mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT

SUBMITTED FOR AN ENVIRONMENTAL AUTHORISATION LODGED IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 0F 1998) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT 28 OF 2002) READ WITH REGULATION 21 OF THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS

NAME OF APPLICANT: IMERYS REFRACTORY MINERALS SOUTH AFRICA (PTY) LTD BUFFELSHOEK MINE

MINING RIGHT NUMBER: LP 166 MR

APPLICATION PROPERTIES: PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

October 2023

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

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ADDENDUM 3: SPECIALIST STUDIES

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Addendum 3D: Aquatic Ecosystem Delineation Report

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Addendum 3F: Storm Water Management Plan

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ADDENDUM 4: PUBLIC PARTICIPATION PROCESS

Addendum 4A: Title deeds: Project properties

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Addendum 4C: Copy and proof of the site notice, and map indicating the location of the site notice

Addendum 4D: Copy and proof of letters sent to I&APs and stakeholders

Addendum 4E: Public meeting attendance register

Addendum 4F: Proof of draft and final ESR sent to I&APs and stakeholders

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ABBREVIATIONS

AEL	Atmospheric Emission Licence
ABA	Acid Base Accounting
AMD	Acid Mine Drainage
BIF	Banded Iron Formation
CA	Competent Authority
CBA	Critical Biodiversity Area
CoC	Contaminants of Concern
CoP	Code of Practice
DALRRD	Department of Agriculture Land Reform and Rural Development
DMRE	Department of Minerals and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environment Assessment Practitioner
EC	Electrical conductivity
ECA	Environmental Conservation Act No 73 of 1989 (as amended)
EIA	Environmental Impact Assessment
EIA/EMP	Environmental Impact Assessment/Environmental Management Programme Report
EIA Regulations	Environmental Impact Assessment Regulations, GN 982 of 2014 i.t.o. the National Environmental Management Act No 107 of 1998
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Programme
EMPs	Environmental Management Plans
ESR	Environmental Scoping Report
e-WULAAS	Electronic Water Use License Application and Authorisation System
FFFARSRA	Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act No 36 of 1947
GA	General authorisations
GDP	Gross Domestic Product
GGP	Gross Geographic Product
GQM	Groundwater Quality Management
HCS	Hazardous chemical substance

HSA	Hazardous Substances Act No 15 of 1973 (as amended)
I&APs	Interested and affected parties
IDP	Integrated Development Plan
IWUL	Integrated Water Use License
IWULA	Integrated Water Use License Application
LED	Local Economic Development
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LIA	Late Iron Age
LoM	Life of Mine
MA	Minerals Act No 50 of 1991
mamsl	Meters above mean sea level
mbgl	Meters below ground level
mbs	Metres below surface
MHSA	Mine Health and Safety Act No 29 of 1996 (as amended)
MPRDA	Mineral and Petroleum Resources Development Act No 28 of 2002 (as amended)
MSA	Middle Stone Age
MSDS	Material safety data sheet
mS/m	Millisiemens/meter
MWP	Mining works programme
NDEA	National Department of Environmental Affairs
NEMA	National Environmental Management Act No 107 of 1998 (as amended)
NEMAQA	National Environmental Management Air Quality Act No 39 of 2004 (as amended)
NEMBA	National Environmental Management Biodiversity Act No 10 of 2004 (as amended)
NEMWA	National Environmental Management Waste Act 59 of 2009 (as amended)
NFA	National Forest Act No 84 of 1998 (as amended)
NHRA	National Heritage Resources Act No 25 of 1999
NVFFA	National Veld and Forest Fire Act No 101 of 1998
NWA	National Water Act No 36 of 1998 (as amended)
PCB	Polychlorinated biphenyl
PES	Present Ecological Score
PPE	Personal Protective Equipment
PPP	Public participation process
REMC	Recommended Ecological Management Class
RE	Remaining Extent
RoD	Record of Decision
RSIP	Rehabilitation Strategy and Implementation Programme
SABS	South African Bureau of Standards
SANAS	South African National Accreditation System
SANBI	South African National Biodiversity Institute
SLP	Social and Labour Plan
SOP	Standard Operating Procedure
SWMP	Stormwater Management Plan

TDS	Total Dissolved Solid
TLM	Thabazimbi Local Municipality
WDM	Waterberg District Municipality

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The objective of the Environmental Impact Assessment (EIA) process is to, through a consultative process—

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

EXECUTIVE SUMMARY

BECS Environmental has been appointed by Imerys Refractory Minerals South Africa (Pty) Ltd (Imerys): Buffelshoek Mine (Buffelshoek) to apply for an environmental authorisation (EA) in terms of the National Environmental Management Act no 107 of 1998 (as amended) (NEMA) for additional activities associated with the current Mining Right. The Department of Mineral Resources and Energy (DMRE) gave acknowledgement of receipt of the application for EA on the 30th of May 2023. Acceptance of the Environmental Scoping Report (ESR) was received on the 6th of July 2023. The application has been assigned the following reference number LP 30/5/1/2/3/2/1 (0166) EM (hereafter LP166EM).

Document Layout

This report has been structured to comply with the information requirements as set out under Appendix 3(3) of the Environmental Impact Assessment Regulations, GN 982 of 2014 (as amended) i.t.o NEMA (EIA Regulations). For ease of reference the checklist in Table 1 has been provided.

Table 1: Checklist in terms of Appendix 3(3) of the EIA Regulations

Requirement	Section
a) Details of – i. The EAP who prepared the report; and ii. The expertise of the EAP, including curriculum vitae;	Part A Section 1.2, Addendum 2A Addendum 2B
b) The location of the activity, including: i. The 21-digit Surveyor General code of each cadastral land parcel; ii. Where available the physical address and farm name; and iii. Where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Part A Section 1.3 Section 1.4
c) A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is – i. A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; ii. On land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Part A Figure 1, Addendum 1A Addendum 1B
d) A description of the scope of the proposed activity, including – i. All listed and specified activities triggered and being applied for; and ii. A description of the associated structures and infrastructure related to the development;	Part A Section 1.5 Section 2.1 Section 2.2
e) A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Part A Section 2.3
f) A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;	Part A Section 3
g) A motivation for the preferred development footprint within the approved site;	Part A Section 4
h) A full description of the process followed to reach the proposed development footprint within the approved site, including: i. Details of the development footprint alternatives considered;	Part A Section 4
ii. Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Part A Section 5
iii. A summary of the issues raised by the interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Part A Section 5.5
iv. The environmental attributes associated with the development footprint alternatives focusing	Part A

Requirement	Section
on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 6
v. The impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts – aa) can be reversed; bb) may cause irreplaceable loss of resources; and cc) can be avoided, managed or mitigated;	Part A Section 7
vi. The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Part A Section 7.1
vii. Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical physical biological, social, economic, heritage and cultural aspects;	Part A Section 7.3.1
ix. The possible mitigation measures that could be applied and the level of residual risk;	Part A Section 7.3.2
x. If no alternative development locations for the activity were investigated, the motivation for not considering such; and	Part A Section 7.3.3
xi. A concluding statement indicating the preferred alternative development location within the approved site;	Part A Section 7.3.4
i) A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including – i. A description of all environmental issues and risks that were identified during the environmental impact assessment process; and ii. An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Part A Section 7.3.5
j) An assessment of each identified potentially significant impact and risk, including – i. Cumulative impacts; ii. The nature, significance and consequence of the impact and risk; iii. The extent and duration of the impact and risk; iv. The probability of the impact and risk occurring; v. The degree to which the impact and risk can be reversed; vi. The degree to which the impact and risk may cause irreplaceable loss of resources; and vii. The degree to which the impact and risk can be mitigated;	Part A Section 7.3.6
k) Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Part A Section 7.4
l) An environmental impact statement which contains – i. A summary of the key findings of the environmental impact assessment; ii. A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and iii. A summary of the positive and negative impacts and risks of the proposed activity and	Part A Section 7.5

Requirement	Section
identified alternatives;	
m) Based on the assessment, and where applicable, 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 authorisation;	Part A Section 8.1
n) The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Part A Section 8.2
o) Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Part A Section 8.3
p) A description of any assumption, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Part A Section 8.4
q) A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Part A Section 8.5
r) Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	Part A Section 8.6
s) An undertaking under oath or affirmation by the EAP in relation to: i. The correctness of the information provided in the reports; ii. The inclusion of comments and inputs from stakeholders and I&APs; iii. The inclusion of inputs and recommendations from the specialist reports where relevant and iv. Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Part B Section 5
t) Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Part A Section 8.8
u) An indication of any deviation from the approved scoping report, including the plan of study, including – i. Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and ii. A motivation for the deviation;	Part A Section 8.9
v) Any specific information that may be required by the competent authority and	Part A Section 8.10 Part B Section 4
w) Any other matters required in terms of section 24(4)(a) and (b) of the Act.	Part A Section 8.11

Specific information required by competent authorities

Please refer to PART B Section 4.1 and 4.2 for correspondence with DMRE and the Limpopo Department of Economic Development, Environment and Tourism (LEDET).

Project description

The proposed activities are as follows:

- Removal /stripping of the topsoil layer,
- Stockpiling of topsoil,
- Extraction of Andalusite ore (excavation activities),
- Loading of Andalusite ore,
- Transporting of Andalusite ore via trucks to Rhino Andalusite Mine Processing Plant,
- Dust suppression on access roads as well as in the pit area,
- Possible construction of additional access roads,
- Use of chemical toilets,
- Use of machinery for mining as well as transporting activities,
- Generation of domestic waste,
- Generation of hazardous waste,
- Sloping of the pit area,
- Deposition of overburden into pit as part of roll-over mining, and
- Re-vegetation of disturbed areas.

Process followed

BECS Environmental has been appointed by Imerys Refractory Minerals South Africa (Pty) Ltd to apply for an environmental authorisation in terms of NEMA for mining related activities at the proposed Buffelshoek Mine. DMRE gave acknowledgement of receipt of the application for EA on the 30th of May 2023. The ESR was distributed electronically on the 21st of April 2023 for comment. The final ESR was submitted as a hard copy on the 23rd of May 2023. DMRE sent an ESR acceptance letter on the 6th of July 2023.

Summary of PPP

The process followed adheres to the NEMA - National guideline on minimum information (20180209-GGN-41432-00086) and the 2012, IEM Guideline Series 7, Public participation, GN 807.

Comments were given on the final ESR by DMRE and LEDET and on the draft EIA by LEDET. Refer to addendum 5 for correspondence with these Competent Authorities. ESKOM and DFFE also gave comments on the application, these comments were responded to.

Summary of impacts

- Geology and the mineral resource
    - The loss of geology due to the mining of andalusite
- Soils
    - Compaction of soils

    - Soil erosion and pollution
- Vegetation
    - Destruction of natural vegetation
    - Removal/Destruction of protected plants and plants of conservation concern
    - Potential increase in invasive vegetation
    - Impact on ecological processes and Critical Biodiversity Areas (CBAs)
    - Bush densification
    - Ecological processes including lowland-highland interface
- Animal life
    - Destruction of sensitive vertebrate habitat
    - Red data mammals and herpetofauna
    - Poaching of wildlife in the vicinity
    - Avifauna
    - Impact on bat population
- Groundwater
    - Groundwater quality
- Surface water
    - Impacts on aquatic ecosystem regulating and supporting services
    - Flooding risk
- Air quality
    - Particulate and exhaust gas emissions impact on human health
    - Dust fall impact on human health
    - Criteria pollutants and dust fall impact on vegetation
- Noise
    - Noise from blasting activities
- Topography and visual aspects
    - Visual impact of pit on the topography and landscape
- Archaeological, historical and cultural aspects
    - Surface and subsurface impact on heritage resources
    - Potential destruction of fossil heritage
- Fly rock
    - This is a potential impact from blasting
- Socio-economic
    - Job creation and the potential increase in social pathologies (including crime or alcoholism)

Refer to Part A Section 7.2 for the full impact assessment including management measures.

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

SECTION 1: INTRODUCTION

1.1 Details of the applicant

General background and current Mining right

Buffelshoek is a proposed open cast mining operation on Portion 4 of the farm Buffelshoek 351 KQ, the Remaining Extent (RE) of the farm Buffelshoek 351 KQ and RE of Portion 1 of the farm Grootfontein 352 KQ. The Mine extracted a bulk sample of Andalusite ore, under a Prospecting Permit. The Mining Right commenced on the 17th of April 2014 and unless cancelled or suspended, will remain in force until the 16th of April 2044. An application for EA was conducted as part of this application and the mine has an Environmental Management Programme (EMP) associated with this. As no activities have commenced since the issuing of the Mining Right, an updated EIA is required to include the listed activities to be undertaken (this application), which will require an EA.

Integrated Water Use Licence Application (IWULA) for Buffelshoek Mine

An Integrated Water Use License (IWUL) is being applied for with the Hartebeespoort regional Department of Water and Sanitation (DWS) as part of the proposed activities.

Refer to Table 2 below for a description of the applicant.

Table 2: Description of the applicant

Project applicant	Imerys Refractory Minerals South Africa (Pty) Ltd
Trading name	Buffelshoek Mine
Contact person	Hendrik Jones
Designation	Operational Director
Telephone number	+27 82 467 4532
E-mail address	hendrik.jones@imerys.com

1.2 Details of the environmental assessment practitioner

BECS Environmental was appointed as an independent consultant and Environmental Assessment Practitioner (EAP) to meet the requirements as set out in regulation 13 of the EIA Regulations. Refer to Table 3 below to a description of the EAP and refer to Addendum 2 for a detailed CV of the EAP, which includes the expertise including qualifications and experience.

Table 3: Description of the EAP

Name of company	BECS Environmental
Postal address	PO Box 72960, Lynnwood Ridge, 0040

Telephone number	012 361 9970
Cell phone number	072 191 6074
Facsimile number	012 361 0645
E-mail address	salome@becsenv.co.za
Name of report reviewer	Salome Beeslaar
Expertise report reviewer	B.Sc Environmental Science (UP[1]), B.Sc Honours Geography (UP), M.Sc Geography (UP) *Memberships:* • SACNASP[2] Professional Scientist (Environmental Science) o Number 400385/14 o Date of registration: 10 September 2014 • Registered EAP[3] (EAPASA[4]) o Number 2020/846 o Date of registration: 11 September 2020 • IAIAsa[5] o Membership number: 5853 Date of registration: 1 March 2018
Name of report author	Christopher Delport
Expertise of report author	B.Sc Environmental Science (UP), B.Sc Honours Environmental Science and Geography (UP) *Memberships:* • SACNASP Candidate Natural Scientist (Environmental Science) o Number 144476 o Date of registration: 3 November 2021 • Candidate EAP (EAPASA) o Number 2022/4844 o Date of registration: 16 February 2023 • IAIAsa o Membership number: 6643 o Date of registration: 1 March 2021

I, Christopher Delport (9507265046081), hereby declare that I have no conflict of interest related to the work of this report. Specially, I declare that I have no business, personal, or financial interests in the property and/or mining right being assessed in this report, and that I have no personal or financial connections to the relevant property owners, or mine. I declare that the opinions expressed in this

[1] University of Pretoria
[2] South African Council for Natural Scientific Professions
[3] Environmental Assessment Practitioner
[4] Environmental Assessment Practitioners Association of South Africa
[5] International Association for Impact Assessment South Africa

report are my own and a true reflection of my professional expertise and that there are no circumstances that may compromise my objectivity in performing such work.

_____

Christopher Delport
BSc Hons– Geography and Environmental Sciences
September 2023

I, Salome Beeslaar (8310190032081), hereby declare that I have no conflict of interest related to the work of this report. Specially, I declare that I have no business, personal, or financial interests in the property and/or mining right being assessed in this report, and that I have no personal or financial connections to the relevant property owners, or mine. I declare that the opinions expressed in this report are my own and a true reflection of my professional expertise and that there are no circumstances that may compromise my objectivity in performing such work.

_____

Salome Beeslaar
M.Sc Geography
September 2023

1.3 Regional setting and location of activity

The mine is in the primary catchment of the Crocodile River and the Quaternary Catchments A24F and A24H. The applicable water management area is the Crocodile (West) and Marico and the responsibility of the Hartebeespoort DWS. The central coordinates of the proposed mine are approximately. S24°40'27.96"; E27°20'37.94".

Buffelshoek Mine is located in the south-western part of the Limpopo Province, approximately 15 km south-west of Thabazimbi and 109 km north of Rustenburg. This area is mainly applied for agriculture, although Platinum and Iron is also mined by neighbouring mines. The site is situated in the Waterberg District Municipality and the Thabazimbi Local Municipality of the Limpopo Province.

1.4 Description of the property

Refer to Table 4 below for a description of the properties. A locality map of the farms is provided below in **Error! Reference source not found.**.

Table 4: Farm names, 21-Digit Surveyor General codes, and coordinates

	The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ	**The Remaining Extent of the farm Buffelshoek 351 KQ**	**Portion 4 of the Farm Buffelshoek 351 KQ**
Title deed number	T11130/2019	T11130/2019	T11130/2019
Property owner	Thabazimbi Iron Ore Mine (Pty) Ltd	Thabazimbi Iron Ore Mine (Pty) Ltd	Thabazimbi Iron Ore Mine (Pty) Ltd
21-digit Surveyor General Code and extent for each farm portion	T0KQ00000000035200001 913.6745 ha	T0KQ00000000035100000 1 859.9250 ha	T0KQ00000000035100004 0.8565 ha
Coordinates	S 24.647998, E 27.330386 S 24.650646, E 27.327850 S 24.652739, E 27.323572 S 24.653135, E 27.324982 S 24.657126, E 27.323348 S 24.658084, E 27.325312 S 24.660692, E 27.323104 S 24.665833, E 27.321874 S 24.668662, E 27.321804 S 24.671065, E 27.317660 S 24.676267, E 27.319425 S 24.680731, E 27.324057 S 24.682712, E 27.321443 S 24.684196, E 27.320625 S 24.687481, E 27.320341 S 24.690124, E 27.322355	S 24.670255, E 27.337106 S 24.701259, E 27.346234 S 24.680002, E 27.398262 S 24.675215, E 27.397333 S 24.669351, E 27.395575 S 24.663499, E 27.396761 S 24.663089, E 27.396130 S 24.665026, E 27.387668 S 24.667395, E 27.386663 S 24.668007, E 27.383421 S 24.665631, E 27.384342 S 24.665705, E 27.377884 S 24.664222, E 27.375529 S 24.660936, E 27.375752 S 24.658457, E 27.377536 S 24.660028, E 27.357162	S 24.665274, E 27.373697 S 24.665999, E 27.373072 S 24.666557, E 27.373819 S 24.665871, E 27.374460

	The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ	The Remaining Extent of the farm Buffelshoek 351 KQ	Portion 4 of the Farm Buffelshoek 351 KQ
	S 24.693120; E 27.321210 S 24.695711, E 27.323428 S 24.699706, E 27.324727 S 24.701278, E 27.345866		

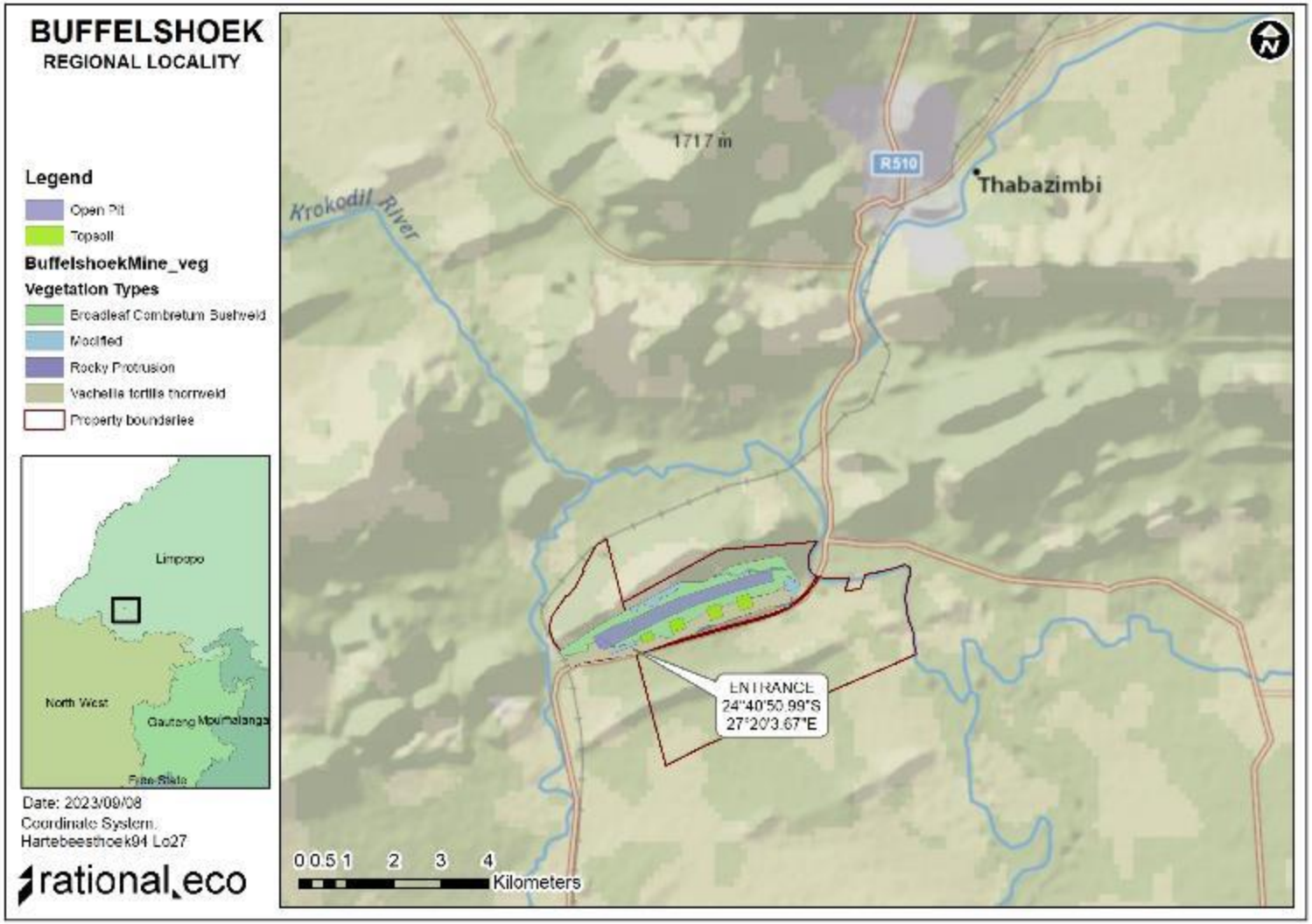

Figure 1: Locality map of Buffelshoek Mine (Rational Environmental, 2023)

1.5 Description of the activities to be undertaken

The proposed activities are as follows:

- Removal /stripping of the topsoil layer,
- Stockpiling of topsoil,
- Extraction of Andalusite ore (excavation activities),
- Loading of Andalusite ore,
- Transporting of Andalusite ore via trucks to Rhino Andalusite Mine Processing Plant,
- Dust suppression on access roads as well as in the pit area,
- Possible construction of additional access roads,
- Use of chemical toilets,
- Use of machinery for mining as well as transporting activities,
- Generation of domestic waste,
- Generation of hazardous waste,
- Sloping of the pit area,
- Deposition of overburden into pit as part of roll-over mining, and
- Re-vegetation of disturbed areas.

The footprint of the open cast mining area to be concurrently rehabilitated via roll-over mining is 294,483 m^2 (29.45 ha) for the first 5 years of mine production, thereafter, the future exploration and mining area will cover 859,090 m^2 (85.91 ha). Roll over mining will continue in an eastern direction within the ore body extension. Vegetation will also be cleared for the topsoil stockpile area as well as the haul road. Refer to the table below for the disturbance footprint of the various activities. The total footprint of the disturbance is 144.63 ha.

Table 5: Disturbance footprint of the various activities

Activity	**Footprint (m^2)**	**Footprint (ha)**
Open-cast roll-over mining area – first 5 years	294,483	29.45
Open-cast roll-over mining area – future exploration and mining	859,090	85.91
Topsoil stockpile	283,793	28.38
Haul road	8,998	0.9
Total	**1,446,310**	**144.63**

SECTION 2: LEGAL REQUIREMENTS

According to Section 24(2) and 24(5) of NEMA:

'The Minister, or an MEC with the concurrence of the Minister, may identify (a) activities which may not commence without environmental authorisation(EA) from the competent authority; (b) geographical areas based on environmental attributes, and as specified in spatial development tools adopted in the prescribed manner by the Minister or MEC, with the concurrence of the Minister, in which specified activities may not commence without EA from the competent authority.

The Minister, or an MEC with the concurrence of the Minister, may make regulations consistent with subsection (4) laying down the procedure to be followed in applying for, the issuing of and monitoring compliance with EAs.'

2.1 Description of the scope of the proposed overall activity

This application is for an EA for mining activities, following an EIA process.

2.2 Listed and specified activities

Refer to Table 6 below for all listed activities applied for tiggering a scoping and EIA process for an EA.

Table 6: All listed activities for this application

Name of Activity	Listed Activity	Applicable Listing Notice
Any process or activity identified in terms of section 53(1) of the National Environmental Management Biodiversity Act No 10 of 2004 (as amended) (NEMBA).	30	GNR 983 (as amended by GN 327 of 2017, and GN 517 of 2021)
The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution, or effluent.	6	GNR 984 (as amended by GN 325 of 2017, and GN 517 of 2021)
The clearance of an area of 20 ha or more of indigenous vegetation.	15	GNR 984 (as amended by GN 325 of 2017, and GN 517 of 2021)
The clearance of an area of 300 m² 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. e. Limpopo ii. Within critical biodiversity areas identified in bioregional plans	12 (e) (ii)	GNR 985 (as amended by GN 324 of 2017, and GN 517 of 2021)

2.3 Policy and legislative context

Applicable legislation and guidelines used to compile the report	Description of 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
Authorisation applications			
MPRDA	According to the MPRDA, Buffelshoek Mine must have a mining right as well as an approved EMP. Due to changes from the Minerals Act no 50 of 1991 (MA) to the MPRDA in 2002, all mining rights had to be converted in 2009 from the old MA to the new MPRDA. Any mining right application submitted after 8 December 2014 must be done in terms of NEMA and not MPRDA.	N/A	The mine obtained a Mining Right on the 17th of April 2014 with the number LP166MR, issued in terms of the MPRDA. The mining right was applied for and approved prior to 8 December 2014, therefore the requirements i.t.o. NEMA pertaining to a new mining right is not applicable.
	Any changes in the mining right, EMP, mining works programme (MWP), or EA, must be authorised through a Section 102 (in terms of the MPRDA) amendment.	N/A	No changes have been necessary.
NEMA and the Environmental Conservation Act 73 of 1989 as amended (ECA)	The first listed activities which required an EA (referred to as a record of decision (RoD) in the past) commenced in 1998. These activities were published in the EIA Regulations of 1998 (GN1183). In 2006, the ECA activities and EIA Regulations were replaced by the first NEMA EIA Regulations. The second set of NEMA EIA activities replaced the first set of NEMA EIA activities in 2010. The third set of NEMA EIA activities commenced on 8 December 2014. According to these listings, a Basic Assessment should be conducted if an activity on Listing Notice 1 or 3 is triggered. If an activity on Listing Notice 2	PART A Section 2.2	As activities are triggered under listing notice 1,2 and 3, a full EIA is required.

Applicable legislation and guidelines used to compile the report	Description of 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
	is triggered, then a full Environmental Impact Assessment (EIA) is required.		
NEMAQA	A list of activities which need an Atmospheric Emission License (AEL) was published in 2010 (GN 248 of 2010 i.t.o. the NEMAQA. This list was updated in 2013 (GN 893 of 2013 i.t.o. NEMAQA). These lists further included compliance timeframes for plant emission standards, whereby new plant had to comply to new plants emission standards on 1 March 2010; existing plants had to comply with existing plant standards on 1 March 2015, and existing plants have to comply with new plants standards on 1 March 2020.	N/A	There are no proposed activities requiring an AEL at this stage.
National Environmental Management: Biodiversity Act No. 10 of 2004 (as amended) (NEMBA)	Chapter 4, Part 2 of NEMBA provides for listing of plant and animal species as threatened or protected. The first list of threatened and protected species published under NEMBA was published in the government gazette on the 23rd of February 200. The most recent amended draft list and regulations was published in March 2015 (Government Gazette No. 38600 of 31 March 2015)	PART A, Section 6.6.7	According to the Terrestrial Vegetation Assessment conducted for the project (Dimela Eco Consulting, 2023: No Threatened or Protected Plant Species (TOPS) was recorded, and none are expected to be present.
	Plant species of conservation concern: Chapter 4, Part 2 of NEMBA also provides for listing of species that are threatened or in need of protection for their long-term survival.	PART A, Section 6.6.7	According to the Terrestrial Vegetation Assessment conducted for the project (Dimela Eco Consulting, 2023: A list of seven (7) plant species of conservation concern for which suitable habitat could be present within the area is given in Appendix C of the

Applicable legislation and guidelines used to compile the report	Description of 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
			specialist report. The site inspection was carried out concurrently to this vegetation assessment with the following results: • Suitable habitat is present for four (4) of the seven (7) species listed in Appendix C. One of these were listed in the screening tool report. • The area classified as "medium"; plant species sensitivity in the screening tool report was historically mined which limits the possibility of the screening tool report species being here, while the site does not include suitable habitat for the other (Appendix C). • One Vulnerable species, and two Data Deficient species have a medium likelihood of being present.
National Water Act No 36 of 1998, (NWA)	Section 21 of the NWA sets out the water uses for which a IWUL is required. These water uses commenced on 1 October 1998, and include permissible water uses (water uses for which no licencing or registration is necessary), general authorisations (GA) (water uses for which registration only is required), and water use licences (water used for which both registration and licencing is required). An existing lawful water use is any water use that commenced 2 years or more prior to the NWA and authorised under the old Act. These water uses are	Addendum 6A	The mine is in the process of applying for an IWULA currently. The water uses will be confirmed as part of consultation with DWS.

Applicable legislation and guidelines used to compile the report	Description of 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
	deemed lawful. In 1999, the GN 704 Regulations i.t.o. NWA were published.		
National Heritage Resources Act no 25 of 1999 (NHRA)	All required permits as per the Act.	PART A Section 6.13.4	A Phase I Archaeological Impact Assessment was conducted for the site (Coetzee, 2023). Some of the areas within the demarcated study area are significant from a heritage perspective. These sites are listed in PART A, Section 6.13.4 below. A full impact assessment has done with mitigation measures in order to prevent any disturbance to the heritage sites. Refer to PART A, Section 7.2 for this. Further, it is not envisaged that any permits will need to be applied for.
Section 15(1) of the National Forest Act No 84 of 1998 (NFA)	No person may cut, disturb, damage or destroy any protected tree; or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except under a licence granted by the Minister.	PART A Section 6.6.7	The Terrestrial Vegetation Assessment conducted for the project Dimela Eco Consulting, 2023), lists the protected trees confirmed to occur on the site. The mine will not engage in any of the activities listed alongside unless a permit for the activity is obtained.
Mining			
Mining plans and surveying: GN 447 of 2011 i.t.o. the Mine Health and Safety Act No 29 of 1996 (as amended) (MHSA)	A competent person must survey the mine. No mining operations may be carried out within a horizontal distance of 100 m from reserve land, buildings,	N/A N/A	A competent surveyor will be appointed to conduct the mine surveying. No mining operations will be carried out within a horizontal

Applicable legislation and guidelines used to compile the report	Description of 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
	roads, railways, dams, waste dumps, or any other structure whatsoever including such structures beyond the mining boundaries, or any surface, which it may be necessary to protect in order to prevent any significant risk, unless a lesser distance has been determined safe by risk assessment and all restrictions and conditions determined in terms of the risk assessment are complied with.		distance of 100 m from any of the infrastructure/structures listed alongside unless it has been determined safe by risk assessment.
Rehabilitation and closure			
Section 24R of NEMA, Appendix 5 of the EIA Regulations, sections 43, 56, 61 of MPRDA	A closure plan must be submitted 5 years before closure to DMRE and the National Department of Environmental Affairs (NDEA). An EMP and rehabilitation plan must be submitted 5 years before commencing with closure to DWS. Closure objectives form part of the draft EMP and must identify the key objectives for mine closure to guide the project design, development, and management of environmental impacts; provide broad future land use objective(s) for the site and provide proposed closure costs. Imerys must ensure that details of rehabilitation of the residue deposit are provided in the EMP.	This EIA/EMP	The Life of Mine (LoM) for Buffelshoek is more than 5 years. The mine is in the process of compiling an annual rehabilitation plan which will include closure objectives as well as rehabilitation of the mine and mine residue. These closure objectives and rehabilitation are included in this EIA/EMP.
Financial provision			
Section 24P of the NEMA, Regulations pertaining to	The EMP must address the requirements as determined in the regulations, pertaining to the financial provision for	PART A Section 8.8	The financial provision calculation in PART A, Section 8.8 below is based on the Buffelshoek Closure Liability Report

Applicable legislation and guidelines used to compile the report	Description of 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
financial provisioning for prospecting, exploration, mining, or production operations (GN 1147 of 2015 i.t.o. NEMA	the rehabilitation. The mine must annually update and review the quantum of the financial provision in consultation with a competent person, as required in terms of the approved EMP, or as requested by the Minister.		2022 (Shangoni Management Services (Pty) Ltd, 2022). The financial provision will be updated for 2023 and submitted to DMRE.

SECTION 3: NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

This section was compiled in accordance with the Guideline on Needs and Desirability in terms of the EIA Regulations (published 20 October 2014).

3.1 Ecological context

This section described how this development (and its separate elements/aspects) impacts on the ecological integrity of the area.

Table 7: Need and Desirability of the proposed project – ecological integrity

Guideline requirement	Comments on requirement
1.1 How were the following ecological integrity considerations taken into account?	
1.1.1 Threatened Ecosystems,	The proposed site falls within CBA 1. These areas are required to meet the region's biodiversity targets and need to be maintained in a natural condition to safeguard identified biodiversity features. The following is extracted from the project description of the flora study (Dimela Eco Consulting, 2023): According to the 2022 Revised National List of Threatened Ecosystems, the Waterberg Mountain Bushveld and the Dwaalboom Thornveld are classified as Least Concern. The project area is not situated within a listed ecosystem. The Waterberg Mountain Bushveld has experienced low rates of natural habitat loss and biotic disruptions, placing this ecosystem at low risk of collapse (Skowno *et al*, 2019). The remaining extent of this ecosystem is about 93%, with 16.5% in protected area. Dwaalboom Thornveld has experienced low rates of natural habitat loss and biotic disruptions, placing this ecosystem at low risk of collapse. About 79% of the Dwaalboom Thornveld is still intact, with 15.2% within protected areas. The aquatic ecosystem delineation, and fauna and flora assessments investigate the impact on the ecological integrity of the area and put forward
1.1.2 Sensitive, vulnerable, highly dynamic, or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure,	
1.1.3 CBAs and Ecological Support Areas (ESAs),	
1.1.4 Conservation targets,	
1.1.5 Ecological drivers of the ecosystem,	
1.1.6 Environmental Management Framework,	
1.1.7 Spatial Development Framework, and	
1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	

Guideline requirement	Comments on requirement
	management measures.
1.2 How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	A risk assessment methodology will be used to assess the impact that the development has on the region to ensure that the development does not cause significant alteration to the surrounding environment. Refer to Part A, Section 7.2 below for the impact assessment.
1.3 How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	
1.4 What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	Roll-over mining will be implemented for the purpose of concurrent rehabilitation of the land. There will be no waste due to processing of the mineral, as this is done off-site. The mine is developing a waste procedure for non-mining waste.
1.5 How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	A Phase I Archaeological Impact Assessment was conducted for the site (Coetzee, 2023). Some of the areas within the demarcated study area are significant from a heritage perspective. These sites are listed in PART A, Section 6.13 below. A full impact assessment has done with mitigation measures in order to prevent any disturbance to the heritage sites. Refer to PART A, section 7.2.10 for this. Further, it is not envisaged that any permits will need to be applied for as the mine does not intend to demolish any heritage sites.
1.6 How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be	Non-renewable resources include: Earth minerals; fossil fuels, nuclear fuels; land surface; and soil. No additional earth minerals will be extracted other than andalusite. Roll over mining and concurrent rehabilitation will be conducted to ensure that

Guideline requirement	Comments on requirement
avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	negative impacts are minimised. Fossil fuel energy will be used during mining and transportation of the mined materials.
1.7 How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	Roll-over mining will aid in rehabilitation of the land surface, thus mitigating the impact on surface topography. Renewable resources include: Water; fauna and flora; and air. The use of water resources on the mine will be monitored, and the mine intends to engage in water conservation and employ emerging technologies to reduce water consumption.
1.7.1 Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (Note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)	Concurrent rehabilitation will take place, which will allow revegetation which will, in turn increase animal presence on site. Dust suppression will take place on haul roads to minimise the impact on air quality.
1.7.2 Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)	
1.7.3 Do the proposed location, type and scale of development promote a reduced dependency on resources?	
1.8 How were a risk-averse and cautious approach applied in terms of ecological impacts?	Ecological components include: Land including soil; water (surface- and groundwater); air; micro-organisms; vegetation; and animal life.
1.8.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be	Refer to Part A, Section 7 for the impact assessment, and Part A, Section 8.4 for a

Guideline requirement	Comments on requirement
clearly stated)?	description of any assumptions, uncertainties, and gaps in knowledge.
1.8.2 What is the level of risk associated with the limits of current knowledge?	
1.8.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	All risks identified are evaluated and appropriate mitigation measures and a risk-averse cautious approach will be followed.
1.9 How will the ecological impacts resulting from this development impact on people's environmental right in terms following	Refer to impact assessment for a comprehensive analysis of all potential impacts.
1.9.1 Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Impact identification and prediction includes a stepwise procedure to identify the direct, indirect and cumulative impacts (relating to both positive and negative impacts) for which a proposed activity and its alternatives will have on the environment as well as the community.
1.9.2 Positive impacts: e.g. improved access to resources, improved amenity, improved air, or water quality, etc. What measures were taken to enhance positive impacts?	This is undertaken by determining the sensitivity of sites and locations as well as the risk of impact of the proposed activity.
1.10 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 (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	Refer to Section 6 for a complete description of these environmental attributes. Sources of data to be used for gathering data on the environmental attributes as well as the impacts include; monitoring / sampling data collected and stored, assumptions and actual measurements, published data available from the departments or other stakeholders in the area as well as specialist studies. Likely impacts are described qualitatively and then studied separately in detail. This provides consistent and systematic basis for the comparison and application of judgements.
1.11 Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	Ecological integrity: The ability of an ecological system to support and maintain a community of organisms that has species composition, diversity, and functional organisation comparable to those of natural habitats within a region. Although some operational impacts can be mitigated, the destruction of good condition vegetation in the open cast footprint cannot be mitigated. The main

Guideline requirement	Comments on requirement
	mitigation measure to consider is to ensure that open, naturally vegetated areas remain through the cleared areas as ecological corridors, while clustering the mining activities areas as far as possible. This could assist the movement of pollinators and the continuation of ecological processes.
1.12 Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	The final decommissioning and rehabilitation will be aimed at an end land use that is sustainable to a post-mining environment. This has been identified as grazing and game farming.
1.13 Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope, and nature of the project in relation to its location and existing and other planned developments in the area?	Refer to the cumulative impact assessment.

3.2 Socio-economic context

This section described how this development (and its separate elements/aspects) impacts on the socio-economic context of the area.

Table 8: Need and Desirability of the proposed project – socio-economic aspects

Guideline requirement	Comments on requirement
2.1 What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	Refer to PART A, Section 6.15 for the socio-economic context of the area.
2.1.1 The Integrated Development Plan (IDP) (and its sector plans' vision, objectives, strategies, indicators, and targets) and any other strategic plans, frameworks of policies applicable to the area,	Two of the municipal strategic objectives of TLM under spatial development and Local Economic Development (LED) are: To ensure sustainable spatial development and; To create conducive environment for sustainable local economic development. (Thabazimbi Local Municipality Integrated Development Plan, 2022/23)
2.1.2 Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	
2.1.3 Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and	
2.1.4 Municipal Local Economic Development Strategy	

Guideline requirement	Comments on requirement
(LED Strategy).	
2.2 Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	
2.2.1 Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	Rhino Andalusite Mine (RAM) Social and Labour Plan (2024-2028): Imerys Refractory Minerals South Africa (Pty) Ltd is committed to skills development through a focus on education, training and development. The training and development system is geared to facilitating a general increase in the skill levels of all employees. In order to identify employees' skill needs and implement a skills development plan, employees are assessed by accredited and registered assessors. Skills Development Plan includes, Portable Skills Plan, Bursary Plan, Learnership Plan, Internship Plan, Career Progression Plan, Mentorship Plan, Core Mining Skills training, Black Persons in Management and Women in Mining Plan. The proposed mine is located adjacent to the existing RAM. For this reason, the placement of the development will allow for new staff from the local area to take transport with staff that go to RAM. The mine is optimising the use of existing infrastructure by conducting processing at the already established RAM. This development also discourages urban sprawl as it is near an existing mine that staff already travel to and the mine is located approximately 15 km southwest of Thabazimbi. This prevents development very far away from central Thabazimbi.
2.3 How will this development address the specific physical, psychological, developmental, cultural, and social needs and interests of the relevant communities?	
2.4 Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	
2.5. In terms of location, describe how the placement of the proposed development will: 2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other, 2.5.2. reduce the need for transport of people and goods, 2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport), 2.5.4. compliment other uses in the area, 2.5.5. be in line with the planning for the area, 2.5.6. for urban related development, make use of underutilised land available with the urban edge, 2.5.7. optimise the use of existing resources and infrastructure, 2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement), 2.5.9. discourage "urban sprawl" and contribute to compaction/densification, 2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of	

Guideline requirement	Comments on requirement
current needs, 2.5.11. encourage environmentally sustainable land development practices and processes, 2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.), 2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential), 2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and 2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	
2.6 How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	
2.6.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	In order to balance the socio-economic aspect, jobs are created for the mining operation, including the rehabilitation phase. Ensuring that local individuals are employed as far as possible, and ensuring that all impacts of the development are minimised will ensure a risk-adverse and cautious approach in terms of socio-economic impacts.
2.6.2 What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability, and sustainability) associated with the limits of current knowledge?	
2.6.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	An impact assessment was done based on the type of activity and its footprint. Refer to PART A, Section 7.2 for this impact assessment.
2.7 How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1 Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	This project is not expected to affect these aspects.
2.7.2 Positive impacts. What measures were taken to enhance positive impacts?	Health awareness is done from time to time in the form of monthly talk topics, and every so often health practitioners are called to the site to engage with the employees.
2.8 Considering the linkages and dependencies	The consultation process will involve

Guideline requirement	Comments on requirement
between human wellbeing, livelihoods, and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	communication with the landowner and other stakeholders and all activities are planned, taking environmental parameters into account.
2.9 What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	Refer to the impact assessment in PART A, Section 7 which includes the environmental objective to be achieved, the phase applicable to the management measure, management tools, management timeframe and schedule, monitoring programmes, responsibilities for implementation and long-term maintenance, financial provision for long-term maintenance and/or environmental costs and the mitigation hierarchy.
2.10 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 (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	
2.11 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?	
2.12 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?	
2.13 What measures were taken to:	
2.13.1 ensure the participation of all I&APs,	The process followed adheres to the National Environmental Management Act 107-1998 - National guideline on minimum information (20180209-GGN-41432-00086) and the 2012, IEM Guideline Series 7, Public participation, GN 807. Below is a summary of the announcement. Formal announcement of the project: The notices as mentioned below include all requirements as per the EIA Regulations.
2.13.2 provide all people with an opportunity to develop the understanding, skills, and capacity necessary for achieving equitable and effective participation,	
2.13.3 ensure participation by vulnerable and disadvantaged persons	
2.13.4 promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate	

Guideline requirement	Comments on requirement
means	
2.13.5 ensure openness and transparency, and access to information in terms of the process	Advertisement: An advertisement was placed in 'Platinum Bushvelder' on the 20th of April 2023. Refer to Addendum 4B for a copy and proof of this advertisement. Site notice: A site notice was placed at the proposed site on the 20th of April 2023. Refer to Addendum 4C for a copy and proof of the site notice as well as a map indicating the location of the site notice. Letters: Letters were sent to all stakeholders as well as landowners on the 20th of April 2023. Refer to Addendum 4D for a copy and proof of these letters sent. Public meeting: A key stakeholder engagement meeting was held on 18 May 2023 at Rhino Andalusite Mine. Refer to Addendum 4E for the attendance register. The draft scoping report was sent out for 30 days of comment. DMRE received three hard copies of the final ESR on the 23rd of May 2023. Hard copies of the final ESR were also sent to LEDET, DWS and the Department of Agriculture, Land Reform and Rural Development (DALRRD). Refer to Addendum 4F for proof of the draft and final ESR being sent. This EIA is simultaneously sent to DMRE, the registered I&APs and stakeholders. Any issues raised have been included in this final EIA/EMP for submission to DMRE. All registered I&APs were given the opportunity to comment on the EIA.
2.13.6 ensure that the interests, needs and values of all I&APs were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and	
2.13.7 ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted	
2.14 Considering the interests, needs and values of all the I&APs, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	
2.15 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,	All contractors, sub-contractors and workers will attend compulsory environmental awareness training and inductions. This training will highlight the dangers associated with the workplace.

Guideline requirement	Comments on requirement
and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Procedures relating to environmental risks will also be put in place and will be regularly updated.
2.16 Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1 the number of temporary versus permanent jobs that will be created,	The mine will embark on a detailed skills development process and the skills development plan will include individual skills development of employees and the evaluation of training and development needs of the geographical area will also be considered.
2.16.2 whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	
2.16.3 the distance from where labourers will have to travel,	
2.16.4 the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and	
2.16.5 the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	
2.17 What measures were taken to ensure:	
2.17.1 that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and	A summary of various legislation is included in PART A, Section 2.3 of this report. All organs of state will receive this EIA/EMP for review. Any comments from them will be incorporated into the final EIA/EMP as well as the final decision.
2.17.2 that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	
2.18 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?	
2.19 Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Refer to impact assessment mitigation measures.
2.20 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 damage or adverse health effects will be paid for by those responsible for harming the environment?	There are provisions made to ensure that environmental pollution does not occur, furthermore there is a financial provision in place for the mine which is updated annually to plan for all required environmental rehabilitation.
2.21 Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how	There is no alternative to this project and the placement of the site was done considering all

Guideline requirement	Comments on requirement
the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	environmental attributes.
2.22 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?	Refer to the cumulative impact assessment.

SECTION 4: ALTERNATIVES

4.1 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

There is no alternative to the proposed roll-over mining project, with the proposed site layout plan. This site layout has been chosen as it factors in the various environmental sensitivities of the target site and the buffer zones as recommended by the specialist reports. The final decommissioning and rehabilitation will be discussed with the landowner and stakeholders. Furthermore, all activities are planned with the aid of specialists.

4.2 Details of the development footprint alternatives considered

No development footprint alternatives are considered. The proposed site layout has been chosen as it factors in the various environmental sensitivities of the target site as identified by the specialist and ensures that the recommended buffer zones are adhered to, to ensure the least possible environmental impact.

The following definition of "alternatives" is given in the EIA Regulations: *"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the -*

(a) property on which or location where the activity is proposed to be undertaken;

(b) type of activity to be undertaken;

(c) design or layout of the activity;

(d) technology to be used in the activity; or

(e) operational aspects of the activity; and

(f) includes the option of not implementing the activity;"

Please note the term preferred alternative is the preferred activity whereby the second alternative is the alternative to the preferred alternative.

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

As above, no alternatives are applied for.

4.2.2 The type of activity to be undertaken

As above, no alternatives are applied for.

4.2.3 The design or layout of the activity

As above, no alternatives are applied for.

4.2.4 The technology to be used in the activity

As above, no alternatives are applied for.

4.2.5 The operational aspects of the activity

As above, no alternatives are applied for.

4.2.6 The option of not implementing the activity

The “no-go” option for implementing the activity has been considered. This option is not promoted as the mine is in the possession of a mining right over the proposed area. Further, considering the overall impacts of this project, the benefits are considered to outweigh the “no-go” option due to job creation (57 individuals will be employed for the mining team, the majority of which will be from the local community), and contribution to the GDP of South Africa. Due to the fact that the site layout was chosen based on the least possible environmental impact and the fact that the mine commits itself to rehabilitation of the land concurrently and post-mining, the option of not implementing the activity was not further pursued.

SECTION 5: DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

According to the Publication of Participation Guideline (NEMA), an I&AP is:
"(a) any person, group or persons or organisations interested in or affected by an activity, and (b) any organ of state that may have jurisdiction over any aspect of the activity".

This definition is more detailed in the Guideline for consultation with communities and I&APs (MPRDA):
"Interested and affected' parties include, but are not limited to; (i) Host Communities, (ii) Landowners (Traditional and Title Deed owners), (iii) Traditional Authority, (iv) Land Claimants, (v) Lawful land occupier, (vi) The Department of Land Affairs, (vii) Any other person (including on adjacent and non-adjacent properties) whose socio-economic conditions may be directly affected by the proposed prospecting or mining operation (viii) The Local Municipality, (ix) The relevant Government Departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project."

The process followed adheres to the National Environmental Management Act 107-1998 - National guideline on minimum information (20180209-GGN-41432-00086) and the 2012, IEM Guideline Series 7, Public participation, GN 807.

5.1 Identification of interested and affected parties

Refer to Table 9 below for all I&APs and stakeholders identified. All of these I&APs and stakeholders were in fact consulted. Refer to Addendum 4D for a copy and proof of letters sent to all stakeholders and I&APs and Addendum 4F for proof of the draft and final ESR having been sent to I&APs and stakeholders. Refer to Addendum 4G for proof of the draft EIA being sent out and Addendum 4H for comments received and responses. Refer to Addendum 4I for the complete stakeholder database.

Table 9: I&APs and stakeholders identified

Interested and Affected Parties	Date comments received & issues raised	EAPs response to issues as mandated by the applicant	Section reference in this EIA where issues and or response were incorporated
Affected parties			
Landowner/s			
Thabazimbi Iron Ore Mine (Pty) Ltd	None	N/A	N/A
Lawful occupier/s of the land			
Istores Primary School	None	N/A	N/A
Landowners or lawful occupiers on adjacent properties			
Thabazimbi Iron Ore Mine (Pty) Ltd	None	N/A	N/A
Imerys Refractory Minerals South Africa (Pty) Ltd	None	N/A	N/A
Alfafa trust	None	N/A	N/A
Sandrivier familie trust	None	N/A	N/A
Combo braai CC	None	N/A	N/A
J M De Villiers trust	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A

Interested and Affected Parties	Date comments received & issues raised	EAPs response to issues as mandated by the applicant	Section reference in this EIA where issues and or response were incorporated
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
Thabazimbi Local Municipality Ward 3			
Municipal councillor	None	N/A	N/A
Thabazimbi Local Municipality Ward 6			
Municipal councillor	None	N/A	N/A
Thabazimbi Local Municipality			
Municipal manager	None	N/A	N/A
Waterberg District Municipality			
Municipal manager	None	N/A	N/A
Organs of state			
DWS Hartebeespoort	None	N/A	N/A

Interested and Affected Parties	Date comments received & issues raised	EAPs response to issues as mandated by the applicant	Section reference in this EIA where issues and or response were incorporated
DWS National	None	N/A	N/A
Department of Agriculture Land Reform and Rural Development			
	None	N/A	N/A
Traditional Leaders			
None identified as of yet	None	N/A	N/A
Roads Agency Limpopo			
	None	N/A	N/A
Limpopo Economic Development, Environment and Tourism			
	19 June 2023 – LEDET sent a letter with comments on the ESR for the attention of the EAP.	5 July 2023 – The EAP sent a response letter addressing the points raised.	Addendum 5C
	16 October 2023 - LEDET sent a letter with comments on the draft EIA for the attention of the EAP.	17 October 2023 – The EAP sent a response letter addressing the points raised.	Addendum 5C
Other Competent Authorities affected			
SAHRA	None	N/A	N/A
LIHRA	None	N/A	N/A
DFFE	12 October 2023 – DFFE sent a letter with comments on the proposed project regarding protected trees for the attention of the EAP.	16 October 2023 - The EAP sent a response letter addressing the points raised.	Addendum 5D
DAFF	None	N/A	N/A
DARD Limpopo	None	N/A	N/A
Other affected parties			

Interested and Affected Parties	Date comments received & issues raised	EAPs response to issues as mandated by the applicant	Section reference in this EIA where issues and or response were incorporated
Historical disadvantaged communities			
None identified as of yet	None	N/A	N/A
Land claimants			
None identified	None	N/A	N/A
Eskom			
Eskom Land & Rights Negotiator	24 April 2023 - Eskom Land & Rights Negotiator a requested cover letter and locality map including coordinates.	24 April 2023 – The EAP sent the requested documentation and asked to be informed whether additional information was required.	Addendum 4H
Eskom Land & Rights Negotiator	25 April 2023 – Comments were sent to the EAP indicating that Eskom Distribution services are present on the target site and that Eskom has no objection to the development provided that the listed conditions are adhered to.	22 May 2023 – The EAP sent a response letter acknowledging that the listed conditions will be adhered to.	Addendum 4H
Eskom	02 May 2023 - Comments were sent to the EAP indicating that Eskom is affected by the proposed development, however Eskom Distribution has no objection to the proposed application, provided that the conditions in the letter are complied with.	22 May 2023 – The EAP sent a response letter acknowledging that the listed conditions will be complied with. 24 May 2023 – The EAP sent an email requesting the KML files of the powerlines that occur on the properties.	Addendum 4H
Eskom	08 August 2023 – Eskom sent the KML files that were requested.	10 August 2023 – The EAP requested the KML files for the transmission network and;	Addendum 4H

Interested and Affected Parties	Date comments received & issues raised	EAPs response to issues as mandated by the applicant	Section reference in this EIA where issues and or response were incorporated
		11 August 2023 – The EAP requested the specific details of the servitude(s) found on the site.	
Eskom	11 August 2023 - ESKOM sent the requested information and indicated that the network is the Thabazimbi Rural Grootkuil 22 kV powerline, specifically the TG42 T Off.	11 August 2023 - The EAP contacted Eskom telephonically to confirm that the information received will be included in the environmental sensitivity plan and that the powerline will not be impacted by the proposed development.	Addendum 4H Addendum 1C
Registered Interested and Affected Parties			
Portion 17 of the farm Wachteenbietjesdraai 350 KQ	6 January 2023 – "Goeie naand Chris, ek J.P vd Merwe is die eienaar van ged 17 van die plaas Wachteenbietjiesdraai 350 kq. Ek maak ten sterkste beswaar teen die prospekteer vir Andolosiet op my gedeelte. By vootbaat dankie. J P vd Merwe. 6Jan 2023" 8 January 2023 – "Skuus my e pos is janplaas1@gmail.com" **Translation:**	9 January 2023 – Good morning sir, My apologies for the delayed response. Thank you very much for your what'sapp. It is duly noted. Thank you for your contact details as well. Kind regards	This table.

Interested and Affected Parties	Date comments received & issues raised	EAPs response to issues as mandated by the applicant	Section reference in this EIA where issues and or response were incorporated
	6 January 2023 – "Good evening Chris, I J.P vd Merwe am the owner of portion 17 of the farm Wachteenbietjiesdraai 350 kq. I strongly object to prospecting for Andalusite on my portion. Thanks in advance. J P vd Merwe. 6Jan 2023" 8 January 2023 – "Sorry, my e-mail is janplaas1@gmail.com"		
Portion 32 of the farm Wachteenbietjesdraai 350 KQ	8 January 2023 – "Goeie naand Chris. Ek is Suzet Burger. Vruggebruiker op Wachteenbietjesdraai nr 32. Ek teken as geaffekteerde inwoner beswaar aan teen die voorgenome prospekteer aksie op die aangrensende geteeltes van die plaas Wachteenbietjesdraai. Ek versoek derhalwe dat my beswaar aangeteken sal word en dat ek op hoogte gehou sal word van verwikkelinge. Baie dankie. Mooiloop"	9 January 2023 – "Good morning, Thank you. You will be registered as an interested and affected party. Kindly provide your email address for future correspondence. Kind regards"	This table.

Interested and Affected Parties	Date comments received & issues raised	EAPs response to issues as mandated by the applicant	Section reference in this EIA where issues and or response were incorporated
	Translation: 8 January 2023 – "Good evening Chris. I am Suzet Burger. Usufructuary on Wachteenbietjesdraai no 32. As an affected resident, I object to the proposed prospecting action on the adjacent portions of the farm Wachteenbietjesdraai. I therefore request that my objection be recorded and that I be kept informed of developments. Thank you very much."		
Portion 32 of the farm Wachteenbietjesdraai 350 KQ	9 January 2023 – "Good morning. Thank you for your reply. My email address is: suzetburger@gmail.com Thank you Blessings"	N/A	This table.
Portion 18	11 January 2023 – The EAP received a phone call from a	The EAP registered the party and informed the party that	This table.

