air and Noise Quality:</u> ⁜ Noise nuisance as a result of the mining activities.	⁜ 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.	<u>Role:</u> ⁜ 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 biennial environmental audit. <u>Responsibility:</u> ⁜ Ensure that employee and visitors to the site conduct themselves in an acceptable manner while on site. ⁜ Do not permit loud music 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. ⁜ Implement best practice measures to minimise potential noise impacts.	Applicable throughout site establishment-, operational-, and decommissioning phases. ⁜ Daily compliance monitoring by site management. ⁜ Biennial compliance monitoring of site by an Environmental Control Officer.
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining	<u>Cultural and Heritage Environment:</u> ⁜ Potential impact on archaeological artefacts.	⁜ Contact number of an archaeologist & palaeontologist that can be contacted when a discovery is made on site.	<u>Role:</u> ⁜ 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 biennial environmental audit.	Applicable throughout site establishment-, operational-, and decommissioning phases. ⁜ 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
footprint and loading onto trucks.	⁜ Potential impact on areas of palaeontological concern.		Responsibility: ⁜ Confine all mining to the development footprint area. ⁜ Implement the following change find procedure when discoveries are made on site: ▪ 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). ▪ Work may only continue once the go-ahead was issued by HWC.	⁜ Biennial compliance monitoring of site by an Environmental Control Officer.
⁜ Stripping and stockpiling of topsoil.	Hydrology: ⁜ Direct disturbance of watercourse habitat.	⁜ Visible beacons indicating the boundary of the 15 m buffer area.	Role: ⁜ 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 biennial environmental audit.	Throughout the site establishment-, and operational phase. ⁜ Daily compliance monitoring by site management. ⁜ Biennial 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
			Responsibility: • Implement and demarcate a 15 m buffer for all wetland units on the property. ECO to approve demarcation. • Do not allow any heavy equipment within the identified wetlands. • Adhere to the requirements of the DWS General Authorisation. • Do not take any water for any purpose without authorisation in terms of the NWA, 1998.	
• Excavation of sand from the mining footprint and loading onto trucks. • Sloping and landscaping (Medium- & Long Term)	Topography: • Creating steep slopes and uneven surfaces. • Uneven surfaces or steep slopes left upon closure of the site.	• Earthmoving equipment to reinstate mined areas. • Restoration specialist to advise on the rehabilitation actions. • Lepidopterist advising on the efficient rehabilitation of the area with regard to SCC butterflies.	Role: • 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 biennial environmental audit. Responsibility: • Keep bench heights to 10 m, width to 20 m, and overall slope angle of ~16° (bench face angle of ~27°). • Ensure no depressions are left in the mining floor to minimize the impact on drainage. Maintain a surface slope (even if minimal) across the mining floor in the drainage direction, so that all excavations are free draining. Control mining depths on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. • Limit mining to the underlying sandstone layer. • Loosen compacted areas and fill ruts to prevent erosion. • Engage a restoration specialist to advise on the rehabilitation of the mining area with the aim of re-establishing Breede Sand Fynbos.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Biennial 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
			⁜ Obtain the input of a lepidopterist on the rehabilitation of the mining area to optimise.	
⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Sloping and landscaping during rehabilitation (Medium- & Long Term).	<u>General</u> ⁜ Soil contamination from hydrocabon spills. ⁜ Potential impact associated with littering at the mining area. ⁜ Potential impact assicated with litter left at the mining area.	⁜ Sealed drip trays. ⁜ Formal waste disposal system with waste registers.	<u>Role:</u> ⁜ 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 biennial environmental audit. <u>Responsibility:</u> ⁜ Ensure regular vehicle maintenance, repairs and services only take place at the off-site workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste handling facility, alternatively arrange collection by a registered hazardous waste handling contractor. File safe disposal certificates for auditing purposes. ⁜ Provide ablution facilities in the form of a chemical toilet. Anchor the chemical toilet and arrange that it be serviced at least once a month by a registered liquid waste handling contractor for the duration of the mining activities. File the safe disposal certificates for auditing purposes. ⁜ Ensure that the use of any temporary, chemical toilet facilities does not cause pollution to water sources or pose a health hazard. In addition, prevent any form of secondary pollution from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately.	Applicable throughout site establishment-, operational-, and decommissioning phases. ⁜ Daily compliance monitoring by site management. ⁜ Biennial compliance monitoring of site by an Environmental Control Officer.

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			⋉ Ensure that sewerage disposal complies at all times with the requirements of Section 22 and 40 of the NWA, 1998. ⋉ If a diesel bowser is used on site, equip it with a drip tray at all times. Ensure that drip trays are used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. ⋉ Clean drip trays after use. Do not use dirty drip trays. Dispose of the dirty rags used to clean the drip trays as hazardous waste into a designated bin at the off-site workshop, and incorporate it into the hazardous waste removal system. ⋉ Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. File the safe disposal certificates for auditing purposes. ⋉ Obtain an oil spill kit, and train the employees in the emergency procedures to be followed when a spill occurs as well as the application of the spill kit. ⋉ Should spillage occur, such as oil or diesel leaking from a burst pipe, collect the contaminated soil, within the first hour of occurrence, in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a recognized 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 at the offices on the farm. Do not burn or bury general waste on the farm, but dispose of it at the Robertson landfill site. ⋉ Prevent the storage, burning or burying of waste on site. ⋉ Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the DWS, DEA&DP, and other relevant authorities. Arrange that the affected area is cleaned by	

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
			a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned. - Implement the use of waste registers to keep record of the waste generated and removed from the mining area. - Ensure all employees are aware of the Emergency Response Procedures attached to this document as Appendix L. - Do not dispose any waste or water containing waste without authorisation from the NWA, 1998 and NEM:WA, 2008. - Promote the minimising of waste and investigate alternative methods for waste management.	
- Transporting of material.	<u>Existing Infrastructure:</u> - Deterioration of the access roads. - Traffiic impact on the bordering La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	- Grader to restore the road surface when needed.	<u>Role:</u> - 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 biennial environmental audit. <u>Responsibility:</u> - 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. - Repair rutting and erosion of the access road caused as a direct result of the mining activities. - Prevent the overloading of the trucks. - Adhere to the DTPW conditions submitted as part of the land use application.	Applicable throughout operational-, and decommissioning phases. - Daily compliance monitoring by site management. - Biennial 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
⁜ Stripping and stockpiling of topsoil. ⁜ Excavation of sand from the mining footprint and loading onto trucks. ⁜ Transporting of material ⁜ Sloping and landscaping (Medium- & Long Term)	<u>General:</u> ⁜ Management of Health and Safety Risks.	⁜ Stocked first aid box. ⁜ Level 1 certified first aider. ⁜ All appointments in terms of the Mine Health and Safety Act, 1996.	<u>Role:</u> ⁜ 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 biennial environmental audit. <u>Responsibility:</u> ⁜ Prevent access to the mining area by unauthorised persons as far as is reasonably practical. ⁜ Ensure adequate ablution facilities and water for human consumption are daily available on site. ⁜ Ensure sanitary facilities is located within 100 m from any point of work. ⁜ 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).	Applicable throughout decommissioning phase. ⁜ Daily compliance monitoring by site management. ⁜ Biennial compliance monitoring of site by an Environmental Control Officer.

List of Non-compliance Penalties:

The amounts are indicative only.

⋉ Failure to demarcate the mining- and buffer areas	R 1 600
⋉ Working outside of the demarcated areas	R 4 000
⋉ Failure to strip topsoil	R 4 000
⋉ Failure to stockpile topsoil	R 4 000
⋉ Pollution of water bodies (incl. increased suspended solid loads)	R 8 000
⋉ Failure to control stormwater runoff (repeat finding)	R 8 000
⋉ Failure to provide adequate sanitation	R 8 000
⋉ Unauthorised removal of indigenous vegetation	R 8 000
⋉ Failure to control litter/waste on site	R 8 000
⋉ Failure to rehabilitate mined areas within specified time	R 9 600
⋉ Failure to maintain the demarcations	R 1 600
⋉ Contravention of an EA condition	R 8 000

It is proposed that the fines/penalties (if issued) be applied in a manner that will augment the management fund of the Biodiversity Offset Area.

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 biennially be submitted to DMRE 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.

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 the mining related employees (operator & management) 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 preforming 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
  - 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 MR Holder undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMRE 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

I,...GA Viljoen.....

The undersigned and duly authorised thereto by .....Zandberg Sandput (Pty) Ltd.....