Interested and Affected Parties	Date comments received & issues raised	EAPs response to issues as mandated by the applicant	Section reference in this EIA where issues and or response were incorporated
Wachteenbietjesdraai 350 KQ	person that resides on Portion 18 Wachteenbietjesdraai 350 KQ asking to be added as a registered I&AP. The email address was given to the EAP.	they would receive future reports and correspondence.	
JAVAVU Game farm and Lodge	21 April 2023 – The party indicated concern about water levels in boreholes and noise impact as the party is in the Eco-tourism business.	3 May 2023 - The EAP registered the party and informed the party that that groundwater abstraction is not part of the scope of the IWULA which the mine will be applying for and that the EIA report will include an impact assessment and mitigation measures that will be incorporated to ensure that noise impacts are minimised.	Addendum 4H
Grootfontein Private Game Reserve	25 April 2023 – The party requested to be added as an I&AP. Two email addresses were given to the EAP.	19 May 2023 - The EAP registered the party and took down the email addresses.	Addendum 4H
Grootfontein Private Game Reserve	2 May 2023 - The party requested to have two individuals added as I&APs. It was stated that the Game Reserve has been offering hunting, tourism and accommodation for decades and that the party feels it would be detrimental if mining is carried out on an adjacent farm with possible impact on the water table. The party then enquired about the time of the public meeting scheduled for 18 May 2023.	10 May 2023 - The EAP registered the party and informed them that the meeting would take place at 9 A.M. on the 18th of May. The EAP then stated that the party's farm is located behind the Iron formation mountains within the Dolomite Geological terrain approximately 3.5 km straight line distance. The EAP included that the proposed activities will not intersect the potential aquifer and that historical quarries 1 - 3 are located closer to the party's property than any of the Buffelshoek future operations. Lastly, the EAP stated that there has been no impact from these quarries in the past and	Addendum 4H

Interested and Affected Parties	Date comments received & issues raised	EAPs response to issues as mandated by the applicant	Section reference in this EIA where issues and or response were incorporated
		that previous Geohydrological Reports state that no significant groundwater level impacts are expected.	
	10 May 2023 - The party asked to confirm the location of the proposed project.	12 May 2023 - The EAP sent the coordinates and a link to the location of the proposed project.	Addendum 4H
	12 May 2023 – Both individuals indicated that they are out of town on the 18th, and asked that the minutes of the meeting be sent to them.	12 May 2023 – The EAP stated that the minutes would be sent to the individuals. 26 May 2023 – The EAP compiled a short memo on the buffelshoek project public meeting which was sent to the parties as there were no attendees at the meeting.	Addendum 4H

*NOTE: In accordance with the Protection of Personal Information Act (Act No. 4 of 2013) personal details are blanked out.

5.2 Formal announcement of the project

The notices as mentioned below include all requirements as per the EIA Regulations.

5.2.1 Advertisement

An advertisement was placed in 'Platinum Bushvelder' on the 20th of April 2023. Refer to Addendum 4B for a copy and proof of this advertisement.

5.2.2 Site notice

A site notice was placed at the proposed site on the 20th of April 2023. Refer to Addendum 4C for a copy and proof of the site notice as well as a map indicating the location of the site notice.

5.2.3 Letters

Letters were sent to all stakeholders as well as landowners on the 20th of April 2023. Refer to Addendum 4D for a copy and proof of these letters sent.

5.2.4 Public meeting

A public engagement meeting was held on 18 May 2023 at Rhino Andalusite Mine. Two registered I&APs indicated interest in attending the meeting, but could not attend due to other commitments. There were no attendees for the meeting. Refer to Addendum 4E for the attendance register.

5.3 Environmental scoping report and environmental impact assessment report & environmental management programme

The draft scoping report was sent to LEDET, DWS Hartebeespoort and DALRRD, District and Local Municipality for 30 days of comment. All registered I&APs and stakeholders also received an electronic copy. DMRE received three hard copies of the final ESR on the 23rd of May 2023. Hard copies of the final ESR were also sent to LEDET, DWS and DALRRD. Refer to Addendum 4F for proof of the draft and final ESR being sent. All registered I&APs and stakeholders received an electronic copy of the draft EIA on the 15th of September 2023, and hard copies were sent to LEDET, DWS and DALRRD as well.

All comments are included in Part A, Section 5.5.

5.4 Decision making announcement to stakeholders and interested and affected parties

To be provided once received.

5.5 Summary of issues raised by interested and affected parties

Eskom has indicated that there is distribution infrastructure on the proposed project area and that there is no obligation to the development provided that the mine complies with the conditions listed in the letters sent to the EAP. The powerlines have been indicated on the Environmental Sensitivity Map (Addendum 1C), and the proposed development will not impact on these powerlines. Nearby I&APs, Grootfontetin Private Game Reserve and JAVAVU Game Farm and Lodge, have indicated concern regarding noise impacts and groundwater levels. Three individuals have been registered as interested and affected parties. Two of the individuals are opposed to prospecting activities taking place on their properties and the other requested to be included in future communication. The comments and responses are incorporated in Table 9 above.

It must be noted that there are old powerlines which are not in use on the proposed future prospecting and mining area. These are the property of Thabazimbi Iron Ore Mine Pty Ltd. The client is aware of this and the parties will be engaging with each other internally regarding the next steps.

Comments were given on the final ESR by DMRE and LEDET and on the draft EIA by LEDET. Refer to Addendum 5 for correspondence with these Competent Authorities.

SECTION 6: THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITES – BASELINE ENVIRONMENT

Refer to Addendum 3 for the full report of specialist studies that were conducted for the development.

6.1 Geology

Information for this section was extracted from the Geohydrological Study and Impact Assessment (Shangoni AquiScience, 2023).

6.1.1 Regional geology

The figure below represents the geology of the area.

The area is underlain by a succession of steeply dipping shales and sandstones and quartzite of the Timeball Hill Formation (Pretoria Group) of the Transvaal Sequence. The Timeball Hill shales and sandstones are bounded to the south by the mafic rocks of the Marginal Zone of the Bushveld Complex. The Andalusite ore body is developed along strike within the alumina-rich shale band developed at the base of the banded ironstone ridge.

A number of north-west striking faults are located in immediate vicinity of the study area while north-south dolerite dyke strikes across the study and mineral resource area.

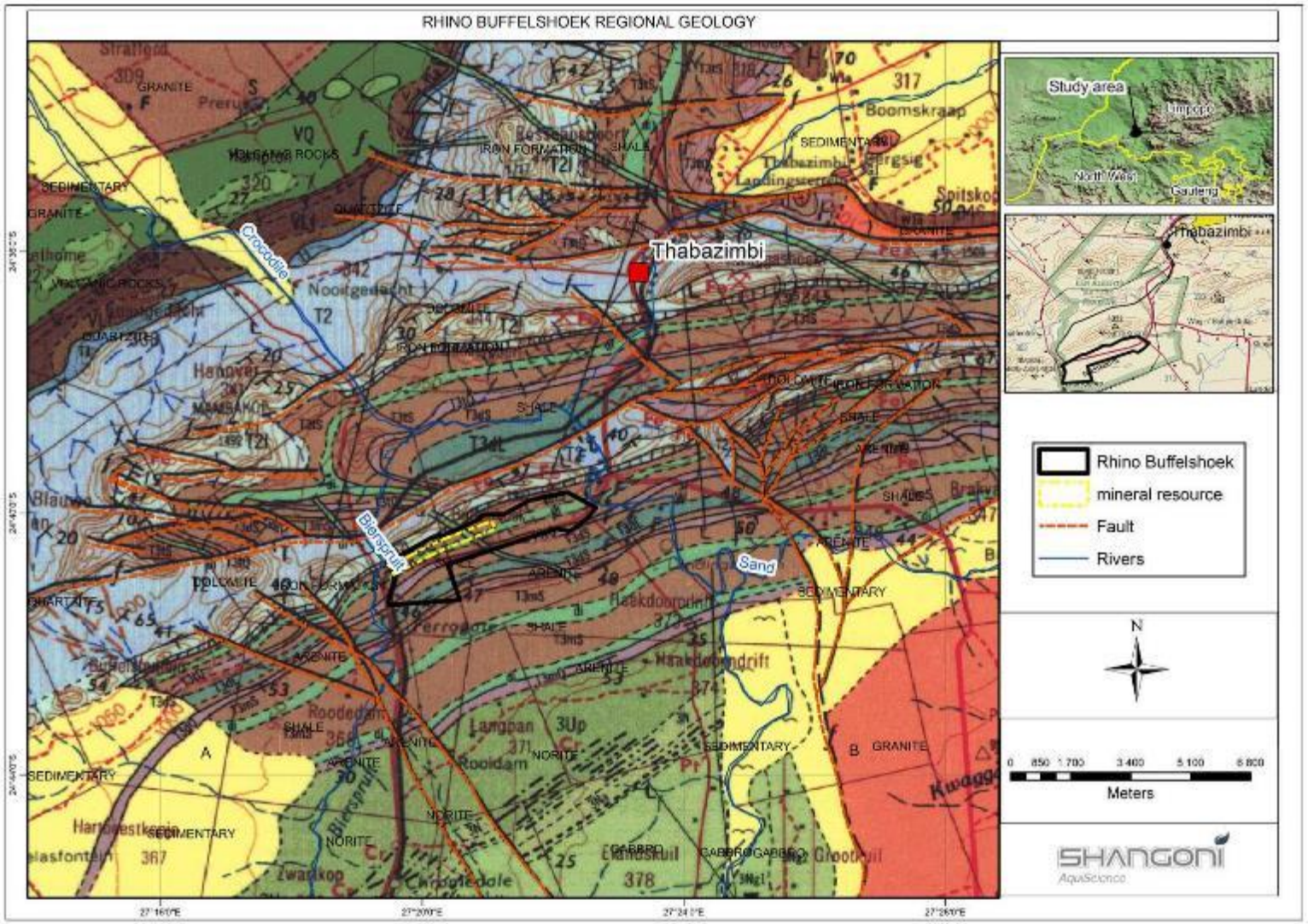

Figure 2: Regional geology (Shangoni AquiScience, 2023)

6.1.2 Local geology

The andalusite bearing hornfels occurs within the shales of the Timeball Hill Formation. The boundary between the ore body and the foot wall is gradational and therefore gradually changes from mineralised material to barren over several meters.

The specific geological formation is the andalusite bearing Timeball Hill Formation composed of shales/hornfels of the Pretoria Group, steeply dipping towards the south. It is underlain by a banded iron formation (BIF) and the dolomites of the Malmani Formation to the north.

Elevations of the orebody measured during a test pit excavation is displayed in Figure 3.

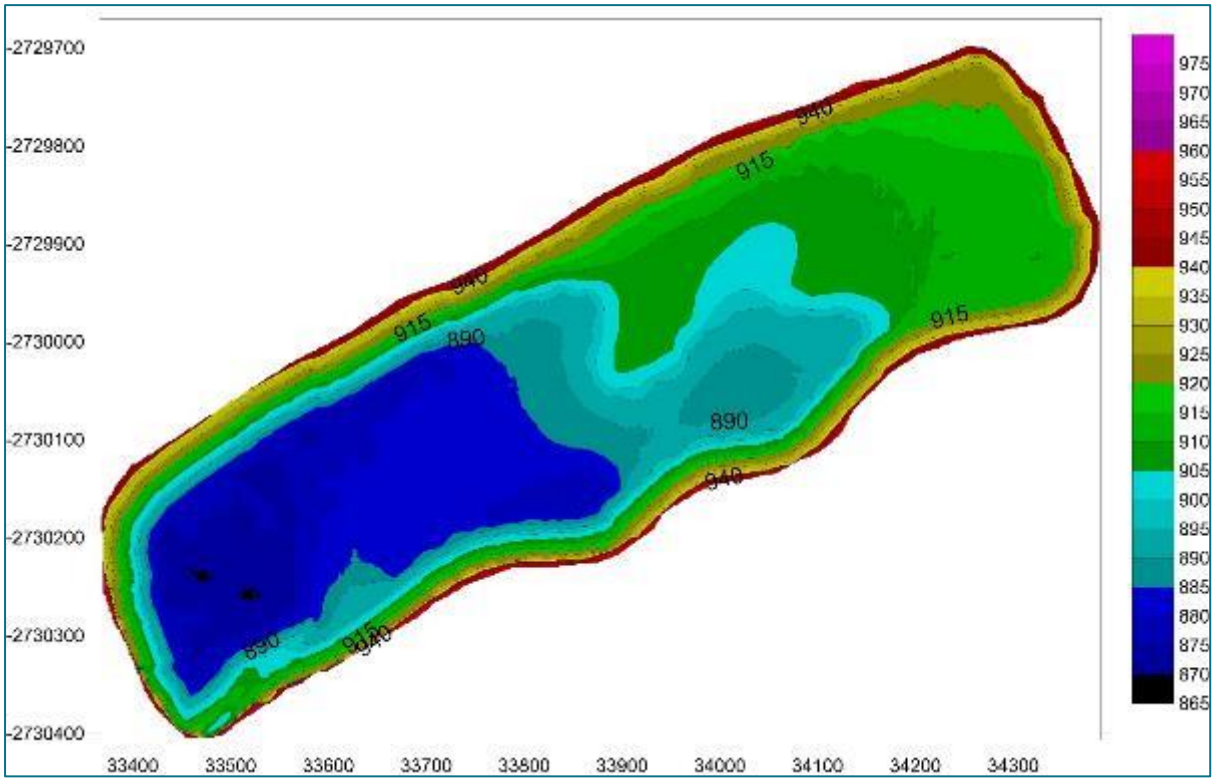

Figure 3: Test pit survey elevations (Shangoni AquiScience, 2023)

6.2 Climate

Information for this section was extracted from the Terrestrial Vegetation report (Dimela Eco Consulting, 2023) and the Storm Water Management Plan (SWMP) (Rational Environmental, 2023).

Thabazimbi is within the summer rainfall area, with dry to very dry winters (Figure 4). Frost is experienced in the higher lying mountainous areas, while frost in lower lying areas between the mountains and on sandy planes are infrequent. The Mean Annual Precipitation ranges from about 500–750 mm (Mucina and Rutherford, 2006).

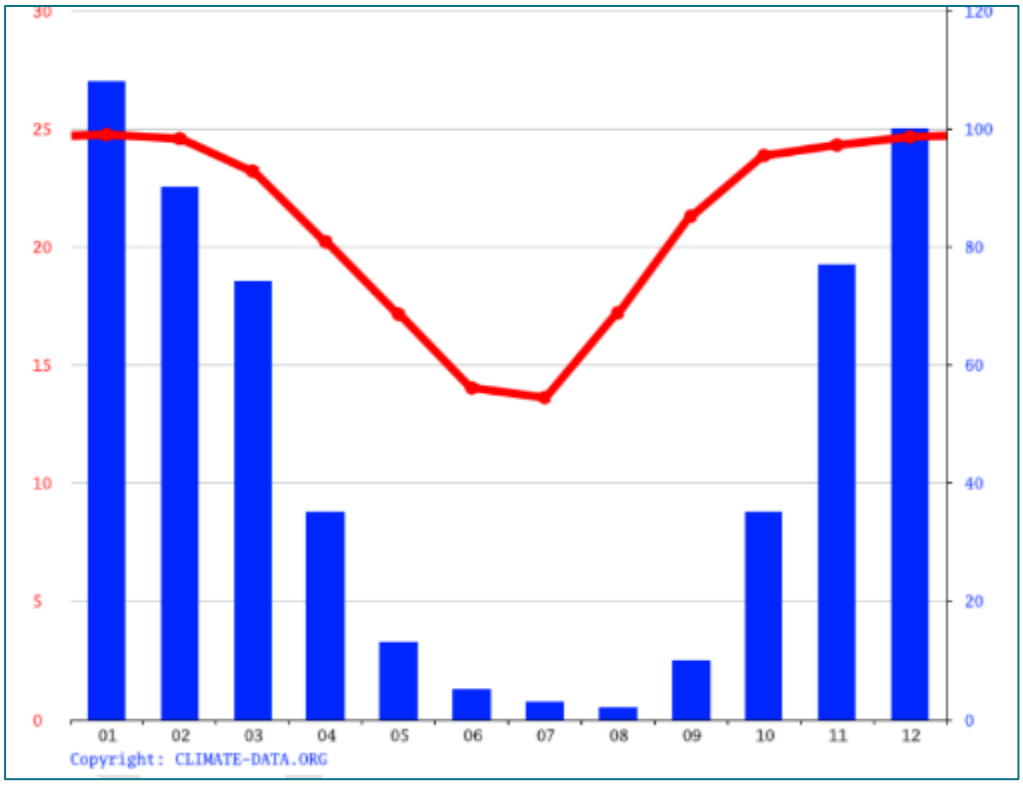

Figure 4: Mean temperature for the Thabazimbi area (climate-data.org)

Rainfall and evaporation data is retrieved from the Nooitgedacht - Bierspruit dam weather station A2E012 located 10 km west of the site using data collected over a period of 10 years.

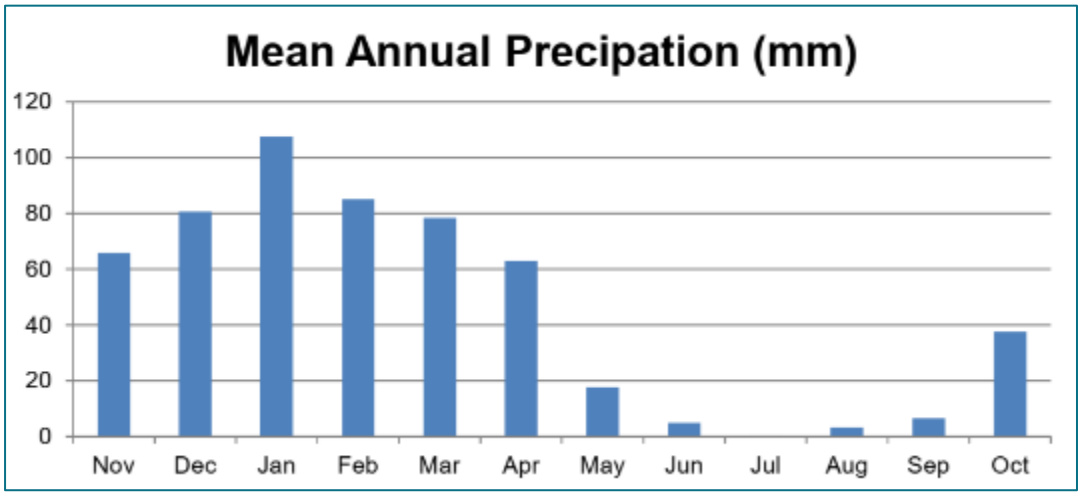

Figure 5: Mean Annual Precipitation (mm) (Rational Environmental, 2023)

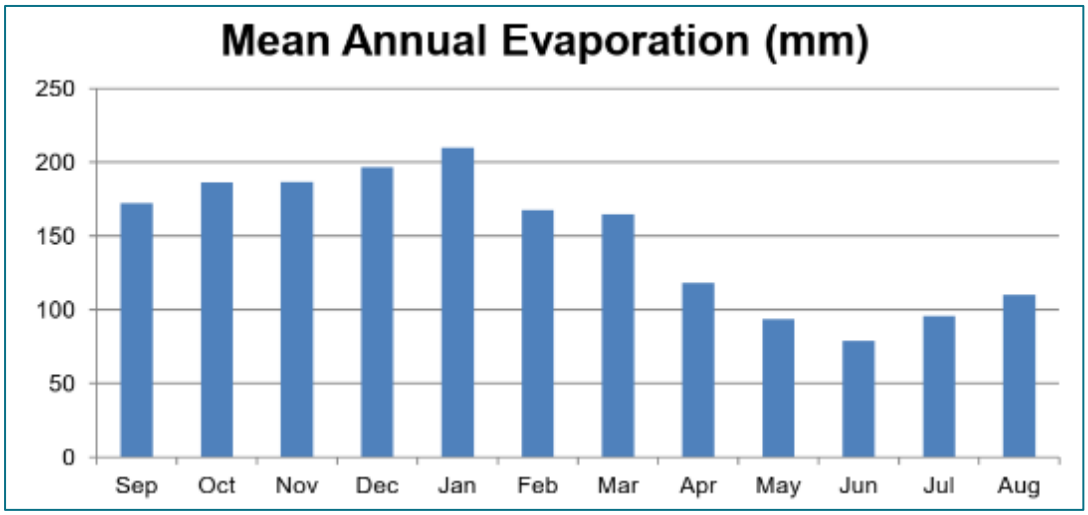

Figure 6: Mean annual evaporation for S-class pan (Rational Environmental, 2023)

Information for the below section was extracted from the Air Quality Impact Assessment Report for the proposed Buffelshoek Extension Mine (TiKOTECH, 2023):

The annual, diurnal and seasonal wind speeds and directions are presented in Figure 7, Figure 8, and Figure 9. The simulated wind speeds are higher than those observed at Thabazimbi. The average wind speed for the proposed site was simulated as 2.7 m/s (0.3- 11.9 m/s). Wind speeds below 2.06 m/s are considered calm or light air. Wind speeds between 3.60 m/s and 5.14 m/s are considered a gentle breeze. In a gentle breeze leaves and small twigs are in constant motion and the wind can extend a light flag (NOAA, n.d.). The area is dominated by northerly wind flow. Wind speeds are higher during the daytime. During autumn and winter winds from the south increase in frequency.

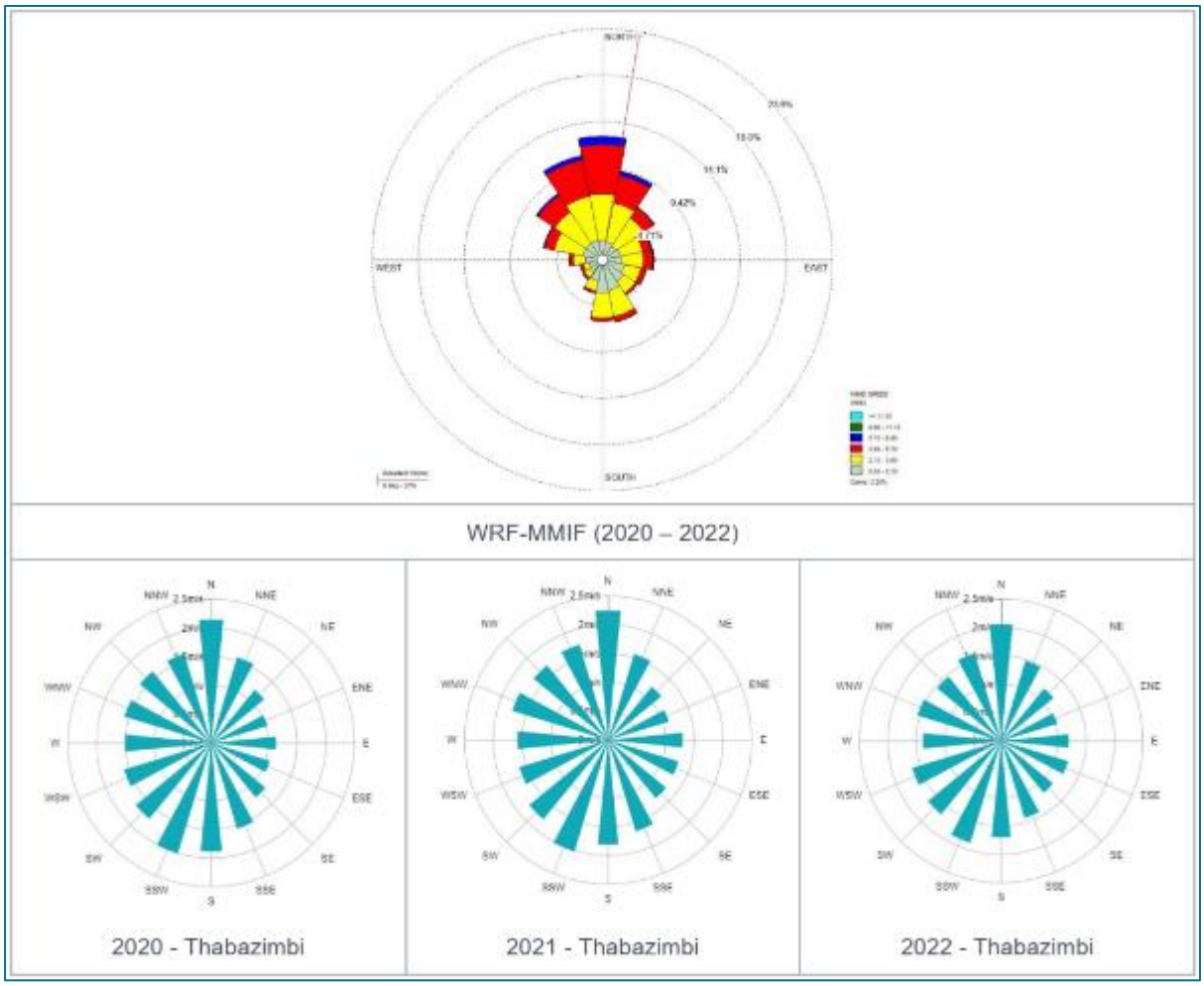

Figure 7: Annual wind roses (TiKOTECH, 2023)

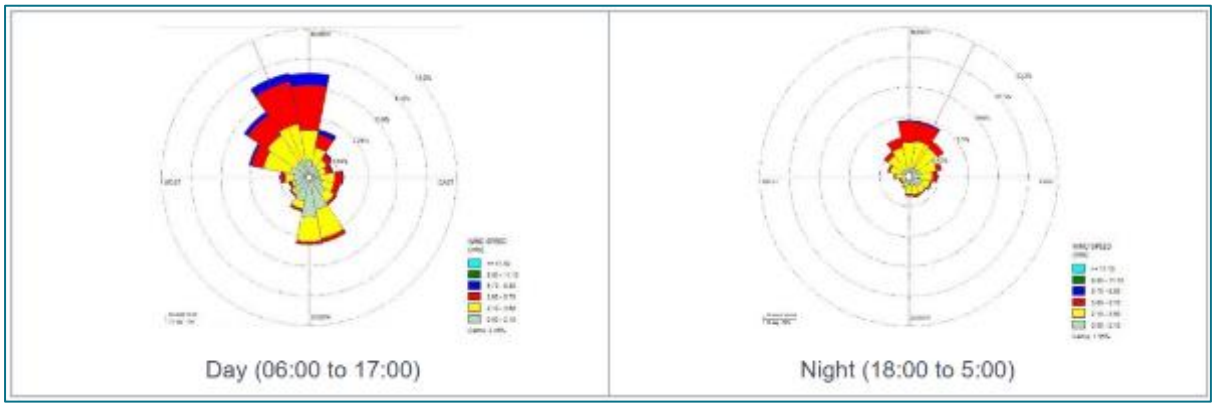

Figure 8: Annual average diurnal wind roses (WRF-MMIF, 2020-2022).

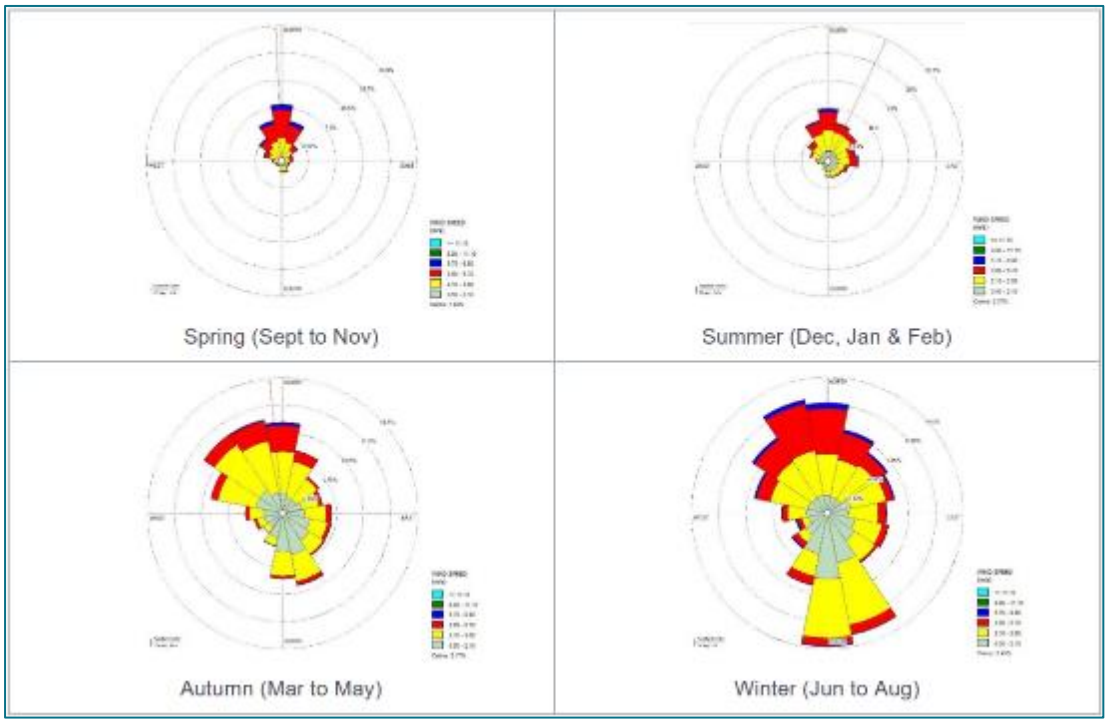

Figure 9: Seasonal average wind roses (WRF-MMIF, 2020-2022).

6.3 Topography

Information for this section was extracted from the SWMP (Rational Environmental, 2023):

The distribution of the Andalusite ore results in a mine layout to be stretched out in a linear direction along the southern foot of a mountain range. The quarry will be located along the steepest slopes with topsoil dumped south as the slope flatten down the foot of the mountain range.

The general drainage is from the mountain peaks southward and slightly southeast towards the Bierspruit in the lowest area, and west towards the Crocodile River. South of the planned infrastructure is relatively flat. Figure 10 indicates the contours with the general topography for the area surrounding the mine.

Figure 10: Site layout plan and general topography

6.4 Soil

Information for this section was extracted from the Samrec (Pty) Ltd EMP for Buffelshoek Extension (Shangoni Management Services, 2010):

The soils are, for the most part, stony red soils with a high base status. Reference can be made to Figure 11 for a General Soil Description. Soil is further described in the northern parts as strongly structured cracking soils, mainly dark coloured, dominated by swelling clays (vertic soils). The soils towards the south are further described as red soils with high base status. Some black clay occurs in the low-lying Bierspruit valley and, bordering on these, the red soils tend towards having melanic A-horizons and Pedocutanic B-horizons. There is thus a gradient from the Hutton form to the Bonheim / Valsrivier spectrum to the Arcadia form going down slope. On the dolomites the red soils are lighter textured than on the shales and breccias.

Soils are deep, at places more than 750 mm deep, with high clay content in most topsoil. This clay has a low swelling potential especially towards the southern parts of the site. Soils are also non-calcareous towards the northern part of the site and Eutrophic towards the southern part of the site.

Water-holding capacity towards the north is low (21 – 40 mm) and medium high towards the south (61 – 80 mm). Water erosion potential on the northern part is high whereas water erosion potential towards the southern part is moderate. Due to the more loamy texture of the soil on the northern part of the site, the soils are only moderately susceptible to wind erosion. Soils towards the southern part are more susceptible to wind erosion.

In terms of nutrients, as is the case with most soils under dry climatic conditions, the soils are fertile. Organic carbon content is medium - low of 0.6 – 1 mm. In the undisturbed state the soils are not inherently erodible. There are no signs of erosion except in disturbed sites (along the roadways, etc.) in the area. Although topsoil is present it is not in such thick layers to promote topsoil recovery on most parts of the site. Soils have a neutral pH of 6.5 - 7.4. Soils are somewhat susceptible to acidification are dominant towards the southern part of the site.

Soils are furthermore, on the southern part of the site, structurally favourable for arable land use; however, these soils do not have a beneficiary water retaining layer for root development.

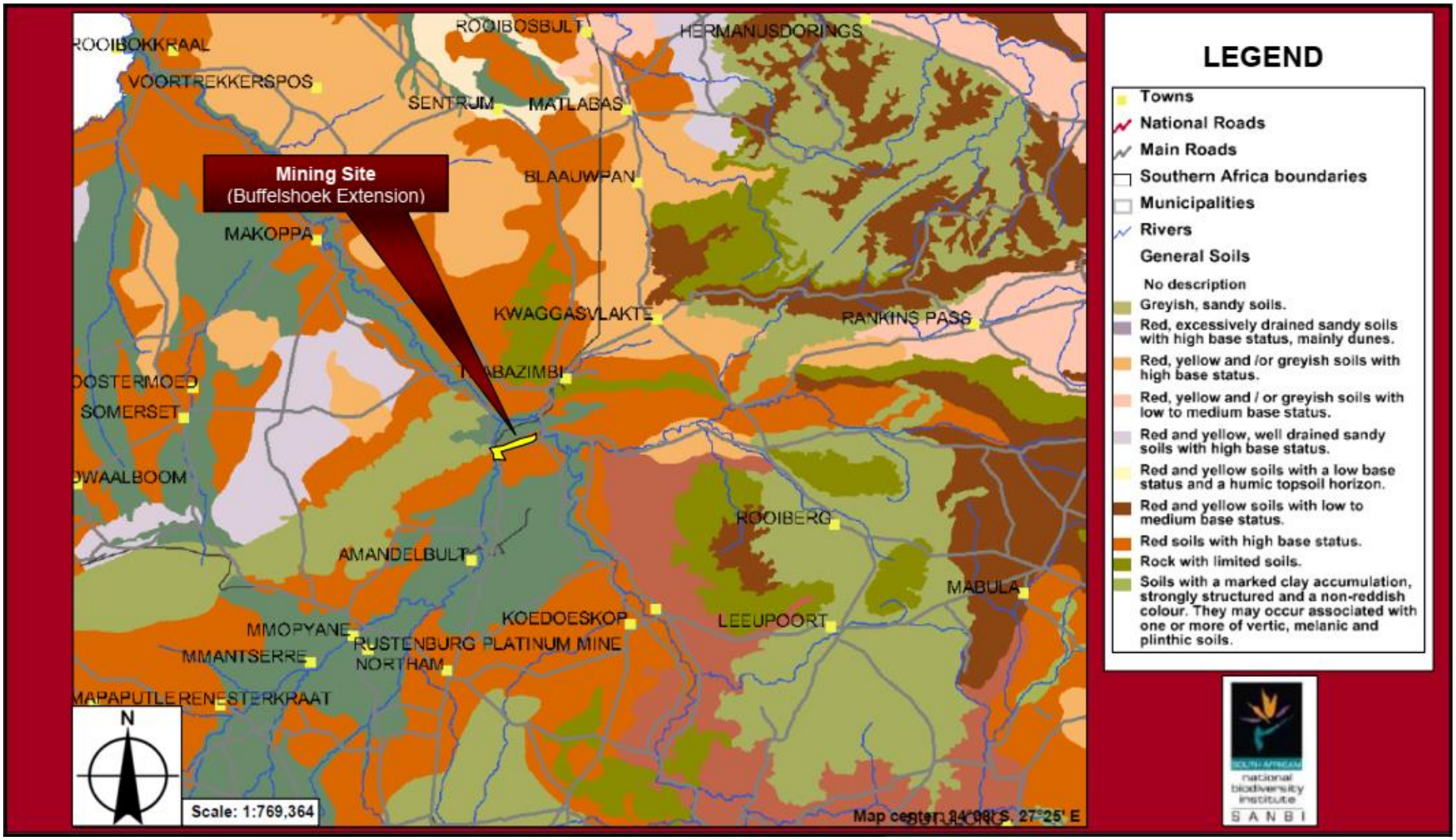

Figure 11: Generalised Soil Description of the Area

6.5 Pre-mining land capability, land use and existing infrastructure

Information for this section was extracted from the Samrec (Pty) Ltd EMP for Buffelshoek Extension (Shangoni Management Services, 2010):

Historical agricultural production is a possibility and the area has areas of transformed rangelands. The southern part of the site has a marginal potential for arable land due to the soil characteristics. Potential grazing capacity is moderately high with 9 – 10 ha per large stock unit towards the northern part of the site and 7 – 8 ha per large stock unit towards the southern parts of the site. There is a small area of degraded land towards the most southern part of the site.

The site itself has a land use described as vacant or unspecified. There are built-up areas and quarries on the western part of the site. To the north of the site, lies a large mined out area. Rhino Andalusite Mine is situated to the west of the site.

There are some cultivated areas a short distance away towards the south of the site, along the river.

6.6 Vegetation

Information for this section was extracted from the Terrestrial Vegetation report (Dimela Eco Consulting, 2023):

6.6.1 Regional Vegetation Overview

The site falls within the Savanna Biome of South Africa and in specific within the Central Bushveld Bioregion. This biome is the largest biome in southern Africa, occupying over one-third of the surface area of the country (Mucina & Rutherford, 2006). It is characterised by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense, as Woodland, and the intermediate stages are commonly known as Bushveld (Mucina & Rutherford, 2006).

The site comprises the Waterberg Mountain Bushveld in the north and the Dwaalboom Thornveld on the lower lying southern areas (Figure 6 of original specialist report). The Waterberg Mountain Bushveld vegetation type occurs on rugged mountains grading from *Faurea saligna – Protea caffra* bushveld on higher slopes through to broad-leaved deciduous bushveld dominated by *Diplorhynchus condylocarpon*, (horingpeultjieboom) to *Burkea africana-Terminalia sericea* savanna in the lower lying valleys and deeper sands. Dwaalboom Thornveld comprises plains with layer of scattered, low to medium high, deciduous microphyllous trees and shrubs with a few broad-leaved tree species. The herbaceous layer is dominated by grass species. Trees such as *Vachellia tortilis* and *Vachellia nilotica* dominate on the medium clays.

6.6.2 Listed Ecosystems

According to the 2022 Revised National List of Threatened Ecosystems, the Waterberg Mountain Bushveld and the Dwaalboom Thornveld are classified as Least Concern (Government Gazette 47526, Government Notice 2747, 18 November 2022). The project area is not situated within a listed ecosystem. The Waterberg Mountain Bushveld has experienced low rates of natural habitat loss and biotic disruptions, placing this ecosystem at low risk of collapse (Skowno *et al*, 2019). The remaining extent of this ecosystem is about 93 %, with 16.5% in protected area. Dwaalboom Thornveld has experienced low rates of natural habitat loss and biotic disruptions, placing this ecosystem at low risk of collapse. About 79% of the Dwaalboom Thornveld is still intact, with 15.2% within protected areas.

6.6.3 Limpopo Biodiversity Assessment and Conservation Plan

The Limpopo Province assessed the biodiversity in the province and classified the province in terms of CBA's and Ecological Support Areas (ESA's), as well as Protected Areas and areas where No Natural Habitat remain (Desmet *et al*, 2013).

CBAs are the sites that are required to meet the region's biodiversity targets and need to be maintained in a natural condition to safeguard identified biodiversity features. Ecological Support Areas (ESAs) are classified as areas that are important for ensuring persistence and to provide intact mega-pathways for long-term biological movement, and they are selected primarily along river lines and altitude gradients to provide for the natural retreat and advance of plants and animals in response to environmental change.

The proposed area assessed is about 475 ha in extent. According to the Limpopo Biodiversity Assessment and Conservation Plan, the site is entirely within a CBA1.

Table 10 lists the conservation categories that are present within the study area (Figure 13), as well as a summary of the development guidelines for these categories (Desmet *et al*, 2013). The proposed site falls within a CBA 1.

Table 10: Conservation categories present in the study area

Conservation category	Development guidelines
CBA 1 Entire site	No further loss of natural habitat should occur i.e., land in this category should be maintained as natural vegetation cover as far as possible. Ideally these areas must be incorporated into protected areas. Compatible land uses for CBA1 (Desmet *et al*, 2013): • Conservation and associated activities. Extensive game farming and eco-tourism operations with strict control on environmental impacts and carrying capacities, where the overall there is a net biodiversity gain.

Conservation category	Development guidelines
	• Extensive Livestock Production with strict control on environmental impacts and carrying capacities. • Required support infrastructure for the above activities. • Urban Open Space Systems. Incompatible land uses for CBA 1 (Desmet *et al*, 2013): • Urban land--uses including Residential (including golf estates, rural residential, resorts), Business, Mining & Industrial; Infrastructure (roads, power lines, pipelines). • Intensive Animal Production (all types including dairy farming associated with confinement, imported foodstuffs, and improved/irrigated pastures). • Arable Agriculture (forestry, dry land & irrigated cropping). • Small holdings

According to the Limpopo Biodiversity Assessment and Conservation Plan, mining and quarrying are not permissible land uses in a CBA 1.

6.6.3.1 Waterberg Bioregional Plan

The Waterberg Bioregional Plan was Gazetted in Provincial Notice 1 of 2019, No 2966 of 04 January 2019 in terms of NEMBA, and is applicable for this project as it falls within the Waterberg district. The below information is extracted from the Waterberg Bioregional Plan (LEDET, 2016):

This Bioregional Plan covers the Waterberg District located within the Limpopo Province of South Africa. The Waterberg District Municipality is the primary implementing agent of the Bioregional Plan. The spatial component of the Bioregional Plan is based on a provincial systematic biodiversity plan, the Limpopo Conservation Plan version 2 (LCPv2), undertaken by LEDET.

The purpose of a bioregional plan is to inform land-use planning, environmental assessments and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. This is done by providing a map of biodiversity priority areas, referred to as CBAs and Ecological Support Areas (ESAs), with accompanying land-use planning and decision-making guidelines.

Agriculture, wildlife, and mining are important economic sectors in the region, with plans underway to expand the mining industry as part of the Strategic Integrated Project, particularly along the Northern Mineral Belt. Expansion of the mining industry is one of the Strategic Integrated Projects that is being coordinated by the Presidential Infrastructure Co-ordinating Committee, which forms part of the implementation of the National Development Plan. Wildlife breeding has shown massive expansion in

the past 5 years. This is strictly an agricultural activity that is having negative impacts on the natural environment. The Growth in the tourism sector is leading to an increase in game farming, tourism facilities, lifestyle estates and golf estates. Consequently, increasing development pressures on biodiversity and the remaining natural ecosystems should be appropriately managed. These factors together make a bioregional plan a useful tool for addressing the need to take biodiversity into account in land-use planning and decision-making, in order to promote sustainable development.

6.6.4 Protected Areas

The area includes several private nature reserves, with the Thabazimbi Private Nature Reserve and the Hanover Private Nature Reserve situated to the north and northwest of the site (Figure 14).

6.6.5 Ecological processes and drivers in savanna and ridges

Summer rainfall coupled with winter fire and regular grazing ensures that the grass layer remains dominant in savanna. In addition, the lack of sufficient rainfall prevents the upper layer (trees) from dominating. However, where grazing intensity is high, and fire frequencies low, the tree layer could become increasingly dominant.

The Waterberg Mountain Complex is an important water source area that supplies nearly the entire fresh water needs of the Waterberg District Municipality (WDM). Intact and well-functioning natural ecosystems are more resilient to the impacts of climate change relative to highly modified (e.g., degraded areas) or anthropogenic landscapes (e.g., croplands, mines, and settlements).

The site comprises the foot- and midslope of a mountainous area, with lower lying areas in the south - western and south-eastern corners. With reference to climate change, very important fauna and flora species migration corridors occur between the foot of a mountain (lowland) and its top. Ridges are also necessary for ecological processes such as groundwater dynamics, hydrological processes, nutrient cycling, and natural corridors for wildlife dispersal.

Ridges are characterized by high spatial heterogeneity due to the range of differing aspects (north, south, east, west and variations thereof), slopes and altitudes all resulting in differing soil (e.g. depth, moisture, temperature, drainage, nutrient content), light and hydrological conditions. Subsequently, ridges also provide a greater diversity of potential niches for plants and animals than do homogeneous landscapes. According to climate change modelling, level topography will be particularly sensitive to future climate change and major extinction in these areas can be expected (Rutherford *et al.*, 2001). As such, in a landscape affected by climate change chances of species survival will be higher on ridges.

Figure 12: Vegetation map (Mucina and Rutherford (2006); Skowno *et al*, 2019)

Figure 13: Limpopo Biodiversity Assessment and Conservation Plan (2018) (Dimela Eco Consulting, 2023)

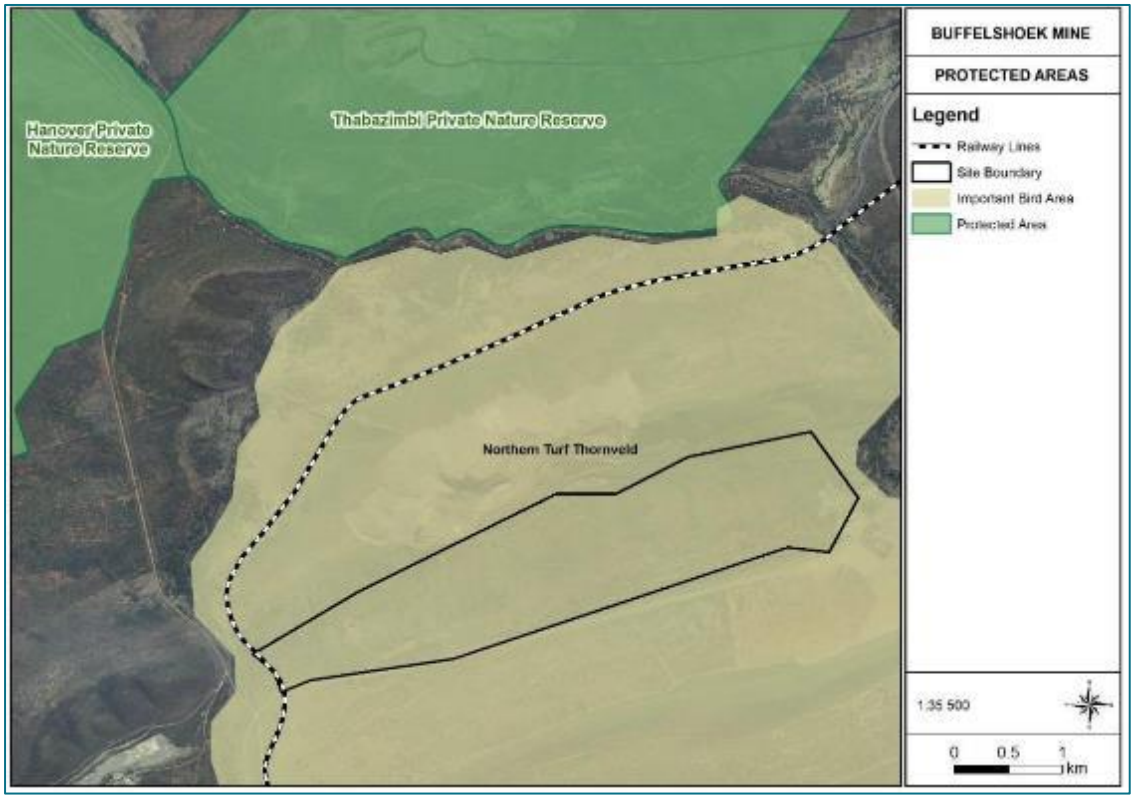

Figure 14: Protected areas map (Dimela Eco Consulting, 2023)

6.6.6 Results: Vegetation groups

Most of the site supports natural vegetation representative of the Waterberg Mountain Bushveld. The vegetation was dominated by broadleaved trees and in particular species of the *Combretum* genus. The south-western extent, and portions along the southern boundary comprised vegetation akin to Dwaalboom Thornveld in which the microphyllous, thorny tree species dominated, particularly *Vachellia tortilis* (umbrella thorn / haak-en-steek). Although the species composition remains much the same through the vegetation groups, the varied topography, rockiness, and aspects influenced the distribution of plant species and their dominance.

The vegetation groups delineated thus show where a certain species is predominant, but smaller inclusions of another vegetation association do exist but have not been mapped separately. The broad vegetation groups were extrapolated from field data and Google Earth imagery and were described as follows:

1. *Combretum* dominated, broadleaved bushveld.

Two subgroups were noted within this group namely:

1.1 Bushveld on low rocky ridge

1.2 *Dichrostachys* encroached drainage lines and disturbed areas

2. *Vachellia tortilis* dominated thornveld.
3. Modified land

The vegetation is briefly discussed below and geographically represented in Figure 15. Species recorded in the vegetation groups are listed in Table 11. Species listed below were recorded in walked transects and sample areas. Note that this list represents the minimum number of species present.

Table 11: Plant species recorded

Species	Common name	Habitat notes	*Combretum* bushveld	*V. tortilis* thornveld
Trees				
Senegalia caffra (M)	Common Hook thorn	Grassland, bushveld, often on rocky ridges	1	1
Senegalia galpinii	Apiesdoring / Monkey Thorn	Bushveld and along streams	1	1
Acacia (Vachellia) karroo (M)	Sweet Thorn	Widespread, often proliferate in overgrazed areas		1
Senegalia mellifera *subsp detinens*	Black Thorn	Very thorny shrub to small tree occurring in bushveld and semi-desert areas, often on Kalahari sand and forming impenetrable thickets		1
Senegalia nigrescens	Knob Thorn	Bushveld	1	1
Vachelia nilotica (M)	Scented Thorn	Bushveld on sandy soils around pans and near riverbanks. Often colonising disturbed areas	1	1
Vachellia robusta	Ankle Thorn	Bushveld and grassland		1
Acacia (Vachellia) tortilis	Umbrella Thorn	Bushveld and grassland.	1	1
Berchemia zeyheri (M)	Red Ivory	Bushveld and near watercourses	1	
Boscia cf albirtrunca (M)(P)	Shepherds' Tree	Occur in semi-desert areas and bushveld, often on termitaria		1
Brachyleana rotundata	Mountain Silver Oak / Bergvaalbos	Bushveld, usually in rocky places	1	
Bridelia mollis	Velvet Sweetberry	Bushveld, often rocky places	1	
Burkea africana	Wild Seringa	Bushveld, often on sandy soil		1
Combretum apiculatum(M)	Red Bushwillow	Bushveld, often in low altitudes and in rocky places	1	1
Combretum hereroense	Russet Bushwillow	Bushveld, often on sandy soil	1	
Combretum imberbe (P)	Leadwood /Hardehout	Often along rivers and watercourses, in mixed woodland. grow in brackish soil and in mixed woodland	1	1
Combretum molle	Velvet Bushwillow	Bushveld or sheltered rocky places in grassland	1	

Species	Common name	Habitat notes	*Combretum* bushveld	*V. tortilis* thornveld
Combretum zeyheri	Large-fruited Bushwillow /raasblaar	Bushveld and grassland, often in deep soil and along rivers.	1	1
Coptosperma supra axillare	Narrow-leaf Butterspoon		1	
Croton gratissimus	Lavender Fever Berry	Bushveld and wooded places in grassland	1	1
Dichrostachys cinerea (M)	Sickle Bush	Bushveld, often invasive and thicket forming	1	1
Diospyros lycioides subsp sericea	Bluebush	Wide variety of habitats	1	
Dombeya rotundifolia (M)	Common Wild Pear	Bushveld, rocky ridges.	1	1
Englerophytum magalismontanum	Transvaal Milkplum / Stamvrug	Rocky outcrops or riverine fringing forests.	1	
Euclea crispa subsp crispa	Blue Guarri	Rocky slopes, kloofs, along rivers and forest margins	1	1
Euclea undulata	Common Guarri	Bushveld, grassland and often in rocky areas.		1
Faurea saligna	Transvaal Beech	Bushveld, often on sandy soils	1	
Grewia flava	Velvet Raisin	Bushveld and wooded grassland.		1
Grewia flavescens	Sandpaper Raisin	Bushveld and wooded grassland.	1	1
Heteropyxis natalensis (M)	Lavender Tree	Bushveld, forest margins and often in rocky places	1	1
Lannea discolor (M)	Live-long / Dikbas	Bushveld, sometimes on rocky ridges or termitaria		1
Lannea edulis	Wild grape	Bushveld, rocky ridges	1	
Ochna pulchra	Peeling Plane	Bushveld, on rocky hillsides and sandy soils.		1
Ozoroa paniculosa	Common Resin Tree	Bushveld	1	
Pappea capensis	jacket-plum	Bushveld and wooded grassland or scrubveld.	1	1
Pseudolachnostylis maprouneifolia	Kudu-berry / Koedoebessie	Small to large deciduous tree. Bushveld, often on rocky ridges	1	
Pterocarpus rotundifolius	Round-leafed Teak	Bushveld and woodland.	1	1

Species	Common name	Habitat notes	*Combretum* bushveld	*V. tortilis* thornveld
Sclerocarya birrea subsp caffra (P)(M)	Morula	Bushveld and woodland.	1	1
Strychnos madagascariensis	Black Monkey Orange	Bushveld and coastal bush	1	1
Tarchonathus camphoratus	Camphor-bush / Vaalbos	Wide variety of habitats, extensive stands are regarded as an indicator for Kalahari type soils (Venter *et al*, 1996)	1	1
Terminalia brachystemma	Green Cluster-leaf	Bushveld, usually on Kalahari-sand and in places with shallow water table	**1**	
Terminalia sericea	Silver Cluster Leaf	Bushveld on sandy soils.	**1**	**1**
Ximenia americana	Blue Sourplum	Bushveld, hot low altitudes	**1**	**1**
Ziziphus mucronata	Buffalo-thorn	Widespread, in various habitats	**1**	**1**
Number of indigenous tree species recorded =44			**35**	**31**
Grasses				
Aristida bipartita	Rolling Grass	Moist places or overgrazed veld and road reserves. Increaser II	1	1
Brachiaria serrata	Saw-tooth grass	Rocky, undisturbed grassland	1	
Chrysopogon serrulatus	Golden beard grass	Shallow sandy soils and in rocky places	1	1
Cymbopogon pospischilii	Narrow-leafed Turpentine Grass	Grassland.	1	
Cymbopogon validus	Giant Turpentine Grass	Open veld. Rocky hillsides, sometimes in moist soils.	1	1
Digitaria eriantha	Finger Grass	Sandy, rocky soil in arid areas or next to rivers/vlei's in areas with higher rainfall. Planted for pasture	1	
Eragrostis curvula	Weeping Love Grass	Mostly occurs in disturbed areas / sown as pasture. Increaser II grass	1	1
Eragrostis superba	Saw-tooth love grass	Disturbed areas next to roads.Increaser II, palatable grass	1	1
Heteropogon contortus	Spear Grass	Rocky, sloped land and common on disturbed road reserves. Increaser II grass. Palatable in early summer	1	1
Loudetia simplex	Common russet grass	Open grassland, poor sandy soil to rocky slopes and vlei's. Increaser II	1	

Species	Common name	Habitat notes	*Combretum* bushveld	*V. tortilis* thornveld
Melinis nerviglumis	Bristle-leaved Red Top	Undisturbed grassland, rocky slopes and soils.	1	
Melinis repens	Natal Red Top	Disturbed grassland. Increaser II grass.	1	1
Panicum maximum	Guinea Grass	Grow in shade under trees, also in sun, moist to dry areas.	1	1
Pogonarthria squarrosa	Herringbone Grass	Disturbed places, sparsely distributed in natural, open grassland. Sub climax grass that colonise disturbed sandy soils. Not palatable, Increaser II	1	
Setaria incrassata	Vlei bristle grass	Moist areas and sometimes on rocky slopes	1	
Themeda triandra	Red grass	Undisturbed or disturbed open grassland. Decreaser Grass	1	1
Trachypogon spicatus	Giant Spear Grass	Grows mostly in undisturbed grassland, bushvled and close to vlei's. Often on rocky ridges - indicative of sourveld. Increaser I grass		
Tragus berteronianus	Carrot Seed Grass	Disturbed, bare patches and compacted soils.	1	1
Urochloa mosambicensis	Bushveld Signal Grass	Disturbed areas such as farmland, also in compacted soils. Good grazing grass. Increaser II	1	1
Minimum number of indigenous grass species = 20			**18**	**11**
Climbers				
Clematis brahiata	Traveller's Joy	Bushy hillsides, particularly rocky places	1	
Dalechampia capensis	Wild Hop / Inzula (z)	Vine in bushveld, dry areas	1	
Rhoicissus tridentata	Bushmans' grape	Grassland, bushveld on rocky ridges or along streams	1	1
Xenostegia tridentata, subsp angustifolia	Miniature morning glory	open woodland, grassland, roadsides, disturbed and cultivated land.	1	
Number of climbers recorded = 4			**4**	**1**
Small shrubs / Forbs / succulents				
Abutilon species				1
Albuca cf. glauca	Waxy Albuca	Sandy soils	1	
Cleome maculata		Grassland, often a weed of disturbed sandy places	1	

Species	Common name	Habitat notes	*Combretum* bushveld	*V. tortilis* thornveld
Corchorus asplenifolius (M)	Geel varingblaartjie	Woodland, grassland on margins of marshes	1	1
Crossandra greenstockii	Bushveld Crossandra	Grassland and woodland	1	1
Dicerocaryum senecioides	Beesduweltjie	Sandy soils		1
Evolvulus alsinoides var linifollus		Rocky places, a weed in overgrazed areas.	1	
Gomphocarpus fructicosus	Milkweed	Grassland, often along roadsides and abandoned cultivated fields, disturbed areas.		1
Hermannia boraginifolia	Gombossie	Grassland and bushveld	1	
Hermbstaedtia odorata	Rooiaarbossie Cat's tail	Grassland, bushveld, often in moist places		1
Hirpicium bechuanense	Botswana Marigold	Sandy soil, common along roadsides	1	1
Justicia odora	Scented justicia	Dry, stony areas	1	1
Justicia protracta subsp rhodesiana	Veld jsuticia	Rocky areas	1	1
Kalanchoe paniculata	Hassieoor	Grows in shallow soils overlaying rock.	1	
Kohautia caespitosa		Grassland and bushveld	1	
Kyphocarpa angustifolia	Silky Burweed	Grassland and disturbed areas.	1	1
Lippia javanica (M)	Laventelbossie	Grassland and bushveld	1	1
Melhania acuminata	Flannelweed	Sandy soils, wooded slopes	1	1
Melhania prostrata		Grassland and bushveld	1	1
Nidorella cf hottentottica		Grassland, often along roadsides. Sometimes in moist areas	1	1
Nidorella resedifolia subsp resedifolia	Poverty	Prefers moist areas	1	1
Ocimum cf americanum	Wild basil	Mixed woodland, tends to spread into disturbed areas		1
Pavonia burchelii	Rocky areas, savanna	1		

Species	Common name	Habitat notes	*Combretum* bushveld	*V. tortilis* thornveld
Psiadia punctulata	Sticky Psidia	Bushveld, along dry sandy or rocky rivers, often under trees	1	1
Pupalia lappacea	Forest Burr	Undershrub	1	
Rhynchosia minima	Moist grassland, often in clay.	1		
Rhynchosia cf totta	Yellow Carpet Bean	Grassland, open woodland and forest margins	1	1
Sida cordifolia	Heartleaf Sida	Grassland, open areas, becomes weedy in disturbed areas		1
Solanum delagoense	Bitterappel	Common in disturbed areas	1	1
Tragia species	Nettel	1		
Triumfetta cf sonderii (M)	Maagbossie	Grassland, woodland, roadsides and rocky areas in sandy or loamy soil.	1	1
Viscum combreticola	Mistletoe	Usually parasitic on Combretum and Acacia species	1	
Waltheria indica	Meidebossie	Grassland and Bushveld, often in disturbed areas.	1	1
Xerophyta retinervis (M)	Monkey's Tail	Rocky ridges	1	
Minimum number of indigenous forb species recorded = 34			**26**	**24**
Ferns and mosses				
Pellaea calomelanos (P)	Hard Fern	Grassland, often in moist or rocky places.	1	
Number of ferns and mosses = 1			**1**	**0**
Alien / Invasive Species				
Cereus hildmannianus / jamacaru	Queen of the night	Category 1b tall growing succulent		1
Malvastrum coromandelianum	Prickly malvastrum	Category 1b		1
Pennisetum setaceum	Fountain Grass	Category 1b, except sterile cultivars	1	
Tridax procumbens		A weed of disturbed ground, often on roadsides and in waste places; also in naturally disturbed areas such as sandy stream beds	1	1
Verbesina encelioides var	Wilde Sonneblom	Naturalised, weed from S. America		1

Species	Common name	Habitat notes	*Combretum* bushveld	*V. tortilis* thornveld
encelioides				
Number of alien and invasive species recorded= 5			**2**	**4**
Minimum indigenous species per vegetation group			**84**	**67**

M=Medicinal

P=Provincially protected

PT=national protected tree

1= species recorded in a sample plot in this vegetation group

Figure 15: Vegetation groups on the site (Dimela Eco Consulting, 2023)

6.6.6.1 Broadleaf *Combretum* veld on midslopes

Most of the vegetation on the site comprised broadleaved bushveld dominated by *Combretum* species on rocky substrate (Figure 16). The canopy varied from open to dense. *Combretum apiculatum* (red bushwillow) and *C zeyherii* (large-fruited bushwillow /raasblaar) were the most dominant trees, followed by *Combretum molle*, *C hereroense* and the protected tree *Combretum imberbe* (leadwood). The remainder of the tree layer was diverse including *Pseudolachnostylis maprouneifolia* (kudu-berry), *Pelthophorum africanum* (African weeping wattle), *Dombeya rotundifolia*, *Englerophytum magalismontana* (stamvrug), *Heteropyxis natalaensis* (lavender tree), *Croton gratissimus*, *Coptosperma supra-axillare* (narrow-leaf butterspoon), *Ximenia americana* (blue sourplum) and *Euclea undulata* (ghwarrie). The microphyllous trees *Senegalia galpinii* (monkey thorn), *Vachellia nilotica* (scented pod) and *Vachellia tortillis* (haak-ensteek) were also recorded (Figure 16, Figure 17).