Company / ~~Closed Corporation / Municipality or Council~~
(Delete whichever is not applicable)

hereby undertake to implement all the aspects contained in the ~~BAR and EMPr /~~ EIA and EMPr and accept full responsibility therefore.
(Delete whichever is not applicable)

SIGNED at Robertson this 22nd day February 2022

GAViljoen
SIGNATURE

WITNESSES:

1.....

2.....

Official use

APPROVAL

Approved in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998), as amended.

SIGNED at ..... this ..... day 2022

REGIONAL MANAGER
WESTERN CAPE
Undertaking/eg

3. 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 (Pty) Ltd

Name of Company:

22 February 2022

Date:

-END-

APPENDIX A

REGULATION 2(2) MINE PLAN

APPENDIX B

LOCALITY MAP

APPENDIX C

SITE ACTIVITIES PLAN

APPENDIX D

SURROUNDING LAND USE MAP

APPENDIX E

REHABILITATION MAP

APPENDIX F1

ZANDBERG MINING AUTHORISATIONS

APPENDIX F2

ZANDBERG ZONING APPROVAL

APPENDIX F3

LANDOWNER AGREEMENT

APPENDIX F4

OFFSET RESOLUTION SIGNED BY ZANDBERG SANDPUT (PTY) LTD

APPENDIX F5

OFFSET RESOLUTION SIGNED BY ZANDBERGFONTEIN TRUST

APPENDIX G1

WATER USE AUTHORISATION

APPENDIX G2

WETLAND DELINEATION REPORT, 2016

APPENDIX G3

WATERCOURSE DELINEATION AND HABITAT ASSESSMENT, 2021

APPENDIX G4

FLOODLINE DETERMINATION REPORT, 2021

APPENDIX H1

COMMENTS AND RESPONSE REPORT

APPENDIX H2

PROOF OF PUBLIC PARTICIPATION

APPENDIX I1

SPECIALIST VEGETATION / ECOLOGICAL SURVEY, 2010

APPENDIX I2

BOTANICAL STUDY AND ASSESSMENT, 2021

APPENDIX J1

TERRESTRIAL FAUNA ASSESSMENT, 2021

APPENDIX J2

BUTTERFLY SURBEY, 2021

APPENDIX K

BIODIVERSITY OFFSET REPORT, 2022

APPENDIX L

HERITAGE IMPACT ASSESSMENT

APPENDIX M

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 expansion of the Zandberg Sand Mine 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.

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
APPROVED ZANDBERG SAND MINE			
⁒ Geology	**Duration of operational phase ±27 years**	⁒ Definite	⁒ Low
⁒ Air Quality - Dust		⁒ Definite	⁒ Low
⁒ Air Quality - Emissions		⁒ Probable	⁒ Low
⁒ Groundwater		⁒ Probable	⁒ Low
⁒ Visual Aspects		⁒ Definite	⁒ Low
⁒ Surface Water		⁒ Probable	⁒ Low
⁒ Topography		⁒ Definite	⁒ Low
⁒ Natural Vegetation		⁒ Definite	⁒ Medium
⁒ Soils		⁒ Definite	⁒ Low
⁒ Sensitive Landscapes		⁒ Definite	⁒ Low
⁒ Land Use		⁒ Definite	⁒ Low
⁒ Land Capability		⁒ Definite	⁒ Low
⁒ Animal Life		⁒ Probable	⁒ Low