Figure 16: Dense *Combretum* bushveld on higher slopes (Dimela Eco Consulting, 2023)

Figure 17: Open grassy areas in open *Combretum* bushveld (Dimela Eco Consulting, 2023)

The shrub layer included *Grewia flavescens, Lippea javanica, Triumfetta sonderii* (maagseerbossie) and *Diospyros lycioides* (bluebush). The shrub *Melhania prostrata* was common in the herbaceous layer. Forb species were limited. Small species could have been obscured by dense grasses or inconspicuous if not in flower. Species such as *Psiadia punctulata* (sticky Psidia), *Kyphocarpa*

angustifolia (silky burweed), *Evolvulus alsinoides var linifollus* and *Crossandra greenstockii* (bushveld Crossandra) were noted. Due to the low light levels in denser bushveld, the herbaceous layer was sparse under denser canopies. The grass layer was largely dominated by *Loudetia simplex* (common russet grass), *Setaria incrassata* (bristle grass), *Heteropogon contortus* (spear grass), *Chrysopogon serrulatus* (golden beard grass) and *Melinis repens.*

6.6.6.1.1 Vegetation on low rocky ridge

A low rocky ridge extends from east to west along the south-eastern boundary of the site (Figure 18; Figure 19). Most of this low ridge falls outside of the area assessed. This area was dominated by broad-leafed trees (*Combretum* species, *Pseudolachnostylis maprouneifolia*, *Coptosperma supra-axillare*, *Terminalia brachystemma*) and included several additional forb species (e.g., *Justicia odora*, the climber *Dalechampia capensis, Commelina africana*, *Cleome maculata*, *Tragia dioica* (nettle)) and at least one bulb, believed to be an *Albuca* species (not in flower at the time).

Figure 18: Low rocky ridge along the south-eastern boundary. The arrows point out the darker line that constitutes the rocky protrusion (Google Earth satellite image, dated 2016) (Dimela Eco Consulting, 2023)

Figure 19: Vegetation on the low rocky ridge

6.6.6.1.2 *Dichrostachys* encroached drainage lines and disturbed areas

Several drainage lines drain the higher lying portion of the site southwards. Although these areas fall within the broadleaf *Combretum* bushveld, they were found to be dominated by the indigenous, but encroacher tree *Dichrostachys cinerea* (sickle-bush) (Figure 20; Figure 21).

Figure 20: *Dichrostachys cinerea* visible as dense, darker patches along drainage lines (arrows) (Google Earth satellite imagery, 2021) (Dimela Eco Consulting, 2023)

Figure 21: *Dichrostachys cinerea* stands along drainage lines (Dimela Eco Consulting, 2023)

This tree can become overly abundant in the absence of fire, where increased soil moisture is present or in disturbed areas. *Dichrostachys cinerea* also formed dense stands along the roads/ cut lines and in historically disturbed areas (Figure 22).

Figure 22: *Dichrostachys cinerea* stands along roads and in historically disturbed areas (Dimela Eco Consulting, 2023)

No plant species of conservation concern were recorded in walked transects in the *Combretum* bushveld. Protected trees noted include *Combretum imberbe* (leadwood), *Sclerocarya birrea subsp caffra* (marula), and *Berchemia zyeheri* (red ivory). The table below summarises the prominent species recorded in this vegetation group.

Table 12: Summary of the prominent and dominant species recorded within the *Comberetum* bushveld (Dimela Eco Consulting, 2023)

Dominant taxa recorded
Dominant trees: *Combretum* species, *Dichrostachys cinerea* along drainage lines and roads Common trees / shrubs: *Englerophytum magalismontanum, Heteropyxis natalensis, Croton gratissimus, Pseudolachnostylis maprouneifolia, pelthophorum africanum, Coptosperma supra-axillare, Dombeya rotundifolia, Euclea undulata, Ozoroa paniculos, Senegalia caffra, Vachellia nilotica* Shrubs: *Grewia flavescens, Lippia javanica, Melhania prostrata* Grasses: *Brachiaria serrata, Chrysopogon serrulatus, Cymbopogon Validus, Heteropogon contortus, Loudetia simplex, Melinis nerviglumis, Panicum maximum, Themeda triandra* Herbaceous plants: *Crossandra greenstockii, Evolvulus alsinoides var linifollus, Hermannia boraginifolia, Justicia species, Rhynchosia cf totta, Triumfetta cf sonderii, Xerophyta retinervis* Geophytes: *Albuca* species. Dense grass layer likely obscured other species. Fern and moss: *Pellaea calomelanos* Succulent: *Kalanchoe paniculata* Parasite: *Viscum combreticola*
Species richness (indigenous species) at the time of the site visits = 84
Grasses: 18 Forbs:26 Trees: 35 Climbers: 4 Ferns: 1
Protected or threatened plant species
Provincially protected: None recorded, however protected succulents might be present. National protected trees: *Sclerocarya birrea subsp africana*, *Berchemia zeyheri* and *Combretum imberbe* were recorded. Plant species of conservation concern: None recorded; however, the rocky habitat is suitable for some species listed in Table 11 (e.g., *Cyphostemma hardyi*, *Drimia elata* and one of the two species listed in the screening tool report)
Uniqueness of vegetation
This vegetation occurs on the upper slopes areas of the farm and is abundant in the area.
Sensitive ecological features
• Natural, rocky vegetation • Provincially protected succulents (*Orbea* and *Stapelia*) are likely present • Protected trees were recorded

6.6.6.2 *Vachellia tortilis* microphyllous thornveld

The southern section of the site was dominated by microphyllous, thorny trees on reddish loam to clayey soils. The tree layer comprised mainly of the trees *Vachellia tortilis* (umbrella thorn), *V karroo*, *Senegalia mellifera subsp ditensis* (black thorn), *V robusta* (ankle thorn) and *Dichrostachys cinerea* (sickle-bush). Broadleaf trees such as *Euclea undulata*, *Combretum* species, *Pappea capensis* (jacket plum) and the large shrub *Tarchonanthus camphorathus* (camphor bush) were also recorded. The

western extent, particularly south and south-west of the existing test pit, were historically disturbed and the shrub *Melhania prostrata* formed dominant stands in the understory (Figure 23).

Figure 23: *Vachellia tortilis* dominated microphyllous bushveld in the western extent of the area assessed (Dimela Eco Consulting, 2023)

In the eastern extent, compacted and bare areas were present along a dirt road (Figure 24). These areas included several additional trees such as *Senegalia nigrescens* (knob thorn), *S galpinii* (monkey thorn), *Terminalia sericea*, *Pelthophorum africanum*, *Burkea africana* and the protected trees *Boscia albitrunca* (shepherds tree) and *Combretum imberbe* (leadwood).

Figure 24: *Vachellia tortilis* thornveld on the eastern extent of the site. The images were taken around historically disturbed and compacted areas (Dimela Eco Consulting, 2023)

The shrub layer was mostly dominated by *Melhania protrata,* along with *Sida cordifolia, Waltheria indica*, and *Psiadia punctulata*. In densely vegetated areas, the ground layer was sparse. Common grasses included *Aristida bipartita* (rolling grass), *Eragrostis capensis* (love grass), *Heteropogon contortus* (spear grass), *Loudetia simplex* (common russet grass), *Tragus berteronianus* (carrot seed grass), and *Urochloa mosambicensis* (bushveld signal grass). No plant species of conservation concern were recorded. Protected trees included *Boscia albitrunca* and *Combretum imberbe.* The table below summarises the prominent species recorded in this vegetation group.

Table 13: Summary of the prominent and dominant species recorded within the *Vachellia tortilis* microphyllous thornveld (Dimela Eco Consulting, 2023)

Dominant taxa recorded
Dominant trees: *Vachellia tortilis, Dichrostachys cinerea* Common trees / shrubs: *Euclea undulata, Pelthophorum africanum, Senegalia nigrescens, V. karroo, V robusta, Senegalia mellifera subsp ditensis, Senegalia galpinii, Burkea africana, Terminalia sericea* Grasses: *Chrysopogon serrulatus, Cymbopogon validus, Heteropogon contortus, Loudetia simplex, Melinis nerviglumis, Panicum maximum, Tragus berteronianus, Urochloa mosambicensis* Herbaceous plants: *Melhania prostrata, Justicia odorata, Dicerocaryum senecioides, Gomphocarpus fructicosus Hirpicium bechuanense* Geophytes: *Cyphostemma* species
Species richness (indigenous species) at the time of the site visits = 67
Grasses: 11 Forbs:24 Trees: 31 Climbers: 1 Ferns: 0
Protected or threatened plant species
Provincially protected: None recorded; however succulents and *Gladiolus* species might be present. National protected trees: The protected trees *Boscia albitrunca* and *Combretum imberbe* were recorded. Plant species of conservation concern: None recorded; and none is expected to be present (Table 11)
Uniqueness of vegetation
This vegetation occurs on foot slopes and lower lying plains, which is abundant n the area.
Sensitive ecological features
• Natural, rocky vegetation • Provincially protected succulents (*Orbea* and *Stapelia*) are likely present

6.6.6.3 Modified land

Modified landscapes are regarded as areas where the vegetation structure and composition have been compromised and are not representative of the reference state (SANBI, 2016). Modified land can range from moderately modified to severely or irreversibly modified. Subsequently, these areas are usually of a poor to fair ecological condition. The modified vegetation on the site included the secondary bushveld that re-established in the test pit, compacted and relandscaped areas south thereof, as well as the historical iron ore mine and related infrastructure.

Other than the secondary bushveld in the test pit, the modified areas were bare and compacted. Due to the low species diversity and state of modified land, it is not further discussed and regarded as low sensitivity to the proposed mining.

6.6.7 Summary of Plants of Conservation Importance

6.6.7.1 Threatened or Protected Plant Species

Chapter 4, Part 2 of NEMBA provides for listing of plant and animal species as threatened or protected. If a species is listed as threatened, it must be further classified as Critically Endangered, Endangered or Vulnerable. These species are commonly referred to as TOPS listed. The Act defines these classes as follows:

- Critically endangered species: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- Endangered species: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- Vulnerable species: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- Protected species: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category will include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, known as 'Restricted Activities', are regulated on listed species using permits by a special set of regulations published under NEMBA. Restricted activities regulated under the act are keeping, moving, having in possession, importing, and exporting, and selling. The first list of threatened and protected species published under NEMBA was published in the government gazette on the 23rd of February 2007, with the most recent amended draft list and regulations published in March 2015 (Government Gazette No. 38600 of 31 March 2015).

No TOPS species was recorded, and none are expected to be present.

6.6.7.2 Plant species of conservation concern

Plants of conservation concern are those plants that are important for South Africa's conservation decision making processes and include all plants that are Threatened, Extinct in the wild, Data deficient, Near-threatened, Critically rare and Rare (Figure 25). Chapter 4, Part 2 of NEMBA provides for listing of species that are threatened or in need of protection to ensure their survival in the wild, while regulating the activities, including trade, which may involve such listed threatened or protected species and activities which may have a potential impact on their long-term survival.

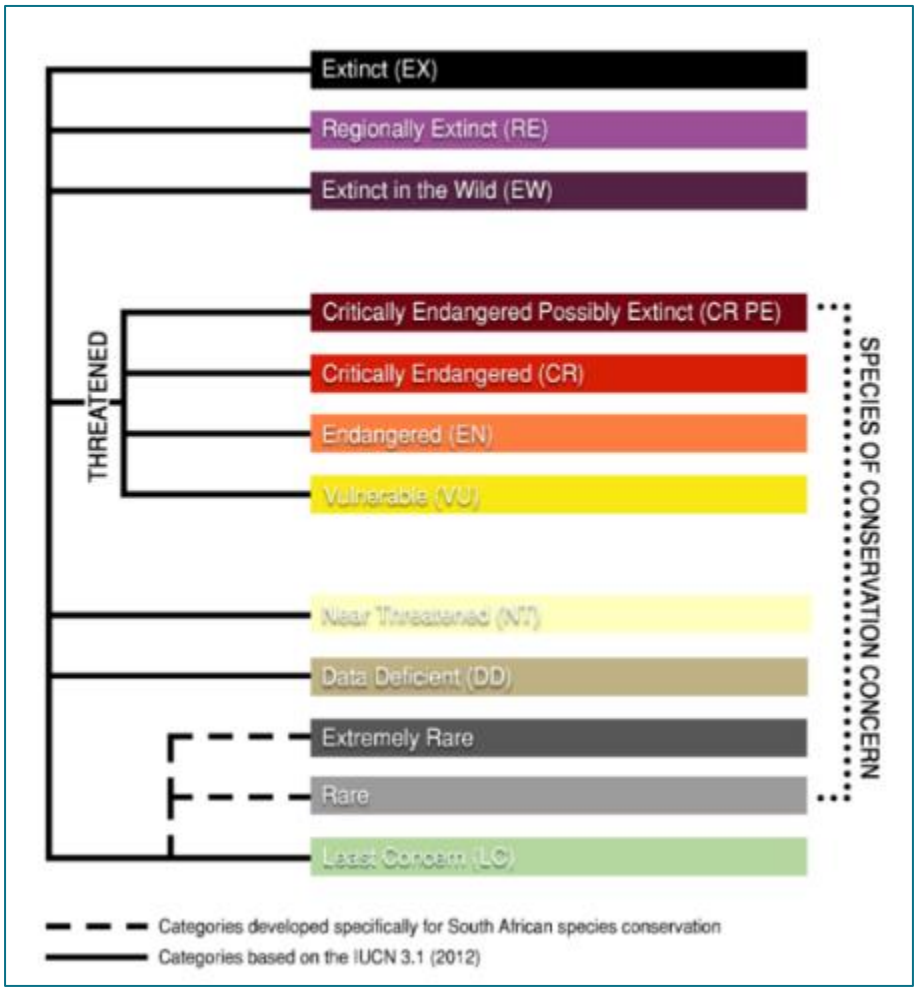

Figure 25: Categories of species of conservation concern (SCC) modified from the IUCN's extinction risk categories (reproduced in part from IUCN, 2012) as referenced in Dimela Eco Consulting (2023)

A list of plants of conservation concern that could be present in the area that the proposed site is situated in was compiled using information from the South African National Biodiversity Institute's (SANBI) checklist (SANBI, 2009b), Raimondo *et al*, (2009), the Plants of Southern Africa (POSA, 2021) website for the area that the site is situated in, and information received from SANBI on sensitive species listed in the screening tool report. Other data consulted for plant species of conservation concern include the citizen science website, iNaturalist.

6.6.7.2.1 Potential occurrence of plant species of conservation concern

A list of seven (7) plant species of conservation concern for which suitable habitat could be present within the area is given in Appendix C of the original report. Appendix C assesses whether suitable habitat is present within the proposed site. Of the short-listed species, suitable habitat for four (4) species is present. As per Appendix C, suitable habitat, and a medium possibility of occurring is present for 2 Vulnerable species and 2 Data deficient species.

6.6.7.2.2 Sensitive plant species site inspection result

The national screening tool report as downloaded on 18/01/2023 21:45:07, classified the site as low sensitivity for plant species. However, a small portion on the northern boundary of the site was classified as “medium for sensitive plant species”, indicating that the site includes suitable habitat for plant species of conservation concern. The screening tool lists two (2) species that has a possibility of occurring here. However, this assessment found that much of the “medium sensitivity “area was historically mined and comprise a deserted iron ore mine.

An applicant intending to undertake an activity on a site identified by the screening tool as being of “medium sensitivity” for terrestrial plant species, must submit either a Terrestrial Plant Species Specialist Assessment Report or a Terrestrial Plant Species Compliance Statement, depending on the outcome of a site inspection.

The site inspection was carried out concurrently to this vegetation assessment with the following results:

- Suitable habitat is present for four (4) of the seven (7) species listed in Appendix C. One of these were listed in the screening tool report.
- The area classified as “medium”; plant species sensitivity in the screening tool report was historically mined which limits the possibility of the screening tool report species being here, while the site does not include suitable habitat for the other (Appendix C).
- One Vulnerable species, and two Data Deficient species have a medium likelihood of being present.

As per the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species (Government Gazette 43855 30 October 2020):
Where sensitive plant species of conservation concern are found on site or have been confirmed to be likely present, a Terrestrial Plant Species Specialist Assessment must be submitted in accordance with the requirements specified for “very high” and “high” sensitivity in this protocol.

However, this assessment found that there is at most, a medium possibility for three (3) species of concern. These species are more likely within the higher lying and rocky areas of the site. The proposed mine aims to commence mining around the existing test pit. This report recommends that once finalised, the proposed footprint of the mining in Combretum bushveld, be assessed for such species in its flowering period (Appendix C).

6.6.7.3 Provincially protected species

Several plants are provincially protected by the Limpopo Environmental Management Act 2003 (Act 7 of 2003). These plants are not to be removed, damaged, or destroyed without a permit from LEDET.

Several succulent and geophyte species such as *Brachystelma*, *Ceropegia, Huernia, Orbea* and *Scadoxus* could be present within the area assessed, although not recorded.

6.6.7.4 National protected trees

The NFA enforces the protection of several indigenous trees. The removal, thinning or relocation of protected trees will require a permit from the local Department of Forestry, Fisheries and the Environment (DFFE) (Notice of the List of Protected Tree Species under the NFA, Notice 1935, Government Gazette No 46094, 25 March 2022). Several protected trees occur in the area assessed. The table below list the protected tree species recorded.

Table 14: Protected trees confirmed to occur (Dimela Eco Consulting 2023)

Species	Common name	Habitat
Berchemia zeyheri	Red ivory	Recorded around rocky boulders in the broadleaf *Combretum* bushveld
Boscia albitrunca	Shepherds tree	Recorded in the *Vachellia tortilis* thornveld
Combretum imberbe	Leadwood	Recorded in both vegetation groups
Sclerocarya birrea subsp. *caffra*	Marula	A wide variety of bushveld and woodland.

This report recommends that once finalised, the proposed footprint of the mining be assessed for such species and a permit for their removal be obtained prior to commencement.

6.6.7.5 Alien and Invasive Plant Species

Declared weeds and invader plant species have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition, and function of natural ecosystems. Therefore, it is important that these plants are controlled and eradicated by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001).

NEMBA is the most recent legislation pertaining to alien invasive plant species. On 25 September 2020, the updated list of Alien Invasive Species was published in terms of NEMBA (Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 43735, 25 September 2020. The legislation calls for the removal and / or control of alien invasive plant species. Below is a brief explanation of the three categories in terms of NEMBA:

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:
(a) notify the competent authority in writing
(b) take steps to manage the listed invasive species in compliance with
(i) section 75 of the Act;
(ii) the relevant invasive species management programme developed in terms of regulation 4; and
(iii) any directive issued in terms of section 73(3) of the Act.

Table 15 lists the invasive species encountered. The infestation was low with the most serious threat that of the *Pennisetum* grass colonising the overburden of the deserted iron ore mine to the north of the site.

Table 15: Category 1b invasive plant species recorded at the time of the site visit (Dimela Eco Consulting 2023)

Species	Common name	Habitat
Cereus hildmannianus /jamacaru	queen of the night	Sporadically through the site, but mainly within the *Vachellia tortilis* thornveld
Malvastrum coromandelianum	prickly malvastrum	Sporadically through the site, but mainly within the *Vachellia tortilis* thornveld
Pennisetum setaceum	fountain grass	On the northern boundary, adjacent to the deserted iron ore mine

6.6.8 Vegetation Importance and Sensitivity

It has been clearly demonstrated that vegetation not only forms the basis of the trophic pyramid in an ecosystem, but also plays a crucial role in providing the physical habitat within which organisms complete their life cycles (Kent & Coker 1992). Therefore, the vegetation of an area will largely determine the ecological sensitivity thereof.

The Vegetation Importance and Sensitivity (VIS) is discussed and mapped as detailed in the methodology section (Section 2.5 of the original report). Due to the similar ratings of the vegetation groups, they are discussed as the Mountainous Bushveld and Vegetation associated with Watercourses.

VIS is a function of the (**BI**) of the receptor (e.g. species of conservation concern, the vegetation community or habitat type present on the site) and its resilience to impacts as follows:

VIS = Biodiversity Importance (**BI**) + Receptor Resilience (**RR**)
Wherein **BI** in turn is:
BI = Conservation Importance (**CI**) + Functional Integrity (**FI**)

Table 16: Scoring of vegetation that occurs within the site assessed

Broad vegetation community	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Vegetation Importance & Sensitivity (VIS) – mitigation
Broadleaf *Combretum* Bushveld	**Medium** More than 50% of receptor contains natural habitat with potential to support SCC, Situated in a SWSA	**High** Very large (>100 ha) intact area for any conservation status of ecosystem type. High habitat connectivity Only minor current negative ecological impacts	**Medium**	**Medium** Recovers slowly (>10 years for >70 % of the original species composition and functionality Species moderately likely to return to site once impact ceases.	**Medium** Minimise and restore
Vachellia tortilis thornveld	**Medium** More than 50% of receptor contains natural habitat with potential to	**High** Very large (>100 ha) intact area for any conservation status of ecosystem type.	**Medium**	**Medium** Recovers slowly (>10 years for >70 % of the original species	**Medium** Minimise and restore

Broad vegetation community	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Vegetation Importance & Sensitivity (VIS) – mitigation
	support SCC, Situated in a SWSA	High habitat connectivity Only minor current negative ecological impacts		composition and functionality Species moderately likely to return to site once impact ceases.	
Modified	**Very low** Unlikely to support SCCs No or limited natural habitat remaining.	**Very low** Very small (<1 ha) area. Several major current ecological impacts.	**Very low**	**High** Habitat can recover relatively quickly	**Very low**

6.6.8.1 Discussion of VIS results

The interpretation of the VIS ranks is described in Section 2: Methodologies; Table 4 of the original report. The VIS rating was utilised to generate the vegetation sensitivity map (Figure 26). This map must be considered along with the fauna sensitivity map and wetland map to obtain an overall sensitivity map.

6.6.8.2 Medium VIS

Within a medium VIS, development activities of medium impact are acceptable, if impacts are minimised, followed by appropriate restoration activities. However, high impact developments, such as mining, should be considered with caution, if at all. The site is within a CBA 1 and CBA 2 and if the entire site is mine, it will reduce the CBAs in the province by 375 ha. Therefore, development must be restricted in footprint and impacts managed and mitigated by an approved management plan. Edge effects to must be mitigated / prevented to ensure continuation of ecological processes and to limit fragmentation.

6.6.8.3 Very Low VIS

Development activities of medium to high impact are acceptable and restoration activities may not be required. Most types of development can proceed within these areas with little to no impact on conservation worthy vegetation. Edge effects to other proximate sensitivity classes must be mitigated / prevented.

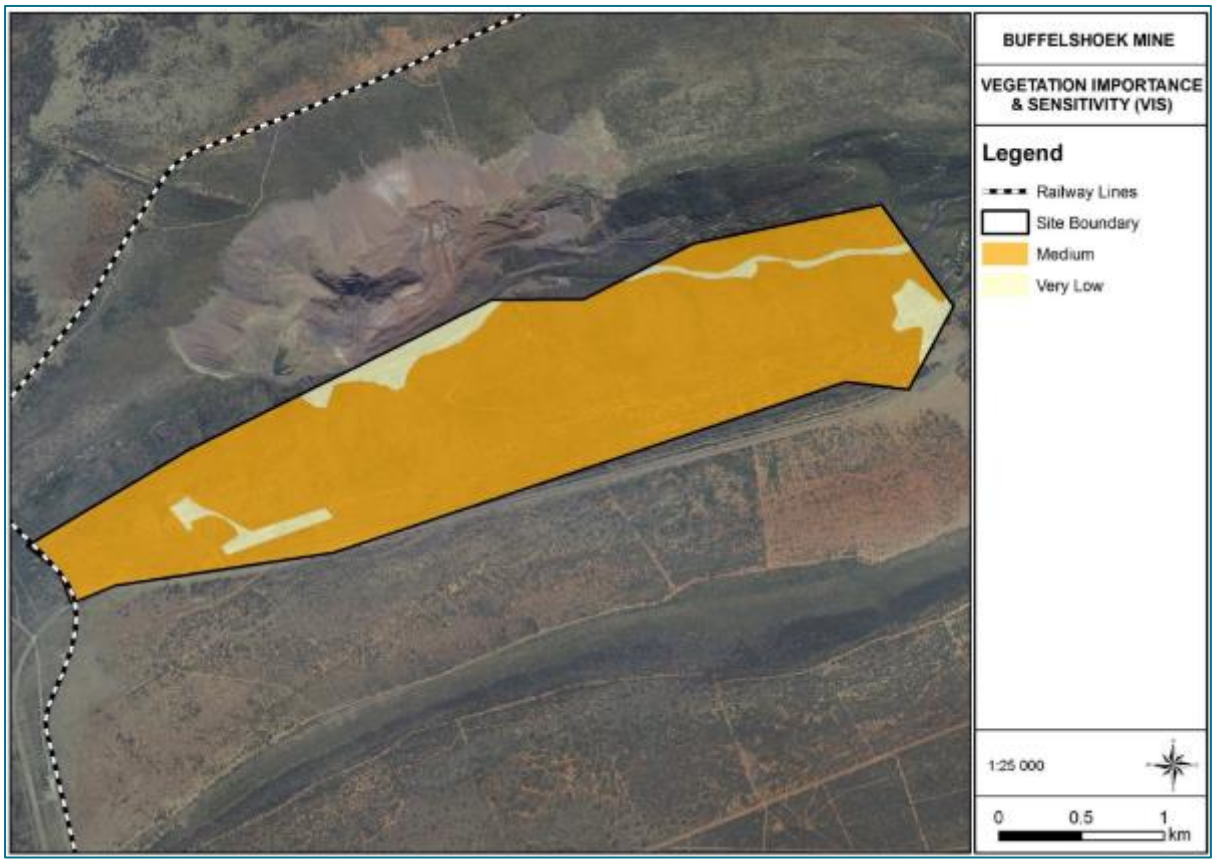

Figure 26: Vegetation Importance and Sensitivity map, specific to the proposed activities (Dimela Eco Consulting 2023)

6.7 Animal life

Information for this section was extracted from the Vertebrate fauna (Mammals & Herpetofauna) Habitat Assessment report (Limnology, 2022):

6.7.1 Mammals

6.7.1.1 Mammal Habitat Assessment

The local occurrences of mammals are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of mammal species by evaluating the habitat types within the context of global distribution ranges.

From a mammal habitat perspective, it was established that all four major habitats are naturally present on the study site.

Most of the study site consists of pristine Akasia and Broadleaf Bushveld. The site was first transformed for agricultural purposes like grazing by livestock and fields and later by anthropogenic influences such as mining, invasive plants, gravel roads, fences ground clearing, poaching and man-

made structures like a trough. The study site can thus be regarded as ecologically disturbed, but only in certain parts. No moribund termitaria were recorded on the study site. These structures are good indicators of the occurrence of small mammals. Accordingly, it is estimated that the mammal population density for the study site is somewhat lower. At the time of the site visit the basal cover was good in many places after good rain and would provide adequate nourishment and cover for small terrestrial mammals (Figure 27).

Figure 27: Good grass cover on the study site

Many indigenous trees grow on the site, which would provide arboreal habitat for arboreal mammal species (Figure 28). Due to the presence of natural arboreal habitat, many arboreal species like vervet monkey, South African galago and woodland dormouse were added to the species list in Table 17. There are several dead logs, which would provide shelter and food for some mammals.

Figure 28: Arboreal habitat on the study site

There is very good aquatic habitat just west of the site in the form of the Bierspruit (Figure 29) and the Crocodile River east of the site. Permanent and temporary water sources occur on the rest of the study site in the form of artificial water holes and small drainage lines.

Figure 29: The Bierspruit west of the site

There are also important natural rupicolous habitats on the study site in the form of ridges (Figure 28 & Figure 29) and rock-embedded soil (Figure 30). Man-made rupicolous habitat exists in the form of a mine (Figure 31) and manmade structures such as artificial waterpoints. Due to the presence of natural rupicolous habitat, species like eastern rock elephant shrew, klipspringer, mountain reedbuck and grey rhebok, Jameson's red rock rabbit and dassie were added to the species list in Table 17.

Figure 30: Rock-embedded soil on the site

Figure 31: Man-made rupicolous habitat on site

The site has no caves suitable for cave-dwelling bats, although some of the mining areas may act as substitute daytime roosts. It is likely that common bats commute from roosting sites elsewhere to hawk for insects over the Bierspruit, Crocodile River and other wetlands of the study site.

Many of the surrounding properties are currently used for game farming and with the exception of the R510 tar road south of the site and mining activities, connectivity is fairly good. However, game fences inhibit large mammal movement. Real opportunities for migration exist along the Bierspruit and Crocodile River.

Sight records were also used to compile this mammal report.

6.7.1.2 Expected and Observed Mammal Species Richness

Many large mammals (such as elephant, African buffalo, hippopotamus, giraffe, tsessebe, roan, blue wildebeest, red hartebeest, eland, southern reedbuck, waterbuck, black and white rhino, lion, wild dog, cheetah, and spotted hyena have long since been extirpated for sport and later to favour livestock farming. However, many other large to medium-sized mammals still occur on the site or were introduced, like plain zebra, kudu, impala, bushbuck, vervet monkey, brown hyena, aardwolf, aardvark, warthog, black-backed jackal, common duiker, and steenbok.

The species richness is fair to good due to the pristine nature of most parts. Most of the species on the study site are common and widespread (viz. common duiker, scrub hare, vervet monkey, multimammate mouse, pygmy mouse, genet species, mongoose species, tree squirrel and others).

Of 91 mammal species expected to occur on the study site (Table 17), six were confirmed during the site visit. It should be noted that potential occurrences are interpreted as being possible over a period

of time as a result of environmentally induced expansions and contractions of population densities and ranges, which stimulate migration.

Table 17 lists the mammals which are deemed as probable residents on the study site and the 500 metres extended study area. All feral or domesticated mammal species expected to occur on or near the study site (e.g. house mice, house rats, cattle, sheep, dogs and cats) were omitted from Table 17 since these species are normally associated with human settlements.

The bats listed are mostly common in the area wherever they can find daytime roosts in manmade structures. Many bat species commute over considerable distances in search of rich feeding patches, such as insects that are swarming (or may eventually swarm) over wetlands at dusk.

The species richness is good due to the size of the site and the fact that all four habitat types occur on the study site.

Table 17: Mammal species richness. The species observed or deduced to occupy the site. (Systematics and taxonomy as proposed by Skinner & Chimimba [2005], Apps [2012] Stuart & Stuart [2015], and Child. et.al. 2016).

	Scientific Name	English Name
	Order: MACROSCELIDEA	
	Family: Macroschelididae	**Elephant-shrews**
?	*Elephantulus brachyrhynchus*	Short-snouted elephant-shrew
√	*Elephantulus myurus*	Eastern rock elephant-shrew
	Order: TUBULIDENTATA	
	Family: Orycteropodidae	**Aardvark**
√	*Orycteropus afer*	Aardvark
	Order: HYRACOIDEA	
	Family: Procaviidae	**Hyraxes**
√	*Procavia capensis*	Rock hyrax
	Family: Orycteropodidae	
	Order: LAGOMORPHA	
	Family: Leporidae	**Hares, rabbits and rock rabbits**
√	*Lepus saxatilis*	Scrub hare
√	*Pronolagus randensis*	Jameson's red rock rabbit
	Order : RODENTIA	
	Family: Bathyergidae	**Mole rats**
√	*Cryptomys hottentotus*	African mole rat
	Family: Hystricidae	**Porcupines**
√	*Hystrix afriaeaustralis*	Cape porcupine
	Family: Thryonomyidae	**Canerats**

	Scientific Name	English Name
*	*Thryonomys swinderianus*	Greater canerat
	Family: Pedetidae	
√	*Pedetes capensis*	Springhare
	Family: Sciuridae	Squirrels
√	*Paraxerus cepapi*	Tree squirrel
	Family: Myoxidae	**Dormice**
*	*Graphiurus platyops*	Rock dormouse
√	*Graphiurus murinus*	Woodland dormouse
	Family: Muridae	**Rats and mice**
?	*Acomys spinosisimus*	Spiny mouse
*	*Lemniscomys rosalia*	Single-striped grass mouse
*	*Rhabdomys pumelo*	Four-striped grass mouse
?NT	*Dasymys incomtus*	African marsh rat
√	*Mus indutus*	Desert pygmy mouse
?	*Mastomys natalensis*	Natal multimammate mouse
√	*Mastomys coucha*	Southern multimammate mouse
√	*Thallomys paedulcus*	Acacia rat
√	*Aethomys ineptus*	Tete veld rat
√	*Micaelamys namaquensis*	Namaqua rock mouse
?	*Otomys angoniensis*	Angoni vlei rat
√	*Otomys irroratus*	Vlei rat
?	*Gerbillurus paeba*	Hairy-footed gerbil
*	*Tatera leucogaster*	Bushveld gerbil
√	*Tatera brantsii*	Highveld gerbil
*	*Saccostomus campestris*	Pouched mouse
√	*Dendromus melanotis*	Grey pygmy climbing mouse
?	*Dendromus mystacalis*	Chestnut climbing mouse
*	*Steatomys pratensis*	Fat mouse
	Order: PRIMATES	
	Family: Galagidae	**Galagos**
√	*Galago moholi*	South African galago
	Family: Cercopithecidae	Baboons and monkeys
√	*Papio hamadryas*	Chacma baboon
√	*Cercopithecus pygerythrus*	Vervet monkey
	Order: EULIPOTYPHA	
	Family Soricidae	**Shrews**
?	*Suncus lixus*	Greater dwarf shrew
?NT	*Crocidura mariquensis*	Swamp musk shrew
*	*Crocidura fuscomurina*	Tiny musk shrew
*	*Crocidura cyanea*	Reddish-grey musk shrew
?	*Crocidura silacea*	Lesser grey-brown musk shrew

	Scientific Name	English Name
*	*Crocidura hirta*	Lesser red musk shrew
	Family: Erinaceidae	**Hedgehog**
*NT	*Atelerix frontalis*	Southern African hedgehog
	Order: CHIROPTERA	**Bats**
	Family: PTEROPIDAE	**Epauletted fruit bats**
?	*Epomophorus wahlbergi*	Wahlberg's epauletted fruit bat
?	*Eidolon helvum*	Straw-coloured fruit bat
	Family: Embalonuridae	**Sheath-tailed bats**
?	*Taphozous mauritianus*	Mauritian tomb bat
	Family: Molossidae	**Free-tailed bats**
√	*Tadarida aegyptiaca*	Egyptian free-tailed bat
	Family: Vespertilionidae	**Vesper bats**
?	*Miniopterus natalensis*	Natal Long-fingered bat
?	*Pipisterellus rusticus*	Rusty pipistrelle
√	*Neoromicia capensis*	Cape serotine bat
?	*Myotis tricolor*	Temminck's hairy bat
?	*Scotophilus dinganii*	African yellow house bat
	Family: Nycteridae	**Slit-faced bats**
?	*Nysteris thebaica*	Egyptian slit-faced bat
	Family: Rhinolophidae	**Horseshoe bats**
?	*Rhinolophus hildebrandtii*	Hildebrandt's horseshoe bat
?	*Rhinolophus darling*	Darling's horseshoe bat
?NT	*Rhinolophus blasii*	Blasius's horseshoe bat
?	*Rhinolophus simulator*	Bushveld horseshoe bat
	Family: Hipposideridae	Trident bats and leaf-nosed bats
?	*Hipposideros caffer*	Sundevall's roundleaf bat
	Order: PHOLIDOTA	
	Family: Manidae	**Pangolins**
?VU	*Mantis (Smutsia) temminckii*	Ground pangolin
	Order: CARNIVORA	
	Family: Hyaenidae	Hyaenas
*	*Proteles cristatus*	Aardwolf
*NT	*Parahyaena brunnea*	Brown hyaena
	Family: Felidae	**Cats**
?VU	*Panthera pardus*	Leopard
√	*Caracal caracal*	Caracal
√	*Felis silvestris*	African wild cat
?NT	*Leptailurus serval*	Serval
	Family: Viverridae	**Civets and genets**
?	*Civettictis civetta*	African civet
√	*Genetta genetta*	Small-spotted genet

	Scientific Name	English Name
√	*Genetta tigrina*	South African large-spotted genet
	Family: Herpestidae	**Suricates and mongooses**
√	*Cynictis penicillata*	Yellow mongoose
√	*Galerella sanguinea*	Slender mongoose
√	*Ichneumia albicauda*	White-tailed mongoose
√	*Atilax paludinosus*	Marsh mongoose
√	*Mungos mungo*	Banded mongoose
?	*Helogale parvula*	Dwarf mongoose
	Family: Canidae	**Foxes, wild dogs and jackals**
?	*Otocyon megalotis*	Bat-eared fox
√	*Canis mesomelas*	Black-backed jackal
?	*Vulpes chama*	Cape fox
	Family: Mustelidae	**Otters, honey badger, weasel and polecat**
?NT	*Aonyx capensis*	African clawless otter
*****	*Mellivora capensis*	Honey badger
?NT	*Poecilogale albinucha*	African striped weasel
√	*Idonyx striatus*	Striped polecat
	Order: SUIFORMES	
	Family: Suidae	**Pigs**
?	*Potamochoerus larvatus*	Bushpig
√	*Phacochoerus africanus*	Common warthog
	Order: PERISSODACTYLA	
	Family: Equidae	**Zebra**
√	*Equus quagga*	Plains zebra
	Order: RUMINANTIA	
	Family: Bovidae	**Antelopes and buffalo**
√	*Tragelaphus strepsiceros*	Greater kudu
?	*Tragelapus scriptus*	Bushbuck
√	*Sylvicapra grimmia*	Common duiker
***EN**	*Redunca fulvorufula*	Mountain reedbuck
?NT	*Pelea capreolus*	Grey rhebuck
√	*Raphicerus campestris*	Steenbok
√	*Aepyceros melampus*	Impala
√	*Oreotragus oreotragus*	Klipspringer

√ Definitely present or have a high probability to occur;

* Medium probability to occur based on ecological and distributional parameters;

? Low probability to occur based on ecological and distributional parameters.

Red Data species rankings as defined in Friedmann and Daly's S.A. Red Data Book / IUCN (World Conservation Union) (2004) are indicated in the first column: CR= Critically Endangered, En = Endangered, Vu = Vulnerable, LR/cd = Lower risk conservation dependent, LR/nt = Lower Risk near threatened, DD = Data Deficient. All other species are deemed of Least Concern.

Table 18: Mammal species positively confirmed on the study site, observed indicators and habitat.

Scientific Name	English Name	Observation Indicator	Habitat
Papio hamadryas	Chacma baboon	Scat & Vocalisation	Terrestrial, Rupicolous & Arboreal
Cercopithecus pygerythrus	Vervet monkey	Sight record	Terrestrial & Arboreal
Phacochoerus africanus	Common warthog	Spoor and feeding signs	Terrestrial
Equus quagga	Plains zebra	Scat	Terrestrial
Tragelaphus strepsiceros	Greater kudu	Spoor	Terrestrial
Aepyceros melampus	Impala	Sight record	Terrestrial

The Chacma baboon, vervet monkey, common warthog, plains zebra, greater kudu and impala, listed in Table 18, should be common or fairly common on the study site and elsewhere in its range.

6.7.1.3 Threatened and Red Listed Mammal Species

All Red Data species listed in Table 17 as Critically Endangered, Vulnerable, Near Threatened or Data Deficient are discerning species and became endangered as a result of the deterioration of their preferred habitats.

The study site falls outside the natural range of the yellow golden mole (*Calcochloris obtusirostris*); Gunning's golden mole (*Neamblysomus gunningi*); Juliana's golden mole (*Neamblysomus julianae*); robust golden mole; (*Amblysomus robustus*); four-toed elephant-shrew *(Petrodromus tetradactylus*); Maquassie musk shrew (*Crocidura maquassiensis*); the Wood's slit-faced bat (*Nycteris woodi*); Commerson's roundleaf bat (*Hipposideros commersoni*); Swinny's horseshoe bat (*Rhinolophus swinnyi*); damara woolly bat (*Kerivoula argentata*); samango monkey (*Cercopithecus albogularis*); spotted-necked otter (*Hydrictis maculicollis*); red duiker (*Cephalophus natalensis*) and suni (*Neotragus moschatus*). These species should not occur on the study site.

Due to their ability to fly and cover large distances, the distribution information on some bat species is insufficient. Therefore, it is possible that Red Data bat species might occur on site.

Due to the presence of the Bierspruit and the Crocodile River, certain Red Data mammals could occur on the study site. The swamp musk shrew may occur on the study site, because this species is associated with a swampy environment (Skinner & Chimimba, 2005). There are sufficient wetlands in the Bierspruit and Crocodile River for the Cape clawless otter and this species could also occur on the study site from time to time. There is a small possibility that the African marsh rat may occur on the study site due to the presence of the Bierspruit, Crocodile River and other wetlands near the site.

The Southern African hedgehog occurs in a wide variety of habitat types but must have vegetation. It is possible that some individuals may occur on the study site.

Due to the presence of large natural rupicolous habitat, certain Red Data mammals could be present on the site, which include mountain reedbuck and grey rhebok.

It is also possible that the ground pangolin, leopard, serval, brown hyena and African striped weasel may occur on the site from time to time.

No other Red Data or sensitive species are deemed present on the site, either since the site is too disturbed, falls outside the distributional ranges of some species, or does not offer suitable habitat(s).

6.7.1.4 Cheetah (*Acinonyx jubatus*)

According to the Screening Tool Report for Buffelshoek Mine, the cheetah has a medium sensitivity. Due to the close proximity of many game reserves and game farms, the quarter degree grid cell could contain cheetahs.

However, the site is disturbed, too small, and does not have many prey species, therefore cheetah probably does not occur on the site.

6.7.2 Herpetofauna

6.7.2.1 Herpetofauna Habitat Assessment

The local occurrences of reptiles and amphibians are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of reptile and amphibian species by evaluating the habitat types within the context of global distribution ranges. From a herpetological habitat perspective, it was established that all four major habitats are naturally present on or near the study site, namely terrestrial, arboreal, rupicolous and wetland-associated vegetation cover.

Most of the study site consists of Akasia and Broadleaf Bushveld. The site was first transformed for agricultural purposes like grazing and later by anthropogenic influences such as mining, invasive plants, gravel roads, fences, ground clearing, poaching and man-made structures like an artificial trough (Figure 32). The study site can thus be regarded an ecologically disturbed area, but only in certain parts. No moribund termitaria were recorded on the study site. These structures are good indicators of the occurrence of small herpetofauna. Accordingly, it is estimated that the reptile and amphibian population density for the study site is somewhat lower. At the time of the site visit the basal cover was good in many places and would provide adequate cover for small terrestrial herpetofauna.

There are also important natural rupicolous habitats on the study site in the form of ridges (Figure 28; Figure 29) and rock-embedded soil (Figure 30). Manmade rupicolous habitat exists in the form of a

large mine (Figure 31) and manmade structures such as an artificial trough. Due to the presence of natural rupicolous habitat, species like the common giant plated lizard, dwarf flat lizard, rainbow skink, common girdled lizard and rock agama were added to the species list in Table 19.

Figure 32: Man-made rupicolous habitat in the form of a trough on the site.

Many indigenous trees grow on the site, which would provide arboreal habitat (Figure 33) for many arboreal mammal species. Due to the presence of natural arboreal habitat, many arboreal species like boomslang, tree agamas and flap-necked chameleons may occur on the site. There are many dead logs, which would provide shelter and food for several herpetofauna.

Figure 33: Arboreal habitat on the study site.

There is very good aquatic habitat just west of the site in the form of the Bierspruit (Figure 29) and the Crocodile River east of the site. Permanent and temporary water sources occur on the rest of the study site in the form of artificial water bodies (Figure 34) and small drainage lines (Figure 35).

Figure 34: An artificial wetland on the site, which provides good habitat for some herpetofauna.

Figure 35: A small drainage line on the study site.

All rivers, streams and wetlands are protected and are regarded as sensitive.

Many of the surrounding properties are used for game farming and with the exception of the R510 tar road south of the site and some mining activities, connectivity is fairly good. However, game fences inhibit large mammal movement. Real opportunities for migration exist along the Bierspruit and Crocodile River.

Sight records were also used to compile this mammal report.

6.7.2.2 Expected and Observed Herpetofauna Species Richness

Of the 91 reptile species which may occur on the study site (Table 19), three were confirmed during the site visit (Table 20) and of the 22 amphibian species which may possibly occur on the study site (Table 19), one was confirmed during the site visit (Table 20). Table 19 lists the reptiles & amphibians which were observed on or deduced to occupy the site.

The American red-eared terrapin (*Trachemys scripta elegans*) and the Brahminy blind snake (*Ramphotyphlops braminus*) are the only two feral reptile or amphibian species known to occur in South Africa (De Moor and Bruton, 1988; Picker and Griffiths, 2011), but with only a few populations, they are not expected to occur on this particular site.

The species assemblage is typical of what can be expected of habitat that is severely disturbed, but with sufficient habitat to sustain populations. Most of the species of the resident diversity (Table 19) are fairly common and widespread (viz. the common house snake, mole snake, common dwarf gecko, common tropical house gecko, striped skink, variable skink, guttural toad, red toad, common platanna and Boettger's caco).

The species richness is fair to good due to the size of the site and the fact that all four habitat types occur on site.

Table 19: Reptile and Amphibian diversity. The species observed or deduced to occupy the site. Systematic arrangement and nomenclature according to Branch (1998), Minter, et.al (2004), Alexander & Marais (2007), Bates et.al (2014) and Du Preez & Carruthers (2017).

	Scientific Name	**English Name**
	Class: REPTILIA	**Reptiles**
	Order: TESTUDINES	**Tortoises & Terrapins**
	Family: Pelomedusidae	Terrapins
√	*Pelomedusa subrufa*	Marsh Terrapin
√	*Pelusios sinuatus*	Serrated Hinged Terrapin
	Family: Testudinidae	Tortoises
?**VU**	*Kiniixys lobatsiana*	Lobatse Hinged-Back Tortoise
*	*Kinixys spekii*	Speke's Hinged-Back Tortoise
?	*Psammobates oculifer*	Serrated Tent Tortoise
√	*Stigmochelys pardalis*	Leopard Tortoise
	Order: CROCODYLIA	
	Family: Crocodylidae	**Crocodiles**
?**VU**	*Crocodylus niloticus*	Nile Crocodile

	Scientific Name	English Name
	Order: SQUAMATA	**Scale-Bearing Reptiles**
	Suborder: LACERTILIA	**Lizards**
	Family: Gekkonidae	**Geckos**
√	*Chondrodactylus turneri*	Turner's Gecko
√	*Hemidactylus mabouia*	Common Tropical House Gecko
√	*Homopholis wahlbergi*	Wahlberg's velvet Gecko
√	*Lygodactylus capensis capensis*	Common Dwarf Gecko
?	*Lygodactylus nigropunctatus nigropunctatus*	Black-Spotted Dwarf Gecko
?**NT**	*Lydodactylus waterbergensis*	Waterberg Dwarf Gecko
√	*Pachydactylus affinis*	Transvaal Gecko
?	*Pachydactylus capensis*	Cape Gecko
	Family: Amphisbaenidae	**Amphisbaenians**
√	*Dalophia pistillum*	Pestle-Tailed Worm Lizard
*	*Monopeltis infuscata*	Dusky Worm Lizard
?	*Zygaspis quadrifrons*	Kalahari Dwarf Worm Lizard
?	*Zygaspis vandami*	Van Dam's Worm Lizard
	Family:Lacertidae	**Old World Lizards or Lacertids**
?	*Heliobolus lugubris*	Bushveld Lizard
√	*Meroles squamulosus*	Savanna Lizard
√	*Ichnotropis capensis*	Ornate Rough-Scaled Lizard
*	*Nucras holubi*	Holub's Sandveld Lizard
√	*Nucras intertexta*	Spotted Sandveld Lizard
√	*Pedioplanis lineoocellata lineoocellata*	Spotted Sand Lizard
?	*Pedioplanis lineoocellata pulchella*	Common Sand Lizard
	Family: Cordylidae	**Cordylids**
*	*Cordylus jonesii*	Jones' Girdled Lizard
?	*Cordylus vittifer*	Common Girdled Lizard
*	*Smaug breyeri*	Waterberg Dragon Lizard
?	*Platysaurus guttatus*	Dwarf Flat Lizard
?	*Platysaurus minor*	Waterberg Flat Lizard
	Family: Gerrhosauridae	**Plated Lizards**
√	*Gerhosaurus flavigularis*	Yellow-throated Plated Lizard
√	*Matobosaurus validus*	Common Giant Plated Lizard
	Family: Scincidae	**Skinks**
?	*Acontias occidentalis*	Savanna Legless Skink
√	*Afroablepharus wahlbergii*	Wahlberg's Snake-Eyed Skink
√	*Mochlus sundevallii sundevallii*	Sundevall's Writhing Skink
√	*Trachylepis capensis*	Cape Skink
√	*Trachylepis margaritifer*	Rainbow Skink
√	*Trachylepis punctatissima*	Speckled Rock Skink

	Scientific Name	English Name
?	*Trachylepis striata*	Striped Skink
√	*Trachylepis varia*	Variable Skink
	Family: Varanidae	**Monitors**
√	*Varanus albigularis albigularis*	Southern Rock Monitor
√	*Varanus niloticus*	Nile Monitor
	Family Chamaeleonidae	**Chameleons**
√	*Chamaeleo dilepis dilepis*	Common Flap-Neck Chameleon
	Family: Agamidae	**Agamas**
√	*Agama aculeate distanti*	Eastern Ground Agama
?	*Agama atra*	Southern Rock Agama
√	*Acanthocerus atricollis atricollis*	Southern Tree Agama
	Suborder: SERPENTES	**Snakes**
	Family: Typhlopidae	**Blind Snakes**
*	*Afrotyphlops bibronii*	Bibron's Blind Snake
?	*Megatyphlops schlegelii*	Schlegel's Giant Blind Snake
	Family: Leptotyphlopidae	**Thread Snakes**
?	*Leptotyphlops distanti*	Distant's Thread Snake
√	*Leptotyphlops scutifrons scutifrons*	Peter's Thread Snake
	Family: Pythonidae	**Pythons**
√	*Python natalensis*	Southern African Python
	Family: Viperidae	**Adders**
√	*Bitis arietans arietans*	Puff Adder
*	*Bitis caudalis*	Horned Adder
*	*Causus defilippii*	Snouted night Adder
√	*Causus rhombeatus*	Rhombic Night Adder
	Family: Lamprophiidae	
√	*Amblyodipsas polylepis polylepis*	Common Purple-Glossed Snake
*	*Aparallactus capensis*	Black-headed Centipede Eater
*	*Atractapis bibronii*	Bibron's Stiletto Snake
?	*Xenocalamus bicolour bicolour*	Bicoloured Quill-Snouted Snake
?	*Xenocalamus bicolour australis*	Waterberg Quill-Snouted Snake
√	*Boaedon capensis*	Common House Snake
*	*Limaformosa capensis*	Common File Snake
?	*Gracililima nyassae*	Black File Snake
?	*Lycodonomorphus inornatus*	Olive Ground Snake
?	*Lycodonomorphus rufulus*	Brown Water Snake
?	*Lycophidion capense capense*	Cape Wolf Snake
?	*Lycophidion variegatum*	Variegated Wolf Snake
*	*Psammophis angolensis*	Dwarf Sand Snake
√	*Psammophis brevirostris*	Short-snouted Grass

	Scientific Name	English Name
?	*Psammophis jallae*	Jalla's Sand Snake
?	*Psammophis subtaeniatus*	Western Yellow-Bellied Sand Snake
?	*Psammophylax rhombeatus rhombeatus*	Striped Grass Snake (Skaapsteker)
√	*Psammophylax tritaeniatus*	Striped Grass Snake (Skaapsteker)
?	*Prosymna stuhlmannii*	East African Shovel-Snout
?	*Prosymna bivittata*	Two-Striped Shovel-Snout
*	*Prosymna sundevallii*	Sundevall's Shovel-Snout
√	*Pseudaspis cana*	Mole Snake
	Family: Elapidae	**Cobras, Mambas and Others**
*	*Aspidelaps scutatus scutatus*	Common Shield Cobra
*	*Dendroaspis polylepis*	Black Mamba
?	*Elapsoidea sunderwallii*	Sundevall's Garter Snake
√	*Naja annulifera*	Snouted Cobra
√	*Naja mossambica*	Mozambique Spitting Cobra
	Family: Colubridae	
*	*Crotaphopeltis hotamboeia*	Red-Lipped Snake
√	*Dasypeltis scabra*	Rhombic Egg Eater
√	*Dispholidus typus*	Boomslang
?	*Philothamnus hoplogaster*	Southeastern Green Snake
?	*Philothamnus natalensis occidentalis*	Western Natal Green Snake
√	*Philothamnus semivarietiegatus*	Spotted Bush Snake
*	*Telescopus semiannulatus semiannulatus*	Eastern Tiger Snake
*	*Thelotornis capensis capensis*	Southern Twig Snake
	Class: AMPHIBIA	**Amphibians**
	Order: ANURA	**Frogs**
	Family: Pipidae	**Clawed Frogs**
√	*Xenopus laevis*	Common Platanna
	Family: Bufonidae	**Toads**
?	*Poyntonophrynus fenoulheti*	Northern Pygmy Toad
*	*Sclerophrys gutturalis*	Guttural Toad
?	*Sclerophrys poweri*	Western Olive Toad
√	*Sclerophrys garmani*	Eastern Olive Toad
√	*Sclerophrys pusilla*	Flat-backed Toad
?	*Sclerophrys capensis*	Raucous Toad
√	*Schismaderma carens*	Red Toad
	Family: Ptychadenidae	**Grass Frogs**
?	*Hildebrandtia ornate*	Ornate Frog
√	*Ptychdena anchietae*	Plain Grass Frog
?	*Ptychdena mossambica*	Broad-banded Grass Frog
	Family: Hyperoliidae	**Reed Frogs**

	Scientific Name	English Name
√	*Kassina senegalesis*	Bubbling Kassina
	Family: Breviceptidae	**Rain Frogs**
√	*Breviceps adspersus*	Bushveld Rain Frog
	Family: Phrynobatrachidae	**Puddle Frog**
√	*Phrynobatrachus natalensis*	Snoring Puddle Frog
	Family:Microhylidae	**Rubber Frogs**
√	*Phrynomantis bifasciatus*	Banded Rubber Frog
	Family: Pyxicephalidae	
√	*Amietia delalandii*	Common River Frog
*	*Pyxicephalus edulis*	Edible Bullfrog
√	*Cocosternum boettgeri*	Boettger's Caco
√	*Tomopterna cryptotis*	Tremolo Sand Frog
?	*Tomopterna krugerensis*	Knocking Sand Frog
√	*Tomopterna natalensis*	Natal Sand Frog
	Family: Rhacophoridae	**Foam Nest Frog**
?	*Chiromantis xerampelina*	Southern Foam nest frog

√ Definitely present or have a high probability to occur;

* Medium probability to occur based on ecological and distributional parameters;

? Low probability to occur based on ecological and distributional parameters.

Systematic arrangement and nomenclature according to Branch (1998), Alexander & Marais (2007), Minter, et.al (2004), Du Preez & Carruthers (2009) and Bates, et.al 2014.

Red Data species rankings as defined in Branch, The Conservation Status of South Africa's threatened Reptiles': 89 – 103..In:- G.H.Verdoorn & J. le Roux (editors), 'The State of Southern Africa's Species (2002) and Minter, et.al, Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland (2004) are indicated in the first column: CR= Critically Endangered, En = Endangered, Vu = Vulnerable, NT = Near Threatened, DD = Data Deficient. All other species are deemed of Least Concern.

Table 20: Reptile and Amphibian species positively confirmed on the study site, observed indicators and habitat.

Scientific Name	English Name	Observation Indicator	Habitat
Trachylepis punctatissima	Speckled Rock Skink	Sight record	Man-made rupicolous habitat
Agama aculeate distanti	Eastern Ground Agama	Sight record	Terrestrial
Psammophylax tritaeniatus	Striped Grass Snake (Skaapsteker)	Sight record	Arboreal
Cocosternum boettgeri	Boettger's Caco	Vocalisation	Aquatic habitat

The speckled rock skink, eastern ground agama, striped grass snake and Boettger's caco listed in Table 20 should be abundant or common on the study site and elsewhere in its range.

6.7.2.3 Threatened and Red listed Reptile and Amphibian Species

Eastwood's long-tailed seps is now extinct and the study site also falls outside the natural range of this species.

The study site either falls outside the natural range or has no suitable habitat for the following species: woodbush flat gecko, Muller's velvet gecko, granite dwarf gecko, Methuen's dwarf gecko, cryptic dwarf gecko, Makgabeng dwarf gecko, Soutpansberg dwarf gecko, Waterberg dwarf gecko, Soutpansberg rock lizard, coppery grass lizard, large-scaled grass lizard, northern crag lizard, unexpected flat lizard, orange-throated flat lizard, Fitzsimons' flat lizard, stripe-bellied legless skink, Richard's legless skink, Woodbush legless skink, white-bellied dwarf burrowing skink, striped harlequin snake and northern forest rain frog. These species should not occur on the study site.

The study site falls inside the natural range of the Southern African python. According to Bradley (1990), Southern African pythons favour moist, rocky, well-wooded valleys, plantations or bush country, but seldom if ever stray far from permanent water. The study site is thus large enough to support a small population of the Southern African python. It is often estimated that a single python needs at least a 100-ha area to forage. A few Southern African python individuals may occur on the site and other individuals might migrate to and from the study site.

The Southern African python's national status has changed from Vulnerable (Branch, 1988) to regional Least Concern (Alexander, 2014), although it is currently still a TOPS listed species.

6.7.2.4 Sensitive Species 1

The study site falls inside the natural range of Sensitive species 1 and the Bierspruit and Crocodile Rivers both have potential habitat to support a few crocodiles. It is possible for this species to move onto the study site, especially during floods.

6.7.2.5 Sensitive Species 2

The study site falls in the distribution range of Sensitive animal species 12 (Boycott, 2014).

Vulnerable Sensitive animal species 12 was not mentioned in the South African Red Data Book– Reptiles and Amphibians (Branch, 1988) and has the status of Least Concern in the Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (Bates et.al. 2014). However, Hofmeyr & Boycott (2018) accorded that this species the Red Data Status of Vulnerable.

Degradation of this species' habitat is mainly due to habitat destruction due to agricultural conversion, urban development, mining activities and alien species invasion. The use of mechanical bush clearing and fire as management tools is particularly destructive. There are also indications that this species is sometimes used for food, cultural purposes, and the pet trade, which can cause local extinction (Hofmeyr & Boycott, 2018).

This species prefers rocky hillsides and rocky outcrops (Boycott & Bourquin, 2000). There is an area of such habitat available on the site and other rupicolous habitat on nearby properties. It is possible that individuals may occur on the study site. The development would affect this species negatively. The education of the construction staff about the value of wildlife and environmental sensitivity must be properly done. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.

Figure 36: Faunal Sensitivity Map (Limnology, 2022)

6.7.3 Avifauna

6.7.3.1 Avifaunal Habitat Assessment

Information for this section was extracted from the Avifaunal Habitat Assessment (Limnology, August 2023):

One of the primary reasons for conserving avifaunal species is that they are environmental indicators. Being a very mobile fauna, they move from less favourable environments to more favourable ones and are the first to respond to any environmental change, whether positive or negative. One of the

difficulties with human-induced environmental change is that it can often be many years before the full, long-term effects of a particular action become apparent. However, avifaunal species are quick to colonize optimal environments and to leave poor or degraded ones.

Some avifaunal species are habitat-specific or have very definite biological or ecological requirements, such as specific breeding, roosting or foraging habitat systems. These avifaunal species may not be able to move on and so often become threatened species, especially if their preferred habitat continues to shrink or degrade due to various impacts, which could include change in land-use or water regimes, altered weather patterns, and impacts such as overgrazing, bush encroachment, afforestation, desertification, human development, and the general transformation of natural vegetation due to urbanisation, mining and industrialisation. The number of threatened species in an area is therefore an indication of its general environmental health. Avifaunal species are very sensitive to environmental change and when deciding on whether a habitat is suitable, avifaunal species consider things such as the arrangement of vegetation, spaces between the foliage in trees and so on. Because of this sensitivity to their surroundings, avifaunal species can also be used as indicators to determine the health of existing areas. The presence or absence of certain avifaunal species (not only threatened species but also the more common grassland or wetland species) can give an immediate indication of the quality of the habitat system, such as water quality, depending on particular species individual requirements. This is however a long-term process and the presence of these avifaunal species in a certain area can only be determined over a period of time and during different seasons. The availability of suitable habitat is just as important due to the rate that these habitats are being transformed not only for threatened avifaunal species but also species that are habitat specific such as endemic and near-endemic avifaunal species.

Some avifaunal species will favour a specific habitat type such as river and riparian vegetation or open grassland while other bird species will make use of more than one habitat system such as riparian vegetation and other woodland vegetation. Some avifaunal species are able to adapt to areas change by man while other are very sensitive to human disturbance and areas transformed by man.

Three major avifaunal habitat systems were identified within the study area (Figure 37). A short description of each habitat type follows, ranked from most to least important. These habitat systems are as follow:

- River and riparian vegetation
- Thornveld dominated bushveld
- Disturbed and transformed Area

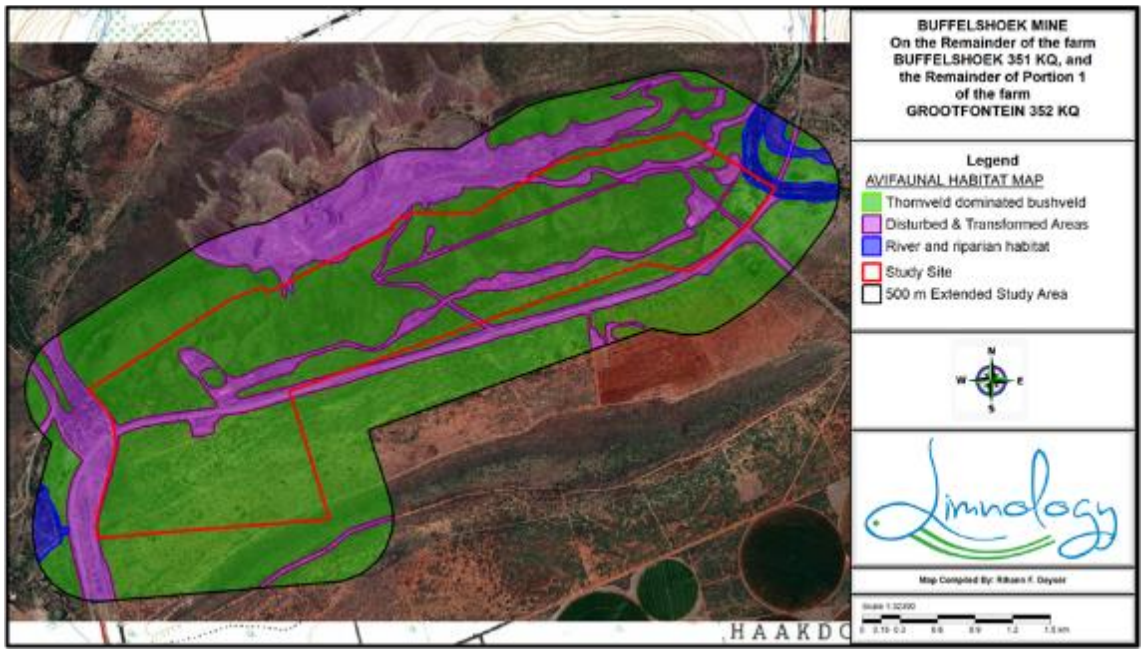

Figure 37: Avifaunal species habitat systems identified on the study site and within the study area (Limnology, 2023).

A short description of each habitat system follows, ranked from most to least important.

6.7.3.2 River and riparian habitat

Rivers can have permanent running water (perennial) or are seasonally dry (temporary).Here the habitat include the seasonal flood plains along the river reaches (Ginkel *et al*. 2011) as well as the riparian vegetation that grow along the river.

This habitat consists of the Crocodile River with riparian habitat the mainly consist of large thorny trees. The Crocodile River forms the far eastern boundary of the proposed development site and consists of a disturbed open area, resembling a floodplain area.

This floodplain area will mainly attract ground living bird species that either breed on the ground or forages on the ground for food, such as lapwings, hoopoes, bishops and lark species. Birds such as bishops, weavers, cisticolas and warblers will breed in the reeds and trees growing along the river feeding on insects that live within the riparian vegetation. The riparian vegetation will favour species typically associated with a bushveld habitat, including a variety of arboreal passerines such as drongos, warblers, flycatchers, shrikes, sunbirds, waxbills and weavers, and such arboreal non-passerines as doves, cuckoos and woodpeckers. Many of these species make use of the thorny nature of these trees to build their nests. *Acacia* trees generally also attract many insects that in turn attract a diversity of typical “Bushveld” bird species.

Although suitable habitat is present for Half-collared Kingfisher along the river with its riparian habitat, they are unlikely to occur due to a lack of reporting rate and suboptimal habitat conditions. African Finfoot will also favour this this habitat for foraging, roosting and possible breeding purposes. Despite suboptimal habitat conditions, very low numbers (0% for Half-collared Kingfisher and <1% n=1 for African Finfoot since 1 July 2007) have been recorded for these species along the Crocodile River stretch bordering the study area.

Sensitivity: The riparian area as delineated by an aquatic specialist together with a buffer area of 50 m from the edge of the riparian zone should be regarded as of high sensitivity.

Thornveld dominated bushveld

This habitat consists of the Waterberg Mountain Bushveld vegetation unit on the higher slopes for the mountain range to the north of the study site and the Dwaalboom Thornveld vegetation unit on the lower slopes and flat areas on the study site. This habitat system consists of thornveld dominated bushveld. In disturbed areas bush encroachment has occurred resulting in dense to almost impenetrable secondary vegetation growth.

This habitat system will favour avifaunal species typically associated with a bushveld habitat. This area generally include a variety of arboreal passerines such as drongos, warblers, flycatchers, shrikes, sunbirds, waxbills and weavers and arboreal non-passerines such as doves, cuckoos, woodpeckers. *Vachellia spp* (previously known as *Acacia*) and other thorny trees are well represented and many of the avifaunal species will make use of the thorny nature of these trees to build their nests, roost, forage and to hide from predator. Thorn trees generally attract many insects and in turn attract a good diversity of typical “Bushveld” bird species.

Sensitivity: It is unlikely that this habitat system will favour any threatened avifaunal species on and permanent basis and should they occur, they are only likely to move through the area on rare occasions to and from more suitable habitat surrounding the study site. This habitat system can be regarded as of low sensitivity for threatened bird species.

Disturbed and Transformed Areas

The rest of the study area is disturbed and consists of present and past mining activities and other developments and human related infrastructure. In general, these areas include roads, areas with dumping and areas that has been cleared or graded.

Sensitivity: Only the more common avifaunal species that are able to adapt to areas changed by man will make use of this habitat system. None of these species that occur within this habitat system are threatened. This habitat can be regarded as of low sensitivity.

6.7.3.3 Red Data Avifaunal Species

The following Red Data avifaunal species were recorded for the 2427CB q.d.g.c. according to the SABAP1 data (Harrison *et al.* 1997) and the current SABAP2 data and more specifically for the 2440_2720 pentad in which the largest part of the study area is situated (sabap2.adu.org.za Aug 2023) (Table 21). These species include species that were assessed as threatened during the 2000 assessment (Barnes, 2000) but are now assessed as least concern (LC) according to the 2015 assessment (Taylor *et al,* 2015).

Table 21: Red Data avifaunal species recorded during the SABAP1 and SABAP2 periods for the 2427CB q.d.g.c.

Scientific Names	Common Names*	Reporting Rate (%)**		
		SABAP1	SABAP2	Pentad
Coracias garrulus	European Roller (LC/NT)	0	2(n=6)	4(n=1)
Neotis denhami	Denham's Bustard (VU/VU)	0	<1(n=1)	0
Ardeotis kori	Kori Bustard (VU/NT)	2	0	0
Podica senegalensis	African Finfoot (VU/VU)	0	<1(n=1)	4(n=1)
Pterocles gutturalis	Yellow-throated Sandgrouse (NT/NT)	18	3(n=8)	32(n=8)
Rostratula benghalensis	Greater Painted-snipe (NT/VU)	2	<1(n=1)	0
Glareola nordmanni	Black-winged Pratincole (NT/NT)	1	0	0
Gyps africanus	White-backed Vulture (VU/EN)	2	<1(n=1)	0
Gyps coprotheres	Cape Vulture (VU/EN)	31	13(n=40)	0
Circus ranivorus	African Marsh Harrier (VU/EN)	1	0	0
Aquila rapax	Tawny Eagle (VU/EN)	1	0	0
Aquila verreauxii	Verreaux's Eagle (LC/NT)	0	1(n=3)	0
Polemaetus bellicosus	Martial Eagle (VU/EN)	2	3(n=8)	8(n=2)
Sagittarius serpentarius	Secretarybird (NT/VU)	0	1(n=4)	12(n=3)
Falco naumanni	Lesser Kestrel (VU/LC)	7	1(n=2)	0
Falco biarmicus	Lanner Falcon (NT/VU)	3	<1(n=1)	0
Falco peregrinus	Peregrine Falcon (NT/LC)	0	<1(n=1)	0
Phoenicopterus ruber	Greater Flamingo (NT/NT)	0	1(n=2)	8(n=2)
Mycteria ibis	Yellow-billed Stork (NT/EN)	4	<1(n=1)	4(n=1)
Ciconia nigra	Black Stork (NT/VU)	2	<1(n=1)	0
Ciconia abdimii	Abdim's Stork (LC/NT)	0	3(n=8)	8(n=2)
Leptoptilos crumeniferus	Marabou Stork (NT/NT)	2	3(n=10)	4(n=1)
Buphagus erythrorhynchus	Red-billed Oxpecker (NT/LC)	1	24(n=78)	4(n=1)
	Total species	**15**	**19**	**9**

*Red data status according to Barnes (2000)/Red Data status according to Taylor *et al* (2015)

Latest bird names according to BirdLife South Africa Checklist of Birds in South Africa (2017)

**The reporting rate of SABAP1 and SABAP2 is calculated as follows: Total number of cards on which a species was reported X 100 ÷ total number of cards for a particular quarter degree grid cell.

The reporting rate for each species is the percentage for the q.d.g.c. according to the SABAP 1 atlas (Harrison *et al.* 1997) (and the current SABAP2) data and is represented by colour codes as follows: Yellow = Very Low, Light Orange = Low, Dark Orange = Medium and Red = High. The colour codes of the SABAP2 reporting rate indicate the following; Red = decrease in reporting rate, Green = increase in reporting rate and Blue= stable reporting rate compared to the SABAP1 data.

Red Data avifaunal species categories: **EX**= Extinct (regionally), **CR** = Critically Endangered **EN** = Endangered, **VU =** Vulnerable, **NT =** Near-threatened, **LC =** Least Concern, **DD =** Data Deficient, **NR =** Not Recognised by BirdLife International, **NA** = Not Assessed (Taylor *et al* 2015).

Adhoc or **ind** = species seen incidentally while passing through the pentad. **"n"** = the number of times a certain species was recorded within a pentad since 1 July 2007.

A total of 23 Threatened or Red Data avifaunal species have been recorded within the 2427CB q.d.g.c. during the SABAP1 period (Harrison *et al.* 1997) and the current SABAP2 period combined, 15 species during the SABAP1 period, 19 species during the current SABAP2 period and 9 species for the pentad (SABAP2) in which the study area is situated (sabap2.adu.org.za August 2023) (Table 21).

A total of 52% (n=12) of the Red Data avifaunal species recorded for the q.d.g.c. indicate a decrease in reporting rate and 47% (n=11) species an increase in reporting rate. None are stable.

6.7.3.4 Summary of the Red Data avifaunal species

Table 22 provides a list of the Red Data avifaunal species recorded for the 2427CB q.d.g.c. according to the SABAP1 data (Harrison *et al.* 1997) and the current SABAP2 data and an indication of their likelihood of occurrence within the study area based on actual sightings and habitat and food availability.

Table 22: Red Data avifaunal species assessment for the study area according to the SABAP1 and SABAP2 data for the 2427CB q.d.g.c.

Species Name**	Presence of suitable habitat and habitat requirements	Likelihood of occurrence on study site
Coracias garrulus (European Roller) (**LC/NT**)	YES Closed to very open savanna. Most common in open, broadleaved and Acacia woodlands with grassy clearings; least common in areas with less-developed woody cover (Hockey *et al*, 2005).	Likely Might only pass through the area on rare occasions to and from more suitable habitat surrounding the study site.
Ardeotis kori (Kori Bustard) (VU/NT)	SUBOPTIMAL Fairly dry, open savanna with rainfall 100-600 mm; also Nama Karoo dwarf shrublands and, occasionally, western grasslands, where typically close to tree-lined watercourses, which provide cover when disturbed and shade during heat of day; also dry grassy pan edges. Occasionally in dense, closed-canopy woodland, including miombo (*Brachystegia*) and Zimbabwe Teak *Baikiaea plurijuga* woodland, especially breeding females, but usually absent from dense vegetation. Often on sandy soil, especially Kalahari sands, but also stony ground. Typically on level terrain, but sometimes hilly areas, probably when nesting. Mainly in natural vegetation, but sometimes aggregates in cleared areas, e.g. fire-breaks, airstrips, pastures and fields. Occasionally attracted to burnt ground (Hockey *et al*. 2005).	Highly unlikely Due to human disturbance and presence as a result of the close proximity of roads and miming areas. More suitable habitat can be found in more isolated areas further away and surrounding the study site. The species was only recorded during the SABAP1 project and have subsequently disappeared from the area.
Neotis denhami (Denham's Bustard) (VU/VU)	NONE In the grassland biome, its habitat is high-rainfall open, exposed, hilly, sour grassland during its breeding season (Tarboton *et al.* 1987). They move into cultivated pastures and cereal cropland in the nonbreeding season, where they prefer harvested fields; ploughed fields and fields with growing cereal crops are avoided (Herhold 1988; Allan 1993).	Highly unlikely Due to a lack of suitable habitat and human related disturbance on and surrounding the study site.

Podica senegalensis (African Finfoot) (**VU/CU**)	SUBOPTIMAL Occurs single or in pairs on clear perennial rivers and streams flanked by thick riparian bush vegetation with overhanging trees, shrubbery and reeds (Urban *et al*., 1986, Barnes and Parker, 2000). Avoids both stagnant and very fast-flowing turbulent waters, with a preference for perennial to ephemeral watercourses and clear to silted water (Hockey *et al*., 2005). Generally keeps to secluded, shady areas and seldom found far from shoreline vegetation; occasionally in mangroves, at the edges of dense papyrus beds and along vegetated verges of dams (Urban *et al*., 1986). Water temperature might be an important factor as finfoots plumage is probably not waterproofs (Harrison *et al*. 1997a). Finfoots hunt aquatic invertebrates and small vertebrates while swimming or walking along riverbanks and roost at night in riverine vegetation or on branches overhanging water. Their nest is built in tangles of flood debris caught among branches overhanging water or among driftwood or reeds (Tarboton, 2011).	Unlikely This species has not been recorded during the SABAP1 period and has only been recorded once (23 December 2012) since the start of the SABAP2 project period. This species is only likely to move through the area on very rare occasions.
Rostratula benghalensis (Greater Painted-snipe) (**NT/VU**)	NONE Dams, pans and marshy river flood plains. Favours waterside habitat with substantial cover and receding water levels with exposed mud among vegetation, departing when water recedes beyond the fringes of vegetation. Rare in seasonally flooded grassland and palm savanna (Hockey *et al*. 2005).	Highly unlikely Due to a lack of suitable foraging habitat
Glareola nordmanni (Black-winged Pratincole) (NT/NT)	NONE A non-breeding overland migrant to southern Africa. In southern Africa winter quarters, prefers open grassland, edges of pans and cultivated fields, but most common in seasonally wet grasslands and pan systems. Attracted to damp ground after rains, also to agricultural activities, including mowing and ploughing, and to newly flooded grassland (Hockey *et al*. 2005)	Highly unlikely Might only pass through the area on very rare occasions during migration.
Pterocles gutturalis (Yellow-throated	NONE Inhabits short, open grassy plains, particularly on relatively moist, black/cotton clay-like soils, usually near seasonal rivers or swamps, or on seasonal flood plains where pioneer	Highly unlikely. Due to a lack of suitable foraging habitat. Only likely to move through the area on rare occasions.

Sandgrouse) (NT/NT)	plant communities provide an abundant source of seeds for food. Also, readily occupies fallow fields in cultivated areas and recently burnt ground (Hockey *et al*. 2005). Short open grassveld, fallow fields and recently burnt veld on black clay soils, but avoid coarser soils derived from quartzite, granite or felsite, and also avoids natural, pristine *Acacia* savanna, preferring agricultural fields (Tarboton, *et al.* 1999).	
Gyps africanus (White-backed Vulture) (**VU/EN**)	SUBOPTIMAL Their presence is dependent on the availability of food. Lightly wooded arid savanna, including Mopane *Colophospernum mopane* woodland; but absent from forest, true deserts, and the treeless grass- and shrubland of the south and central Karoo (Hockey *et al*. 2005).	Highly unlikely This species is only likely to move through the area on rare occasions.
Gyps coprotheres (Cape Vulture) (VU/EN)	SUBOPTIMAL They mostly occur in mountainous country, or open county with inselbergs and escarpments; less commonly as visitors to savannah or desert (Maclean, 1993). Forage over open grassland, woodland and agricultural areas; usually roosts on cliffs, but will also roost on trees and pylons (Barnes, 2000). It is reliant on tall cliffs for breeding but it wanders widely away from these when foraging. It occurs and breeds from sea level to 3 100 m.a.s.l. Current distribution is closely associated with subsistence communal grazing areas characterised by high stock losses and low use of poisons and, to a lesser extent, with protected areas (Harrison *et al*. 1997a), but their presence is ultimately dependent on the availability of food. Gyps vultures are unique among extant vertebrates in being obligate scavengers. They feed typically in large groups, on large mammalian carcasses, both wild and domestic, (Mundy et al., 1992 & Piper in Hockey *et al*., 2005). Cape Vulture avoids forest and dense woodland likely due to difficulties in locating and accessing suitable carcasses in such habitat (Schultz 2007 in Taylor *et al*., 2015). Recent research has emphasised the important ecological role played by these birds in carcass removal, related to disease control (Ogada *et al*., 2012).	Highly unlikely Due to a lack of suitable foraging and breeding habitat, lack of food availability and human related disturbance on and surrounding the study site. Only likely to pass through the area on very rare occasions to and from more suitable habitat and food availability.
Circus ranivorus	NONE	Highly unlikely

(African Marsh Harrier) (**VU/EN**)	This species is dependant almost exclusively dependent on permanent wetlands both inland and coastal wetlands for breeding, feeding and roosting. It also hunts over drier floodplains, grassland, croplands and Fynbos where it preys mainly on small rodents as well as birds, reptiles, frogs and insects (Simmons in Hockey *et al*. 2005). Most highveld wetlands > 100 ha support a breeding pair (Tarboton & Allan 1984). Nests are usually placed in extensive reedbeds often high above water although breeding has been recorded in adjacent sedges, Fynbos, scrub and agricultural field, but these are considered to be rare occurrences (Kemp and Kemp, 2006). Forages over reeds, lake margins, floodplains and occasionally even woodland. Almost entirely absent from areas below 300 mm of rainfall (Harrison *et al*., 1997a). Marsh, vlei, grassland (usually near water); may hunt over grassland, cultivated lands and open savanna (Maclean, 1993). May utilise small wetlands 1-2 ha in extent for foraging, but larger wetlands are required for breeding (Barnes, 2000). Breeding adults are largely sedentary (Simmons in Hockey *et al*. 2005) with pairs often retaining the same territory year after year (Simmons, 1990) while juveniles disperse widely.	Due to a lack of suitable habitat.
Aquila rapax (Tawny Eagle) (VU/EN)	SUBOPTIMAL Occurs in lightly wooded savannah and thornveld as well as semi-desert but they are absent from dense forests and highlands (Simmons in Hockey *et al*. 2005). Able to colonise Nama Karoo and treeless grasslands by breeding on pylons and alien trees (Hockey *et al*. 2005). Adults maintain a year-round territory of approximately 70 km² (Tarboton & Allan, 1984) but do respond to temporarily favourable environmental conditions, or biological phenomena such as irruption of Red-billed Quelea (Quelea quelea) or Armoured Ground Crickets (Acanthoplus discoidalis). Their prey and feeding habits are similar to that of Bateleur (Terathopius ecaudatus), with scavenging and piracy being two of the most important foraging strategies (Watson *et al*., 1983). Breeding takes place during winter.	Highly unlikely Only likely to move through the area on rare occasions.
Aquila verreauxii	SUBOPTIMAL	Highly unlikely

(Verreaux's Eagle) (**LC/VU**)	Verreaux's Eagles prefer mountains and rocky areas with cliffs (Hockey *et al*. 2005). They are solitary nesters and build a massive stick structure on rocky outcrops or cliffs and more rarely in trees or on power pylons (Taylor *et al*., 2015) or tall telecommunication towers on top of mountains such as the Magaliesburg, Wonderboom, Gauteng (pers obs). Juveniles disperse from breeding areas, while adults show a strong fidelity to their breeding territories and the availability of prey seems to play a large role in breeding timing of and breeding density (Gargett & Mundy, 1990). They mainly breed from April with a single nestling fledging in October/November (Davies & Allan, 1997). Verreaux's Eagles feeds mainly on Rock Hyrax (*Procavia capensis*) although it is an opportunistic predator that will also prey on medium-sized mammals, large birds and carrion (Simmons in Hockey *et al*. 2005). Predation of hyrax varied from 70-180 hyraxes per pair per year and has been estimated to exceed 350 elsewhere (Gargett & Mundy, 1990). Paradoxically, the breeding performance of Verreaux's Eagle shows an inverse relationship with rainfall (Allan, 1988), as more hyraxes become available to eagles when they are forced to move further from their refuges to find food during drought (Davies, 1994) and probably also during the winter season. Populations do not show good correlation with fluctuation in hyrax numbers because the eagles are able to switch to alternative prey items when hyraxes are scarce. Birds in the Strandveld on the West Coast rely heavily on Augulate Tortoises (*Chersina angulata*) and Molerats (*Cryptomus & Bathyergus* spp) (M Murgatryd unpubl. data). Mammals consists of between 81-99% of the prey remains found at 73 nests in western South Africa, with Rock Hyrax (*Procavia capensis*) being more important in Karoo (89%, n = 3 623) than in the Eastern Cape grassland-savanna (62%, n = 1 370) or fynbos (49%, n = 755). Other mammalian prey include Vervet Monkey (*Cercopithecus aethiops*), Chacma Baboon (*Papio ursinus*), canerats (*Thryonomys* spp), Dune Mole Rat (*Bathyergus suillus*) bushbabies (*Galago* spp), bush squirrels (*Paraxerus* spp), hares (*Lepus* spp), rabbits (*Pronolagus* spp), African Porcupine (*Hystrix africaeaustralis*), African Wild Cat (*Felis lybica*), Grey Duiker (*Sylvicapra grimmia*), Klipspringer (*Oreotragus oreotragus*), Mountain	Only likely to move through the area on rare occasions.

	Reedbuck (*Redunca fulvorfula*) and Springbok (*Antidorcas marsupialis*). Avian prey mostly consists of guineafowl, francolins and bustards, but also Egyptian Goose, Cape Vulture chicks, herons, Southern Bald Ibis chicks, Western Cattle Egret, Kelp Gull, doves (taken in flight) and (rarely) chickens. One juvenile repeatedly took fledgling Cape Cormorants from nest ledges at Cape Point, Western Cape. Occasionally takes snakes and lizards, especially monitor lizards (*Varanus* spp); also tortoises, broken open by dropping them from air onto rocks (Hockey *et al*. 2005).	
Polemaetus bellicosus (Martial Eagle) (VU/EN)	SUBOPTIMAL Martial Eagles tolerates a wide range of vegetation types but seem to favour arid and mesic savannah but are also regularly found at forest edges and in open shrubland (Simmons in Hockey *et al*. 2005). They will occupy most habitats provided there are adequate tall trees or pylons for nesting and perching (Machange *et al*., 2005). They rarely occur in mountainous areas. Martial Eagles are known to nest on human-made structures, such as pylons and wind-pumps, and in alien trees (Tarboton & Allan, 1984). The ability to nest on such structures may have increased densities in natural treeless parts of the Karoo, Namaqualand and Kalahari (Machange *et al*., 2005). In extensive areas of good natural habitat, such as the Kruger National Park (Kemp & Kemp, 1974), immatures are uncommon while adults and juveniles are seen regularly (Kemp & Begg, 2001), suggesting that breeding pairs dominate the best habitat and immatures have to disperse elsewhere to mature. Declining sightings in the Kruger National Park suggests that adult recruitment may be falling because dispersal areas for immatures have become population sinks with reduced survival and therefore failing recruitment (Taylor *et al*., 2015). They are found in open grassland, scrub, Karoo, agricultural lands and woodland, It relies on large trees (or electricity pylons) to provide nest sites (Barnes, 2000) as well as windmills and even cliffs in treeless areas. It occurs mainly in flat country and is rarer in mountains, and it also avoids extreme desert, and densely wooded and forested areas (Harrison *et al*. 1997a & Barnes, 2000).	Highly unlikely With a low reporting rate this species is only likely to move through the area on rare occasions.

Sagittarius serpentarius (Secretarybird) (NT/VU)	NONE Secretarybirds prefers open grassland and scrub, with ground cover shorter than 50 cm and with scattered trees as roosting or nesting sites, shrubland, open *Acacia* and *Combretum* savannah (Hockey *et al*. 2005). They avoid forests, densely wooded areas, Mountain Fynbos, very rocky, hilly and mountainous woodland areas (Hockey *et al*. 2005 & Barnes, 2000). They can found from sea-level to montane grassland over 2 000 m a.sl. They normally occur single or in pairs, although groups of up to 50 have been recorded at waterholes in arid areas (Herholdt & Anderson, 2006). Nests are large, stick platforms usually built on top of isolated small to medium-sized flat-crowned *Vachellias* (*Acacia*) trees and will also make use of alien pines or wattles where indigenous thorny trees are not available (Tarboton, 2011) and such adaptive trails indicate that they may have the potential to exploit marginal conditions and therefor recover rapidly from population decline (Barnes, 2000) Nesting density only about 150 km^2/pair (n = 4, Kemp, 1995). Secretarybirds are indiscriminate predators of a great variety of small animals. The majority of the diet consists of invertebrates particularly Orthoptera (grasshoppers, locusts and crickets but will also prey on small mammals, birds, and their eggs, reptiles (including tortoises), amphibians and rodents (Taylor *et al*., 2015). Small prey items, include small tortoises, that is swallowed whole and larger items are held down with their feet and torn up with bill. They are attracted to recently burnt areas to feed on animals killed by fire, but does not eat carrion.	Highly unlikely Due to a lack of suitable foraging and breeding habitat and human related disturbance on and surrounding the study site. Only likely to pass through the area on very rare occasions to and from more suitable habitat and food availability.
Falco naumanni (Lesser Kestrel) (**VU**/**LC**)	NONE Non-breeding Palaearctic migrant. Forages preferentially in pristine open grassland but also hunts in converted grassland such as small scale pastures provided the conversion is not as total as in plantation forestry or in areas of consolidated agricultural monoculture (Barnes, 2000; Hockey *et al*. 2005) such as maize, sorghum, peanuts, wheat, beans and other crops (Tarboton & Allan 1984) where they hunt for large insects and small rodents, but avoid wooded areas except on migration. They roost communally in tall trees, mainly	Unlikely This species was assessed as regionally Vulnerable in the 2000 (Barnes, 2000) assessment, but it is now assessed as regionally Least Concern because it no longer approaches any of the thresholds for Vulnerable (Taylor *et al*., 2015)

	Eucalyptus, in urban areas (Barnes, 2000), often in towns or villages, but also in farm lands (pers. obs). Favour a warm, dry, open or lightly wooded environment, and are concentrated in the grassy Karoo, western fringes of the grassland biome and southeast Kalahari. Generally avoids foraging in transformed habitats but occurs in some agricultural areas, including croplands, in fynbos and renosterveld of the Western Cape (Hockey *et al*. 2005). Large numbers congregate in sweet and mixed grasslands of the highveld regions.	
Falco biarmicus (Lanner Falcon) (**NT/VU**)	SUBOPTIMAL Most frequent in open grassland, open or cleared woodland, and agricultural areas. Breeding pairs generally favour habitats where cliffs are available as nest and roost sites, but will use alternative sites such as trees, electricity pylons and building ledges if cliffs are absent (Hockey *et al*. 2005). Mountains or open country, from semi desert to woodland and agricultural land, also cities (Maclean, 1993), even on forest-grassland ecotones. Generally a cliff nesting species and its wider distribution is closely associated with mountains with suitable cliffs. Able to breed on lower rock faces than Peregrine Falcon *Falco peregrinus* and also utilises the disused nests of other species, such as crows, other raptors and storks, on cliffs, in trees and on power pylons, and also quarry walls (Tarboton *et al*. 1987). Generally prefers open habitats e.g. alpine grassland and the Kalahari, but exploits a wide range of habitats – grassland, open savanna, agricultural lands, suburban and urban areas, rural settlements – in both flat and hilly or mountainous country. Also breeds in wooded and forested areas where cliffs occur (Harrison *et al*. 1997a).	Highly unlikely Only likely to pass through the area on rare occasions to and from more suitable habitat and food availability.
Falco peregrinus (Peregrine Falcon) (**NT/LC**)	YES / SUBOPTIMAL / NONE Resident *F. p. minor* mostly restricted to mountainous riparian or coastal habitats, where high cliffs provides breeding and roosting sites. Breeding pairs prefer habitats that favour specialised, high speed, aerial hunting, e.g. high cliffs overhanging vegetation with raised and/or discontinuous canopy (e.g. forest, fynbos, woodland), or expanses of open water. Also uses quarries and dam walls, and frequents city centres, e.g. Cape Town, where tall buildings substitute for rock faces. Migrant *F. p. calidus* in more open country, often	Unlikely This species was assessed as regionally Near Threatened in the 2000 (Barnes, 2000) assessment, but given its vast global range, adaptability to urban environments and inaccessible breeding sites it is now considered as regionally Least Concern (Taylor *et al*., 2015)

	coastal, even roosting on ground on almost unvegetated salt flats.	
Phoenicopterus roseus (Greater Flamingo) (**NT/NT**)	NONE Greater Flamingos occur in large flocks of up to tens of thousands, often with Lesser Flamingos. Movements take place at mostly at night and in response to inundation of ephemeral pans (Simmons in Hockey *et al*. 2005). Little is known regarding regional movements but apparent large influxes from East Africa occur during the breeding season, particularly to Sue Pan in Botswana (McCulloch & Borello, 1998). They feed on brine shrimps, brine flies, molluscs and diatoms by wading in water, bill upside down, filtering food from mud (Simmons in Hockey *et al*. 2005). Their main breeding sites in southern Africa is situated at Etosha Pan and Sue Pan, but occasionally breeds at number of smaller wetlands in South Africa (Anderson, 2000) although these breeding attempts are often unsuccessful (Simmons in Hockey *et al*. 2005). Most of the recruitment to the South African population originates from Sua Pan. Breeding has been successful in South Africa at Lake St Lucia, De Hoop Vlei, Bredasdorp and several wetlands in the Northern Cape (Taylor *et al*., 2015). The species is a colonial nester, with hundreds to thousands of nests per colony and breeds in summer, after breeding areas are flooded (Taylor *et al*., 2015). Breeds at recently flooded, large, eutrophic wetlands (favoured foraging habitat), shallow salt pans; at other times, at coastal mudflats, inland dams, sewage treatments works, small ephemeral pans and river mouths (Hockey *et al*. 2005). Usually breeds colonially on mudflats in large pans (Harrison *et al*. 1997). Also in shallow pans, especially saline pans when they have water; also occasionally on other bodies of shallow water such as dams and vleis (Tarboton *et al.* 1987). Large bodies of shallow water, both inland and coastal; prefers saline and brackish water (Maclean 1993). Occasionally forages along sandy coasts.	Highly unlikely Due to a lack of suitable foraging and breeding habitat.
Mycteria ibis (Yellow-billed Stork) (**NT/EN**)	NONE Utilises diverse wetlands and permanent and seasonal habitats, including alkaline and freshwater lakes, river, dams, pans, flood plains, large marshes, swamps, estuaries,	Highly unlikely Due to a lack of suitable breeding and foraging habitat. Only likely to pass through the area on rare occasions.

	margins of lakes or rivers, flooded grassland and small pools or streams where there are areas of shallow water free of emergent vegetation (Tarboton *et al.,* 1987); less often marine mudflats and estuaries (Hockey *et al*., 2005). Nests colonially on large trees adjacent to productive wetlands, but only locally and erratically during ideal conditions.	
Ciconia nigra (Black Stork) (NT/VU)	NONE The Black Stork is a solitary and associated with mountainous areas and build nests on suitable cliffs (Hancock *et al*., 2010) during winter which is an adaptation to take advantage of an abundance of prey in waterbodies with receding water levels (Siegfried, 1967). This species is mainly piscivorous which constitute 91% of their diet (Chevallier *et al*., 2008). Their piscivorous diet recoded consists of such species as Sharptooth Catfish (*Clarias gariepinus*), other catfish (*Clarias* spp), mud-fishes (*Labeo* spp), and Tigerfish (*Hydrocynus vittatus*). In Kuiseb River, Namibia, inferred to eat Mozambique Tilapia (*Oreochromis mossambicus*), Carp (*Cyprinus carpio*) and Chubbyhead Barb (*Barbus anoplus*) (all alien to the river system). They are absent or uncommon from seasonal pans that lack fish (Allan in Hockey *et al*., 2005). There is no correlation between the abundance of fish and site selected by Black Storks and suggests that selection of fishing areas are influenced by other factors such as human activities (Chevallier *et al*., 2008). The diet of nestlings differs from adult birds and mainly consists of amphibians and insects (Hampl *et al*., 2005). Amphibian prey species include Common Platanna (*Xenopus laevis*), Southern Pygmy Toad (*Bufo vertebralis*) and Cape Sand Frog (*Tomopterna* delalandi). Other diet include tadpoles, small mammals, nestling birds, small reptiles, including tortoises, large insects, larvae of Armyworms (*Spodoptera exempta*), and freshwater snails (Hockey *et al*., 2005). Black Storks mainly forages single and occasionally, in pairs or small groups in shallow water where they are readily found at dams, shallow pans and floodplains where they are readily found in their core distribution range and also make use of shallows of streams and rivers, pools in dry riverbeds, coastal estuaries and sometimes on marshland and flooded grassland and they are occasionally found on dry land (Hockey *et al*., 2005).	Highly unlikely Due to a lack of suitable breeding and foraging habitat. Only likely to pass through the area on rare occasions.

	Their nests are being predated by Verreaux's Eagle (*Aquila verreauxii*) and Martial Eagle (*Polemaetus bellicosus*) as well as Chacma Baboon (*Papio ursinus*) (Cannell, 1991).	
Ciconia abdimii (Abdim's Stork) (LC/NT)	NONE Abdim's Storks are non-breeding inter-African migrants that depart during May to August to their breeding ground in a wide band south of the Sahara from Senegal in the west to Ethiopia and Somalia in the east. Local movements occur throughout summer in response to food availability, especially rain-related insect irruptions. They depart to their breeding grounds from February to early April, exceptionally during the middle to late April. They gather in large flocks at staging areas, including Limpopo Province during mid-March. Occasionally overwinters in southern Africa. Abdim's Storks are mainly found in grassland, sparsely savannah woodland, edges of pans, pastures, cultivated land and suburban areas in groups of up to 100 birds (Anderson in Hockey *et al*., 2005). Prior to migration they occur in large groups of up to 10 000 birds. After good rains and during migration they also occur in semi-desert habitats, including Kalahari. Generally absent from wetlands, but uses rice paddies and marshes near Beira, Mozambique (Hockey *et al*., 2005).	Highly unlikely Due to a lack of suitable breeding and foraging habitat. Only likely to pass through the area on rare occasions.
Leptoptilos crumeniferus (Marabou Stork) (NT/NT)	SUBOPTIMAL Marabou Storks occur in both aquatic and terrestrial habitats, favouring open and semi-arid areas and are largely absent from forest areas and true desert. Common at wetlands, including dams, pans and rivers, and in wildlife reserves and ranching areas (Hockey *et al*., 2005). They are scavengers and feed on a wide variety of food resources, including carrion from large mammal carcasses, aquatic vertebrates and human waste (Pomeroy, 1975). Despite their extensive distribution, they only breed at limited localities throughout their distribution range (Monadjem *et al*., 2008)	Highly unlikely Due to a lack of suitable habitat. Only likely to pass through the area on rare occasions.
Buphagus erythrorhynchus (Red-billed Oxpecker)	YES Open savanna, up to 3 000 m a.s.l. (Hockey *et al*., 2005). Uses mammal feeding hosts in a variety of woodlands, all in rainfall zones of more than 400 mm/annum. Needs holes in trees for nesting and uses Ilala Palms, tree Aloes, reed beds and rarely larger game to	Unlikely Due to a lack of cattle on the study site. Only likely to move through the area. This species was assessed as regionally Near Threatened

(**NT/LC**)	roost on at night (Harrison *et al*. 1997a). Their presence is highly dependent on the availability of tick on large game species and cattle.	in the 2000 (Barnes, 2000) assessment, but due to its encouraging population size increase through conservation efforts, it is now assessed as regionally Least Concern (Taylor *et al*., 2015)

**Red data status according to Barnes (2000)/Red Data status according to Taylor *et al* (2015)

Latest bird names according to BirdLife South Africa Checklist of Birds in South Africa (2016)

Red Data avifaunal species Categories: **EX**= Extinct (regionally), **CR** = Critically Endangered **EN** = Endangered, **VU =** Vulnerable, **NT =** Near-threatened, **LC =** Least Concern, **DD =** Data Deficient, **NR =** Not Recognised by BirdLife International, **LC =** Least Concern, **DD =** Data Deficient, **NR =** Not Recognised by BirdLife International, **NA** = Not Assessed (Taylor *et al* 2015).

6.7.3.4.1 Red Data avifaunal species confirmed from the study site for which suitable foraging, breeding and roosting habitat was confirmed
None

6.7.3.4.2 Red Data avifaunal species confirmed within the study area for which suitable foraging, breeding and roosting habitat was confirmed
None

6.7.3.4.3 Red Data avifaunal species for which suitable foraging, breeding and/or roosting habitat was confirmed from the study site
None

6.7.3.4.4 Red Data avifaunal species for which suitable foraging, breeding and/or roosting habitat was confirmed within the study area
None

The only sensitive topographical feature is the river and riparian vegetation habitat system that, apart from biodiversity richness, form an important movement corridor for many species.

6.7.3.5 Black Stork (*Ciconia nigra*)

Particular reference was made to the occurrence of Black Stork (*Ciconia nigra*) on or surrounding the study site according to National Screening Tool.

IUCN Global Status (2016): Least concern
Red Data Status according to Barnes (2000): Near-Threatened.
Red Data Status according to Taylor *et al*. (2015): Vulnerable.
Habitat: Black Storks are usually found in small flocks in grassland, open savanna and cultivated field, often in company with White Stork. They breed on high cliffs and forage in wetland systems such as rivers.
Threat: The Black Stork montane breeding habitat is not threatened due to it inaccessibility. It is reliant on shallow water bodies such as rivers where they forage for fish, amphibians and a range of aquatic invertebrates.
On site conclusion: Apart from small, restricted foraging areas along the Crocodile River no suitable breeding habitat was identified for this species within the study area. Black Storks are only likely to move through the area on rare occasions to and from more suitable habitat surrounding the study area. This species has a reporting rate of 2% for the SABAP1 project period and a reporting rate of less than one present (<1%) with only one record (12 December 2012) for the species for the 2427CB q.d.g.c. This species was not recorded for the pentad in which the study site is situated but was recorded only once (12 May 2012) for the pentad to the west of the study site (2440_2715).

6.7.3 Bats

The information below was extracted from the EIA of Chiroptera for the proposed mining activity at Buffelshoek (Limnology, 2023).

There are 75 known bat species in Southern Africa, of which 56 species occur in South Africa. Of the 56 species, 39 are found in the northern part of South Africa, which comprises Gauteng, Limpopo, Mpumalanga, and part of Northwest Province. Bats are mammals of the order Chiroptera with nine families occurring in South Africa. The word Chiroptera has a Greek origin meaning "hand-wing". The order Chiroptera is subdivided into the larger fruit-eating bats that belong to the Suborder Megachiroptera and the smaller predominantly insect-eating Suborder Microchiroptera. With their forelimbs adapted as wings, they are the only mammals capable of true and sustained flight. Bats are more agile in flight than most birds, flying with their very long spread-out digits covered with a thin membrane or patagium. In general, bats seek out a variety of daytime retreats such as caves, rock crevices, old buildings, bridges, mines, and trees.

6.7.3.1 Methods for acoustic surveying of bats

For the study a non-invasive sampling method was chosen. Acoustic monitoring is a useful technique that is used to study bats which can provide important information about bat species, their distribution, behaviour, and activity patterns. This involves the use of specialized equipment, namely ultrasonic bat detectors to record the ultrasonic echolocation calls (high frequency calls) that bats emit. It is a non-invasive and cost-effective way to study bats, especially where direct observation may be challenging and has become an essential tool for bat research and conservation.

- Ultrasonic bat detectors: The ultrasonic calls of bats are typically beyond the range of human hearing therefore ultrasonic bat detector devices are designed to capture and record the ultrasonic calls of bats.
- Deployment: A central point survey will be conducted where most of the bat's activity occurs.
- Recording data: The detectors continuously record ultrasonic bat calls during the monitoring period which is analysed later.
- Analysis: The recorded calls are analysed to determine which bat species are present by examining the characteristics of the calls since each species have distinct echolocation call patterns. Activity patterns and population estimates can also be determined through data analysis after using bat monitoring techniques.
- Data Interpretation: The data collected through acoustic monitoring can be used to identify species, study bat migration, monitoring the health of bat populations, assessing the impact of environmental changes on bats, and identifying important bat habitats.

6.7.3.2 Results and observed species

Three sample points were completed. These sites are in the riparian area where most of activity is expected and one along the R510 road. Sampling was done using acoustic monitoring, a non-invasive bat monitoring technique allowing species identification through recording and analysing subsonic bat vocalisations. It is important to note that the R510 road is busy, and the acoustic sampler recorded many “noise” samples.

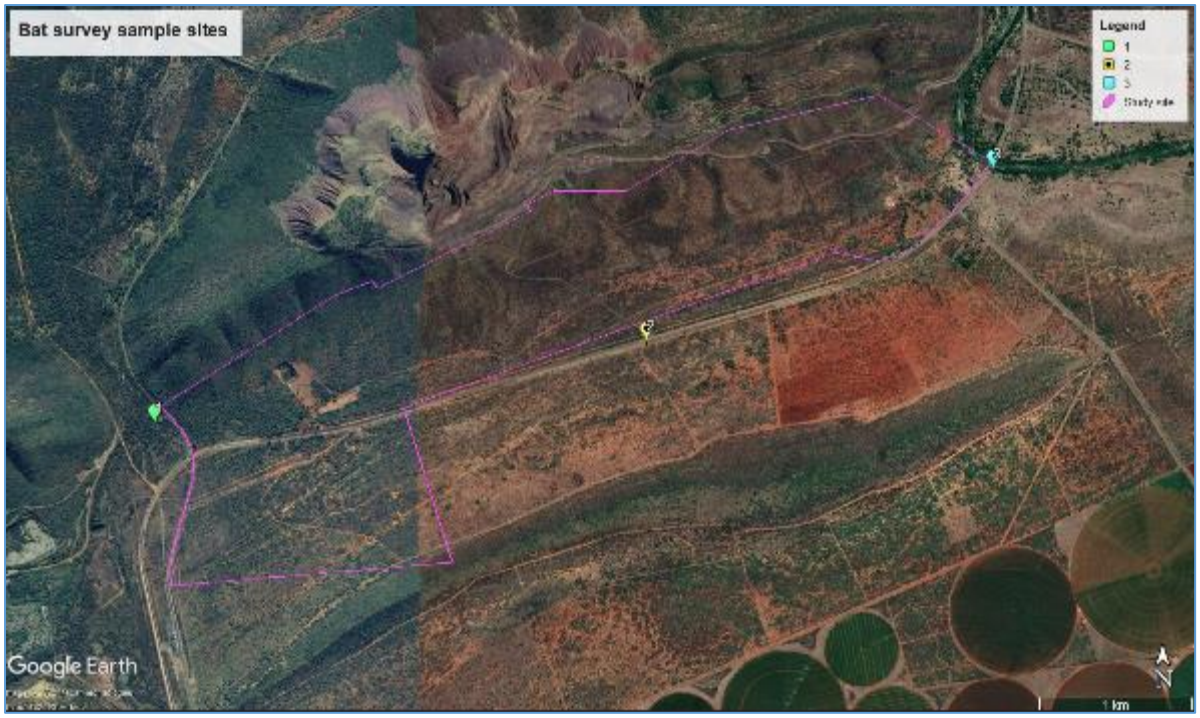

Figure 38: Bat Survey Sample Points (Limnology, 2023)

Sample point 2 only yielded a single species *Tadarida aegyptiaca* with the sample point 1 and 3 being the most diverse in terms of species. Sample point 1 was yielded the same species as point 3 but with the addition of *Scotophilus dinganii*.

A total of eight species were observed at the sample sites. See Table 23 for the list of species, conservation status of each species and an ecological information .

The identification of eight species of bats in the area indicates the ecological system is functional and the ecological services of the study site is intact. An average of 300 “hits” was made by the echolocator per hour indicating a large population. Most common was *Tadarida aegyptiaca* possibly due to its ability to inhabit human structures.

Table 23: Observed species of the study site

Species	Conservation status	Ecological information (SANBI, 2023)
Chaerephon pumilus	**Least Concern (LC)**	The Little Free-tailed Bat occurs across a variety of habitats from semi-arid savannah in the north of its range to forested regions further south (Happold 1987). In Zimbabwe it occurs within dry mopane woodland habitats below 1,000 m asl (Skinner and Chimimba 2005). Brickwork under roofs, corrugated roofs or other crevices in buildings provide suitable roosting sites for Little Free-tailed Bats within built-up areas, but natural roost sites include cracks and crevices in rocks and trees (Skinner and Chimimba 2005, Mickleburgh *et al.* 2008, Monadjem *et al.* 2010). The species is considered an open-air forager, feeding on Coleoptera, Hemiptera, Lepidoptera, Hymenoptera and Diptera (Aldridge and Rautenbach 1987). The Little Free-tailed Bat typically exhibits summer seasonal breeding. For example, females in the Kruger National Park experienced synchronised breeding with three peaks in parturition: early November, late January, and early April (van der Merwe *et al.* 1986). This was similar in Swaziland, with peaks in parturition estimated to occur in November, January, and March (Monadjem 1998). Individuals in Malawi experienced a fourth peak in parturition in about May, but Monadjem (1998) suggests that this is likely to be limited to low latitude regions and more tropical climates. The Little Free-tailed Bat experiences a gestation period of approximately 60 days, and single young of about 3.2 g is produced (Skinner and Chimimba 2005). Sexual maturity in females is reached at an age of between 5 and 12 months (Skinner and Chimimba 2005).
Eptesicus hottentotus	**Least Concern (LC)**	The Little Free-tailed Bat occurs across a variety of habitats from semi-arid savannah in the north of its range to forested regions further south (Happold 1987). In Zimbabwe it occurs within dry mopane woodland habitats below 1,000 m asl (Skinner and Chimimba 2005). Brickwork under roofs, corrugated roofs or other crevices in buildings provide suitable roosting sites for Little Free-tailed Bats within built-up areas, but natural roost sites include cracks and crevices in rocks and trees (Skinner and Chimimba 2005, Mickleburgh *et al.* 2008, Monadjem et al. 2010). The species is considered an open-air forager, feeding on Coleoptera, Hemiptera, Lepidoptera, Hymenoptera and Diptera (Aldridge and Rautenbach 1987). The Little Free-tailed Bat typically exhibits summer seasonal breeding. For example, females in the Kruger National Park experienced synchronised breeding with three peaks in parturition: early November, late January, and early April (van der Merwe *et al.* 1986). This was similar in Swaziland, with peaks in parturition estimated to occur in November, January, and March (Monadjem 1998).