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
SITE ALTERNATIVE 1			
Stripping and Stockpiling of Topsoil:	**Duration of operational phase ±15 years**		
⁎ Alteration of the agricultural sense of place.		**Possible**	**Low-Medium Concern**
⁎ Loss of agricultural land for duration of mining.		**Definite**	**Low-Medium Concern**
⁎ Visual intrusion as a result of mining.		**Possible**	**Medium Concern**
⁎ Potential impact on vegetation and SCC		**Definite**	**Low-Medium Concern**
⁎ Loss of topsoil and fertility during mining and stockpiling.		**Low Possibility**	**Low Concern**
⁎ Infestation of the topsoil heaps and mining area with invader plant species.		**Low Possibility**	**Low Concern**
⁎ Potential impact on local fauna (excl. butterflies) due to disturbance and loss of available habitat and migration routes.		**Low Possibility**	**Low Concern**
⁎ Potential impact on SCC butterflies and available habitat.		**Definite**	**Medium-High Concern**
⁎ Dust nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Noise nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Potential impact on archaeological artefacts.		**Low Possibility**	**Low Concern**
⁎ Direct disturbance of watercourse habitat.		**Low Possibility**	**Low Concern**
⁎ Potential increased erosion risk and destabilisation of the dune plume.		**Low Possibility**	**Low Concern**
Excavation of sand from the mining footprint and loading onto trucks:	**Duration of operational phase ±15 years**		
⁎ Visual intrusion associated with the excavation of the mineral.		**Definite**	**Low-Medium Concern**
⁎ Creating steep slopes and uneven surfaces.		**Low Possibility**	**Low Concern**
⁎ Soil contamination from hydrocarbon spills.		**Low Possibility**	**Low Concern**
⁎ Disturbance to fauna within the footprint area.		**Possible**	**Medium Concern**
⁎ Dust nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Noise nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Potential impact associated with littering at the mining area.		**Low Possibility**	**Low Concern**
⁎ Potential impact on areas of palaeontological concern.		**Low Possibility**	**Low Concern**
⁎ Facilitation of erosion.		**Low Possibility**	**Low Concern**
Transporting of Mineral:	**Duration of operational phase ±15 years**		
⁎ Dust nuisance caused by vehicles transporting the mineral.		**Low Possibility**	**Low Concern**
⁎ Degradation of the access road.		**Low Possibility**	**Low Concern**
⁎ Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity.		**Low Possibility**	**Low Concern**

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
SITE ALTERNATIVE 1			
Cumulative Impacts: ß Reduced ability to meet conservation obligations and targets ß Reduced ability to meet conservation obligations and targets (with other projects) ß Impact the broad-scale ecological process ß Impact the broad-scale ecological process (with other projects) ß Cumulative impact of projects on palaeontological resources	**Duration of operational phase ±15 years**	**Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility**	**Medium Concern** **Medium Concern** **Low-Medium Concern** **Medium Concern** **Low Concern**
Sloping and Landscaping (Medium- & Long Term): ß Erosion of returned topsoil after rehabilitation. ß Infestation of the reinstated area with invader plant species. ß Potential impact associated with litter left at the mining area. ß Uneven surfaces or steep slopes left upon closure of the site.	**Operational phase** **&** **Decommissioning phase**	**Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility**	**Low Concern** **Low Concern** **Low Concern** **Low Concern**

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
SITE ALTERNATIVE 2			
Stripping and Stockpiling of Topsoil: ß Alteration of the agricultural sense of place. ß Loss of agricultural land for duration of mining. ß Visual intrusion as a result of mining. ß Potential impact on vegetation and SCC ß Loss of topsoil and fertility during mining and stockpiling. ß Infestation of the topsoil heaps and mining area with invader plant species. ß Potential impact on local fauna (excl. butterflies) due to disturbance and loss of available habitat and migration routes. ß Potential impact on SCC butterflies and available habitat. ß Dust nuisance as a result of the mining activities. ß Noise nuisance as a result of the mining activities.	**Duration of operational phase ±29 years**	**Possible** **Definite** **Possible** **Definite** **Low Possibility** **Low Possibility** **Possible** **Definite** **Low Possibility** **Low Possibility**	**Low-Medium Concern** **Low-Medium Concern** **Medium Concern** **Low-Medium Concern** **Low Concern** **Low Concern** **Low-Medium Concern** **Medium-High Concern** **Low Concern** **Low Concern**