		Individuals in Malawi experienced a fourth peak in parturition in about May, but Monadjem (1998) suggests that this is likely to be limited to low latitude regions and more tropical climates. The Little Free-tailed Bat experiences a gestation period of approximately 60 days, and single young of about 3.2 g is produced (Skinner and Chimimba 2005). Sexual maturity in females is reached at an age of between 5 and 12 months (Skinner and Chimimba 2005).
Tadarida aegyptiaca	**Least Concern (LC)**	The Egyptian Free-tailed Bat occurs across a range of habitats, foraging over desert, semi-arid scrub, savannah, grassland, and agricultural land (Monadjem *et al.* 2010). Aside from the fringes, it is generally absent from forests (Skinner & Chimimba 2005). In arid areas, its presence is commonly associated with surface water (Sirami *et al.* 2013), which provides a source of moisture (Skinner & Chimimba 2005), and usually has concentrated densities of insect prey (Monadjem *et al.* 2010). It is known to be common in arid scrub and open grassland regions (Skinner & Chimimba 2005). This species roosts communally during the day in small to medium-sized groups (Herselman & Norton 1985; Monadjem *et al.* 2010). Roost habitats include, but are not limited to, rock crevices, under exfoliating rock sheets, tree hollows, caves, behind the bark of dead trees, building crevices and roofs of houses (Herselman & Norton 1985; Taylor 1998; Skinner & Chimimba 2005; Monadjem *et al.* 2010). It is considered an open-air forager, foraging over most habitat types, and feeds mainly on Diptera, Hemiptera and Coleoptera and, to a lesser degree, Lepidoptera (Monadjem *et al.* 2010). There are definite seasonal patterns in activity levels of this species emerging from long-term monitoring studies in the assessment region, with typical peaks at most sites in late summer and autumn. However, this requires further investigation. Gestation is approximately four months and typically, single young is born once a year in November or December (Monadjem *et al.* 2010).
Miniopterus natalensis	**Least Concern (LC)**	It is predominantly a temperate or subtropical species with the core of its distribution in the savannahs and grasslands of southern Africa (Monadjem *et al.* 2010), and has been recorded from semi-desert, dry and moist savannah, and Mediterranean-type shrubby vegetation. It is associated with trees and orchards surrounding artificial wetlands (Sirami *et al.* 2013). It is generally a cave roosting species also found in similar habitats such as disused mines. The availability of suitable roosting sites may be more critical in determining its presence in an area than the surrounding vegetation (Monadjem *et al.* 2010). Smaller groups will also utilise crevice-type habitats. It utilises separate caves as winter hibernacula and summer maternity roosts (van der Merwe 1975), with hibernacula generally being cooler and at higher altitudes, which may be an important consideration for wind farm planning. Females typically migrate seasonally between these caves, which may be separated by up to 260 km (Miller-Butterworth et al. 2003). Females congregate at maternity roosts where each one gives birth to single young (Monadjem *et al.* 2010). This species holds the longevity record for a southern Africa bat of 13 years (van der

		Merwe 1989). It is a clutter-edge forager, feeding on a variety of aerial prey including Diptera, Hemiptera, Coleoptera, Lepidoptera and Isoptera (Jacobs 1999; Schoeman & Jacobs 2003; Miller-Butterworth et al. 2005).
Neoromicia capensis	**Least Concern (LC)**	It appears to tolerate a wide range of environmental conditions from arid semi-desert areas to montane grasslands (at altitudes as high as 1,600 m asl in the Drakensberg, KwaZulu-Natal; Taylor 1998), forests (dry and moist), bushveld, Acacia woodland, savannahs (dry and moist), and Mediterranean shrubland (Skinner & Chimimba 2005; Monadjem *et al*. 2010). However, it is possibly less abundant in low-lying, hot savannahs in the far east of southern Africa (Monadjem *et al*. 2010). It roosts under the bark of trees and similar vegetation, at the base of aloe leaves, between cracks in walls and under the roofs of houses, both thatched and corrugated iron or tiled (Lynch 1983; Monadjem 1998; ACR 2015). The species is recorded from all bioregions in the assessment region. It is an insectivorous, clutter-edge forager (Monadjem *et al.* 2010), with a diet that is known to vary seasonally and geographically. At Sengwa, Zimbabwe, a study found that Coleoptera and Trichoptera made up most of the diet of *N. capensis*, with Lepidoptera, Hemiptera and Diptera making up a lesser proportion (Fenton 1985). However, moth consumption by this syntonic species has been shown to increase six-fold under artificial lights (Minnaar *et al.* 2015), which may place unprecedented pressure on eared-moth populations and increase interspecific competition with allotonic bat species, given the global increase in light pollution.
Rhinolophus smithersi	**Least Concern (LC)**	This species occurs in miombo savannah on Karoo Sandstone, and in diverse riparian woodland fringes of the Lutope and Ngolanola rivers as well as along the Limpopo River at Pafuri (Taylor *et al.* 2012). It appears to be locally quite widespread in the Soutpansberg, Blouberg and Waterberg ranges in Limpopo Province as well as in the Limpopo Valley (19 localities known), where it is dependent on natural caves (such as sandstone cliffs or hollows in baobabs) or man-made underground cavities such as old mine adits (Pearl 1994; Taylor *et al*. 2013). One roost in the Soutpansberg comprised an underground spring which had been opened to the surface artificially. This species is insectivorous.
Scotophilus dinganii	**Least Concern (LC)**	Found in most habitats south of the Sahara but predominantly recorded from both dry and moist woodland savannah. It occurs throughout the Savannah Biome but avoids open habitats such as grasslands and Karoo scrub (Monadjem *et al.* 2010b). The habitat of this wide-ranging species is not easy to classify, but it appears to be tied to the presence of trees (Monadjem *et al.* 2010b), and thus its absence from open habitats may reflect the lack of roost sites. It roosts in hollow trees, such as Combretum imberbe (Monadjem *et al*. 2010a), roofs (Monadjem *et al.* 2010b), and other dark places in houses. It may roost in buildings to avoid inter-specific competition with sympatric Scotophilus species (Jacobs & Barclay 2009). Although it may roost singly, small groups up to 30 bats are not uncommon (Happold *et al.* 1987; Skinner & Chimimba 2005). It is a clutter-edge forager, feeding mainly on medium-sized Coleoptera but also other

		insect species (Monadjem *et al.* 2010b).
Sauromys petrophilus	**Least Concern (LC)**	Occurs in both wet and dry woodlands (including miombo and mopane), shrublands and Acacia-wooded grasslands always in areas with rocky outcrops and hills, especially of Karoo sandstones and granitic intrusions (Cotterill 2013). This species is closely associated with rocky habitats, usually in dry woodland, mountain fynbos or arid scrub (Monadjem *et al.* 2010). In the assessment region, the species is recorded from the Mopane Bioregion, Central Bushveld, Lowveld, Gariep Desert, Bushmanland, Northwest Fynbos, Namaqualand Hardeveld, Namaqualand Sandveld. In the Western Cape, it utilises open areas surrounding artificial wetlands (Sirami *et al*. 2013). Generally restricted to rocky areas, the essential habitat requirements of this species include the presence of narrow rock crevices and fissures for daytime roosting, as well as the availability of an adequate insect food supply (Skinner & Chimimba 2005). It roosts in crevices, narrow cracks, exfoliated rock, sandstones, and granite (Jacobs & Fenton 2001; Monadjem *et al.* 2010). It's extremely flattened skull is an adaptation to roosting in the narrowest of rock crevices (Jacobs & Fenton 2002). Roosts are made up of small numbers; most records average a roost size of four (Skinner & Chimimba 2005). The species is known as an open-air forager with a diet consisting mainly of Diptera, Hemiptera and Coleoptera (Monadjem *et al.* 2010). The reproductive ecology of this species is largely unknown. However, in Zimbabwe, a pregnant and lactating female was recorded in mid-November (Monadjem *et al.* 2010).

6.8 Surface water

Information from this section was extracted from the Aquatic Ecosystem Delineation (Limnology, 2023).

6.8.1 Catchment description

The site is bisected by the A24F and A24H quaternary catchments. The catchments form part of the Crocodile River drainage system with the Bierspruit on the western boundary and the Crocodile River on the eastern. See Figure 39 below for the Google Earth description of the site, as provided by the Department of Water Affair's Resource Quality Services (RQS) department.

6.8.2 DWS RQS PES EI and ES inventory

The DWS reserve quality services (RQS) data is given in Figure 40. This sets the Present Ecological State (PES) of reach 516 and 517 of the site to "C" for reach 517 and "D" for 516. The Ecological Integrity (EI) is both "Moderate" for both reaches and Ecological Services (ES) is both "Low" for both reaches. This map is derived from a web-based dataset and unfortunately the quality is not very good.

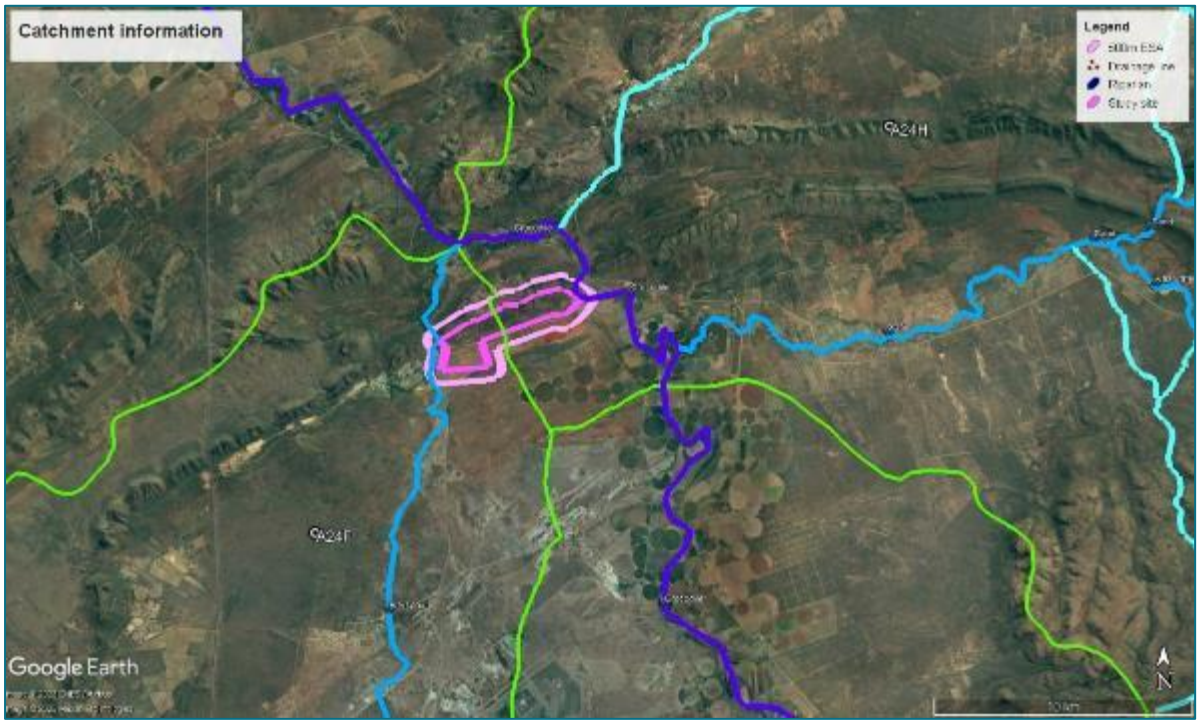

Figure 39: The catchment and hydrological data (Limnology, 2023)

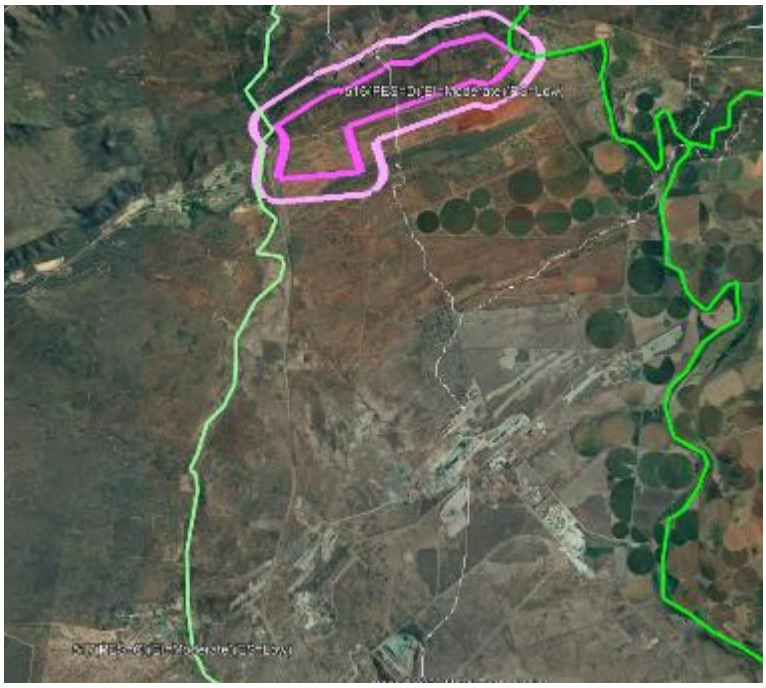

Figure 40: DWS RQS data for the reach 516 and 517 (Limnology, 2023)

The Quaternary catchment map below is extracted from the Geohydrological Study and Impact Assessment (Shangoni AquiScience, 2023).

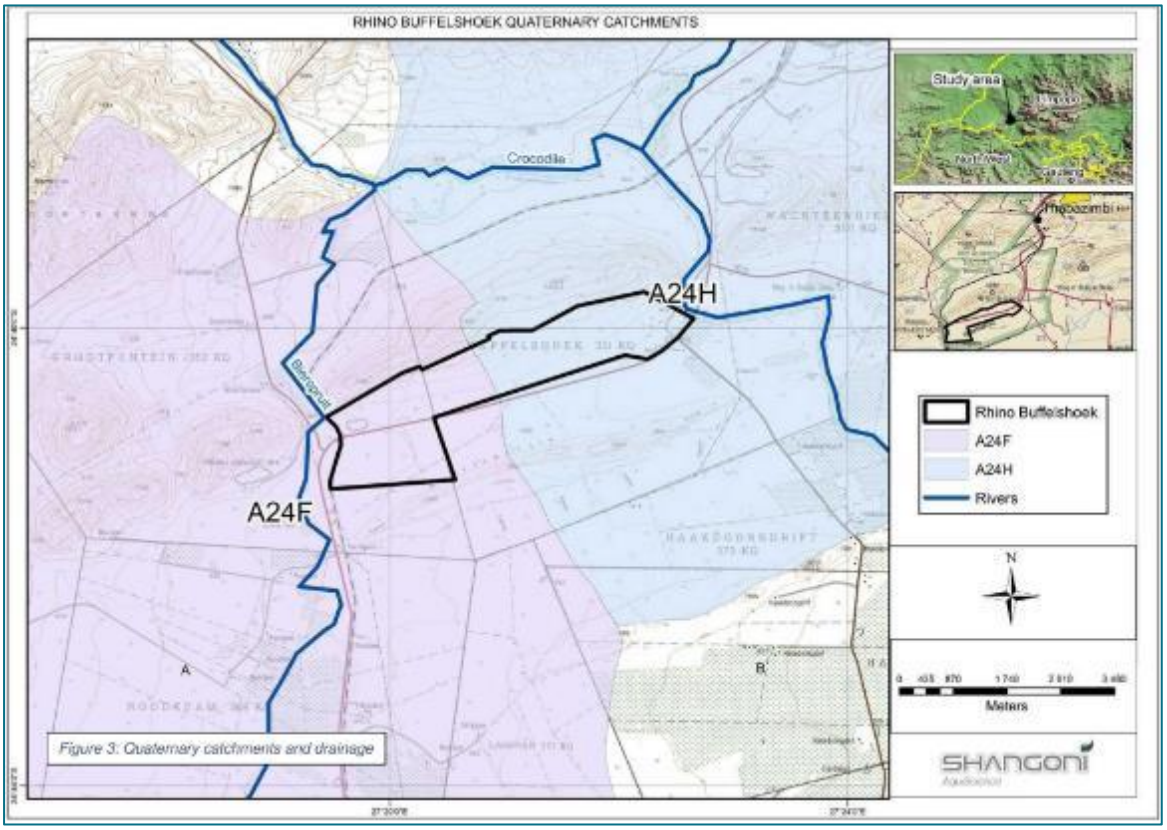

Figure 41: Quaternary Catchments (Shangoni AquiScience, 2023).

6.8.3 Aquatic ecosystem delineation

Information from this section was extracted from the Aquatic Ecosystem Delineation (Limnology, 2023).

During the site visit of December 2023, the site is open with few informal dirt roads bisecting the site. The site is dominated by a mountain along the northern boundary of the site. Two main river systems occur to on the western boundary (Bierspruit) and the eastern boundary (Crocodile River). Two drainage lines occur running from the mountain down into the site. See Figure 42 for the aquatic ecosystem delineation of the study site.

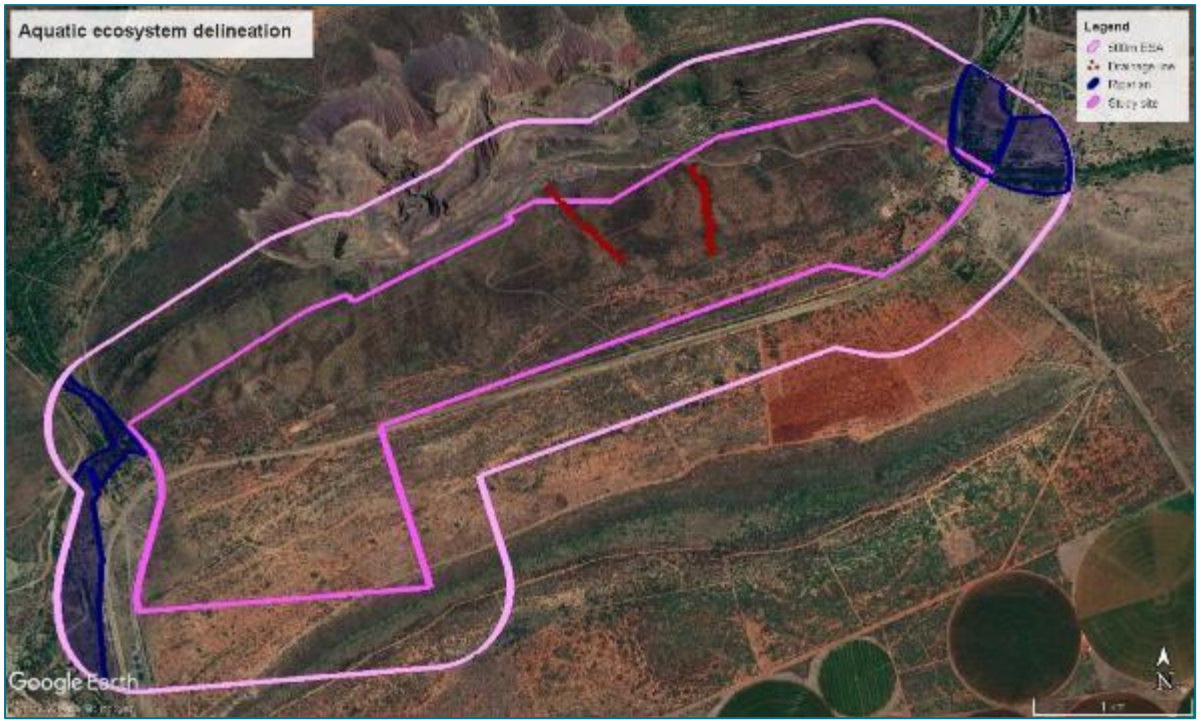

Figure 42: Aquatic ecosystem delineation (Limnology, 2023)

6.8.4 Wetland indicators as in line with DWA 2005

The following indicators were not observed on site, confirming the absences of wetlands on site.

6.8.4.1 Wetland (hydromorphic) soils and anaerobic conditions in the soil

Not observed

6.8.4.2 The presence, at least occasionally, of water loving plants (hydrophytes)

Observed associated with riparian condition and not wetlands.

6.8.4.3 Topographical location in relation to the landscape.

Not applicable

6.8.4.4 Open standing water or water near the surface

Observed associated with riparian condition and not wetlands.

6.8.5 Riparian area indicators as in line with DWA 2005

The following indicators were observed on site, confirming riparian conditions:

6.8.5.1 Topography associated with the watercourse

The visual representation of the topography is given in Figure 43. This shows the mountainous area along the northern section of the site as well as the contour lines indicating the low laying areas of aquatic ecosystems.

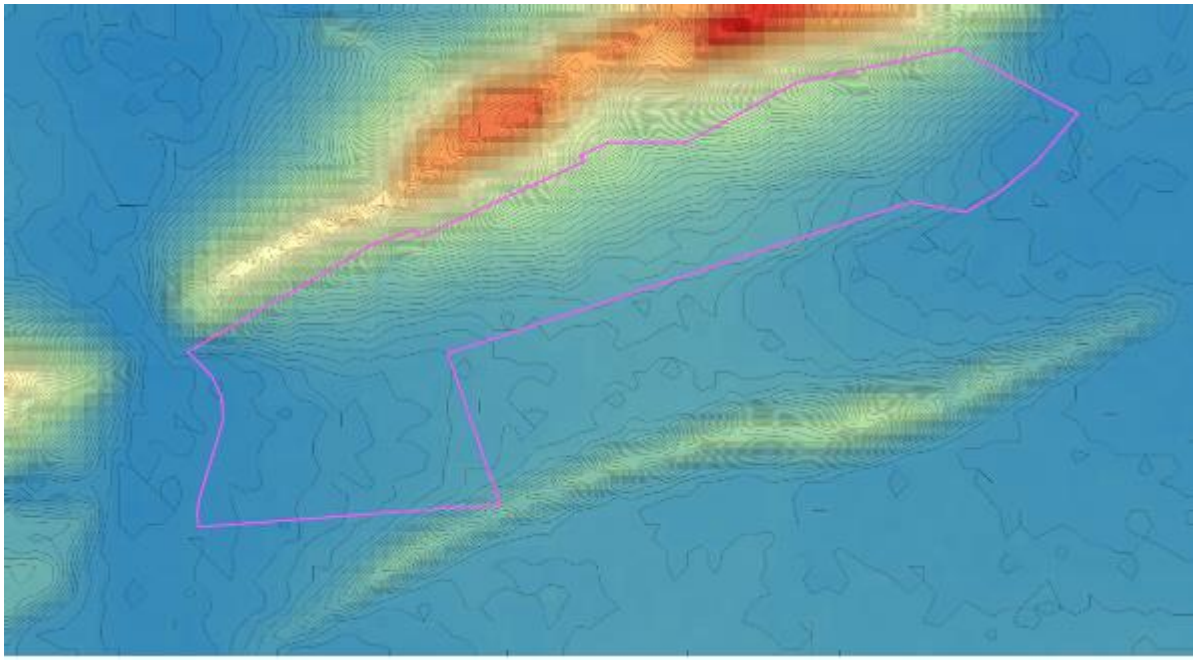

Figure 43: Visual Representation of the Topography of the Area (Limnology, 2023)

6.5.8.2 Vegetation especially changes in the composition of communities found on site.

Denser vegetation occurs in the areas around the riparian area with emphasis on arboreal species. This is indicative of riparian ecosystems in the bushveld setting.

6.5.8.3 Alluvial soils and deposited materials.

Observed in both the Bierspruit and Crocodile River systems.

6.8.6 Aquatic ecosystem classification (Ollis *et al* 2013)

The classification of the system was done using the dichotomous key in Ollis *et al.* (2013) (Table 24) with the services provided by the aquatic ecosystems found on site in Table 5 of the original report. The classification of the aquatic ecosystems on site was identified as:

Riparian zone or **riparian area**: area of land directly adjacent to the active channel of a river, which is influenced by river-induced or river-related processes. The NWA defines 'riparian habitat' to include "...the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas."

NOTE: Riparian areas, which are saturated or flooded for prolonged periods, would be considered wetlands and should be classified as such. However, many riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).

The classification of the system was done using the dichotomous key in Ollis *et al*. (2013).

Table 24: Summary of the application of Levels 1 To 5 of the Aquatic Ecosystem Classification in accordance with the Dichotomous Key from Ollis *et al*. 2013

Watercourse	**Level 3**		**Level 4: HGM Unit**			**Level 5**				
	Key 1 Landscape Unit		**Key 2 HGM Unit**			**Key 3a River Flow types**		**Key 3b Hydroperiod**		
	Level 3a	**Level 3b**	**Level 4a** HGM Type	**Level 4b** River zonation/ Landform/ Outflow drainage	**Level 4c** Landform/ Inflow drainage	**Level 5a** Flow regime	**Level 5b** Non-perennial flow regime	**Level 5a** Inundation period	**Level 5b** Saturation period	**Level 5 c** Inundation depth class ONLY IF PERMANENTLY INUNDATED
Drainage line	Slope	Saddle				N/A	N/A	Never/ Rarely inundated	Unknown Saturation period	Natural
Riparian area	Valley floor		River	Lowland river		Perennial		Seasonal Intermitted	Permanently saturated	Limnetic
Crocodile River	Valley floor		River	Lowland river		Non-perennial	Non-Perennial sub type: Intermittent	Seasonal Intermitted	Intermittently saturated	Unknown depth class

6.8.7 Presence of aquatic species, composition of aquatic species communities and aquatic species habitats

6.8.7.1 In situ water quality

In situ assessments was competed using a Hanna HI 9813-6 portable probe. Aspects measured included pH, electrical conductivity, Total dissolved solids, and temperature. See Table 25 for the results. The temperature of the sample sites was very high. The TDS is also much higher than expected. This can be attributed to the urban catchment of the river in combination with the agricultural and mining activities upstream of the sample sites.

Table 25: In situ water quality results

	Crocodile River	Bierspruit
pH	8.0	8.2
TDS (in ppm)	551	543
Electrical conductivity (mS)	0.77	0.77
Temperature	31.0	31.0

6.8.7.2 SASS 5

The South African Scoring System (SASS) 5 protocol was completed for the Crocodile and Bierspruit systems. A summary of findings is given in Table 26.

Table 26: Summary of SASS 5 results

Site	SASS score	Number of TAXA	ASPT
Bierspruit River	21	8	2.6
Crocodile River	62	16	3.9

ASPT – Average Score Per Taxon

6.8.7.3 Physical aquatic macroinvertebrate habitat assessment using the IHAS method

The Invertebrate Habitat Assessment System (IHAS) field forms were completed during the site visit and a summary of the findings is given in Table 27 in conjunction with the SASS 5 results.

Table 27: Summary of IHAS results

Site	SASS score	Number of TAXA	ASPT	IHAS Score
Bierspruit River	21	8	2.6	82.95%
Crocodile River	62	16	3.9	77.35%

ASPT – Average Score Per Taxon

6.8.7.4 Fish population assessment

The fish population assessment for the Bierspruit and Crocodile River were completed using baiting stations, electronarcosis and cast netting. See Table 28 for the reference list of species and the results of the fish population assessment.

Table 28: Observed fish species per site

Abbreviation	Scientific Name	Reference Occurrence	Bierspruit	Crocodile
AJOH	*Aplocheilichthys johnstoni*	**1**	0	0
BBIF	*Enteromius bifrenatus*	**2**	0	0
BPAU	*Enteromius paludinosus*	**7**	1	0
BMAR	*Labeoenteromius marequensis*	**2**	0	0
BMAT	*Enteromius mattozi*	**1**	1	0
BTRI	*Enteromius trimaculatus*	**6**	4	4
BUNI	*Enteromius unitaeniatus*	**5**	1	0
CCAR	*Cyprinus carpio*	**3**	0	0
CGAR	*Clarias gariepinus*	**6**	0	0
CPAR	*Chiloglanis paratus*	**2**	0	0
LCYL	*Labeo cylindricus*	**1**	0	0
LMOL	*Labeo molybdinus*	**4**	0	0
LROS	*Labeo rosae steindachner,*	**1**	0	0
MACU	*Micralestes acutidens*	**1**	0	0
MBRE	*Mesobola brevianalis*	**4**	0	0
MMAC	*Marcusenius macrolepidotus*	**2**	0	0
OMOS	*Oreochromis mossambicus*	**5**	0	0
PPHI	*Pseudocrenilabrus philander*	**5**	0	0
SINT	*Schilbe intermedius*	**3**	0	0
SZAM	*Synodontis zambezensis*	**1**	0	0
TREN	*Tilapia rendalli*	**1**	1	0
TSPA	*Tilapia sparrmanii*	**4**	3	0
TOTAL		**22**	**6**	**1**

Occurrence ratings are 0=absent and 5= highly abundant

6.8.7.5 Fish response assessment index

Using the information from Table 28 the Fish response assessment index (FRAI) assessment was completed. See a summary in Table 29.

Table 29: FRAI results

Site	SASS score	Number of TAXA	ASPT	IHAS Score	FRAI results
Bierspruit River	21	8	2.6	82.95%	25% E
Crocodile River	62	16	3.9	77.35%	35.8% E

6.8.8. Description of the ecological importance and sensitivity of the aquatic ecosystem including

6.8.8.1 Historical ecological condition

The historic ecological condition (reference) as well as present ecological state of rivers (in-stream, riparian and floodplain habitat), wetlands and/or estuaries in terms of possible changes to the channel

and flow regime (surface and groundwater). Google Earth's Timeline function was used as reference imagery (Accessed February 2019). Google Earth imagery from 2009 (Figure 44) to early 2021 (Figure 45) is available and was used to determine the historical land use and whether the site was extensively altered in the past or to detect large changes in the land use of the catchment. The maps are also used to identify areas where possible aquatic ecosystems occur). From these images the site has altered little over the past 12 years.

Figure 44: The oldest usable Google Earth image of the site from 2005 (Limnology, 2023)

Figure 45: Google Earth image from 2015 (Limnology, 2023)

6.8.9 Crocodile River System

6.8.9.1 Present Ecological Score (Wetland IHI) results

Using the method described in the specialist report, the following calculations were completed to determine the Present Ecological Score (PES) of the aquatic ecosystem found on site. See Table 30 for the PES calculation and Table 6 of the specialist report for interpretation of the results.

Table 30: The wetland IHI PES result of the wetland system (Crocodile river)

Overall PES Score					
	Ranking	**Weighting**	**Score**	**Confidence rating**	**PES Category**
Driving Processes:		**100**	**0,9**		
Hydrology	1	80	1,0	2,2	**B/C**
Geomorphology	2	100	0,7	3,0	**B**
Water Quality	3	30	1,2	1,9	**C**
Wetland Land Use Activities:		**100**	**0,7**	**2,8**	
Vegetation alteration score	1	100	0,7	2,8	**B**
Weighting needs to consider the sensitivity of the type of wetland e.g. nutrient poor wetlands are sensitive to nutrient loading (Water Quality rated higher)					
OVERALL SCORE:			**0,8**	**Confidence rating**	
	PES %		**84,1**		
	PES Category		**B**	**1,4**	

The PES score of the system indicated the system to be **Largely natural with few modifications**. "*A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place*".

6.8.9.2 Ecological Importance and Sensitivity

Ecological Importance and Sensitivity (EIS) was calculated in Table 31. The wetland found within the study area can be considered to be of moderate ecological management class. The Recommended Ecological Management Class (REMC) was calculated to be in **High** condition "Aquatic ecosystems that are considered to be ecologically important and sensitive. The biodiversity of these floodplains may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.".

Table 31: Crocodile River EIS Score

Determinant	**Score**	**Discussion**
Primary Determinants		
Rare & Endangered Species	2	Possible terrestrial and aquatic species using the site for foraging. Open area, with little impacts increases possibility for rare and endangered
Populations of Unique Species	2	

Determinant Primary Determinants	Score	Discussion
		species.
Species/taxon Richness	2	Diverse flora, limited ichthyofauna due to no flows in the system.
Diversity of Habitat Types or Features	2	Somewhat improved habitat in landscape
Migration route/breeding and feeding site for wetland species	2	Important especially in landscape and movement of terrestrial species and avifauna.
Sensitivity to Changes in the Natural Hydrological Regime	3	See Table 1 and Table 2 of the specialist report for description of guidelines for ratings
Sensitivity to Water Quality Changes	3	
Flood Storage, Energy Dissipation & Particulate/Element Removal	3	
Modifying Determinants		
Protected Status	1	Somewhat protected but impacted
Ecological Integrity	3	Intact but threats to the system will degrade the ecological integrity
TOTAL	**23**	
MEAN (Total / 10)	**2.3**	
EIS score	**High**	

6.8.10 Bierspruit River System

6.8.10.1 Present Ecological Score (Wetland IHI) results

Using the method described in the specialist report, the following calculations were completed to determine the Present Ecological Score (PES) of the aquatic ecosystem found on site. See Table 32Table 30 for the PES calculation and Table 6 of the specialist report for interpretation of the results.

Table 32: The wetland IHI PES result of the wetland system (Bierspruit)

Overall PES Score					
	Ranking	**Weighting**	**Score**	**Confidence rating**	**PES Category**
Driving Processes:		**100**	**1,0**		
Hydrology	1	80	1,0	5,0	**B/C**
Geomorphology	2	100	1,0	4,0	**B/C**
Water Quality	3	30	0,7	4,4	**B**
Wetland Land Use Activities:		**100**	**1,0**	**4,0**	
Vegetation alteration score	1	100	1,0	4,0	**B/C**
Weighting needs to consider the sensitivity of the type of wetland e.g. nutrient poor wetlands are sensitive to nutrient loading (Water Quality rated higher)					
OVERALL SCORE:			**1,0**	**Confidence rating**	
	PES %		**80,0**		

Overall PES Score					
	Ranking	**Weighting**	**Score**	**Confidence**	**PES Category**
	PES Category		**B/C**	**2,0**	

The PES score of the system indicated the system to be **Largely natural with few modifications**. "*A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place*".

6.8.10.2 Ecological Importance and Sensitivity

EIS was calculated in Table 33. The wetland found within the extended study area can be considered to be of moderate ecological management class. The REMC was calculated to be in **Very High** condition "Aquatic ecosystems that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these floodplains is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers". Although the system is clearly seasonally intermittent and non-perennial it is an important source of ecological services in the landscape.

Table 33: The EIS score of the seepage wetlands and REMC Classification (0 Indicates no importance and 4 indicates very high importance)

Determinant	**Score**	**Confidence**	**Discussion**
Primary Determinants			
Rare & Endangered Species	4	3	Highly likely. Breeding by game ranchers in the area has further supported these populations. Nearby game farms and nature reserves also assist with this aspect.
Populations of Unique Species	4	4	
Species/taxon Richness	4	3	Diverse fauna and flora
Diversity of Habitat Types or Features	3	2	High due to varying habitats available in the channel of the system
Migration route/breeding and feeding site for wetland species	3	2	The riparian are serves as an important corridor for movement of species. Fencing is made difficult in riparian areas and will be important crossing points between the farms.
Sensitivity to Changes in the Natural Hydrological Regime	2	3	The system is a riparian system. See Table 1 & Table 2 of the specialist report.
Sensitivity to Water Quality Changes	2	3	
Flood Storage, Energy Dissipation & Particulate/Element Removal	2	2	
Modifying Determinants			
Protected Status	3	3	Not formally protected but as the

Determinant Primary Determinants	Score	Confidence	Discussion
			adjacent areas is used as farming the system is an important water source
Ecological Integrity	4	3	The system is intact and ecologically functioning
TOTAL	**31**		
MEAN (Total / 10)	**3.1**		
EIS score	**Very High**		

6.8.10.3 Recommended Ecological Category

The REMC for the aquatic ecosystems was calculated in Table 34. From this table the REMC of the Crocodile River was A/B (improve) and the Bierspruit as B (Improve).

Table 34: REMC Extrapolation Table

			EIS			
			Very high	**High**	**Moderate**	**Low**
PES	**A**	**Pristine/Natural**	A Maintain	A Maintain	A Maintain	A Maintain
	B	**Largely Natural**	A Improve	A/B Improve	B Maintain	B Maintain
	C	**Good - Fair**	B Improve	B/C Improve	C Maintain	C Maintain
	D	**Poor**	C Improve	C/D Improve	D Maintain	D Maintain
	E/F	**Very Poor**	D Improve	E/F Improve	E/F Maintain	E/F Maintain

6.8.11 Mitigation of impacts using buffers

Buffer areas are part of the aquatic ecosystem and may not be developed or affected in any way by the construction activities and is rated the same sensitivity as the system. Buffers are a strip of land surrounding a wetland or riparian area in which activities are controlled or restricted, in order to reduce the impact of adjacent land uses on the wetland or riparian area.

As the study site is located in Limpopo, the requirements for buffers are not set. The buffer calculation tool (Macfarlain *et al*, 2014) was used. Two buffers are recommended: one for construction and one for operation. The construction is not applicable to the development and the final buffer must be applied. The final buffer was calculated to 113 m.

Figure 46: Proposed buffers of the study site (Limnology, 2023)

6.9 Groundwater

Information from this section was extracted from the Geohydrological Study and Impact Assessment (Shangoni AquiScience, 2023).

6.9.1 Acid generation capacity

Mineral waste material, mostly from coal and gold mines, contain sulphidic material (mostly pyrite) which may oxidise to produce acid mine drainage (AMD). The result is sulphuric acid generation which acidifies water it comes into contact with. This has several negative consequences and most notably includes the solubilisation of a variety of trace metals and metalloids. A number of factors control the generation of AMD, but the most important are the relative abundance of acid producing minerals (generally the sulphides) and acid consuming minerals (generally carbonates), moisture content/ ingress and exposure to air. As AMD has the potential to impact significantly on surface and groundwater quality, it is necessary to also quantify the potential of waste to generate acid.

Acid base accounting (ABA) conducted during previous groundwater related studies (Geo Pollution Technologies, 2010) revealed that both the rock and tailings material contain very low concentrations of sulphur and is non-acid forming.

6.9.2 Hydrogeology

6.9.2.1 Unsaturated zone (vadose zone)

The characteristics of vadose zone vulnerability dominating factors are closely related to the migration and transformation mechanisms of contaminants in the vadose zone, which directly affect the state of the contaminants percolating to the groundwater. The permeability and thickness of the unsaturated zone are some of the main factors determining the infiltration rate, the amount of runoff and consequently the effective recharge percentage of rainfall to the aquifer. The type of material forming the unsaturated zone as well as the permeability and texture will significantly influence the mass transport of surface contamination to the underlying aquifer(s). Factors like ion exchange, retardation, biodegradation and dispersion all play a role in the unsaturated zone.

The thickness of the unsaturated zone was determined by subtracting the undisturbed static water levels in the study area from the topography. Water level measurements showed that the depth to water level, and thus the unsaturated zone, generally varies between 6- and 45 meters below ground level (mbgl).

6.9.2.2 Saturated zone

On a regional scale, six (6) different geohydrological regions are distinguished in the greater Thabazimbi area and can be grouped as:

- Crocodile River primary aquifer;
- Quartzite, shale and andesite aquifer;
- Penge banded iron formation aquifer;
- Malmani Subgroup dolomite aquifer;
- Breccia Basin aquifer; and
- Bushveld Igneous Complex aquifer.

Two types of aquifers can generally be associated of these regions, a weathered semi-confined to unconfined aquifer and a confined fractured aquifer.

The weathered aquifer can be described as an intergranular water table aquifer that may be laterally connected to alluvial aquifers associated with river systems. The average depth of weathering is between 20 and 30 mbs while average water levels are between <10 and 40 mbs. Drilling in the project area indicated the presence of significant scree deposits, which are restricted to the lower lying areas. Yields in this aquifer are generally low (less than 0.5 l/s) and the aquifer is usually not fit for supplying groundwater on a sustainable basis. Consideration of the shallow aquifer system becomes important during seepage estimations from pollution sources to receiving groundwater and surface water systems (Groundwater Complete, 2016).

The second aquifer system is the deeper secondary fractured rock aquifer. Groundwater yields, although more heterogeneous, can be higher. This aquifer system usually displays semi-confined or confined characteristics with piezometric heads often significantly higher than the water-bearing fracture position. Fractures may occur in any of the co-existing host rocks due to different tectonic, structural and genetic processes. Drilling results indicated an absence of significant water yielding fractures within the secondary fractured rock aquifer.

The most important geohydrological region is the dolomite aquifer. The Malmani sub-group dolomite of the Chuniespoort Group outcrops to the north of the project area. Dolomite is capable of forming major aquifers, especially where widespread karst formation occurred. However, previously conducted groundwater studies found no signs of significant karst development within the immediate vicinity of the project area – the dolomite is estimated to underlie the mining area at a substantial depth and is therefore not significant to this study.

6.9.3 Hydraulic conductivity

Groundwater Complete (2016) conducted pumping tests on two boreholes during the Tygerkloof Project. A summary of their test results is provided in Table 35.

Table 35: Borehole information and aquifer test results

Borehole ID	Latitude	Longitude	SWL (mbs)	Borehole Depth (m)	Pump rate (l/s)	Max drawdown (mbs)	Transmissivity (m^2/d)
FerdieBotha2	-24.73134	-24.73134	19.1	97	0.30	25	~0.4
TKBH02	-24.38794	30.23865	33.6	47	0.35	10.3	~0.4

mbs – metres below surface

The average transmissivity of the aquifer matrix (between fracture zones) in the project area is approximately 0.4 m²/d, which is equal to an average hydraulic conductivity of ± 0.02 m/d. The average transmissivity of fractures in the area is ± 2.9 m²/d or a hydraulic conductivity of 0.15 m/d. These values are consistent with literature values.

6.9.4 Groundwater levels/hydro census

Groundwater levels were measured during the hydro census survey that was conducted in October 2022. Groundwater levels including other details captured can be viewed in Table 36 below. Several boreholes were located in a ~5 km radius from the mine boundary but none nearer than ~1 km. Twenty-eight boreholes were located of which 25 are used for either domestic, irrigation and/or livestock use while nine are unequipped and not in use. Most boreholes are equipped with electrical submersible pumps, two on solar. One borehole surveyed is equipped with a mono pump. All the boreholes surveyed are privately owned farm boreholes.

Groundwater levels recorded ranged between 2.30 meters below surface (mbs) to 56.0 mbs and an average of 17.30 mbs. Most water levels (25) were static at the time of measuring with the other being recorded as dynamic (influenced by pumping or recovering). Water levels of two boreholes could not be determined due to pumping infrastructure obstructing measurements. Four surface water localities were surveyed – two on the Crocodile River (up and downstream relative to the mine), a tributary of the Crocodile River and one farm dam used for irrigation.

A map showing the positions of the localities surveyed can be viewed in Figure 47.

Table 36: Hydro census information (survey conducted October 2022)

Borehole ID	Coordinates		Type	SWL (m)	Elevation (mamsl)	Application	Owner	Equipped
Groundwater								
HBH 01	-24.711773	27.329677	Borehole	NAWL	920	Irrigation, Livestock & Domestic	R. Rhamakhoka	Submersible
HBH 02	-24.702637	27.318697	Borehole	24.10	919	Domestic & Livestock	Ms. Strydom	Submersible
HBH 03	-24.707258	27.316070	Borehole	36.26	922	Domestic & Livestock	Ms. Venter	Submersible
HBH 04	-24.704592	27.316400	Borehole	24.83	920	Not in use	Ms. Venter	Not equipped
HBH 05	-24.711398	27.315512	Borehole	41.46	923	Domestic & Livestock	Ms. Muller	Submersible
HBH 06	-24.684345	27.393815	Borehole	7.87	913	Not in use	Mr. Coetzee	Not equipped
HBH 07	-24.684491	27.393769	Borehole	11.48	913	Irrigation	Mr. Coetzee	Submersible
HBH 08	-24.682171	27.398557	Borehole	10.53	911	Not in use	Mr. Coetzee	Submersible
HBH 09	-24.683604	27.401985	Borehole	11.70	911	Irrigation	Mr. Coetzee	Submersible
HBH 10	-24.687534	27.393884	Borehole	3.08	917	Irrigation	Mr. Coetzee	Submersible
HBH 11	-24.693446	27.392452	Borehole	9.66	922	Domestic	Mr. Coetzee	Submersible
HBH 12	-24.692073	27.371025	Borehole	15.72	924	Not in use	Jan de Buis	Mono pump
HBH 13	-24.708912	27.297620	Borehole	47.00	954	Domestic	Johan Fourie	Submersible
HBH 14	-24.661279	27.399251	Borehole	8.80	912	Irrigation & Domestic	Mr. Boshoff	Submersible
HBH 15	-24.661811	27.398818	Borehole	7.92	911	Irrigation	Mr. Boshoff	Submersible
HBH 16	-24.669223	27.405723	Borehole	2.30	922	Back-up / Not in use	Mr. De Klerk	Submersible
HBH 17	-24.669075	27.406075	Borehole	20.57	921	Not in use	Mr. De Klerk	Not equipped
HBH 18	-24.668455	27.405238	Borehole	16.59	914	Not in use	Mr. De Klerk	Submersible
HBH 19	-24.668564	27.405787	Borehole	17.08	917	Not in use	Mr. De Klerk	Submersible
HBH 20	-24.670004	27.408745	Borehole	14.93	916	Domestic & Livestock	Mr. van der Merwe	Submersible
HBH 21	-24.672811	27.404170	Borehole	6.56	910	Irrigation & Domestic	Jaco Oosthuizen	Submersible
HBH 22	-24.672952	27.402798	Borehole	6.36	910	Irrigation	Jaco Oosthuizen	Submersible
HBH 23	-24.715921	27.321652	Borehole	15.07	915	Livestock & Wildlife use	Amelia Erasmus	Submersible

Borehole ID	Coordinates		Type	SWL (m)	Elevation (mamsl)	Application	Owner	Equipped
HBH 24	-24.704223	27.325371	Borehole	15.81	915	Irrigation & Livestock	Amelia Erasmus	Submersible (Solar)
HBH 25	-24.711226	27.326114	Borehole	14.17	914	Irrigation & Livestock	Amelia Erasmus	Submersible (Solar)
HBH 26	-24.666581	27.312730	Borehole	19.81	920	Domestic	Jan	Submersible
HBH 27	-24.669249	27.290437	Borehole	56.00	980	Wildlife Use	Jan	Submersible
HBH 28	-24.681517	27.278491	Borehole	NAWL	1041	Wildlife Use	Jan	Submersible
HBH 29	-24.672432	27.311150	Borehole	21.18	926	Not in use	Jan	Not equipped
HBH 30	-24.633156	27.372863	Borehole	5.76	915	Irrigation	Golf Course - Johan	Submersible
HBH 31	-24.633430	27.371229	Borehole	12.38	918	Domestic	Golf Course - Johan	Submersible
HBH 32	-24.658274	27.306613	Borehole	23.14	937	Domestic & irrigation	Beltus Schoeman	Submersible
HBH 33	-24.658574	27.318243	Borehole	15.44	907	Wildlife Use	Kobus van Vuuren	Submersible
HBH 34	-24.643807	27.321346	Borehole	10.10	908	Domestic	Kobus van Vuuren	Submersible
Surface water								
SW 01	-24.682903	27.401695	River (Up Stream)	N/A	N/A	Irrigation	Mr. Coetzee	N/A
SW 02	-24.672863	27.402927	Dam	N/A	N/A	irrigation	Jaco Oosthuizen	N/A
SW 03	-24.636246	27.373490	Stream	N/A	N/A	Not in use	Golf Course - Johan	N/A
SW 04	-24.642625	27.321101	River (Down Stream)	N/A	N/A	Irrigation	Kobus van Vuuren	N/A

NAWL – No access to water level

N/A – not applicable

mamsl – meters above mean sea level

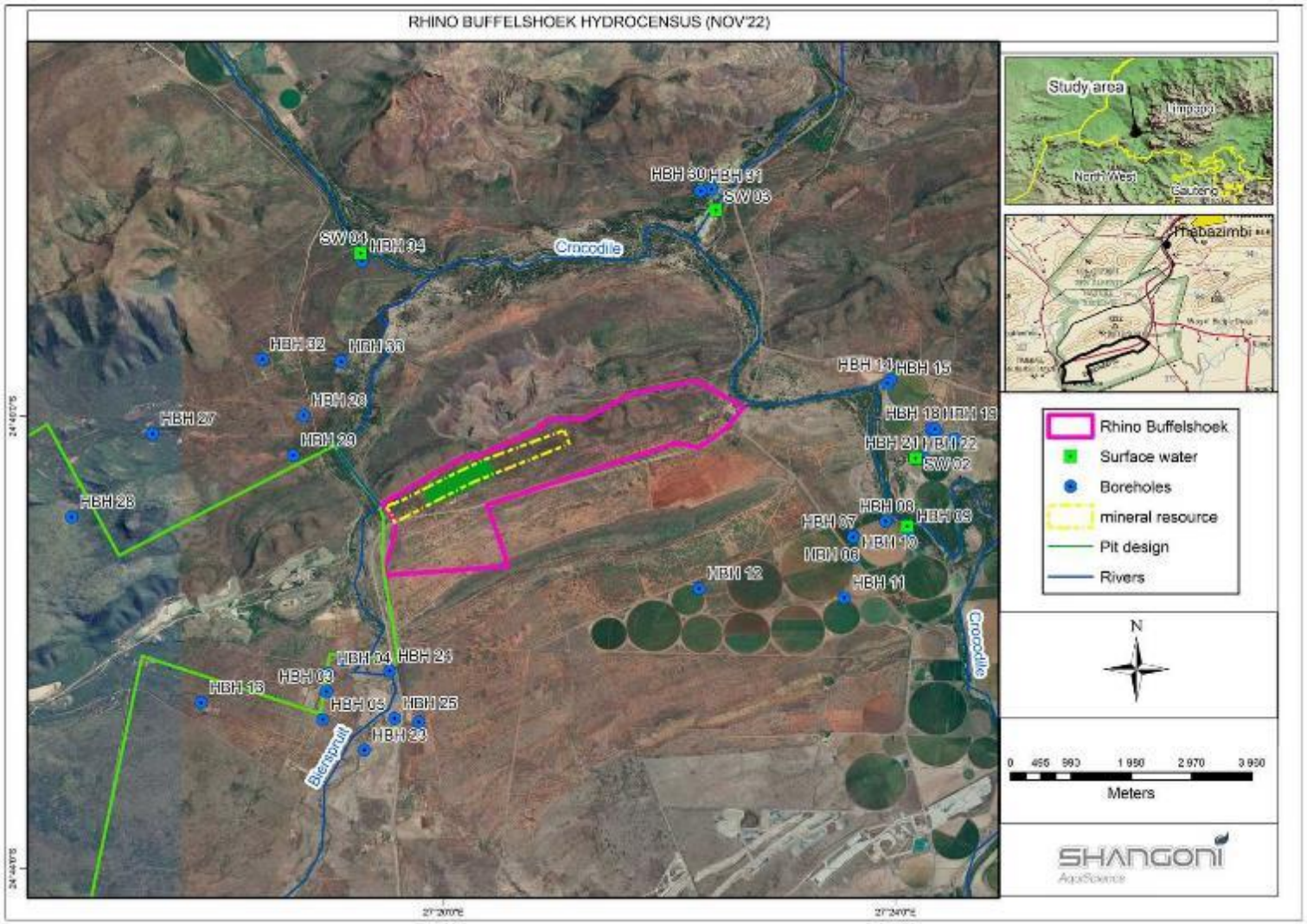

Figure 47: Hydro census locality map (Shangoni AquiScience, 2023)

Figure 48 shows linear regressions between the hydraulic heads of the deeper fractured aquifers and topography. Generally, a good relationship exists between topography and static hydraulic heads. This relationship can be used to distinguish between boreholes with natural unaffected water levels (*static*), or boreholes with anomalous groundwater levels due to disturbances such as pumping or seepage. A fair correlation of 0.76 was achieved for the hydraulic heads and the topography. However, several water levels were recorded as dynamic due to abstraction and do not represent a natural groundwater level. When these were removed from the regression a better correlation of 0.98 was achieved. Although it is assumed that groundwater flow patterns will mimic surface topography within the area, some unnatural deviations still exist.

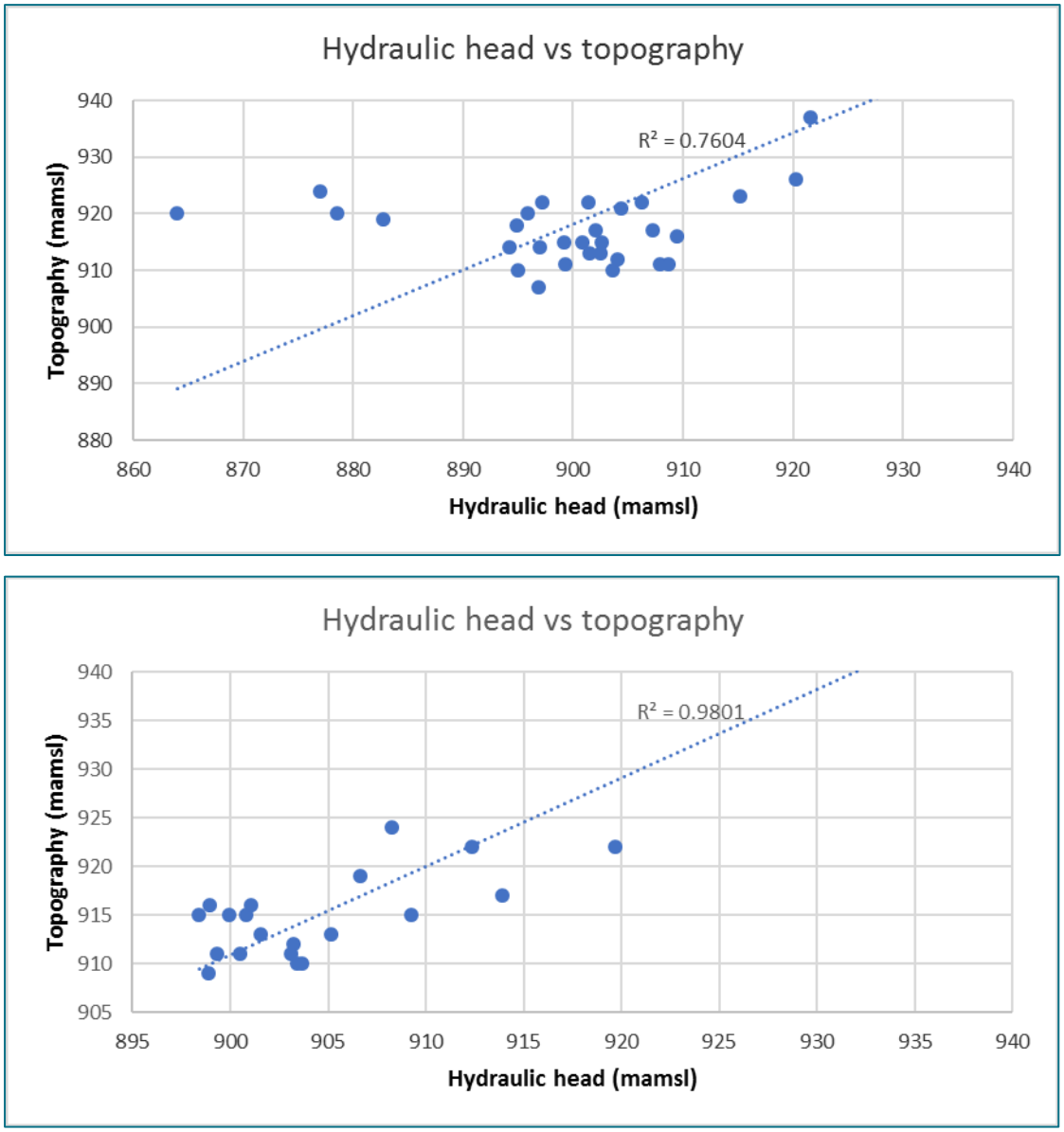

Figure 48: Linear regression between topography and hydraulic heads with suspected unnatural levels (above figure) and removed (below figure)

6.9.5 Groundwater potential contaminants

6.9.5.1 Geochemical assessments

No new geochemical assessments were conducted for this study. This study relied on geochemical data gathered from previous investigations conducted by Geo Pollution Technologies (2010). They conducted the assays on the adjacent Rhino mine owned by Imerys. Due to similar geology and mineral being mined, the data can also be applied to Rhino Buffelshoek.

Geo Pollution Technologies revealed that both the rock and tailings material contain very low concentrations of sulphur and is non-acid forming. Furthermore, samples were also submitted to acid rain leach tests, which involves the percolation of an acid through a finely crushed sample of the material. The leachate (extract) is then retrieved and analysed for a wide range of chemical parameters. The results showed that both the rock and tailings material, even under acidic conditions, do not have the potential to generate poor quality leachate.

6.9.5.2 Wastewater quality

An assessment of the hydrochemistry of wastewater produced is another way to evaluate the contaminants of concern (CoCs) within a mining environment. No wastewater localities are present on site as no mining has been initiated. Groundwater Complete (2016) did however conduct an analysis of water that has collected within the Motswere Quarry and Quarry 4/5 located on the adjacent Rhino mine. The water in the quarries were analysed for a range of chemical and physical parameters. The discussion that follows was abstracted from the report compiled by Groundwater Complete (2016):

The quarries present the correct environments for AMD reactions to occur, as oxygen and water are present in abundance. Furthermore, should the andalusite host rock contain reactive minerals, substandard quality seepage is expected to be generated and the quality of water collecting in the quarries would deteriorate over time. This quarry water should therefore provide an indication of the mine's long-term impact (if any) on the surrounding groundwater quality conditions.

Sulphate is an important chemical indicator parameter of impacts related to the oxidation of iron sulphides (AMD). Groundwater Complete (2016) measured the quality of water contained in the Motswere Quarry and Quarry 4/5 and found that the sulphate contents are < 20 mg/l and 70 mg/l, respectively. These concentrations are well below the maximum permissible SANS value of 500 mg/l and are more or less representative of the ambient groundwater sulphate content.

Water samples from both quarries are neutral to slightly alkaline, which is yet another indication of the absence of AMD. The water is considered to be of good quality and show no signs of impacts related to AMD or the generation of poor-quality leachate.

6.9.6 Water quality

During the hydrocensus, samples were taken from boreholes and surface water and analysed for hydrochemical quality.

6.9.6.1 Groundwater quality

The hydrochemical data for groundwater can be viewed in Appendix A of the specialist report. Based on the data, the following:

- The pH levels of groundwater are circum-neutral ranging between 7.50 and 8.10.
- Groundwater TDS varied between 325 mg/l and 2,027 mg/l. SANS guidelines for TDS set at 1,200 mg/l were exceeded in four boreholes HBH 06, HBH 07, HBH 14 & 15 and HBH 18.
    - The raised TDS correlate well with potassium (K), chloride (Cl), sodium (Na) and sulphate (SO_4) while calcium (Ca) and magnesium (Mg) are also raised.
    - Nitrate (NO_3) and/or ammonium (NH_4) were also raised in these boreholes but PO_4 was recorded as undetected.
    - Raised TDS and NO_3 are most likely attributed to irrigation practices.
- Groundwater range from very hard to extremely hard with total hardness concentrations of between 340 mg $CaCO_3$/l and 1,005 mg $CaCO_3$/l.
- Trace metals measured in low to very low concentrations.

Hydrogeochemical diagrams based on the data can be viewed in Figure 49 and Figure 50, respectively. Based on the diagrams the following:

- Four distinct groundwater types can be distinguished, Mg(Ca)-HCO_3, Mg-HCO_3(Cl), Mg-Cl and Na-Cl.
- Most groundwaters plot in Field 2 of the Expanded Durov diagram. These water types are typical of fresh recently recharged groundwater which has started to undergo Mg ion exchange.
- One sample, HBH21 display a plot in Field 5 and does not have a clear dominating ion and is typical of groundwater that is usually a mix of clean water from fields 1 and 2 that has undergone SO_4 and NaCl mixing.
- Four boreholes, HBH21, HBH06, HBH07 and HBH14&15 plot in either Field 5 or Field 8. It represent groundwater that is usually a mix of different types – either clean water from fields 1 and 2 that has undergone SO4, but especially Na and Cl mixing.
- Two samples plot in Field 9 of the diagram. Boreholes HBH18 and HBH20 contain high to elevated levels of Na and Cl. These groundwaters pose potential Na hazards to sensitive crops with SAR values being greater than 6.

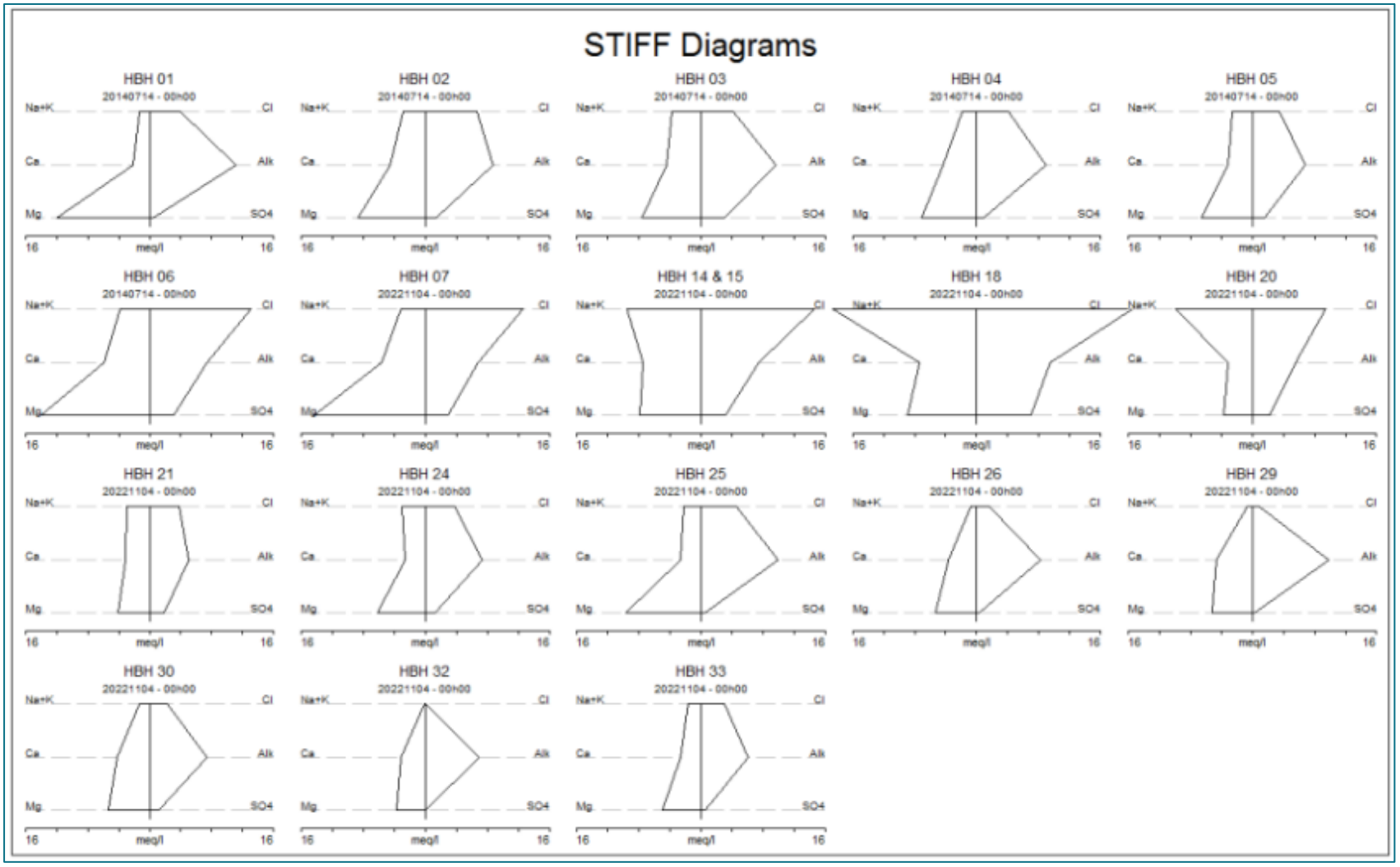

Figure 49: Stiff Diagrams based on meq/l (Shangoni AquiScience, 2023)

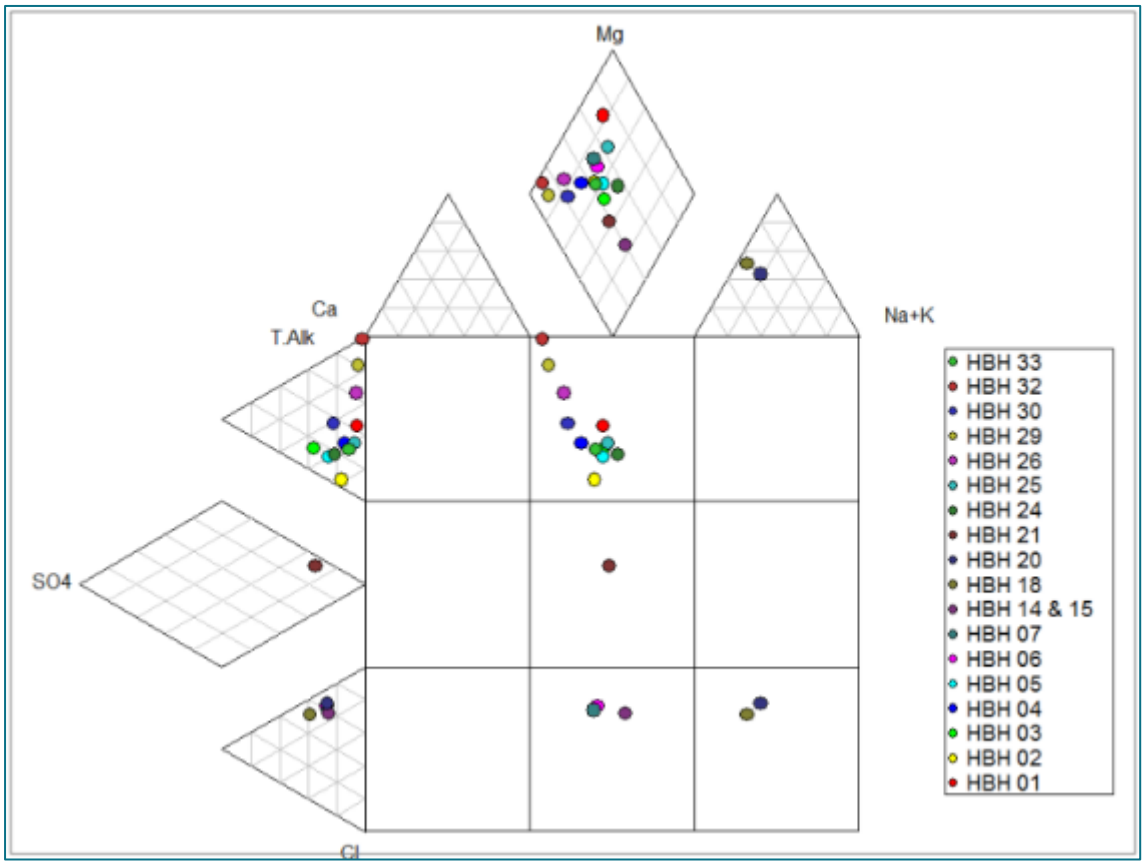

Figure 50: Expanded Durov diagram based on relative meq/l of major ions (Shangoni AquiScience, 2023)

6.9.7 Aquifer Characterisation

6.9.7.1 Aquifer vulnerability

Table 37 summarizes the rating and weighting values and the final score for the vulnerability of the regional aquifer. The final DRASTIC score of 101 indicates that the aquifer/s in the region has a medium susceptibility to pollution. It must be noted that the values are based on averages. Because of this together with the typical heterogeneity of fractured rock aquifers, the vulnerability should therefore be viewed as a worst-case scenario. Refer to the Aquifer Protection Classification in Section 6.3 of the specialist report for the Groundwater Quality Management Index and aquifer protection required.

Table 37: DRASTIC vulnerability scores

Factor	Range/type	Weight	Rating	Total
D	15 - 30 m	5	3	25
R	10 - 50 mm	4	6	24
A	Fractured	3	6	18
S	Loamy sand	2	7	14
T	0-2%	1	10	10

Factor	Range/type	Weight	Rating	Total
I	Pretoria	5	4	20
C	-	3	-	-
DRASTIC SCORE = 101				

6.9.7.2 Aquifer Classification

The DWS has characterised South African aquifers based on the rock formations in which they occur together with its capacity to transmit water to boreholes drilled into specific formations. The water bearing properties of rock formations in South Africa can be classified into four classes defined as:

1. **Class a - Intergranular**
    - Aquifers associated either with loose and unconsolidated formations such as sands and gravels or with rock that has weathered to only partially consolidated material.
2. **Class b - Fractured**
    - Aquifers associated with hard and compact rock formations in which fractures, fissures and/or joints occur that are capable of both storing and transmitting water in useful quantities.
3. **Class c - Karst**
    - Aquifers associated with carbonate rocks such as limestone and dolomite in which groundwater is predominantly stored in and transmitted through cavities that can develop in these rocks.
4. **Class d - Intergranular and fractured**
    - Aquifers that represent a combination of Class a and b aquifer types. This is a common characteristic of South African aquifers. Substantial quantities of water are stored in the intergranular voids of weathered rock but can only be tapped via fractures penetrated by boreholes drilled into the fractured aquifer.

The classes are further subdivided into groups relating to the capacity of an aquifer to transmit water to boreholes, typically measured in l/s. The groups therefore represent various ranges of borehole yields.

The proposed operations are in a **d3 aquifer class region** (Figure 51) with the geology listed as mostly undifferentiated rocks of mixed lithologies containing sedimentary, igneous and metamorphic rock.

The groundwater yield potential is classed as moderate on the basis that most of the boreholes on record for the study area produce between 0.5 and 2.0 l/s. Groundwater should be targeted in vicinity of dolerite dykes or within fault areas where groundwater is held in good water yielding fractures.

The hydrogeology of the region is defined as secondary fractured meta-sedimentary with the main sources of groundwater found in fractures, bedding planes, joints and faults and sometimes limited to weathered material. The aquifer formed is as a result of fracturing in sedimentary rocks caused by intrusions and / or metamorphosis to various degrees of the host rock/s. Groundwater is targeted within contact zones and bedding planes of the sedimentary rocks underlying the study area. Good yields can be also expected in vicinity of dolerite dykes and/ or faults.

6.9.7.3 Aquifer protection classification

In order to achieve the Groundwater Quality Management (GQM) Index a point scoring system as presented in Table 38 – Table 40 were used.

Table 38: Ratings for the Aquifer System Management and Second Variable Classifications

Aquifer System Management Classification		
Class	**Points**	**Study Area**
Sole Source Aquifer System	6	
Major Aquifer System	4	
Minor Aquifer System	2	2
Non-Aquifer System	0	
Special Aquifer System	0-6	
Second Variable Classification (fractured)		
High	3	
Medium	2	2
Low	1	

Table 39: Ratings for the GQM Classification System

Aquifer System Management Classification		
Class	**Points**	**Study Area**
Sole Source Aquifer System	6	
Major Aquifer System	4	
Minor Aquifer System	2	2
Non-Aquifer System	0	
Special Aquifer System	0-6	
Second Variable Classification		
High	3	
Medium	2	2
Low	1	

The occurring aquifer, in terms of the above definitions, is classified as a minor aquifer system. The vulnerability, or the tendency or likelihood for contamination to reach a specified position in the

groundwater system after introduction at some location above the uppermost aquifer is classified as medium. The level of groundwater protection based on the GQM Classification is shown in Table 40.

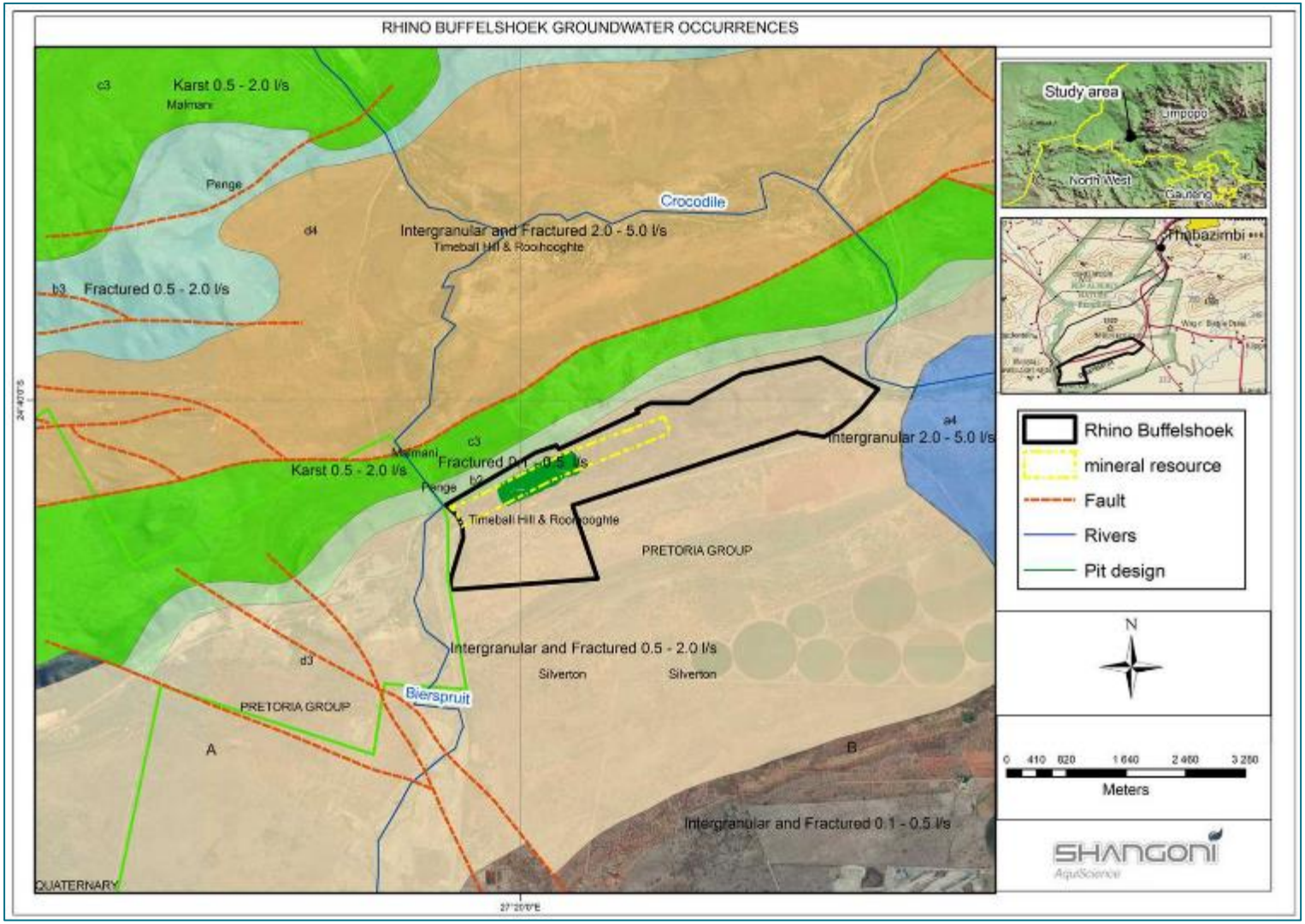

Figure 51: Typical groundwater occurrences in the study area (Shangoni AquiScience, 2023)

Table 40: GQM index for the study area

GQM Index	Level of Protection	Study Area
<1	Limited	
1-3	Low level	
3-6	**Medium level**	**4**
6-10	High level	
>10	Strictly non-degradation	

The ratings for the Aquifer System Management Classification and Aquifer Vulnerability Classification yield a GQM index of 4 for the study area, indicating that medium level groundwater protection is required to adhere to water quality objectives set by DWS. Reasonable and sound groundwater protection measures are recommended to ensure that no cumulative pollution affects the aquifer, during short- and long-term. DWS's water quality management objectives are to protect human health and the environment. Therefore, the significance of this aquifer classification is that if any potential risk exists, measures must be taken to limit the risk to the environment, which in this case is the protection of the underlying aquifer.

6.10 Air quality

Information for this section was extracted from the Air Quality Impact Assessment (AQIA) Report for the proposed Buffelshoek Extension Mine (TiKOTECH, 2023).

6.10.1 Land cover, land use and sensitive receptors

Figure 52 shows the land use and receptors within a 10 km radius from the mine boundary. The land use within the assessment area comprises predominantly of agriculture, fallow land, old fields, woodland, grassland, mining, and residential areas. Natural areas surrounding the mine include the Waterberg Mountain Bushveld and Dwaalboom Thornveld (Musina & Rutherford, 2010). Both these vegetation types have a conservation status of least threatened (Musina & Rutherford, 2010). Sensitive human receptors identified within 10 km radius of the mine boundary include residences or homesteads, schools, hospitals, and clinics. Istores Primary School is located within the mine boundary. Senakangwedi Primary School is located approximately 10 km west northwest of the mine boundary. The following schools are in Thabazimbi: Naomi Baba, Ysterberg Public Primary School, Advanced College Thabazimbi, Laerskool Thabazimbi, Hoerskool Frikkie Meyer, Agile Academy, Rabugale Primary School, Deo Gloria Primary School, Mabogopedi High School, BabbelBekkies creche, A Lo Ha Keiki Kleuterskool, Waterberg TVET College and 48 Steps. The following clinics and hospitals are in Thabazimbi: Thabazimbi Hospital, Curamed Thabazimbi Hospital, Mediclinic Thabazimbi ER, Regorogile 1 Clinic and Thabazimbi Clinic.

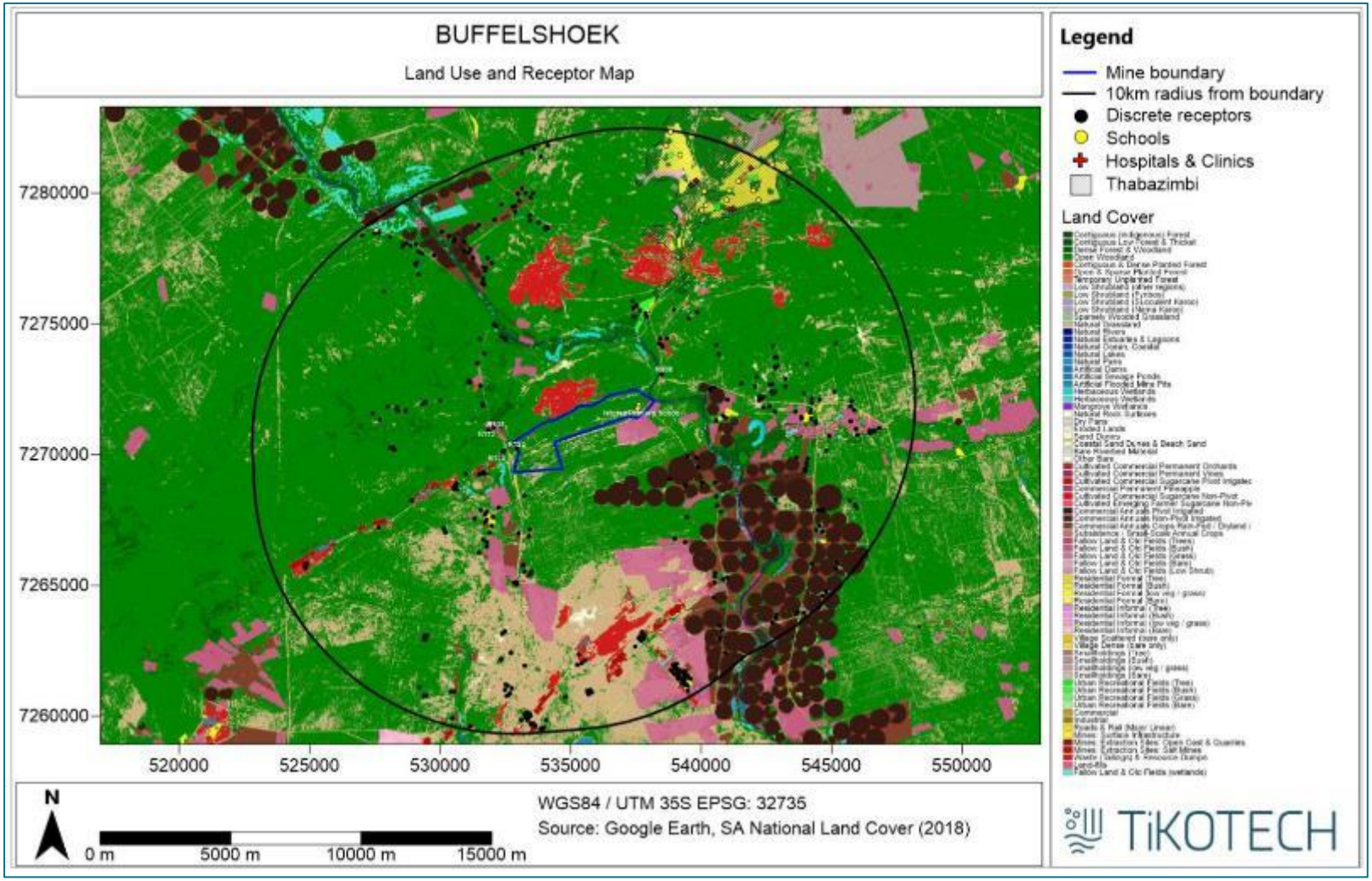

Figure 52: Land use and receptor map (TiKOTECH, 2023)

6.10.2 Ambient air quality background

The proposed Buffelshoek Extension Mine falls within one of South Africa's declared airshed priority areas (i.e., poor, or potentially poor air quality), the Waterberg Bojanala Priority Area (WBPA). The Limpopo Provincial 2013 AQMP identified four hotspot areas within the province: Phalaborwa, Steelpoort, Lephalale and Polokwane. The 2009 Waterberg District Municipality's Air Quality Management Plan (AQMP) identified Lephalale, Thabazimbi and Northam as its hotspot areas.

Figure 68 shows the region within 50 km of the mine boundary. Emission sources within a 50 km radius of the mine include mines, residences, commercial activities, and industrial areas. Emission source activities may include mining, industrial emissions, domestic fuel burning, vehicle emissions, agricultural activities, biomass burning, waste treatment and disposal, vehicle entrainment of dust and wind erosion from exposed surfaces.

There was no site-specific ambient air quality data. Simulation results from the baseline characterisation for the WBPA 2015 AQMP and ambient air quality monitoring data from stations in Thabazimbi, Bierspruit and AngloPlat's 4BDecline were used to consider the background ambient air quality.

The baseline characterisation for the WBPA 2015 AQMP simulated emissions from Listed activities, residential fuel burning, mining (for PM10) and transboundary emissions in the WBPA, a boundary area with Botswana and Rustenburg-Brits area. The figures in the baseline characterisation predicted the following concentrations over the proposed site:

- An average annual SO2 of approximately 5 µg/m3 (Figure 4-37; DEA, 2014).
- A 99th percentile daily SO2 of approximately 25 µg/m3 (Figure 4-38; DEA, 2014).
- A 99th percentile hourly SO2 of approximately 50 µg/m3 (Figure 4-40; DEA, 2014).
- An average annual NO2 of approximately 1 µg/m3 (Figure 4-49; DEA, 2014).
- A 99th percentile hourly NO2 of approximately 10 µg/m3 (Figure 4-50; DEA, 2014).
- An average annual PM10 of approximately 25-50 µg/m3 (Figure 4-62; DEA, 2014).
- A 99th percentile daily PM10 of approximately >25 µg/m3 (Figure 4-63; DEA, 2014).

The ambient air quality monitoring results for Thabazimbi, Bierspruit and AngloPlat's 4BDecline are shown from Figure 53 to Figure 67.

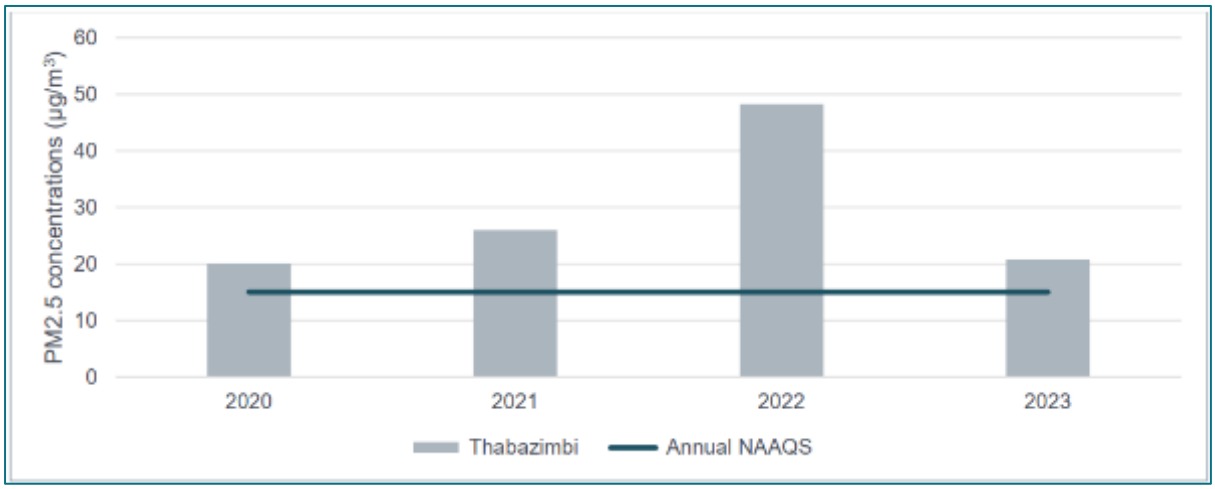

Figure 53: Average annual PM $_{2.5}$ concentrations (2020-Jun2023, downloaded from the SAAQIS).

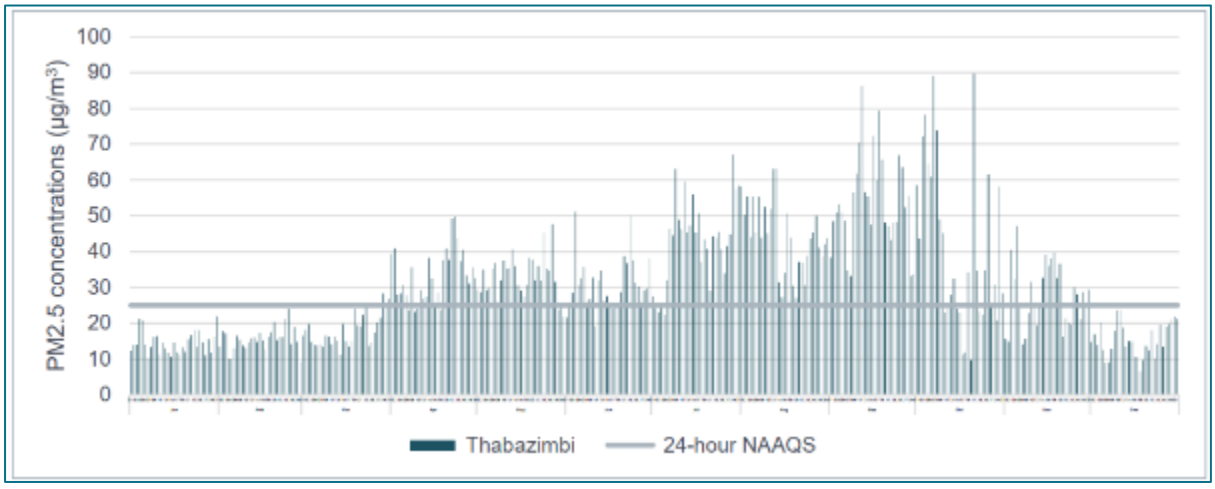

Figure 54: Average daily PM $_{2.5}$ concentrations (2020-Jun2023, downloaded from the SAAQIS).

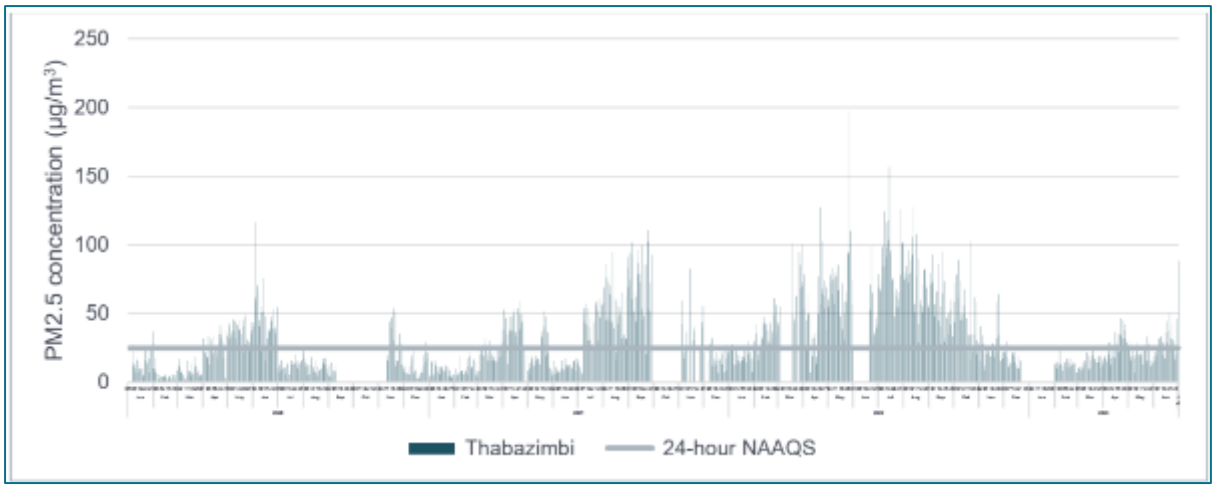

Figure 55: Daily average PM $_{2.5}$ concentrations (2020-Jun2023, downloaded from the SAAQIS).

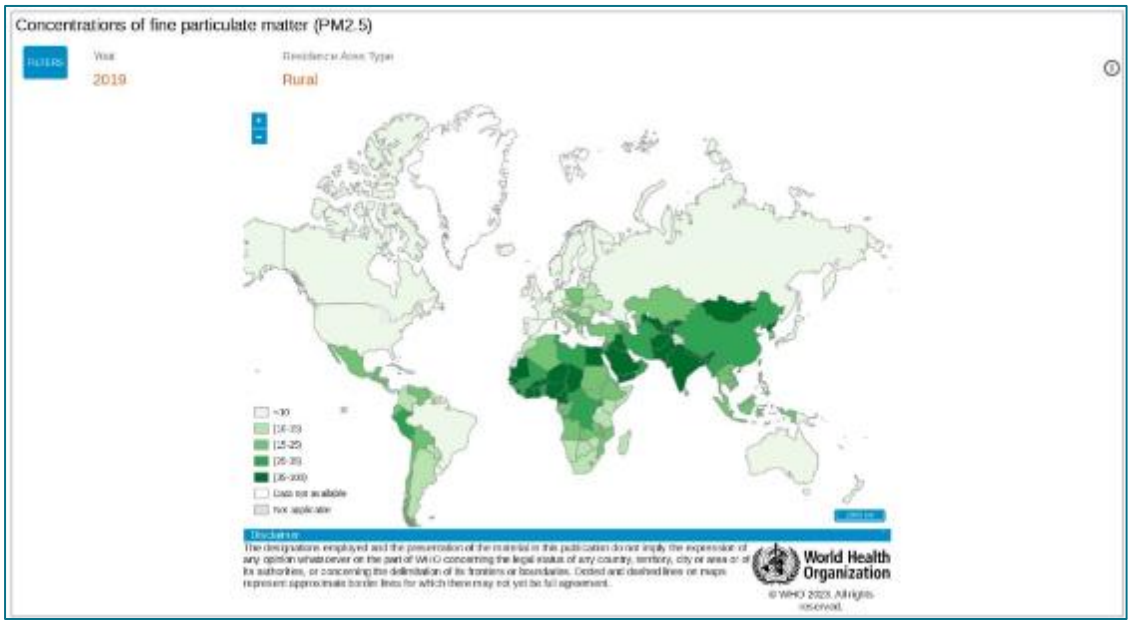

Figure 56: 2019 PM $_{2.5}$ concentrations (WHO, n.d.).

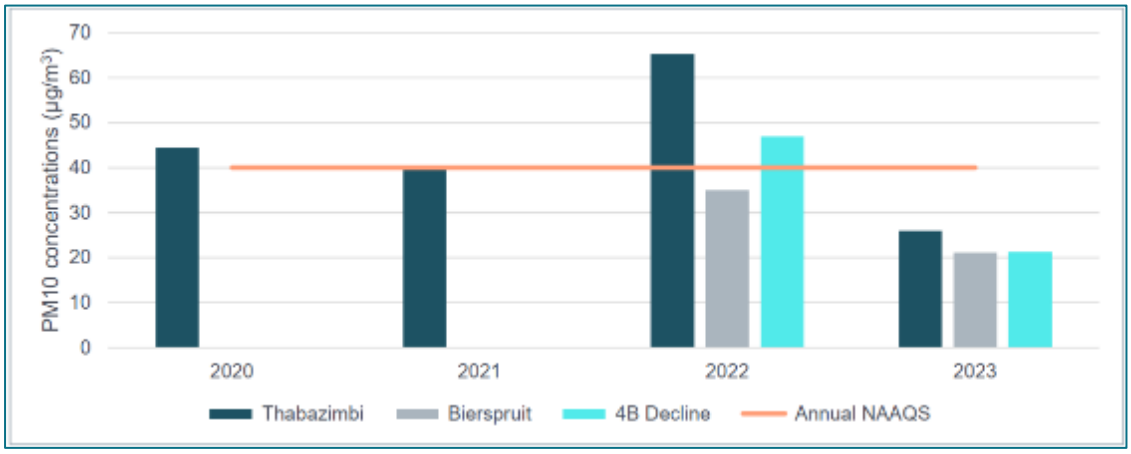

Figure 57: Average annual PM $_{10}$ concentrations (2020-Jun2023, downloaded from the SAAQIS).

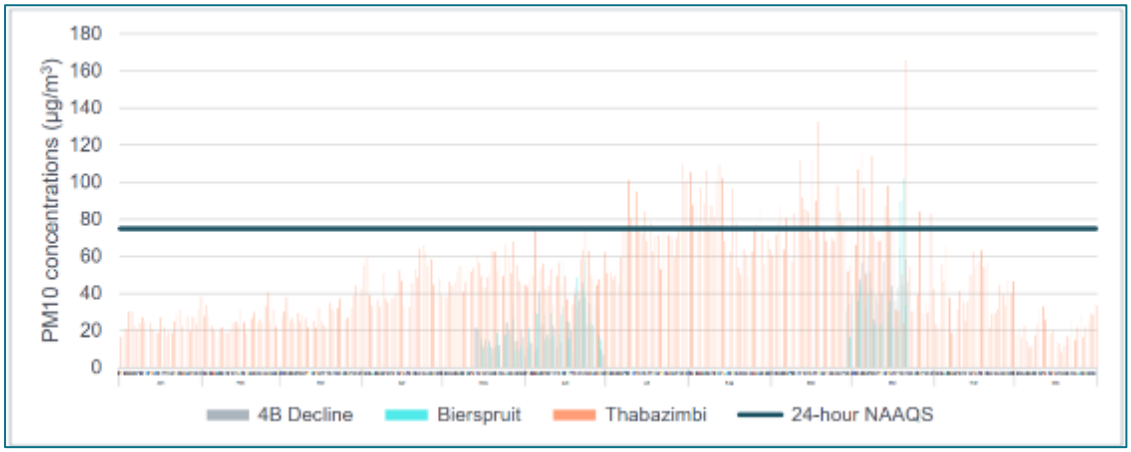

Figure 58: Average daily PM$_{10}$ concentrations (2020-Jun2023, downloaded from the SAAQIS).

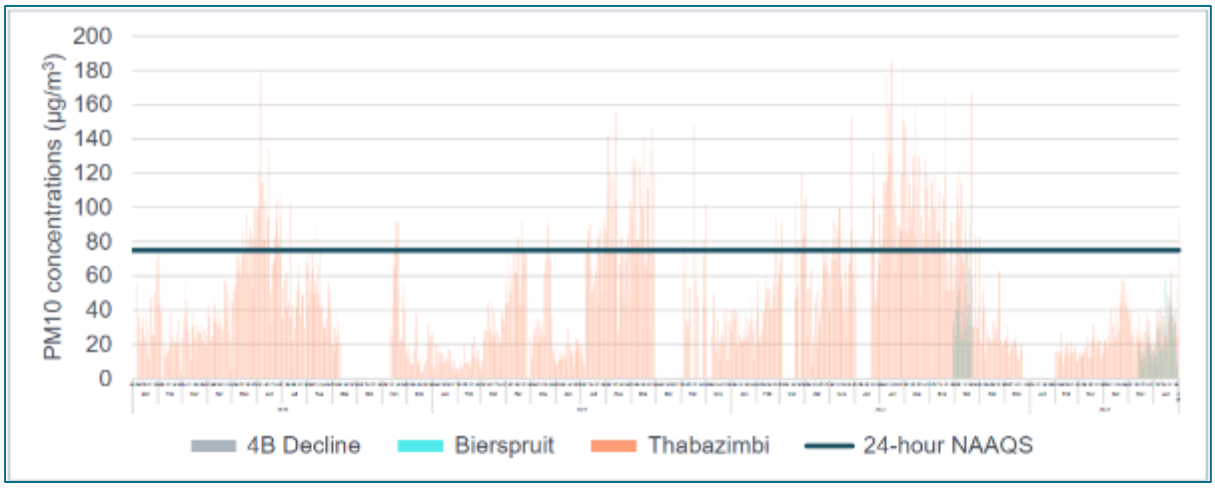

Figure 59: Daily average PM_{10} concentrations (2020-Jun2023, downloaded from the SAAQIS).

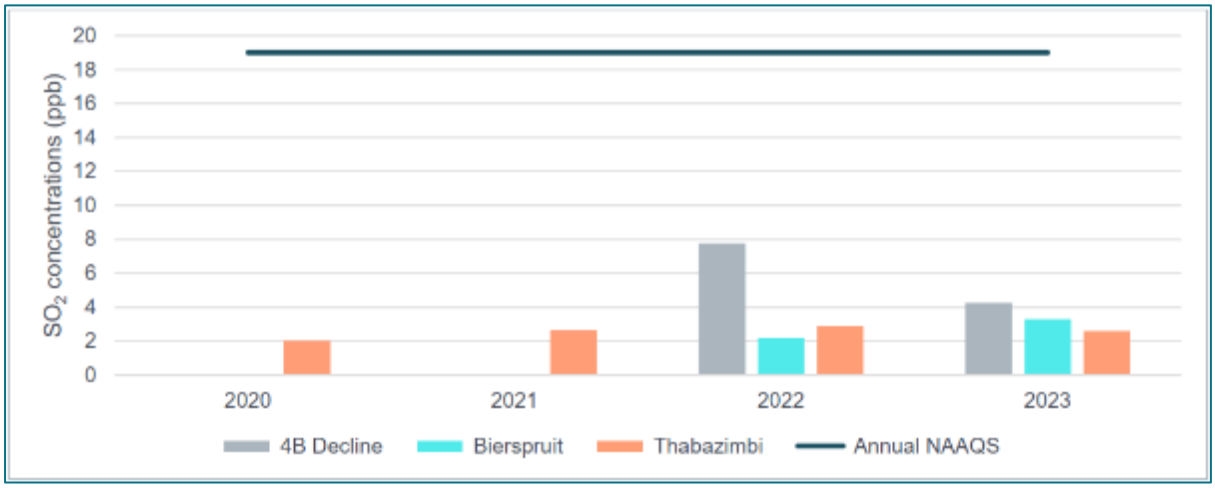

Figure 60: Average annual SO_2 concentrations (2020-Jun2023, downloaded from the SAAQIS).

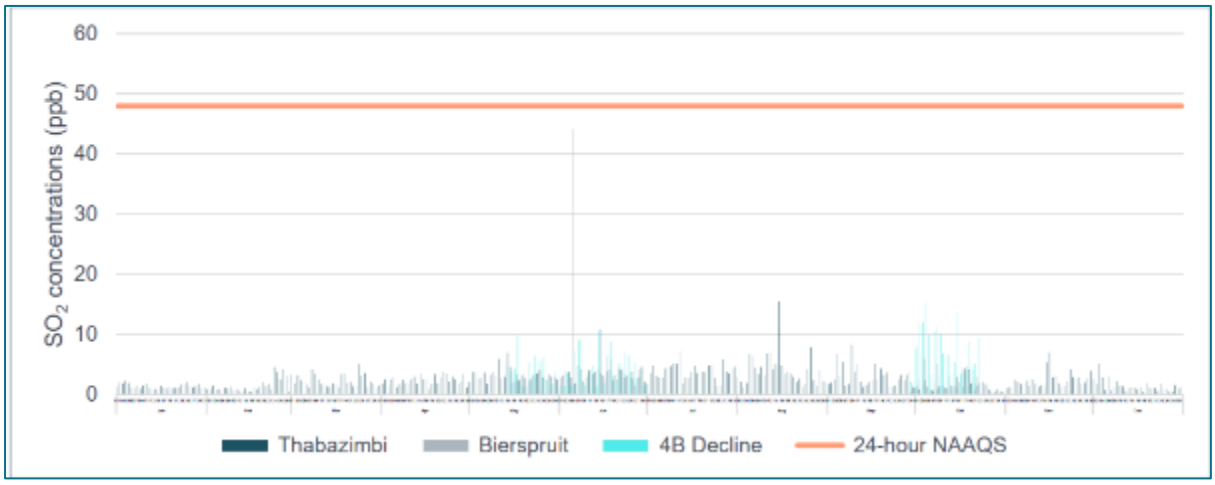

Figure 61: Average daily SO_2 concentrations (2020-Jun2023, downloaded from the SAAQIS).

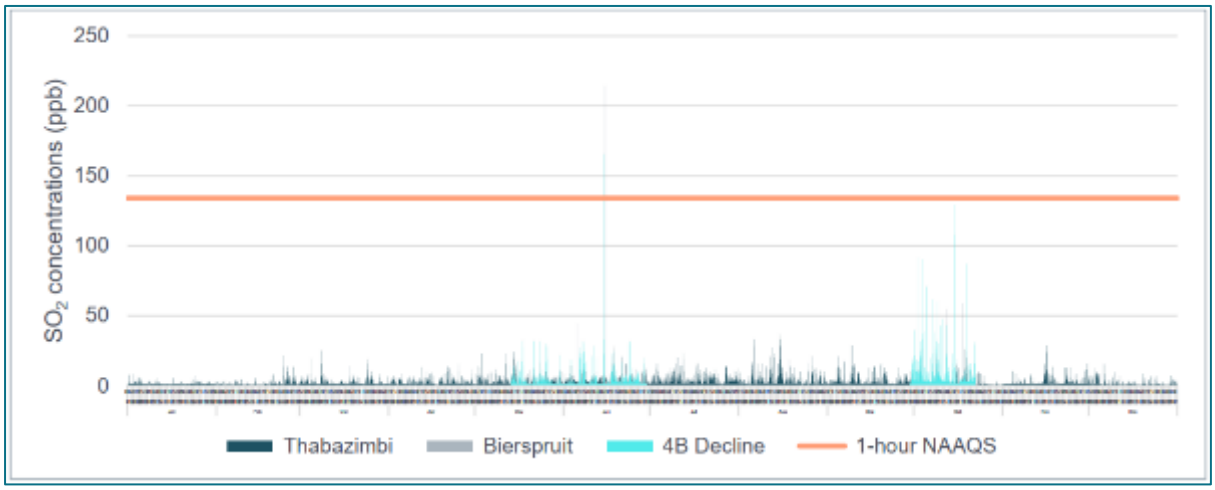

Figure 62: Average hourly SO_2 concentrations (2020-Jun2023, downloaded from the SAAQIS).

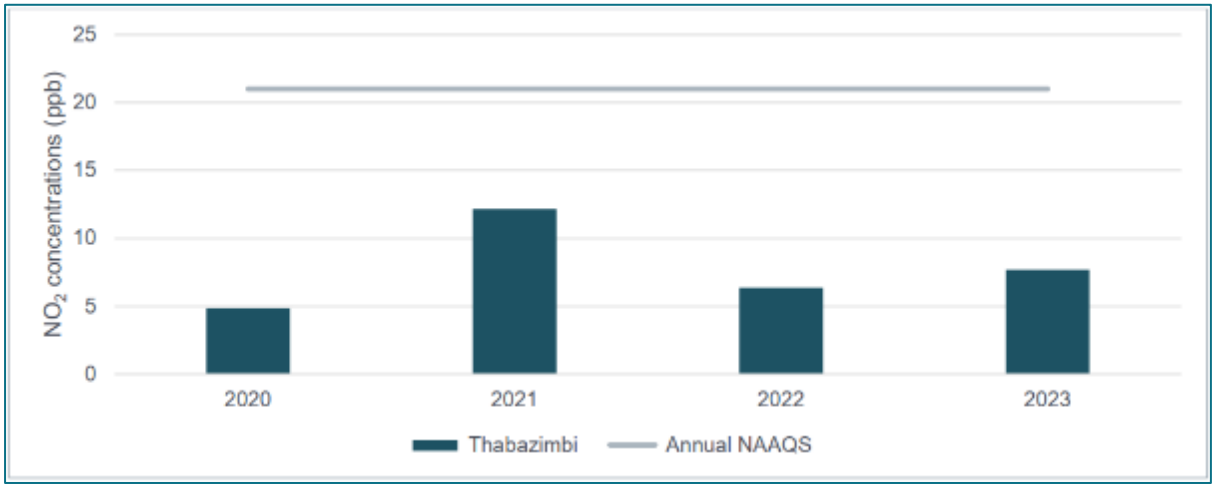

Figure 63: Average annual NO_2 concentrations (2020-Jun2023, downloaded from the SAAQIS).

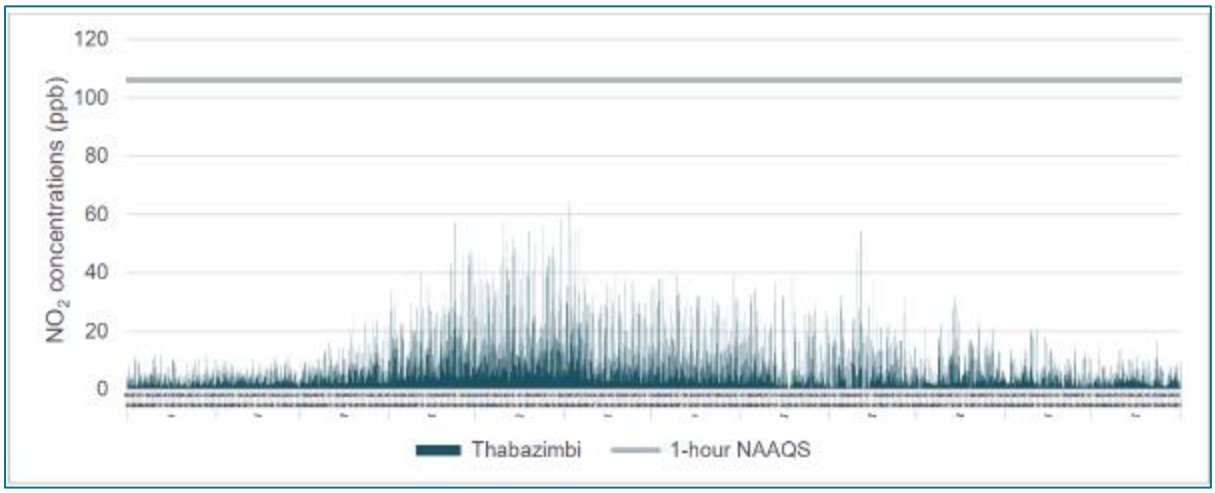

Figure 64: Average hourly NO_2 concentrations (2020-Jun2023, downloaded from the SAAQIS).

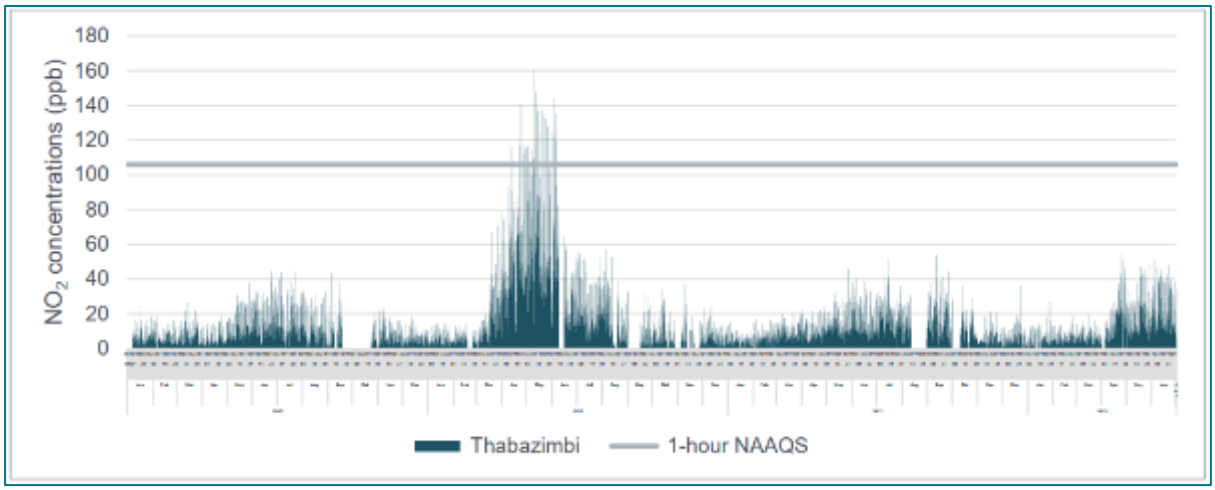

Figure 65: Hourly NO_2 concentrations (2020-Jun2023, downloaded from the SAAQIS).

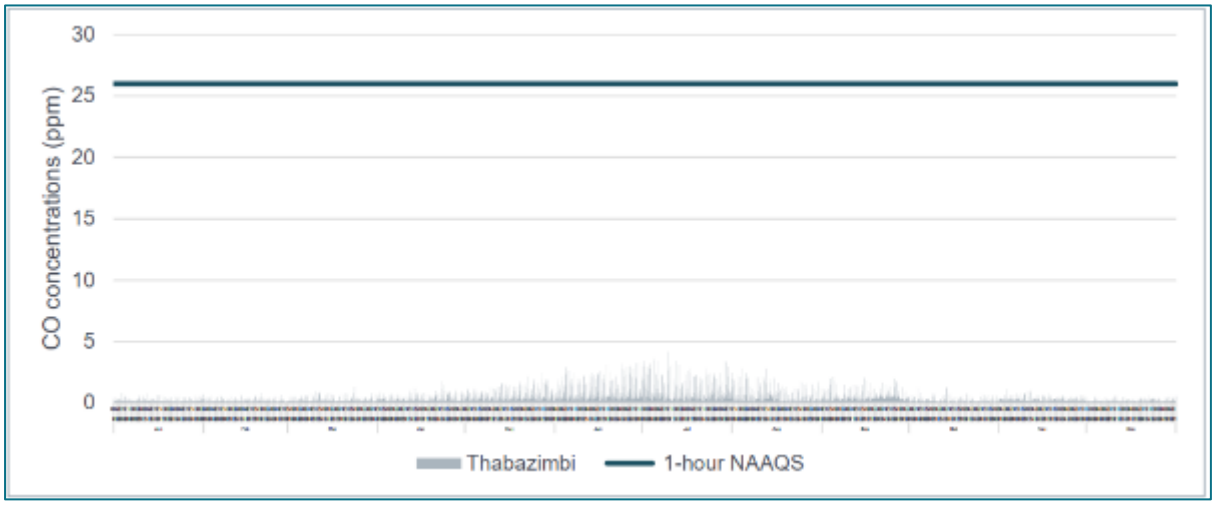

Figure 66: Hourly CO concentrations (2020-Jun2023, downloaded from the SAAQIS).