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
SITE ALTERNATIVE 2			
⁎ Potential impact on archaeological artefacts. ⁎ Direct disturbance of watercourse habitat. ⁎ Potential increased erosion risk and destabilisation of the dune plume.		**Low Possibility** **Low Possibility** **Low Possibility**	**Low Concern** **Low Concern** **Low Concern**
Excavation of sand from the mining footprint and loading onto trucks:	**Duration of operational phase ±29 years**		
⁎ Visual intrusion associated with the excavation of the mineral.		**Definite**	**Medium Concern**
⁎ Creating steep slopes and uneven surfaces.		**Low Possibility**	**Low Concern**
⁎ Soil contamination from hydrocarbon spills.		**Low Possibility**	**Low Concern**
⁎ Disturbance to fauna within the footprint area.		**Possible**	**Medium Concern**
⁎ Dust nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Noise nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Potential impact associated with littering at the mining area.		**Low Possibility**	**Low Concern**
⁎ Potential impact on areas of palaeontological concern.		**Low Possibility**	**Low Concern**
⁎ Facilitation of erosion.		**Low Possibility**	**Low Concern**
Transporting of Mineral:	**Duration of operational phase ±29 years**		
⁎ Dust nuisance caused by vehicles transporting the mineral.		**Low Possibility**	**Low Concern**
⁎ Degradation of the access road.		**Low Possibility**	**Low Concern**
⁎ Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity.		**Low Possibility**	**Low Concern**
Cumulative Impacts:	**Duration of operational phase ±29 years**		
⁎ Reduced ability to meet conservation obligations and targets		**Low Possibility**	**Medium-High Concern**
⁎ Reduced ability to meet conservation obligations and targets (with other projects)		**Low Possibility**	**Medium-High Concern**
⁎ Impact the broad-scale ecological process		**Low Possibility**	**Medium Concern**
⁎ Impact the broad-scale ecological process (with other projects)		**Low Possibility**	**Medium Concern**
⁎ Cumulative impact of projects on palaeontological resources		**Low Possibility**	**Low Concern**
Sloping and Landscaping (Medium- & Long Term):	**Operational phase** **&** **Decommissioning phase**		
⁎ Erosion of returned topsoil after rehabilitation.		**Low Possibility**	**Low Concern**
⁎ Infestation of the reinstated area with invader plant species.		**Low Possibility**	**Low Concern**
⁎ Potential impact associated with litter left at the mining area.		**Low Possibility**	**Low Concern**
		Low Possibility	**Low Concern**

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
SITE ALTERNATIVE 2			
⁎ Uneven surfaces or steep slopes left upon closure of the site.			

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
SITE ALTERNATIVE 3			
Stripping and Stockpiling of Topsoil:	**Duration of operational phase ±22 years**		
⁎ Alteration of the agricultural sense of place.		**Possible**	**Low-Medium Concern**
⁎ Loss of agricultural land for duration of mining.		**Definite**	**Low-Medium Concern**
⁎ Visual intrusion as a result of mining.		**Possible**	**Medium Concern**
⁎ Potential impact on vegetation and SCC		**Definite**	**Low-Medium Concern**
⁎ Loss of topsoil and fertility during mining and stockpiling.		**Low Possibility**	**Low Concern**
⁎ Infestation of the topsoil heaps and mining area with invader plant species.		**Low Possibility**	**Low Concern**
⁎ Potential impact on local fauna (excl. butterflies) due to disturbance and loss of available habitat and migration routes.		**Low Possibility**	**Low Concern**
⁎ Potential impact on SCC butterflies and available habitat.		**Low Possibility**	**Low Concern**
⁎ Dust nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Noise nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Potential impact on archaeological artefacts.		**Low Possibility**	**Low Concern**
⁎ Direct disturbance of watercourse habitat.		**Low Possibility**	**Low Concern**
⁎ Potential increased erosion risk and destabilisation of the dune plume.		**Low Possibility**	**Low Concern**
Excavation of sand from the mining footprint and loading onto trucks:	**Duration of operational phase ±22 years**		
⁎ Visual intrusion associated with the excavation of the mineral.		**Definite**	**Low-Medium Concern**
⁎ Creating steep slopes and uneven surfaces.		**Low Possibility**	**Low Concern**
⁎ Soil contamination from hydrocarbon spills.		**Low Possibility**	**Low Concern**
⁎ Disturbance to fauna within the footprint area.		**Low Possibility**	**Low Concern**
⁎ Dust nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Noise nuisance as a result of the mining activities.		**Low Possibility**	**Low Concern**
⁎ Potential impact associated with littering at the mining area.		**Low Possibility**	**Low Concern**