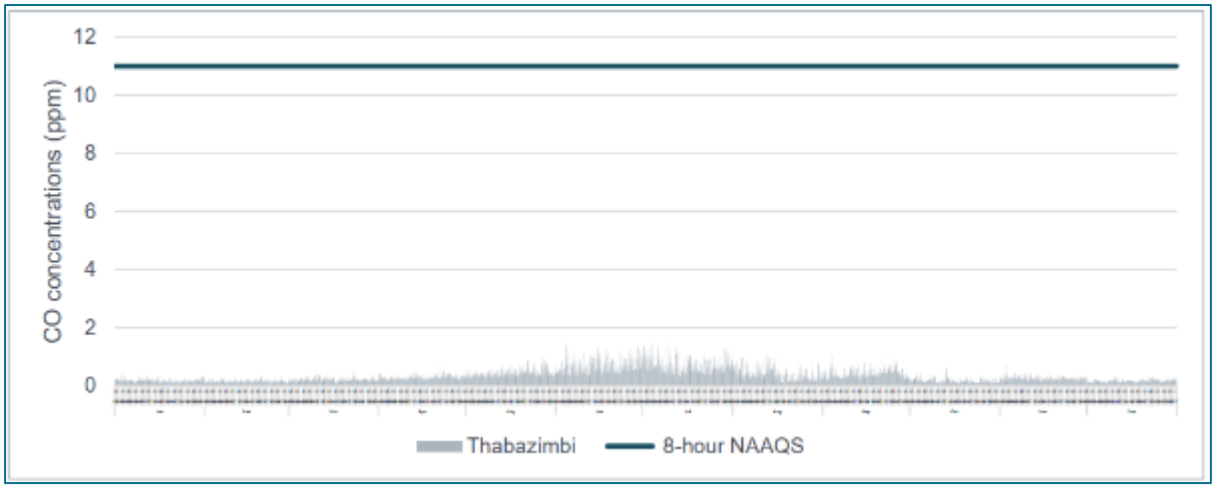

Figure 67: 8-hourly CO concentrations (2020-Jun2023, downloaded from the SAAQIS).

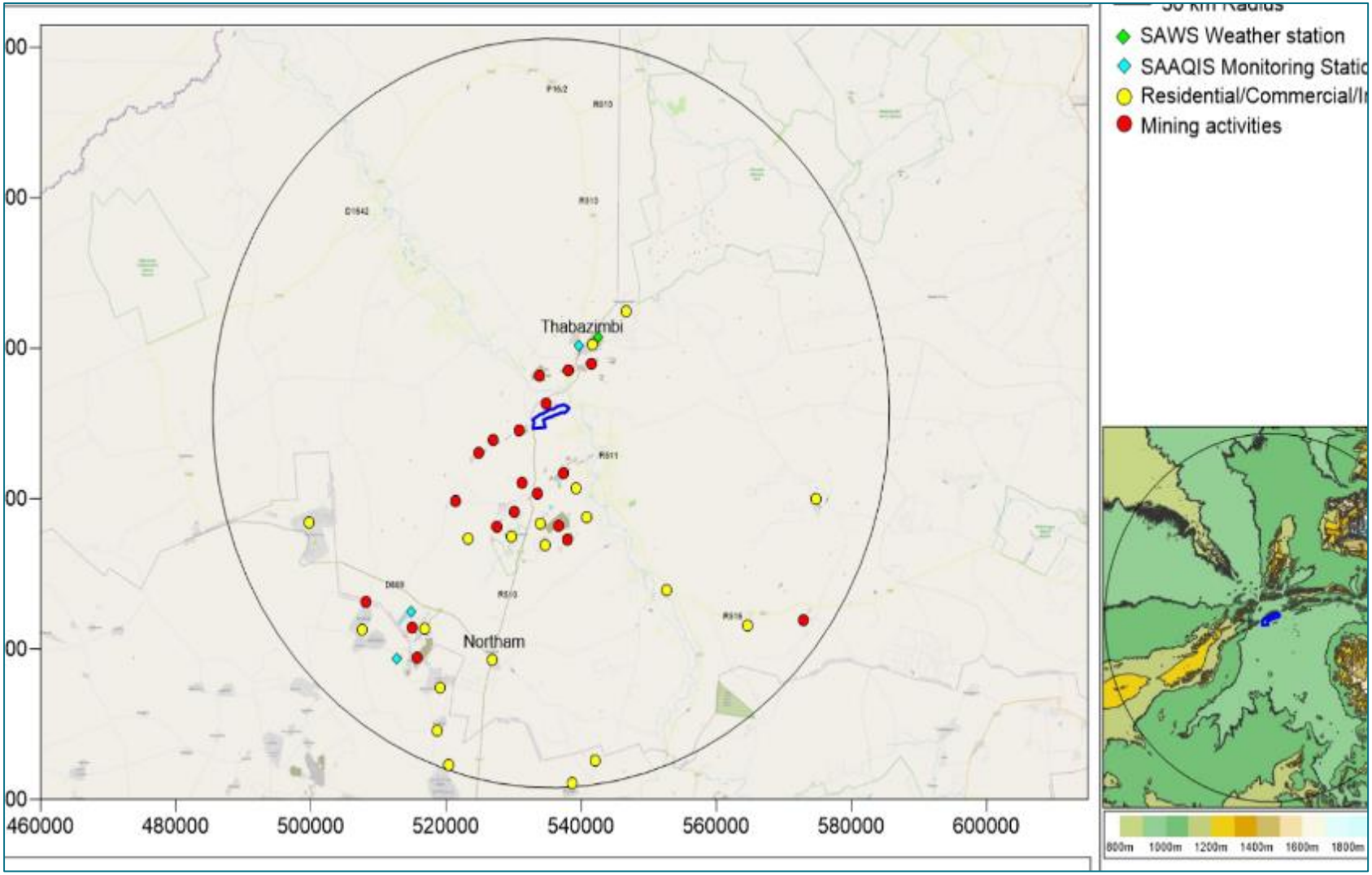

Figure 68: Regional map (TiKOTECH, 2023)

6.11 Environmental noise

Current ambient noise levels at the proposed site are expected to be relatively low as a result of the rural setting with a low population level and limited industrial activity aside from the surrounding mines. Potential receptors are the local community, the nearby school and the fauna and flora of the area. The only source of noise beyond the boundaries of the proposed mine is expected to be low volume traffic noise.

6.12 Visual aspects

The project is planned to be adjacent the R510 Road from Rustenburg to Ellisras (Lephalale). Mining activities may be visible from the R510 however it is not expected that the mining activities will be visible from afar. There are also other mines in the area which impact on the visual aspect of the area.

6.13 Cultural and heritage resources

Information for this section was extracted from the Phase I Archaeological Impact Assessment (Coetzee, 2023).

6.13.1 Methodology

Archaeological reconnaissance of the study area was conducted during January 2023 through an unsystematic pedestrian and vehicular survey of the proposed impact area within the greater study area (Figure 69 and Figure 70). Since the area is associated with extremely dense vegetation cover, only clearings, roads and potential sites recorded during a previous heritage study, as well as sites identified on historical aerial images and topographical maps were inspected. General site conditions were recorded via photographic record. The historical topographical maps dating to 1963, 1980, 2005, and 2015, as well as the historical aerial images dating to 1947, 1969, 1980, 1987, 1990, and 2006, proved useful in terms of providing an indication of potential heritage sites and past land uses associated with the study area. Seven (7) potential sites were identified on historical aerial images and topographical maps, four (4) sites were identified and plotted from information gathered in the previous heritage study conducted on the area (Miller 2010a), and 14 additional sites were identified during the site inspection. Where access was not prohibited, the previously identified sites were visited and recorded (Table 41, Figure 69 & Figure 70). It should be noted that some of the sites identified during the site inspection are located in the same vicinity as the sites identified during the previous heritage study and could therefore be related to the already identified sites. Since these sites are located relatively close to each other, a ‘sensitive area’ was identified and plotted (Figure 123). The site status of all recorded sites is shown in Figure 71 & Figure 72. The total area covered during the survey was approximately 260 ha. Since heritage resources are often associated with perennial and nonperennial rivers, the rivers and streams located within close proximity of the study area were buffered by a distance of 500 m, indicating a potentially sensitive area (Figure 123).

The reconnaissance of the area under investigation served a twofold purpose:

- To obtain an indication of heritage material found in the general area as well as to identify or locate archaeological sites on the area demarcated for development. This was done in order to establish a heritage context and to supplement background information that would benefit developers through identifying areas that are sensitive from a heritage perspective.
- All archaeological and historical events have spatial definitions in addition to their cultural and chronological context. Where applicable, spatial recording of these definitions were done by means of a handheld Global Positioning System (GPS) during the site visit, as well as by plotting the boundaries from aerial imagery and topographical maps.

Table 41: Site coordinates & description

Name	Off. Name	Latitude	Longitude	Description	Age	Current Status	Estimated Extent	ID Source	Parcel Land	Intersecting Project Area
B01	2427CB-B01	-24.664137	27.374059	Building 1947	Historical	Demolished	2.2 ha	Aerial 1947	RE/351	No
B02	2427CB-B02	-24.669464	27.372721	Building 1963	Historical	Demolished	1.9 ha	Topo 1963	RE/351	No
B03	2427CB-B03	-24.666067	27.372055	Hut 1963	Historical	Demolished	4.0 ha	Topo 1963	RE/351; 4/351	Yes
B04	2427CB-B04	-24.667914	27.370961	Building 1980	Contemporary	Intact	1.2 ha	Aerial 1980	RE/351	Yes
B05	2427CB-B05	-24.682691	27.332717	Building 1980	Contemporary	Intact	2.3 ha	Aerial 1980	RE/1/352	No
B06	2427CB-B06	-24.666076	27.374600	Building 1947	Historical	Demolished	2.1 ha	Aerial 1947	RE/351	No
B07	2427CB-B07	-24.666443	27.376657	Building 1947	Historical	Demolished	0.5 ha	Aerial 1947	RE/351	No
B08	2427CB-B08	-24.679906	27.332993	Iron Age byre	LIA	Disturbed	0.4 ha	Prev HIA	RE/1/352	Yes
B09	2427CB-B09	-24.680132	27.330123	Historic Village 1920's	Historical	Demolished	0.2 ha	Prev HIA	RE/1/352	Yes
B10	2427CB-B10	-24.679101	27.330058	European Farmyard late 19th C	Historical	Dilapidated	0.4 ha	Prev HIA	RE/1/352	Yes
B11	2427CB-B11	-24.670022	27.365970	Cemetery	Historical	Intact	48 graves	Prev HIA	RE/351	Yes
F01	2427CB-F01	-24.679441	27.332890	Stone Tools MSA	MSA	Disturbed	2 Stone tools	Field	RE/1/352	Yes
F02	2427CB-F02	-24.680284	27.330740	Stone-Walling	Historical	Dilapidated	3m	Field	RE/1/352	Yes

Name	Off. Name	Latitude	Longitude	Description	Age	Current Status	Estimated Extent	ID Source	Parcel Land	Intersecting Project Area
F03	2427CB-F03	-24.679470	27.331078	Stone-Walling	Historical	Dilapidated	4m	Field	RE/1/352	Yes
F04	2427CB-F04	-24.679967	27.331054	Grinding stone	LIA	Disturbed	1 stone	Field	RE/1/352	Yes
F05	2427CB-F05	-24.672905	27.353058	Building foundation	Unknown	Dilapidated	16m²	Field	RE/351	Yes
F06	2427CB-F06	-24.680415	27.333456	Feeding trough	Contemporary	Intact	5m²	Field	RE/1/352	No

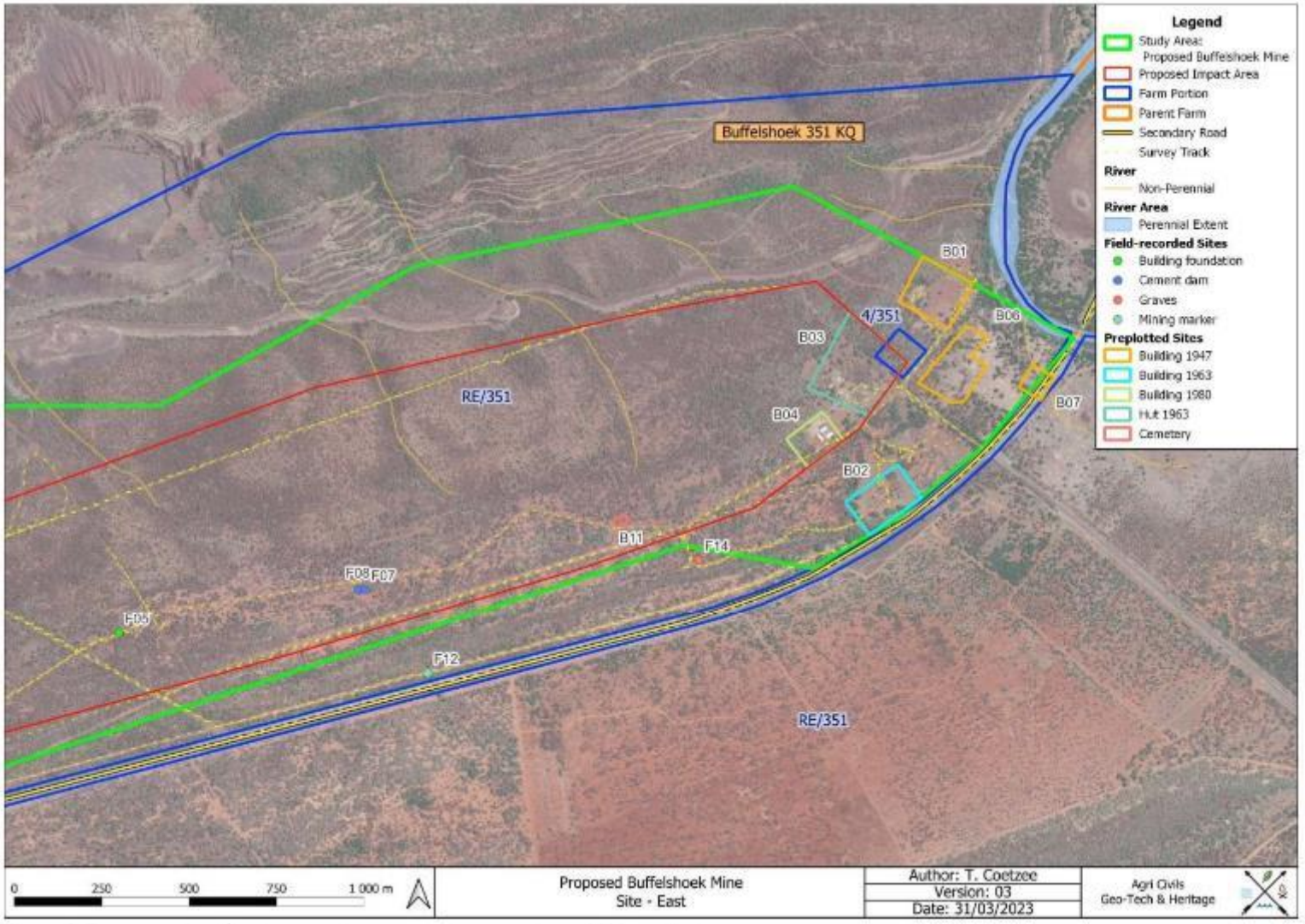

Figure 69: Eastern section of study area with survey track portrayed on a 2021 satellite image (Coetzee, 2023)

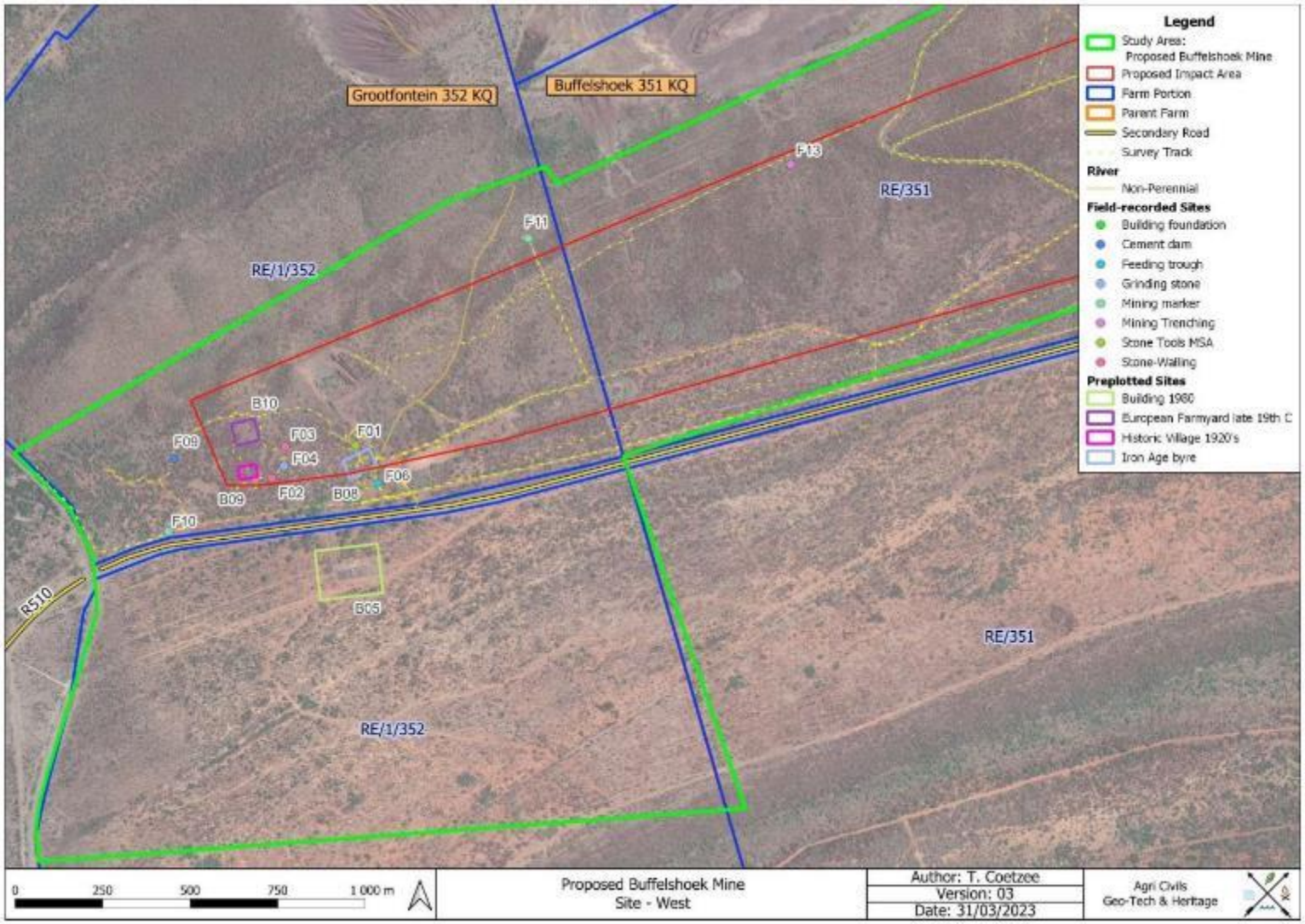

Figure 70: Western section of study area with survey track portrayed on a 2021 satellite image (Coetzee, 2023)

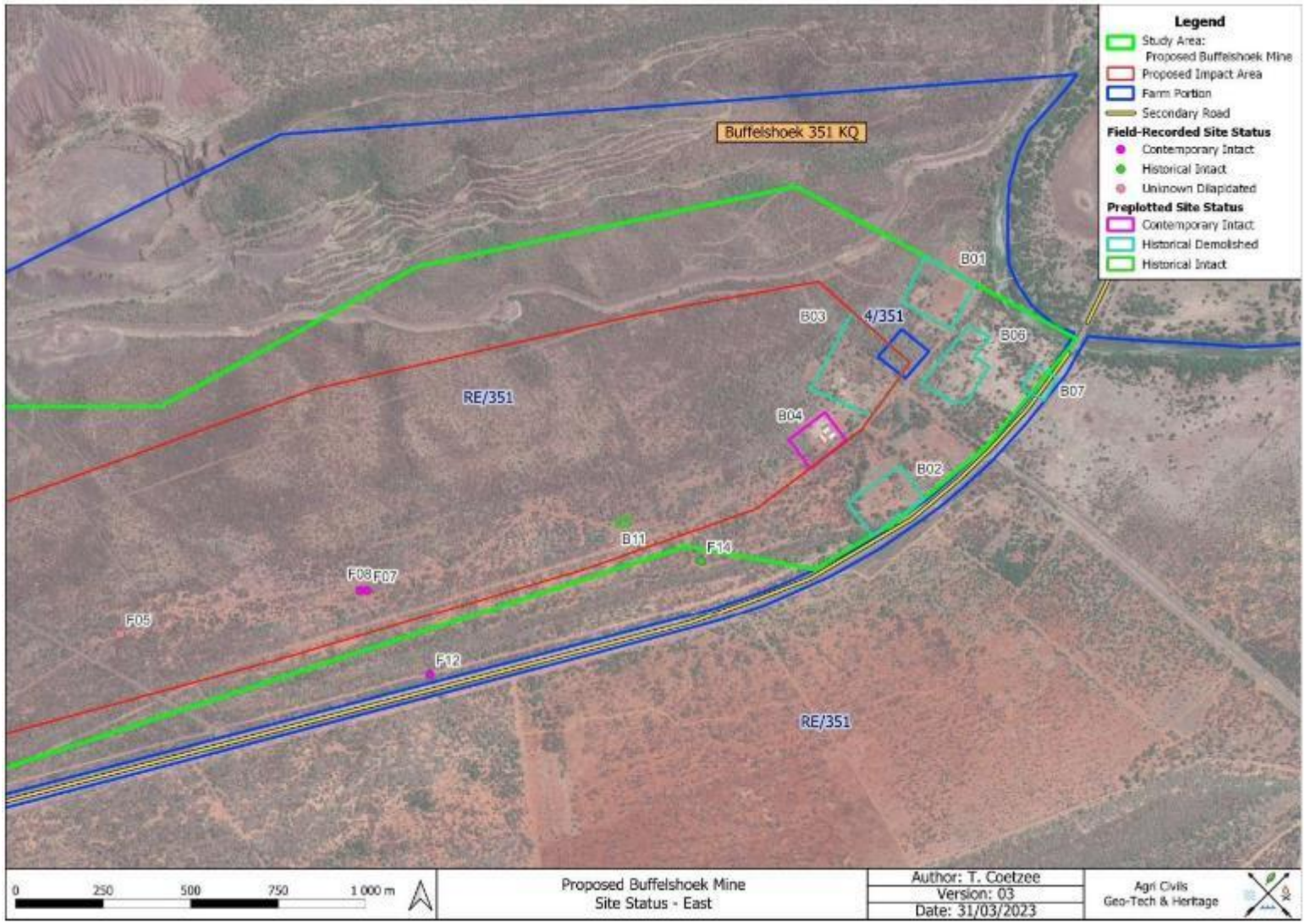

Figure 71: Site status portrayed on a 2021 satellite image – eastern section (Coetzee, 2023)

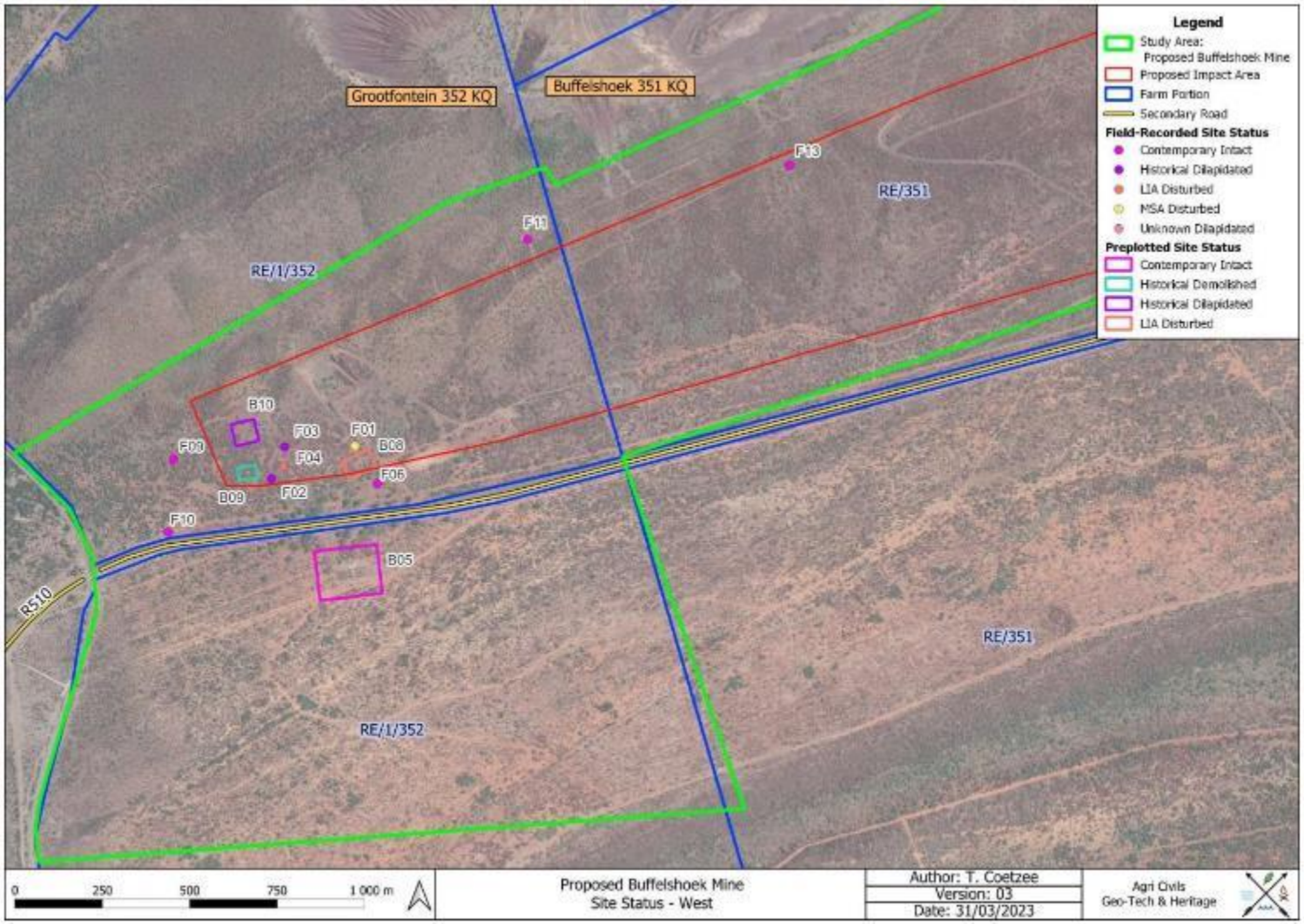

Figure 72: Site status portrayed on a 2021 satellite image – western section (Coetzee, 2023)

6.13.2 Archaeological Background

Southern African archaeology is broadly divided into the Early, Middle and Later Stone Ages; Early, Middle and Later Iron Ages; and Historical or Colonial Periods. This section of the report provides a general background to archaeology in South Africa.

6.13.2.1 The Stone Age

The earliest stone tool industry, the Oldowan, was developed by early human ancestors which were the earliest members of the genus *Homo*, such as *Homo habilis*, around 2.6 million years ago. It comprises tools such as cobble cores and pebble choppers (Toth & Schick 2007). Archaeologists suggest these stone tools are the earliest direct evidence for culture in southern Africa (Clarke & Kuman 2000). The advent of culture indicates the advent of more cognitively modern hominins (Mitchell 2002: 56, 57).

The Acheulean industry completely replaced the Oldowan industry. The Acheulian industry was first developed by *Homo ergaster* between 1.8 to 1.65 million years ago and lasted until around 300 000 years ago. Archaeological evidence from this period is also found at Swartkrans, Kromdraai and Sterkfontein. The most typical tools of the ESA (Early Stone Age) are handaxes, cleavers, choppers and spheroids. Although hominins seemingly used handaxes often, scholars disagree about their use. There are no indications of hafting, and some artefacts are far too large for it. Hominins likely used choppers and scrapers for skinning and butchering scavenged animals and often obtained sharp ended sticks for digging up edible roots. Presumably, early humans used wooden spears as early as 5 million years ago to hunt small animals.

Middle Stone Age (MSA) artefacts started appearing about 250 000 years ago and replaced the larger Early Stone Age bifaces, handaxes and cleavers with smaller flake industries consisting of scrapers, points and blades. These artefacts roughly fall in the 40-100 mm size range and were, in some cases, attached to handles, indicating a significant technical advance. The first *Homo sapiens* species also emerged during this period. Associated sites are Klasies River Mouth, Blombos Cave and Border Cave (Deacon & Deacon 1999).

Although the transition from the Middle Stone Age to the Later Stone Age (LSA) did not occur simultaneously across the whole of southern Africa, the Later Stone Age ranges from about 20 000 to 2000 years ago. Stone tools from this period are generally smaller, but were used to do the same job as those from previous periods; only in a different, more efficient way. The Later Stone Age is associated with: rock art, smaller stone tools (microliths), bows and arrows, bored stones, grooved stones, polished bone tools, earthenware pottery and beads. Examples of Later Stone Age sites are Nelson Bay Cave, Rose Cottage Cave and Boomplaas Cave (Deacon & Deacon 1999). These artefacts are often associated with rocky outcrops or water sources.

6.13.2.2 The Iron Age & Historical Period

The Early Iron Age marks the movement of farming communities into South Africa in the first millennium AD, or around 2500 years ago (Mitchell 2002:259, 260). These groups were agro-pastoralist communities that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Archaeological evidence from Early Iron Age sites is mostly artefacts in the form of ceramic assemblages. The origins and archaeological identities of this period are largely based upon ceramic typologies. Some scholars classify Early Iron Age ceramic traditions into different "streams" or "trends" in pot types and decoration, which emerged over time in southern Africa. These "streams" are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). Early Iron Age ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. This period continued until the end of the first millennium AD (Mitchell 2002; Huffman 2007). Some well-known Early Iron Age sites include the Lydenburg Heads in Mpumalanga, Happy Rest in the Limpopo Province and Mzonjani in Kwa-Zulu Natal.

The Middle Iron Age roughly stretches from AD 900 to 1300 and marks the origins of the Zimbabwe culture. During this period cattle herding appeared to play an increasingly important role in society. However, it was proved that cattle remained an important source of wealth throughout the Iron Age. An important shift in the Iron Age of southern Africa took place in the Shashe-Limpopo basin during this period, namely the development of class distinction and sacred leadership. The Zimbabwe culture can be divided into three periods based on certain capitals. Mapungubwe, the first period, dates from AD 1220 to 1300, Great Zimbabwe from AD 1300 to 1450, and Khami from AD 1450 to 1820 (Huffman 2007: 361, 362).

The Late Iron Age (LIA) roughly dates from AD 1300 to 1840. It is generally accepted that Great Zimbabwe replaced Mapungubwe. Some characteristics include a greater focus on economic growth and the increased importance of trade. Specialisation in terms of natural resources also started to play a role, as can be seen from the distribution of iron slag which tend to occur only in certain localities compared to a wide distribution during earlier times. It was also during the Late Iron Age that different areas of South Africa were populated, such as the interior of KwaZulu Natal, the Free State, the Gauteng Highveld and the Transkei. Another characteristic is the increased use of stone as building material. Some artefacts associated with this period are knife-blades, hoes, adzes, awls, other metal objects as well as bone tools and grinding stones.

The Historical period mainly deals with Europe's discovery, settlement and impact on southern Africa. Some topics covered by the Historical period include Dutch settlement in the Western Cape, early mission stations, Voortrekker routes and the Anglo Boer War. This time period also saw the compilation of early maps by missionaries, explorers, military personnel, etc.

6.13.2.3 Thabazimbi Archaeo-History

Research conducted by Huffman (2007: 89-90) revealed an 'ancient working' at the Rhino Mine near Thabazimbi. The working is associated with a tufa deposit at the base of a steep slope covered by broken ironstone from the ridge above. The working cuts through the tufa and consists of an open trench that extends upslope for more than 130 m whereafter it becomes an underground stope. Three or four vertical ventilation shafts were noted as well. According to the mine geologists, the immediate area is not associated with gold, copper or tin. However, poor quality ochre was noted in the spoil heaps next to the trench. Huffman (2007) suggested that this indicates that the miners were looking for high-quality ochre created by the hydration of ironstone by a fountain that also caused the tufa formation.

According to Huffman (2007: 90), the Sotho-Tswana people were the most likely ochre miners. He also noted that these were the same people who mined tin at Rooiberg, approximately 30 km from Thabazimbi. The tin mines of Rooiberg date to the same period as the gold mines of Zimbabwe and the same techniques were used in both areas. It appears that the same technique was used to mine ochre. According to Changuion & Bergh (1999: 103), the Kwena or their predecessors settled in the general Thabazimbi area and mined tin at Rooiberg around AD 950.

Huffman (2006) also uncovered evidence of Early Iron Age sites with pottery belonging to the Happy Rest facies of the Kalundu Tradition and sherds belonging to the Mzonjani facies of the Urewe Tradition. Late Iron Age pottery belonging to the Madikwe facies of the Moloko tradition were noted as well. The radio carbon dates of the LIA sites were dated to AD 1535-1660. Other dates obtained were AD 1420 – 1435.

In terms of the presence of maize and the role trade played, tin was traded to the Zimbabwe culture area, as well as to Tsonga-speaking people around Maputo before the arrival of the Portuguese. Accordingly, maize arrived in the Maputo area sometime after the mid-16th Century through Portuguese trade with the New World. Research has shown that maize was first grown in northern KwaZulu-Natal in the late 18th to early 19th Centuries. However, maize appears to have been grown in the Thabazimbi area by the mid-17th Century. Therefore, because of the trade links for tin, maize could have been traded into the Thabazimbi and Rooiberg areas shortly after arriving at the coast (Huffman 2006).

Although the rich iron deposits of the Thabazimbi area were mined during the Iron Age, it was only commercially mined from 1931 (Liebenberg 1999: 87 - 88).

6.13.3 Archaeological and Historical Remains

6.13.3.1 Stone Age Remains

Two Stone Age artefacts, likely belonging to the MSA, were located within the demarcated study area. Both were observed in isolation and in the south western corner of the proposed impact area (Table 42, Figure 73 & Figure 74). Stone Age artefacts are often associated with rocky outcrops or water sources. Figure 75 - Figure 77 below are examples of stone tools often associated with the Early, Middle and Later Stone Age of southern Africa.

Table 42: Stone Age Sites

Name	Type	Source	Year / Age	Surface Indications
F01	MSA artefacts	Field	300 000 – 30 000	Two artefacts

The heritage study conducted by Miller (2010a) noted the presence of scattered MSA tools within the study area. The remaining heritage studies did not record Stone Age artefacts. According to Bergh (1999: 4), no major stone age sites are found in the direct vicinity of the study area. Early Stone Age Achaeulean tools, as well as LSA tools, have however been found at Olieboompoort to the northeast of Thabazimbi. Early Stone Age tools have also been found at Rooiberg to the southwest of Thabazimbi.

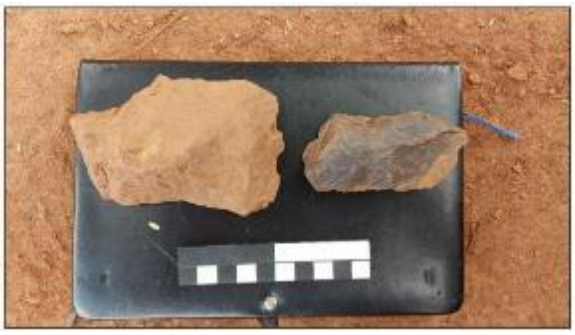

Figure 73: MSA stone tools at site F01.

Figure 74: Reverse side of MSA stone tools at site F02.

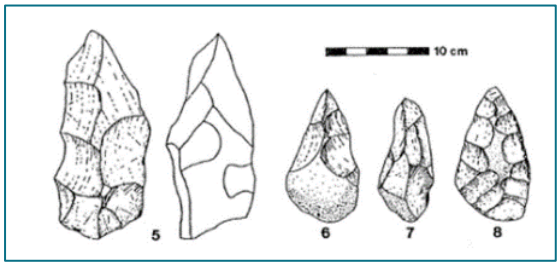

Figure 75: ESA artefacts from Sterkfontein (Volman 1984).

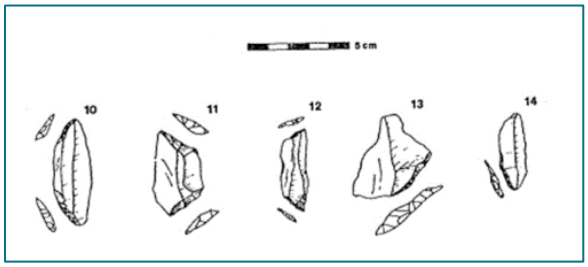

Figure 76: MSA artefacts from Howiesons Poort (Volman 1984).

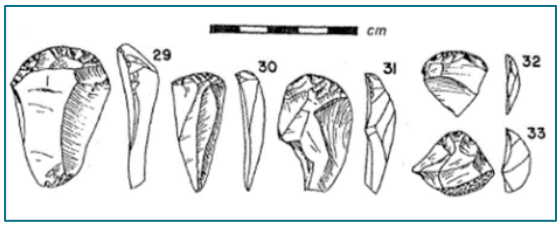

Figure 77: LSA scrapers (Klein 1984).

6.13.3.2 Iron Age Farmer Remains

Two LIA sites were located within the demarcated study area (Table 43). Site B08 was identified as an Iron Age byre in the heritage study conducted by Miller (2010a). According to Miller (2010a), the site is characterised by a number of non-diagnostic potsherds and noted that the site was disturbed by the construction of a road. During the site inspection, a broken upper grinding stone, a non-diagnostic potsherd, as well as a small stone feature that could possibly be the remains of a grain bin were observed (Figure 78 – Figure 80). The remains of the byre, however, could not be located. Site F04 consists of another upper grinding stone approximately 160 m to the west of Site B08.

Table 43: Iron Age Sites

Name	Type	Source	Year / Age	Surface Indications
B08	Byre	Prev. HIA	AD 1535-1660	Grinding stone, undecorated potsherd, stone feature
F04	Griding stone	Field	AD 1535-1660	One upper grinding stone

The heritage studies conducted by Huffman (2004, 2005, 2006) for the Rhino Andalusite Mine to the west of the project area recorded significant Early Iron Age, as well as Late Iron Age sites. Two of these sites were excavated in a Phase 2 assessment.

Figure 78: Broken upper grinding stone and potsherd at Site B08.

Figure 79: Reverse side of the broken upper grinding stone and potsherd at Site B08.

Figure 80: Potential grain bin at Site B08.

Figure 81: Upper grinding stone at site F04.

6.13.3.3 Historical remains

Ten (10) potential sites dating to the Historic Period were noted on historical aerial imagery and during the site inspection (Table 44). Sites B01, B06 and B07 were identified as buildings on the 1947 aerial image and are located in the south-eastern corner between the proposed impact area and the study area boundary (Appendix A: Figure 71 of the original specialist report). Site B01 appears to have been associated with a shop and remained visible on all the aerial images and topographical maps. Contemporary satellite imagery, as well as observations made during the site inspection, confirmed that the buildings associated with the site have been demolished after 2015 and only few brick fragments were observed (Figure 82 & Figure 83). The buildings at Sites B06 & B07 are not indicated on any of the topographical maps. However, the buildings at Site B06 remained visible on aerial imagery until 1969 (Appendix A: Figure 73 of the original specialist report) whereafter it appears to have been demolished, while the building at Site B07 is only visible on the 1947 aerial image (Appendix A: Figure 71 of the original specialist report). Due to restricted access, sites B06 (Figure 88) & B07 could not be inspected during the site visit.

Site B02, identified as a dairy on the 1963 topographical map (Appendix A: Figure 72 of the original specialist report) is located between the proposed impact area and the study area border near the south-eastern corner of the study area. The site appears to have been demolished between 1990 and 2005 (Appendix A: Figures 77 & 78 of the original specialist report). During the site visit, no material remains were observed (Figure 84).

Site B03 was identified as huts on the 1963 topographical map and is located in the eastern corner of the proposed impact area (Appendix A: Figure 72 of the original specialist report). The huts appear to have been demolished by 1969 (Appendix A: Figure 73 of the original specialist report) and several new buildings are visible on the subsequent datasets. The majority of these buildings were demolished between 2006 and 2015 (Appendix A: Figures 79 & 80 of the original specialist report). During the site inspection, however, two remaining buildings were noted (Figure 85 - Figure 87).

Site B09 was identified by Miller (2010a) as a large 1920's village that was possibly inhabited before European occupation. The site is located near the south-western corner of the proposed impact area and is associated with a wagon wheel steel band and glass bottle remains dating to the period prior to 1930 (Miller 2010a). The same metal remains were noted during the site inspection, but no glass remains were noted (Figure 89 & Figure 90).

Site B10 was recorded by Miller (2010a) as buildings and foundations dating to a late 19th Century European occupation. The site is located just to the north of Site B09 and near the western border of the proposed impact area. Remains recorded include a homestead consisting of slate and mud, as well as small sections of stonewalling. Miller (2010a) noted that about 95% of the farmyard complex was lost to time. During the site inspection, the same building ruin in roughly the same condition was noted (Figure 91 & Figure 92). It should be noted that the sites identified by Miller (2010a) are not visible on any of the historical aerial images or on the historical topographical maps.

Sites F02 & F03 are located just to the east of Sites B09 and B10. These sites are associated with angular and curved stone-walling, glass and ceramic fragments, as well as metal objects likely to have been used in a historical farming context (Figure 93 - Figure 98). These findings appear to be similar to the findings made by Miller (2010a) at Site B09 further to the west.

Site F05, located near the centre of the study area and next to a cutline, consists of what appears to be a building foundation / cement slab and two bricks. The feature measures approximately 16m² (Figure 99). The intended use and age of the feature is unknown, but could potentially date to historical times.
Apart from the Miller (2010a) heritage study, Küsel (2007b) recorded a demolished historical building as well.

Table 44: Historical Sites

Name	Type	Source	Year / Age	Surface Indications
B01	Building 1947	Aerial 1947	Historical	Brick fragments
B02	Building 1963	Topo 1963	Historical	None
B03	Hut 1963	Topo 1963	Historical	None
B06	Building 1947	Aerial 1947	Historical	Unknown
B07	Building 1947	Aerial 1947	Historical	Unknown
B09	Historic Village 1920's	Prev. HIA	Historical	Metal objects
B10	European Farmyard late 19th C	Prev. HIA	Historical	Building ruin
F02	Stone-Walling	Field	Historical	Stone-walling
F03	Stone-Walling	Field	Historical	Ceramic & glass fragments
F05	Building foundation	Field	Unknown	Cement slab, bricks

Figure 82: Environment associated with Site B01.

Figure 83: Brick fragments at Site B01.

Figure 84: Environment associated with Site B02.

Figure 85: Area where buildings once existed at Site B03.

Figure 86: A remaining building at Site B03.

Figure 87: Another remaining building at Site B03.

Figure 88: Restricted access at Site B06.

Figure 89: Environment associated with Site B09.

Figure 90: Metal band at Site B09.

Figure 91: Building ruin at Site B10.

Figure 92: Slate and mud ruin at Site B10.

Figure 93: Linear stone-walling at Site F02.

Figure 94: Metal objects at Site F02.

Figure 95: Stone scatter and curved stone-walling at Site F02.

Figure 96: Stone-walling at Site F03.

Figure 97: Glass and ceramic fragments at Site F03.

Figure 98: Reverse side of glass and ceramic fragments at Site F03.

Figure 99: Building foundation / cement slab at Site F05.

6.13.3.4 Contemporary/Cultural Remains

Ten (10) sites dating to contemporary times were noted during the site inspection (Table 45). Site B04 was identified as a school along the south-eastern border of the proposed impact area (Figure 100). The school was first observed on the 1980 aerial image and topographical map (Appendix A: Figures 74 & 75 of the original specialist report) and was therefore constructed between 1969 and 1980

(Appendix A: Figures 73 – 75 of the original specialist report). The site visit confirmed that the school is still intact.

Site B05 is located to the south of the R510 secondary road, outside of the proposed impact area, but within the demarcated study area. The site was identified as a building on the 1980 aerial image (Appendix A: Figure 74 of the original specialist report) and is also indicated on the 2005 topographical map (Appendix A: Figure 78 of the original specialist report). Due to access constraints the site could, however, not be visited.

Site F06, located just south of the proposed impact area and near the south-western corner, is associated with a cement feeding trough. The feeding trough appears to be no longer in use and similar features are likely to be found within the study area (Figure 101).

Sites F07 – F09 are cement dams found throughout the study area. The dams are likely to be used as a water source for the game on the farm and range between 5m² and 20m². Only one dam, however, had water (Figure 102– Figure 104). Sites F07 and F08 are located near the centre of the study area, while Site F09 is located to the west of the proposed impact area. Figure 105 & Figure 106 indicate similar dams located close to Site B10.

Sites F10 – F12 indicate mining related structures found throughout the study area. These generally include what appear to be markers/boreholes/shafts (Figure 107 - Figure 110). Site F10 was recorded near to western corner of the demarcated study area, Site F11 between the proposed impact area and the northern border of the demarcated study area and Site F12 south of the demarcated study area along the R510 secondary road.

Site F13 appears to be a prospecting trench measuring approximately 8m². The site is located roughly in the middle of the study area and along the northern border of the proposed impact area (Figure 111).

The listed heritage studies did not record contemporary sites (see Miller 2010a, Küsel 2007a, Küsel 2007b, Gaigher 2007, Huffman 2004, Huffman 2006).

Table 45: Contemporary Sites

Name	Type	Source	Year / Age	Surface indications
B04	Building 1980	Aerial 1980	Contemporary	Intact building
B05	Building 1980	Aerial 1980	Contemporary	Unknown
F06	Feeding trough	Field	Contemporary	Cement feeding trough
F07	Cement dam	Field	Contemporary	Cement dam - water trough
F08	Cement dam	Field	Contemporary	Cement dam – water trough

Name	Type	Source	Year / Age	Surface indications
F09	Cement dam	Field	Contemporary	Cement dam
F10	Mining marker	Field	Contemporary	Cement feature
F11	Mining marker	Field	Contemporary	Metal pipe / borehole
F12	Mining marker	Field	Contemporary	Cement and metal feature / shaft
F13	Mining Trenching	Field	Contemporary	Trench

Figure 100: School at Site B04.

Figure 101: Feeding trough at Site F06.

Figure 102: Cement dam at Site F07.

Figure 103: Cement dam at Site F08.

Figure 104: Cement dam at Site F09.

Figure 105: Cement dam at Site B10.

Figure 106: Small cement dam at Site B10.

Figure 107: Mining marker at Site F10.

Figure 108: Close-up of mining marker at Site F10.

Figure 109: Metal pipe at site F11.

Figure 110: Cement and metal feature at Site F12.

Figure 111: Prospecting trench at Site F13.

6.13.3.5 Graves/Burial Sites

One cemetery (Site B11) was identified in the heritage study conducted by Miller (2010a) and three graves during the site inspection (Site F14). The two sites are listed in Table 46. The grave/cemetery sites area not visible on any of the aerial images and are not indicated on any of the topographical maps (Appendix A of the original specialist report).

Cemetery B11 is located within the proposed impact area, near the south-eastern corner of the study area and next to a road. Forty-five graves consisting of elongated stone cairns and without headstones or inscriptions were recorded. Five of these graves have been fenced-off and two of the graves are oriented in a north-south direction, while the rest are oriented in an east-west direction. Three graves consist of formal surface decorations oriented in an east-west direction, two of which have been fenced-off. Two piles of rocks possibly indicated that two informal graves were replaced by formal surface decorations. The heritage study conducted by Miller (2010a) stated that there were between 30 and 40 graves. No recent burials or grave goods were noted and the cemetery is in a dilapidated state. Since the previous heritage study, some of the formal surface decorations have been damaged. The oldest grave dates to 1971, but the age of the remaining informal graves is unknown (Figure 112 - Figure 119).

Site F14, located approximately 27 m south of the demarcated study area, 84 m south of the proposed impact area and 235 m southeast of cemetery Site B11, consists of one grave with formal surface decorations and three graves consisting of elongated stone cairns. One of the stone cairns, however, might be the discarded stones from when the formal surface decoration was erected. All four graves are oriented in an east-west direction and are not fenced-off (Figure 120 - Figure 122). The only date observed was 1962. Also, no recent burials or grave goods were observed at the graves.

The heritage study conducted by Küsel (2007b) identified several graves on the farm Maroeloesfontein 366 KQ.

Table 46: Graves/Burial Sites/Cemeteries

Name	Type	Source	Year	Current status	Age
B11	Cemetery	Prev. HIA	1971, possibly older	Intact	Likely historical
F14	Graves	Field	1962	Intact	Historical

Figure 112: Cemetery B11 seen from the southeast.

Figure 113: Cemetery B11 seen from the southwest.

Figure 114: Broken surface feature at Cemetery B11.

Figure 115: Grave dating to 1978 at Cemetery B11.

Figure 116: Double grave at Cemetery B11.

Figure 117: Close-up of double grave at Cemetery B11.

Figure 118: Informal grave at Cemetery B11.

Figure 119: Fenced-off grave at Cemetery B11.

Figure 120: Formal surface decoration at Site F14.

Figure 121: Elongated stone cairn at Site F14.

Figure 122: Possibly two informal graves at Site F14.

6.13.4 Evaluation

The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences.

A fundamental aspect in the conservation of a heritage resource relates to whether the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. There are many aspects that must be taken into consideration when determining significance, such as

rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and if appropriate mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed.

6.13.4.1 Field ratings

All sites should include a field rating in order to comply with section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999). The field rating and classification in this report are prescribed by SAHRA.

Table 47: Prescribed Field Ratings

Rating	Field Rating/Grade	Significance	Recommendation
National	Grade 1		National site
Provincial	Grade 2		Provincial site
Local	Grade 3 A	High	Mitigation not advised
Local	Grade 3 B	High	Part of site should be retained
General protection A	4 A	High/Medium	Mitigate site
General Protection B	4 B	Medium	Record site
General Protection C	4 C	Low	No recording necessary

Table 48: Individual site ratings

Site /Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2427CB-B01	Demolished Building	General Protection B	4 B	Medium	Record site
2427CB-B02	Demolished Building	General Protection B	4 B	Medium	Record site
2427CB-B03	Demolished Hut	General protection A	4 A	Medium	Mitigate site
2427CB-B04	Building	General Protection B	4 B	Medium	Record site
2427CB-B05	Building	General Protection B	4 B	Medium	Record site
2427CB-B06	Demolished Building	General Protection B	4 B	Medium	Record site
2427CB-B07	Demolished Building	General Protection B	4 B	Medium	Record site
2427CB-B11	Cemetery	Local	Grade 3 A	High	Mitigation not

Site /Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
					advised
2427CB-F05	Building foundation	General Protection B	4 B	Medium	Record site
2427CB-F07	Cement dam	General Protection C	4 C	Low	No recording necessary
2427CB-F08	Cement dam	General Protection C	4 C	Low	No recording necessary
2427CB-F09	Cement dam	General Protection C	4 C	Low	No recording necessary
2427CB-F10	Mining marker	General Protection C	4 C	Low	No recording necessary
2427CB-F11	Mining marker	General Protection C	4 C	Low	No recording necessary
2427CB-F12	Mining marker	General Protection C	4 C	Low	No recording necessary
2427CB-F13	Mining Trenching	General Protection C	4 C	Low	No recording necessary
2427CB-F14	Graves	Local	Grade 3 A	High	Mitigation not advised
Sensitive Area: B08 - B10, F01 - F04, F06	Stone tools, grinders, stone walling, feeding trough, ceramics, potsherds, metal remains	General protection A	4 A	Medium	Mitigate site

* Ratings are dependent on specific project boundaries and activities.

6.13.5 Statement of significance

The study area: The Proposed Buffelshoek Mine

Some of the areas within the demarcated study area are considered to be significant from a heritage perspective. The significance of the proposed area and the observed sites are discussed here.

MSA Sites

Site F01 consists of two MSA stone tools that were observed in the general area disturbed by the construction of a road. No concentrations were noted during the site visit and the findings appear to be similar to the findings made by Miller (2010a), who conducted an archaeological investigation on the same area. Although the site is not considered to be particularly significant from a heritage

perspective, cognisance should be taken of the fact the stone tools are located in relatively close proximity of several other heritage sites, thereby contributing to the significance of the associated area. Also, the greater area is associated with Stone Age remains stretching from the ESA to the LSA.

LIA Sites

The two LIA sites (Sites B08 & F04) consist of a combination of potsherds, a byre, upper griding stones and a stone feature. The heritage study conducted by Miller (2010a) noted that the byre and potsherds (Site B08) are located in a disturbed context and are no longer considered to be significant. The upper grinding stone at Site F04 is located to the west of Site B08 and might be related to the site. It should be noted that the delineated sensitive area as indicated on Figure 123 is also labelled as Site F08 and includes several other sites. The heritage studies conducted by Huffman (2004, 2006) recorded significant Early and Late Iron Age sites to the west of the proposed Buffelshoek Mine. Accordingly, the Early Iron Age potsherds likely belong to the Happy Rest facies of the Kalundu Tradition and the Mzonjani facies of the Urewe Tradition, while the LIA potsherds belong to the Madikwe facies of the Moloko tradition. Radio carbon dates obtained for the LIA sites dated to AD 1535-1660 and AD 1420 – 1435. Significant ochre mining was also noted in the general area. As can be seen from the previous heritage studies, the general area is associated with Early and Late Iron Age occupation and mining activities. Although located in a disturbed context, Sites B08 and F04 should be considered potentially significant from a heritage perspective and are therefore protected by the NHRA, 1999 (Act No. 25 of 1999).

Historic Sites

Historic sites B01 – B03, B06, B07, B09, B10, F02, F03 and F05 are likely to exceed 60 years of age and would therefore be protected by the NHRA, 1999 (Act No. 25 of 1999). However, sites B01 and B02 have been demolished, fall outside of the proposed impact area and are therefore no longer considered to be significant from a heritage perspective. Site B03 used to be associated with huts exceeding 60 years of age and later by buildings that were eventually demolished. Two buildings, however, remained and are likely to exceed 60 years of age. These buildings are therefore protected by the NHRA, 1999 (Act No. 25 of 1999). Sites B06 and B07 used to be associated with buildings, but based on contemporary satellite imagery, have completely been demolished. Since these sites could not be accessed, they are considered to be potentially sensitive, but are unlikely to be impacted since both are located outside of the proposed impact area. Sites B09 and B10 are associated with historical built environment and include a building ruin and demolished infrastructure. These sites fall within the demarcated impact area and are considered to be significant from a heritage perspective. Sites F02 and F03 are located in relatively close proximity of Sites B09 and B10 and consist of angular and curved stone-walling in a dilapidated state. Since these sites are likely to relate to Site B09 and B10, they area also considered to be significant from a heritage perspective. Site F05, a

foundation/cement slab near the middle of the study area might exceed 60 years of age, but is not considered to be significant or sensitive from a heritage perspective.

Sensitive area

Due to the relatively high concentration of sites consisting of MSA, LIA and historical sites in the south-western corner of the proposed impact area, the area was delineated as a sensitive area and consists of Sites B08 – B10, F01 – F04, and F06. The sensitive area is labelled as Site B08 in Figure 123. Although Miller (2010a) identified a 1920's historic village, a European farmyard dating to the late 19th C, and an LIA site in relatively close proximity of each other, the possibility exists that these sites form part of one site. Or perhaps one historic site and one LIA site. The demarcated area is therefore considered to be significant and sensitive from a heritage perspective.

Cemeteries / Graves

Cemetery B11 falls within the proposed impact area, is likely to exceed 60 years of age, and is considered to be significant and sensitive from a heritage perspective. At least one of the graves at Site F14 exceeds 60 years of age. Although the graves are located outside of the demarcated study area, the proposed mining development might have a negative impact on the graves. Site F14 is also considered to be significant and sensitive from a heritage perspective.

The following legislation concerning graves apply: For graves older than 60 years the Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925), as well as the National Heritage Resources Act, 1999 (Act No. 25 of 1999) apply, while graves younger than 60 years are protected by the Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925).

Contemporary Sites

The identified contemporary sites (B04, B05, F06 – F13) mostly consist of modern mining related activities and buildings not exceeding 60 years of age. These sites are not considered to be significant or sensitive from a heritage perspective.