TYPE OF IMPACT	DURATION	LIKELIHOOD	SIGNIFICANCE
SECTION 102 APPLICATION			
SITE ALTERNATIVE 3			
⁎ Potential impact on areas of palaeontological concern. ⁎ Facilitation of erosion.		**Low Possibility**	**Low Concern**
Transporting of Mineral: ⁎ Dust nuisance caused by vehicles transporting the mineral. ⁎ Degradation of the access road. ⁎ Traffic impact on the La Chasseur/Agter-Kliphoogte road as a result of the mining activity.	**Duration of operational phase ±22 years**	**Low Possibility** **Low Possibility** **Low Possibility**	**Low Concern** **Low Concern** **Low Concern**
Cumulative Impacts: ⁎ Reduced ability to meet conservation obligations and targets ⁎ Reduced ability to meet conservation obligations and targets (with other projects) ⁎ Impact the broad-scale ecological process ⁎ Impact the broad-scale ecological process (with other projects) ⁎ Cumulative impact of projects on palaeontological resources	**Duration of operational phase ±22 years**	**Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility**	**Medium Concern** **Medium Concern** **Low-Medium Concern** **Medium Concern** **Low Concern**
Sloping and Landscaping (Medium- & Long Term): ⁎ Erosion of returned topsoil after rehabilitation. ⁎ Infestation of the reinstated area with invader plant species. ⁎ Potential impact associated with litter left at the mining area. ⁎ Uneven surfaces or steep slopes left upon closure of the site.	**Operational phase** **&** **Decommissioning phase**	**Low Possibility** **Low Possibility** **Low Possibility** **Low Possibility**	**Low Concern** **Low Concern** **Low Concern** **Low Concern**

APPENDIX N

INVASIVE PLANT SPECIES MANAGEMENT PLAN

APPENDIX O

SOCIAL AND LABOUR PLAN

APPENDIX P

CLOSURE PLAN

APPENDIX Q

FINANCIAL AND TECHNICAL ABILITY

APPENDIX R

EMERGENCY RESPONSE PROCEDURES

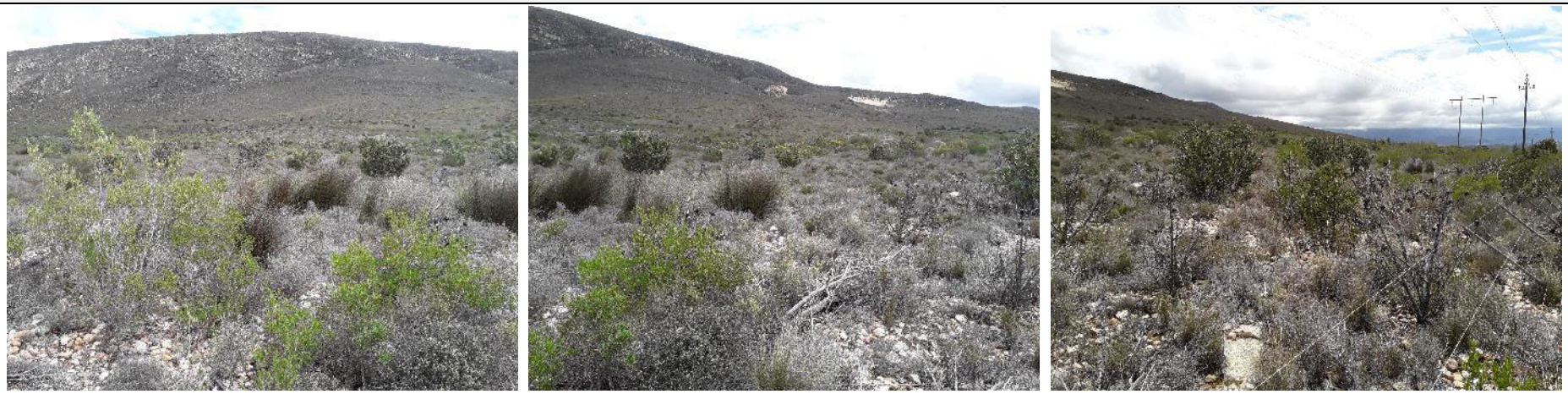
APPENDIX S

STORM WATER MANAGEMENT PLAN

APPENDIX T

PHOTOGRAPHS OF THE EXTENSION AREA

ZANDBERG SAND MINE



SURROUNDING AREA – VIEWED TOWARDS THE NORTH-EAST

SURROUNDING AREA – VIEWED TOWARDS THE NORTH-WEST

ZANDBERG SAND MINE

VIEW OF THE EXISTING SAND MINING AREA

APPENDIX U

CV AND PROOF OF EXPERIENCE OF EAP