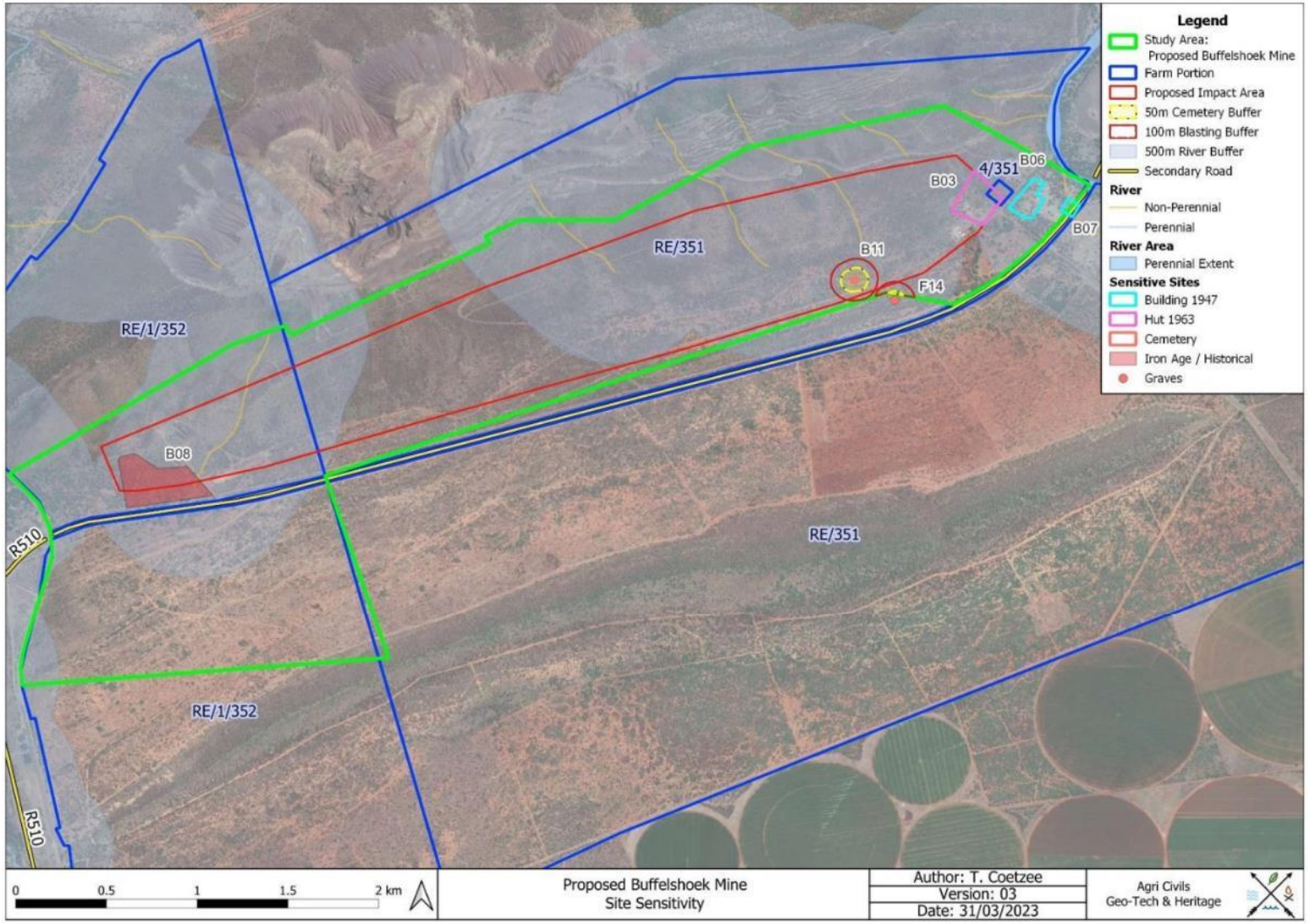

Figure 123: Study area and potentially sensitive areas portrayed on a 2021 satellite image (Coetzee, 2023).

6.13.6 Background to Palaeontology of the area

Information for this section was extracted from the Palaeontological Impact Assessment: Desktop Study (Fourie, 2023).

When rock units of moderate to very high palaeontological sensitivity are present within the development footprint, a desktop and or field scoping (survey) study by a professional palaeontologist is usually warranted. The main purpose of a field scoping (survey) study would be to identify any areas within the development footprint where specialist palaeontological mitigation during the construction phase may be required (SG 2.2 SAHRA AMPHOB, 2012).

One of the formations in the development area may contain fossils. Nixon *et al*. (1988) described the black shales south-west of Potchefstroom as consisting of overlapping laminated basal mounds which are stromatolitic as well as spheroidal possible planktonic fossil algae. These can range in size from 3.5 - 17 mm in height and up to 10 mm in diameter and can be present in the development area.

Chemical sediments such as fine-grained limestone and dolomite of the Malmani Subgroup is made up of deposits of organically derived carbonate shells, particles or precipitate. Dolomite is magnesium-rich limestone formed from algal beds and stromatolites. These Early Proterozoic Transvaal stromatolitic dolomites formed and released free oxygen at around 2900 – 2400 Ma. Stromatolites are common in the Malmani dolomites, accepted to be the fossil remnants of the simplest single-celled organisms. They are finely layered, concentric, mound-like structures formed by microscopic algal organisms (Norman and Whitfield 2006). Chert may contain fossils such as echinoids or sponges if nodular, although not common and is rated unlikely.

Figure 124: Stromatolite (E. Butler) extracted from Fourie (2023).

Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity is generally low to very high.

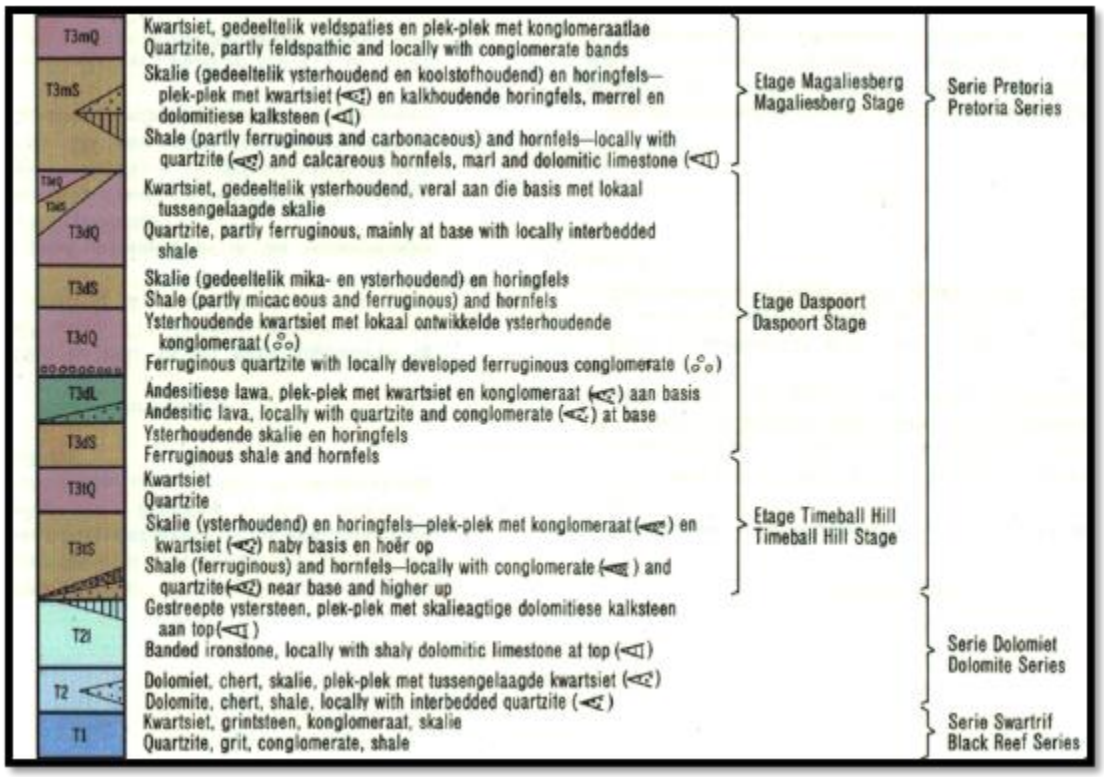

Figure 125: Lithostratigraphic column of the development area (Thabazimbi) (Fourie, 2023)

6.14 Sensitive landscapes

All sensitive areas will be identified as part of specialist studies and a sensitivity map, overlain by the layout plan will be produced and included in the EIAR/EMP.

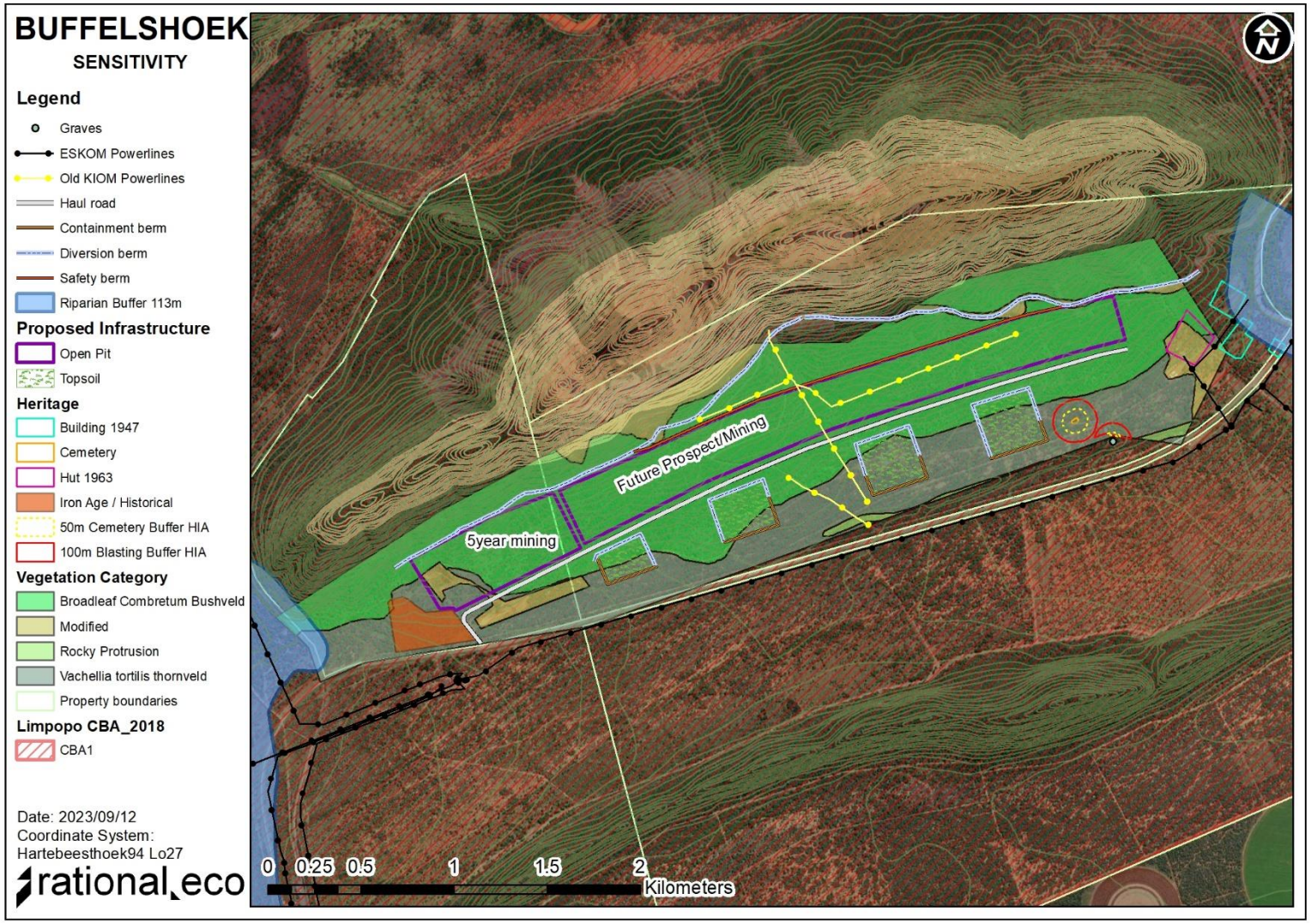

Figure 126: Environmental Sensitivity Map

6.15 Regional socio-economic aspects

Information for this section was obtained from the Rhino Andalusite Mine Social and Labour Plan (2024-2028):

6.15.1 Location of the district and major labour sending areas

Rhino Andalusite Mine is located in the Thabazimbi Local Municipality (TLM), under the Waterberg District Municipality in the Limpopo Province. Neighbouring local municipalities include Lephalale Local Municipality; Modimolle Local Municipality and Bela-Bela Local Municipality. TLM is one of the largest municipalities in Limpopo as it is 986 264.85 hectares in size. It has however, a very low population density and the bulk of the area is used for game and commercial farming.

Thabazimbi Municipality is located in the South-western part of the Limpopo Province. Thabazimbi has Botswana as its international neighbour and is two hour drive from Tshwane. The town is located against the foothills of the majestic Waterberg Mountains in one of the most scenic mountain regions of South Africa. The principal peaks are the Ysterberg, Boshofberg and Kransberg. Thabazimbi lies within the southern African bushveld eco region of Limpopo, renowned for cattle ranching and game farming. Platinum and iron ore mining are major contributors to the economy of the region.

The municipality comprises 12 Wards and 12 settlement areas. Large portion of the area is rural with only four proclaimed townships. Population figures of the municipality are estimated at 60 000; which makes the municipality to be the second highly populated after Lephalale Local Municipality in the Waterberg District.

TLM is a rural municipality, hence, it is characterised by high level of service delivery backlogs. Such backlogs include re-gravelling of roads, water provision, school infrastructure due to neglect and lack of investment. Unemployment rate is high as the main industry employing largest number of the residents is mining.

6.15.2 Municipal challenges

TLM is faced with the following pressing socioeconomic challenges:

6.15.2.1 Water and Sanitation

TLM is a designated Water Services Authority and Water Services Provider. Water is sourced from the Magalies Water Board. About 44% of the households have water connection inside the house and 26% getting water inside their yards. Thabazimbi and Regorogile are using water borne sewer system. The existing water treatment plant caters for Thabazimbi town including Regorogile and Ipelegeng. The current capacity of the plant is 28 litres per second but the average daily flow is about 60 litres per second. The current sanitation system in Northam is 60% water borne and 40% septic tank. The Municipality empty the septic tanks for all the residents regularly and discharges the

sewerage into the existing oxidation pounds. The outfall sewer has been partially constructed in Northam and the project is still outstanding. The municipality does not provide bulk water to the mines within its area of jurisdiction.

6.15.2.2 Electricity

TLM has electricity distribution license issued by NERSA in terms of the Electricity Act 41 of 1987. The license covers the following areas for distribution and retail:

- Greater Northam RLC (Portion)
- Thabazimbi TLC (Whole)
- Warmbad - Pienaarsrivier RLC (Portion)
- Rooiberg

Currently the municipality is an Electricity Service Provider in Thabazimbi town, Regorogile extensions 3, 5, 6, 7, 9, Rooiberg and Raphuti. Eskom is for Northam, Regorogile extensions 2, 4, farms and mining areas.

6.15.2.3 Sewerage and Waste refuse removal

TLM has sewerage treatment facility in the town of Thabazimbi, which does not have sufficient capacity to handle sewage inflows from the town. The municipality provides waste removal services to 60% of the residents.

- The existing trucks are old and always have breakdowns.
- The existing landfill site is about to be full to its capacity.
- No accurate volume of the amount of waste getting into the landfill site only estimations and as such no compliance with Environmental Legislations.
- Late payment of the service provider thus affecting the service rendered by the appointed service provider.
- Open areas are turned into dump sites

6.15.2.4 Road and storm water

The road network in the TLM that passes through the town to Lephalale and Modimolle need upgrading. There is storm water drainage in Regorogile and mining residential areas. Though the infrastructure is old it is still efficient. Smashblock is an informal settlement that lacks most of the basic services including roads and storm water drainage. Informal settlements have informal gravel roads with no storm water channelling.

6.15.2.5 Housing

The municipality has housing shortage due to growing residents in the informal settlement areas. The shortage is further exacerbated by the following factors:

- Mushrooming of informal settlements due to lack of land.
- Illegal occupants on RDP houses.p
- Housing backlog of 3,400.
- Lack of residential site.
- Lack of services in some RDP houses.

6.15.2.6 Town park and walk ways

The municipality has developed a Central Business District Development Plan. The plan entails landscaping the park, planting trees and construction of walkways. The project is intended to beautify the town to stimulate the economic development in the area. The project will include erecting pedestrian crossing over the railway line in Thabazimbi town.

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SECTION 7: IMPACT ASSESSMENT AND MANAGEMENT

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

7.1.1 Impact assessment

The methodology used to assess the significance of an impact is based on the requirements as set out in EIA Regulations, (GN 982) of 2014 i.t.o. the NEMA as well as the Proposed National Guideline on Minimum Information Requirements for Preparing EIA for Activities that Require EA, of 2018, GN 86 in terms of NEMA. The impact significance methodology described below also complies to Appendix B of the Operational Guideline to Integrated Water and Waste Management of 2010 in terms of the NWA. In the event of any Section 21c&i water uses in terms of the NWA being assessed, Appendix A of the General Authorisations of 2016, GN 509 in terms of the NWA will be used to construct a risk matrix. Regulation 3(b) of the General Authorisations of 2016, GN 509 in terms of the NWA states that a suitably qualified SACNASP professional member must determine risks associated with this risk matrix.

Impact identification and prediction means forecasting the change of environmental parameters due to developmental patterns. These parameters may also be changing due to climate change and should be included.

7.1.1.1 Method of assessment

Impact identification and prediction is a stepwise procedure to identify the direct, indirect, and cumulative impacts (relating to both positive and negative impacts) for which a proposed activity and its alternatives will have on the environment as well as the community. This should be undertaken by determining the geographical, physical, biological, social, economic, heritage and cultural sensitivity aspects of sites and locations as well as the risk of impact of the proposed activity. Refer to part A, Section 6 for a complete description of these environmental attributes. Sources of data to be used for gathering data on the environmental attributes as well as the impacts include; monitoring / sampling data collected and stored, assumptions and actual measurements, published data available from the departments or other stakeholders in the area as well as specialist studies. Likely impacts should be described qualitatively and then studied separately in detail. This provides consistent and systematic basis for the comparison and application of judgements.

7.1.1.2 Significance rating

Ratings should then be assigned to each criterion. Significance of impacts should be determined for each phase of the project lifecycle this includes; preconstruction, construction, operational, closure (including decommissioning) and post closure phases. The significance of impacts should further be assessed both with and without mitigation action. The description of significance is largely

judgemental, subjective, and variable. However, generic criteria can be used systematically to identify, predict, evaluate, and determine the significance of impacts resulting from project construction, operation, and decommissioning. The process of determining impact magnitude and significance should never become mechanistic. Impact magnitude is determined by empirical prediction, while impact significance should ideally involve a process of determining the acceptability of a predicted impact to society. Making the process of determining the significance of impacts more explicit, open to comment and public input would be an improvement of environmental assessment practice. Impact magnitude and significance should as far as possible be determined by reference to either legal requirements (accepted scientific standards) or social acceptability. If no legislation or scientific standards are available, the EAP can evaluate impact magnitude based on clearly described criteria. A matrix selection process is the most common methodology used in determining and ranking the site sensitivities:

- The consequence: includes the nature / intensity / severity of the impact, spatial extent of the impact, and duration of the impact.
    - The nature / intensity / severity of the impact: An evaluation of the effect of the impact related to the proposed development on the receiving environment. The impact can be either positive or negative. A description should be provided as to whether the intensity of the impact is high, medium, or low or has no impact in terms of its potential for causing negative or positive effects. Cognisance should be given to climate change which may intensify impacts.
    - The spatial extent of the impact: Indication of the zone of influence of the impact: A description should be provided as to whether impacts are either limited in extent or affect a wide area or group of people. Cumulative impacts must also be considered as the extent of the impact as may increase over time.
    - The duration of the impact: It should be determined whether the duration of an impact will be short-term, medium term, long term or permanent. Cumulative impacts must also be considered as the duration of the impact as it may increase over time.
- The likelihood: includes the probability of the potential occurrence of the impact, and frequency of the potential occurrence of the impact.
    - The probability of the impact: The probability is the quality or condition of being probable or likely. The probability must include the degree to which these impacts can be reversed; may cause irreplaceable loss of resources; and can be avoided, managed, or mitigated.
    - The frequency of the potential occurrence of the impact.
- The significance: This is worst case scenario without any management measures. See below how significance is determined: Impact that may have a notable effect on one or more aspects of the environment or may result in noncompliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and

negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity, and probability of occurrence. Mitigation measures should be provided with evidence or motivation of its effectiveness.

7.1.1.3 Example of significance rating

Prior to mitigation

Intensity and magnitude	1 Natural processes or functions are not affected and will adequately return to its natural state. The impact will be completely reversed with correct management, and can be completely avoided, managed, or mitigated.	2 Natural processes or functions are affected, and natural processes or functions will continue in a modified manner. The impact will be reversed to some degree with correct management, and can be somewhat avoided, managed, or mitigated	3 Natural processes or functions are to the extent where it temporarily or permanently ceases. The impact cannot be reversed even with correct management, and cannot be avoided, managed, or mitigated
Resource replaceability	1 Loss of resource can be completely replaced.	2 Loss of resource can somewhat be replaced.	3 Resources will be completely lost.
Duration	1 The impact will be short-lived.	2 The impact will last for the entire operational life of the activity but will be mitigated thereafter.	3 The impact will not cease after the operational life of the activity ceases but will be permanent.
Extent or spatial scale	1 The impact will be site specific.	2 The impact will affect the local area.	3 The impact will affect an area larger than just the local area.
Probability	1 It is unlikely that the impact will occur.	2 There is a probability for the impact to occur.	3 The impact will definitely occur.
Significance	None or low If the sum of the above ranking is equal or more than 5 and 7, and no ranking equals 3.	Medium If the sum of the above ranking is equal or more than 8 to 11.	High If the sum of the above ranking is 12 or more.

Post to mitigation

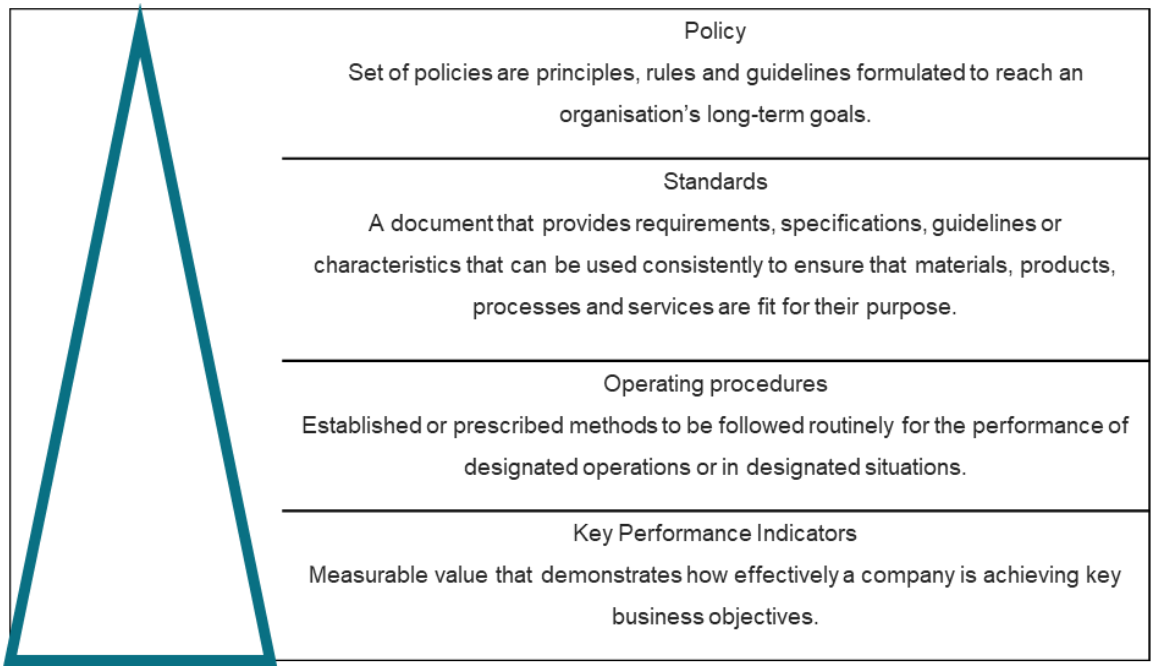
Intensity and magnitude	1 Natural processes or functions are not affected and	2 Natural processes or functions are affected, and natural	3 Natural processes or functions are to the extent

	will adequately return to its natural state. The impact will be completely reversed with correct management, and can be completely avoided, managed, or mitigated.	processes or functions will continue in a modified manner. The impact will be reversed to some degree with correct management, and can be somewhat avoided, managed, or mitigated	where it temporarily or permanently ceases. The impact cannot be reversed even with correct management, and cannot be avoided, managed, or mitigated
Resource replaceability	1 Loss of resource can be completely replaced.	2 Loss of resource can somewhat be replaced.	3 Resources will be completely lost.
Duration	1 The impact will be short-lived.	2 The impact will last for the entire operational life of the activity but will be mitigated thereafter.	3 The impact will not cease after the operational life of the activity ceases but will be permanent.
Extent or spatial scale	1 The impact will be site specific.	2 The impact will affect the local area.	3 The impact will affect an area larger than just the local area.
Probability	1 It is unlikely that the impact will occur.	2 It is likely for the impact to occur.	3 The impact will definitely occur.
Significance	None or low If the sum of the above ranking is equal or more than 5 and 7, and no ranking equals 3.	Medium If the sum of the above ranking is equal or more than 8 to 11.	High If the sum of the above ranking is 12 or more.

7.1.2 Mitigation and management

Management methodology is based on the requirements as set out in EIA Regulations, (GN 982) of 2014 i.t.o. the NEMA as well as the Proposed National Guideline on Minimum Information Requirements for Preparing EIA.

Management statements detail the processes, procedures and practices required to achieve an impact management outcome. A hierarchy of management tools used can also be used as seen below.



Mitigation should include measures in the following order of priority. The aim is to prevent adverse impacts from happening or, where this is unavoidable, to limit their significance to an acceptable level.

7.1.2.1 Avoiding or preventing impacts

If the biodiversity (an ecosystem, habitat for threatened species, ecological corridor or area that provides essential ecosystem services) is of conservation value or importance, it is best to plan to avoid or prevent impacts altogether by changing the location, siting, method or processes of the mining activities and related infrastructure.

7.1.2.2 Minimising impacts

Minimising impacts of mining is a mitigation measure that deals with the environment in general. In areas where the biodiversity is to be affected is of conservational value or importance, then every effort should be made to minimise those impacts that cannot be avoided or prevented. Mining companies should strive to minimise impacts on biodiversity to ensure environmental protection. Section 2 of NEMA contains environmental management principles that resonates with minimising the impact rather than stopping at mitigation, this is imperative in the mining sector.

7.1.2.3 Rehabilitating impacted areas

Rehabilitation is the measures that are undertaken to as far as it is reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which aligns to the generally accepted principle of sustainable development. A closure plan is an essential part of rehabilitation and must be developed based on the establishment of the closure objectives and criteria.

7.1.2.4 Biodiversity offsets

Biodiversity offsets are measurable conservation gains that help to balance any significant biodiversity losses that remain after actions to avoid, minimise, and restore negative impacts have been taken. They are the last stage of mitigation and should be considered after appropriate avoidance, minimisation, and rehabilitation/restoration measures have been applied already.

7.1.3 Conclusion

When dealing with management, impact management outcomes must:

- be set for the expected activity-based impacts;
- describe the desired outcome of the management measure/s prescribed or the standard to be achieved (environmental objective);
- be clearly documented and identified per project phase as in the impact identification and significance rating process (this must be aligned to the mines closure objectives, and must therefore include predicted long-term result of the applied management measures);
- be measurable to determine compliance, which includes time frames and schedule for the implementation of the management measures; responsibilities for implementation and long-

term maintenance of the management measures; financial provision for long-term maintenance; and monitoring programmes to be implemented;

- be informed by stakeholder expectations; and
- ensure legal compliance;

Finally, the impact assessment must refer to the residual and latent impact after successful implementation of the management measures.

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

This section includes the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts can be reversed; may cause irreplaceable loss of resources; and can be avoided, an assessment of each identified potentially significant impact and risk, including cumulative impacts, as well as how these impacts can be managed or mitigated and level of residual risk. This is related to the operational phase.

7.2.1 Geology and the mineral resource

Activity, nature, and consequence of impact:

The loss of geology due to the mining of andalusite.

Cumulative impacts:

Geology is also removed at the adjacent Rhino Andalusite Mine.

Assumptions, uncertainties, and gaps in knowledge:

Information for this risk was extracted from similar EMPs.

Loss of geology		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	1 The loss of geology will alter the surrounding environment in such a way that natural, social, cultural, and environmental processes are marginally affected.	1 The loss of geology will alter the surrounding environment in such a way that natural, social, cultural, and environmental processes are marginally affected.
Resource replaceability	3 The impact is not reversible, and the resource cannot be replaced.	3 The impact is not reversible, and the resource cannot be replaced.
Duration	1	1

Loss of geology		
	Impact pre-mitigation	**Impact post-mitigation**
	Although the activity is ongoing until closure, this impact itself is once-off, as roll over mining will be practiced.	Although the activity is ongoing until closure, this impact itself is once-off, as roll over mining will be practiced.
Extent or spatial scale	1 The impact will be site specific.	1 The impact will be site specific.
Probability	3 The loss of geology will occur regardless of any prevention measures.	3 The loss of geology will occur regardless of any prevention measures.
Significance	**9** **Medium**	**9** **Medium**

Environmental objective
To ensure the impact on geology is minimised.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Mining must take place within the approved mining plan.	Operational	Mining Plan	Mining Plan	Ongoing as mining advances	Mine surveyor and mine manager	Rehabilitate

Stakeholder expectations and / or comments
None received.
Residual and latent risks
The residual impacts from the removal of geology will remain, as well as the residual impact from covering of geology. Roll over mining will lessen this residual impact. No additional latent impacts are envisaged.

7.2.2 Soils

Information for this section was extracted from the Terrestrial Vegetation report (Dimela Eco Consulting, 2023) and the SWMP (Rational Environmental, 2023).

7.2.2.1 Compaction of soils

Activity, nature, and consequence of impact:

The movement of heavy machinery over vegetated areas, other than the road/mining footprint, will result in soil compaction that will modify habitats, destroy vegetation, and inhibit re-vegetation. Soil compaction because of vehicles and traffic, could lead to a decrease of water infiltration and an increase of water runoff. Such areas are more likely to be colonised by pioneer, alien invasive plant species, than indigenous species. This will further transform the vegetation of the area.

Direct impact:

Soil compaction which inhibits revegetation and increase water runoff. This impact is readily mitigated.

Cumulative impacts:

If mitigation is properly implemented, no cumulative impacts are expected.

Assumptions, uncertainties, and gaps in knowledge:

The exact level of compaction will depend on a number of factors.

Compaction of soils				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and	2	1	2	1

Compaction of soils				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
magnitude	Moderate	Low	Moderate	Minor
Resource replaceability	2 Moderate	1 Low	2 Moderate	1 Low
Duration	1 Short term	1 Very short term	1 Short term	1 Very short term
Extent or spatial scale	1 Site bound.	1 Site bound.	1 Limited to site.	1 Limited to site.
Probability	2 Highly probable	1 Improbable	2 Probable	1 Improbable
Significance	**8** **Medium**	**5** **Low**	**8** **Medium**	**5** **Low**

Environmental objective
To prevent compaction.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Vehicles and machinery may not veer from the dedicated roads.	Construction	Final approved site layout plan	Site inspections	On-going until closure	Mine Manager and ECO	Prevent
Once construction is complete, obsolete roads / parking areas should be obliterated by breaking the surface crust and erecting earth embankments to prevent erosion, while the natural species composition should be allowed to re-establish.	Construction	Rehabilitation plan	N/A	On-going until closure	ECO	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Maintenance and operational vehicles may not deviate from dedicated roads.	Maintenance	N/A	N/A	On-going until closure	ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Altered soil characteristics and vegetation that remain in an unstable, pioneer phase or invaded by alien invasive plant species.

7.2.2.2 Soil erosion

Activity, nature, and consequence of impact:

Concentration of accelerated runoff may lead to erosion of steep slopes resulting in the loss of soil. The impact can take place throughout construction to decommissioning phase.

Cumulative impacts:

Farming and mining activities in the area can lead to soil erosion as well.

Assumptions, uncertainties, and gaps in knowledge:

Calculations assume uniform rainfall intensities throughout the duration of the storm over the entire catchment areas assessed (Rational Environmental, 2023).

Soil erosion		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	2 Erosion will be directly at drainage lines and exposed slopes. Erosion usually has an escalating effect.	1 The risks on soil erosion will be mitigated.
Resource replaceability	1 Eroded soil can be replaced.	1 Impacts from erosion can be reversible with adequate rehabilitation.
Duration	3 If not prevented or rehabilitated, erosion may remain after closure.	2 Soil erosion will be temporary with management.
Extent or spatial scale	2 The impact of erosion may extend far downstream.	1 The risks will be site specific with adequate management.
Probability	2 If not managed there is a probability that erosion will take place.	1 The impact is less likely with management measures.
Significance	**10** **Medium**	**6** **Low**

A combined management table is provided under 7.2.2.3 below. All management pertaining to HCS and waste is under section 7.2.13 below.

7.2.2.3 Soil pollution

Activity, nature, and consequence of impact:

Soil pollution may occur due to mining activities. The impact can take place throughout construction to decommissioning phase.

Cumulative impacts:

Farming and mining activities in the area can lead to soil pollution.

Assumptions, uncertainties, and gaps in knowledge:

Information for this risk was extracted from similar EMPs.

Soil pollution		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	2 The risks on soil pollution will be somewhat severe.	1 The risks on soil pollution will not be severe with adequate management.
Resource replaceability	2 The risks on soil pollution will not be severe and are reversible.	1 The risks on soil pollution will not be severe and are reversible.
Duration	2 Soil pollution will not be temporary.	1 Soil pollution will be temporary with adequate management.
Extent or spatial scale	1 The risks will be site specific.	1 The risks will be site specific.
Probability	2 The impact will be probable without management measures.	1 The impact is less likely with management measures.
Significance	**9** **Medium**	**5** **Low**

Environmental objective
To prevent soil erosion and pollution.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Soil erosion prevention as per the rehabilitation	Operational phase	Rehabilitation Strategy and	Erosion	On-going until	Mine Manager	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
plan.	until closure	Implementation Plan	monitoring	rehabilitation and closure		
Removal of topsoil should be done systematically, only clearing the necessary areas at a time	Operational until closure.	According to the mining plan	Site inspections.	Continuously throughout operation.	Mine manager.	Minimise
If there is sufficient topsoil, it must be stockpiled to be used as part of rehabilitation.	Operational phase until closure	Rehabilitation Strategy and Implementation Plan	Erosion monitoring	On-going until rehabilitation and closure	Mine Manager	Minimise
Implement all measures under Section 4 of the SWMP	Operational phase until closure	SWMP	Erosion monitoring	On-going until rehabilitation and closure	Mine Manager	Prevent
An Erosion Management Plan must be developed prior to the commencement of construction activities to mitigate the unnecessary loss of topsoil and runoff.	Planning	Erosion Management Plan	Erosion monitoring	On-going until rehabilitation and closure	Mine Manager	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
No residual risks from soil erosion or pollution; however, the loss of topsoil will remain as a residual risk if not replaced.

7.2.3 Vegetation

Information for this section was extracted from the Terrestrial Vegetation report (Dimela Eco Consulting, 2023).

7.2.3.1 Destruction of natural vegetation

Activity, nature, and consequence of impact:

The mining will unavoidably require the removal of vegetation for the purpose of access roads, servitudes and the footprint of the mine and dumps. Surrounding vegetation could be flattened which is detrimental to the persistence of the vegetation. In addition, the illegal disposal of construction / maintenance material such as oil, cement etc. could destroy natural vegetation surrounding the mining operation.

The sources of this impact could include, but are not limited to:

- Clearing of and damage to vegetation in construction footprint, access roads, construction camps, vehicle/ machinery traffic and trampling by workers;
- Illegal disposal and dumping of construction material such as cement or oil, as well as maintenance materials during construction;
- Edge effects e.g. heavy vehicles turning in adjacent areas;
- Storage of equipment within vegetation; and
- Operational vehicles driving within natural or rehabilitated vegetation, not directly impacted on by the mine

Direct impact:

- Localised loss of vegetation and associated habitats and –organisms
- Reduction of the extent of CBA1s in the Province.
- Denudation and compaction of soils which may lead to an increase in runoff
- Fragmentation of vegetation and habitat
- Possible permanent reduction of re-vegetation potential of soil surface

Cumulative impacts:

Increase in transformed areas and loss of CBA extent in the province. Ongoing mining that extends eastward will fragment the natural habitat and the entire southern aspect of the mountain, and the CBA1, will be modified from the natural state.

Assumptions, uncertainties, and gaps in knowledge:

Comprehensive vegetation assessments and plant species assessments (search for species of conservation concern) were not undertaken. Although no plant species of conservation concern were recorded in walked transects around proposed activities footprint, this does not mean that the species are absent.

Destruction of natural vegetation				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	3 High	3 High	2 Moderate	2 Moderate
Resource replaceability	3 High irreplaceability (CBAs)	2 Moderate	3 High irreplaceability (CBAs)	2 Moderate
Duration	2 Medium term	2 Medium term	2 Long-term	2 Medium term
Extent or spatial scale	2 Limited to local area.	1 Limited to site.	2 Limited to local area.	1 Limited to site.
Probability	3 The impact will definitely occur.	3 The impact will definitely occur.	3 The impact will definitely occur.	2 It is probable for this impact to occur.
Significance	**13** **High**	**11** **Medium**	**12** **High**	**9** **Medium**

Environmental objective
To prevent the destruction of natural vegetation.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Limit vegetation clearing to the mining footprint and cluster infrastructure to reduce the mining footprint. The construction footprint and operational area of the mine may not result in edge effects to surrounding vegetation.	Design phase	Final approved site layout plan	Site inspections	Pre-construction	Mine Manager and ECO	Avoid
Leave as much connecting natural open space as possible. Leave boulders and rocks in place where possible. This will ensure the persistence of microhabitats.	Design phase	Final approved site layout plan	Site inspections	Pre-construction	Mine Manager and ECO	Minimise
After the final layout has been approved, conduct a thorough footprint investigation to detect all affected protected and/or threatened plant species that must be removed.	Design phase	Botanist to be appointed	Botanist to be appointed	Pre-construction	ECO	Prevent
Aim to start/conduct bulk of construction activities during the dry season.	Design phase	N/A	N/A	Planning	Mine Manager and ECO	N/A
Planning of the construction site must incorporate eventual rehabilitation in accordance with a vegetation rehabilitation plan. Retain rocks to include in relandscaping post closure.	Design phase	Rehabilitation plan	Site inspections	Pre-construction	Mine Manager and ECO	Minimise and avoid
Undertake a Plant Species Assessment in accordance with the Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species as published in the Government Gazette No 43855 on 30 October 2020 in terms of sections24(5)(a) and 25 (5)(h) NEMA	Design phase	N/A	N/A	Planning	Mine Manager and ECO	N/A
Train staff/ workers on the value of biodiversity and the need to conserve the species and systems that occur within the mining rights area where necessary.	Construction/Operational phase	Awareness training	Attendance registers	Quarterly	Mine Manager and ECO	Prevent
There is zero tolerance of the destruction or collecting of any biodiversity or part thereof by anybody working for or on behalf of the mine.	Construction/Operational phase	Awareness training	Attendance registers	Quarterly	Mine Manager and ECO	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005)	Construction/Operational phase	This EMP	Site inspections	Continuous	ECO	Minimise
Minimise the impact by clearly demarcating the footprint area to be affected, and strictly prohibit any movement outside the demarcated areas during construction and operation. Maintain site demarcations in position until the cessation of construction and operational work.	Construction/Operational phase	Final approved site layout plan	Site inspections	Continuous	Mine Manager and ECO	Prevent
No off-road driving or pedestrian access to be permitted beyond designated areas.	Construction/Operational phase	Awareness training	Attendance registers	Quarterly	Mine Manager and ECO	Prevent
No open fires are permitted within naturally vegetated areas.	Construction/Operational phase	Awareness training	Attendance registers	Quarterly	Mine Manager and ECO	Prevent
Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.	Construction/Operational phase	Final approved site layout plan	Site inspections	Continuous	Mine Manager and ECO	Prevent
Construction workers may not remove flora and neither may anyone collect seed from the plants without permission from the local authority.	Construction/Operational phase	Awareness training	Attendance registers	Quarterly	Mine Manager and ECO	Prevent
Store topsoil in a separate area where such soils can be protected until they can be re-used for postconstruction/operation rehabilitation. Never mix topsoil with subsoils or other spoil materials.	Construction/Operational phase	Rehabilitation plan	Site inspections	Continuous	Mine Manager and ECO	Prevent
Pollution and litter prevention and emergency containment and remediation measures must be implemented.	Construction/Operational phase	Spill handling procedure	Site inspections	On-going until rehabilitation and closure	Mine Manager	Prevent
Major spillage incidents will be handled in accordance with the emergency response procedure.	Construction/Operational phase	Emergency response procedure	Site inspections	On-going until rehabilitation and closure	Mine Manager	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
All foreign material from decommissioned infrastructure must be entirely removed.	Closure	Rehabilitation plan	Site inspections	Closure	Mine Manager	Prevent
As per the existing, approved EMP, the rehabilitation must be to such quality that the natural vegetation could re-establish after a period of time and the capability of the land as a grazing field needs to be strived for as an end-result. For this reason, it is critical to ensure the re-establishment of indigenous and grazing vegetation and prevent the establishment of exotic vegetation. Furthermore, slopes that remain after closure will not have any sharp curves or edges and must blend with the natural area. The reintroduction of indigenous vegetation will ensure the least possible visual impact will remain after closure.	Closure	Approved EMP	Site inspections	Closure	Mine Manager	Prevent
A vegetation rehabilitation plan must be implemented to ensure areas that are mined are rehabilitated timeously. Grass species, typical of the area can be sown in prepared soils. Revegetation should take place successively to re-establish vegetation as soon as possible after construction in a specific area.	Closure	Rehabilitation plan	Site inspections of planted grass	Closure	Mine Manager	Prevent
Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access Delay the re-introduction of livestock (where applicable) to all rehabilitation areas until an acceptable level of revegetation has been reached.	Closure	Cordon off tape	Site inspections	Closure	Mine Manager	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Localized alteration of soil surface characteristics and loss of flora, and increased fragmentation of remaining CBA.

7.2.3.2 Removal/Destruction of protected plants and plants of conservation concern

Activity, nature, and consequence of impact:

The proposed open cast mine will destroy the suitable habitat, as well as protected tree species.

Direct impact:

Removal of vegetation could result in the uprooting or destruction of sensitive plant species and protected trees. This could be mitigated if known populations / individuals of these species are avoided by the careful placement of infrastructure.

Cumulative impacts:

If mitigation measures are adequately implemented, no cumulative impacts are expected.

Assumptions, uncertainties, and gaps in knowledge:

Comprehensive vegetation assessments and plant species assessments (search for species of conservation concern) were not undertaken. Although no plant species of conservation concern were recorded in walked transects around proposed activities footprint, this does not mean that the species are absent.

Removal/Destruction of protected plants and plants of conservation concern				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	3 High	1 Low (Only if plants are avoided or	1 Low	1 Low

Removal/Destruction of protected plants and plants of conservation concern				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
		relocated, permits granted, else rating stays at High)		
Resource replaceability	1 Low irreplaceability	1 Low irreplaceability	1 Low irreplaceability	1 Low irreplaceability
Duration	2 Medium term	2 Medium term	2 Medium term	1 Short term
Extent or spatial scale	2 Limited to local area.	1 Limited to site.	2 Limited to local area.	1 Limited to site.
Probability	2 Highly probable (protected trees)	1 Improbable	2 Probable	1 Improbable
Significance	**10** **Medium**	**6** **Low**	**8** **Medium**	**5** **Low**

Environmental objective
To prevent the removal/destruction of protected plants and plants of conservation concern.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Record protected trees in the initial and subsequent mining footprints. Where protected trees must be removed or pruned, apply for a permit from the local DFFE prior to commencement.	Design phase	Botanist survey	Site inspections	Pre-construction	Mine Manager and ECO	Avoid
A plant rescue operation must be undertaken to relocate species that	Construction	Plant rescue	Plant survival and	For at least four	Botanist/ECO	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
cannot be avoided. Mitigation will depend on the size of the population and species present and must be informed by the plant species assessment. If the species are to be relocated, it should be moved to suitable habitat outside of the proposed impact zone. Survival and fecundity must be monitored for at least four (4) years post relocation and thereafter at least every three (3) years until at least two (2) years post closure. Monitoring should result in a regular reporting to the conservation authority. Unearthed geophytes and succulents should be replanted immediately to the road verges or other areas disturbed by construction. Take not of any unearthed geophytes, succulents etc and contact a specialist for the correct naming and threat status of the species. This will determine whether any follow-up action is required.		operation	fecundity monitoring reports	years post relocation		
Permits for the removal or pruning of protected trees on the site is in place. Ideally, an on-site ecologist should be present when excavation takes place to ensure that any species not identified during this phase, are protected from destruction. Note that the species could be dormant for some time until favourable conditions arise.	Construction	Botanist survey	N/A	Construction onwards	Botanist/ECO	Prevent
Where plant species of conservation concern are not directly affected by the construction footprint, but occur close to the activities, the species should be cordoned off and protected from edge effects	Construction	Cordon off tape	Site inspections	Construction onwards	Botanist/ECO	Prevent
Relocated species of conservation concern should be monitored for at least three years after construction to ensure that no edge effects impacted on this species. If die back is noted, a specialist should be consulted, and corrective action taken as soon as possible.	Operational	Plant rescue operation	Plant survival and fecundity monitoring reports	For at least three years after construction	Botanist/ECO	Prevent
Prevent trampling of natural vegetation around the mining activities. No operational activities are allowed to impact on these species or the habitat	Operational	Awareness training	Site inspections	On-going	Mine Manager and ECO	Avoid

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
in which they occur.						
A terrestrial plant species assessment must be undertaken, based on a botanical walkthrough, to determine if plant species of conservation concern are present within the development footprint. This report must inform any permitting for protected trees, the relocation of plant species of conservation concern as well as deviations to the routes to avoid such plants. Search and Rescue for such plants should be conducted prior to vegetation clearance.	Pre-construction	Botanist survey	N/A	Construction onwards	Botanist/ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
No residual risks are expected.

7.2.3.3 Potential increase in invasive vegetation

Activity, nature, and consequence of impact:

The seed of alien invasive plant species that occur on and in the vicinity of the construction areas could spread into the disturbed and stockpiled soil. Also, the construction vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds or indigenous plants not belonging to this vegetation unit to the construction site. In addition, if rehabilitation of the indigenous vegetation are unsuccessful or is not enforced, exotic and invasive vegetation may invade the area.

Direct impact:

Alien invasive species colonise disturbed soils, resulting in a decrease of the indigenous plant species diversity and a change in ecological processes. Such species are difficult to eradicate once they established. Propper mitigation will limit significance of this impact.

Cumulative impacts:

The area that the proposed development is situated in has a low frequency of alien invasive plant species. If such species are introduced during construction, they could spread into the surrounding area.

Assumptions, uncertainties, and gaps in knowledge:

Comprehensive vegetation assessments and plant species assessments (search for species of conservation concern) were not undertaken. Although no plant species of conservation concern were recorded in walked transects around proposed activities footprint, this does not mean that the species are absent.

Increase in invasive vegetation				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	3 High	1 Low	1 Low	1 Minor
Resource replaceability	2 Moderate	2 Moderate	2 Moderate	2 Moderate
Duration	2 Long term	1 Short term	2 Medium term	1 Short term
Extent or spatial scale	2 Limited to local area.	1 Site bound.	2 Limited to local area.	1 Limited to site.
Probability	2 Highly probable	2 Probable	2 Probable	1 Improbable

Increase in invasive vegetation				
	Construction phase		Operational phase	
	Impact pre-mitigation	Impact post-mitigation	Impact pre-mitigation	Impact post-mitigation
Significance	**11** **Medium**	**7** **Low**	**9** **Medium**	**6** **Low**

Environmental objective
To prevent the establishment of invasive alien species.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Alien invasive species, in particular category 1b species that were identified within the study area (Appendix B of vegetation assessment), should be removed from the development footprint and immediate surrounds, prior to construction or soil disturbances. By removing these species, the spread of seeds will be prevented into disturbed soils which could thus have a positive impact on the surrounding natural vegetation.	Construction	Botanist and Vegetation assessment report	Site inspections	On-going until closure	Mine Manager and ECO	Minimise
The establishment of alien invasive species must be prevented and regularly monitored. All alien seedlings and saplings must be removed as they become evident for the duration of construction. Manual removal is preferred to chemical control.	Construction	Alien invasive species programme	Site inspections/eradication programme	On-going until closure	Mine Manager and ECO	Minimise
Only suitably trained alien invasive plant control contractors (e.g., certified by the South African green Industries Council (SAGIC)) with knowledge of the species in question should be employed. OR mine staff tasked with the clearing of alien invasive plant	Construction	Alien invasive species programme	Site inspections/eradication programme	On-going until closure	Mine Manager and ECO	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
species must be suitably qualified to use herbicides and machinery and comply to the Hazardous Substances Act 15 of 1973 and the Occupational Health and Safety Act 85 of 1993.						
All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction areas. This should be verified by the ECO.	Construction	N/A	Site inspections	On-going until closure	ECO	Prevent
If filling material is to be used, this should be sourced from areas free of invasive species.	Construction	N/A	N/A	On-going until closure	ECO	Prevent
Implement an alien invasive plant monitoring and management plan whereby the spread of alien and invasive plant species into the areas disturbed by the construction and mining are regularly removed and re-infestation monitored.	Operational	Alien invasive species programme	Site inspections/eradication programme	On-going until closure	Mine Manager and ECO	Minimise
Combating alien infestation is a dynamic process and needs to be reviewed periodically. The invasive management plan must be updated regularly and be implemented for at least three (3) years post closure.	Operational	Alien invasive species programme	N/A	At least 3 years post closure	ECO	Minimise
Only use indigenous species, naturally occurring in the area for landscaping around offices / buildings and for rehabilitation.	Operational	N/A	N/A	On-going until closure	ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Re-infestation in areas initially cleared.

7.2.3.4 Impact on ecological processes and CBAs

Activity, nature, and consequence of impact:

The mine will lead to fragmentation of habitats and alter fire regimes (Pienaar, unknown). Fragmentation is one of the most important impacts on vegetation as it creates breaks in previously continuous vegetation, or can destroy large areas of vegetation, leaving no linkages between remaining natural habitats.

Direct impact:

The mine will destroy and/or indirectly impact on about 0.005% of the Limpopo CBA1's. Although the area is small in comparison to the remaining CBAs in the Province, it will impact on the functionality of the CBAs and at best reduce it to an Ecological Support Area. The cumulative effect of small impacts in CBAs will inevitably impact on the conservation targets of the province.

Cumulative impacts:

No cumulative impacts are expected.

Assumptions, uncertainties, and gaps in knowledge:

Comprehensive vegetation assessments and plant species assessments (search for species of conservation concern) were not undertaken. Although no plant species of conservation concern were recorded in walked transects around proposed activities footprint, this does not mean that the species are absent.

Impact on ecological processes and CBAs				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	2 Moderate	1 Low	2 Moderate	1 Minor
Resource replaceability	2 Moderate	1 Low	2 Moderate	2 Moderate

Impact on ecological processes and CBAs				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Duration	1 Short term	1 Very short term	1 Short term	1 Very short term
Extent or spatial scale	1 Site bound.	1 Site bound.	1 Limited to site.	1 Limited to site.
Probability	2 Probable	1 Improbable	1 Improbable	1 Improbable
Significance	**8** **Medium**	**5** **Low**	**7** **Low**	**6** **Low**

Environmental objective
To minimise the impact on ecological processes and CBAs.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Allow natural processes such as fire to continue, while safeguarding staff and equipment.	Construction	Emergency preparedness response procedure	Site inspections	On-going until closure	Mine Manager and ECO	Minimise

Stakeholder expectations and / or comments
None received.
Residual and latent risks

Altered soil characteristics and vegetation that remain in an unstable, pioneer phase or invaded by alien invasive plant species

7.2.3.5 Bush densification

Activity, nature, and consequence of impact:

The vegetation is prone to bush densification whereby open veld, in the absence of good veld management, become denser and dominated by stands of encroacher species e.g. "stands of plants of the kinds specified in Table 4 of Regulation 16 of the Conservation of Agricultural Resources Act no. 43 of 1983 (as amended) (CARA), where individual plants are closer to each other than three times the mean crown diameter" (Agricultural Research Council, 2013). Plants in this group are not alien plants, but indigenous plants that tend to become abnormally abundant when the area is degraded (Agricultural Research Council, 2013). The plants themselves are thus not the problem, but their increased abundance or encroachment into vegetation serves as an indicator of poor land management practices.

Direct impacts:

Several species occurring on the site could become encroachers e.g. *Tarchonanthus camphoratus*, *Senegalia mellifera*, and *Dichrostachys cinerea* (sickle-bush) which has already densified on site. Clearing edge effects and operational disturbances can result in densification of such species, a change in vegetation composition, and a loss of species diversity, particularly grass and forb species.

Cumulative impacts:

Dense vegetation comprising of a low species diversity.

Assumptions, uncertainties, and gaps in knowledge:

Comprehensive vegetation assessments and plant species assessments (search for species of conservation concern) were not undertaken. Although no plant species of conservation concern were recorded in walked transects around proposed activities footprint, this does not mean that the species are absent.

Bush densification				
	Clearing phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	2 Moderate	1 Low	2 Moderate	1 Low
Resource replaceability	2 Moderate	1 Low	2 Moderate	1 Low
Duration	2 Long term	1 Short term	2 Long term	1 Short term
Extent or spatial scale	1 Limited to site.	1 Limited to site.	1 Limited to site.	1 Limited to site.
Probability	2 Highly probable	2 Probable	2 Highly probable	2 Probable
Significance	**9** **Medium**	**6** **Low**	**9** **Medium**	**6** **Low**

Environmental objective
To prevent bush densification.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Leave as much natural vegetation intact as possible. Do not disturb soil or vegetation unnecessarily.	Clearing	Final approved site layout plan	Site inspections	On-going until closure	Mine Manager and ECO	Avoid
Ensure that areas outside of the operational footprint that were	Clearing	Final	Site inspections	On-going until	Mine Manager and	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
disturbed, are adequately rehabilitated, and prevent dense stands of encroacher species.		approved site layout plan		closure	ECO	
Monitor the establishment of dense stands of encroacher species and remove or thin as soon as detected.	Operation	Vegetation management plan	Site inspections	On-going until closure	ECO	Minimise
If game or grazers will be excluded from the natural vegetation, a management plan to prevent densification or a shift in species composition should be implemented to maintain the vegetation in a natural to near-natural state	Operation	Vegetation management plan	Site inspections	On-going until closure	ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Bush densification

7.2.3.6 Ecological processes, including lowland-highland interface

Activity, nature, and consequence of impact:

Development within the site will interfere or limit the functionality of the migration corridors occur between the lowland-highland interface; impact on pollinator habitat and movement and limit the sites functionality as climate change refuge. The site includes the interface between the higher lying Waterberg Mountain Bushveld in the north and the Dwaalboom Thornveld on the lower lying southern areas. Such ecotones usually have a unique species composition between the vegetation types. Hills and koppies generally have more insects than the immediate surroundings (Samways & Hatton, 2000). Development could render the site inaccessible or dangerous to such pollinators Fire and grazing have always been important driving forces in savannah, and certain changes in the vegetation composition and structure must be expected if these driving forces are removed or intensely modified.

Direct impacts:

Loss of species diversity and change in vegetation composition and structure.

Cumulative impacts:

Low species diversity and a limited resilience to climate change.

Assumptions, uncertainties, and gaps in knowledge:

Comprehensive vegetation assessments and plant species assessments (search for species of conservation concern) were not undertaken. Although no plant species of conservation concern were recorded in walked transects around proposed activities footprint, this does not mean that the species are absent.

Ecological processes, including lowland-highland interface				
	Clearing phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	3 High	2 Moderate	2 Moderate	1 Low
Resource replaceability	2 Moderate	2 Moderate	2 Moderate	2 Moderate
Duration	3 Permanent	2 Long term	2 Long term	1 Medium term
Extent or spatial scale	3 Regional	3 Regional	1 Limited to site.	1 Limited to site.
Probability	2 Highly probable	2 Probable	2 Highly probable	2 Probable
Significance	**13**	**11**	**9**	**7**

Ecological processes, including lowland-highland interface				
	Clearing phase		Operational phase	
	Impact pre-mitigation	Impact post-mitigation	Impact pre-mitigation	Impact post-mitigation
	High	Medium	Medium	Low

Environmental objective

To prevent impacts to ecological processes, including lowland-highland interface

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Leave as much natural vegetation intact as possible and ensure that unfragmented open space remain as ecological corridors, including the varying aspects on the site. Ideally a buffer area between the open cast and surrounding vegetation should be fenced to protect wildlife as well as limit edge effects.	Clearing	Final approved site layout plan	Site inspections	On-going until closure	Mine Manager and ECO	Avoid
No chemicals may be used to clear vegetation, other than alien invasive plant species in accordance with an Alien invasive plant species management plan.	Clearing	Final approved site layout plan Alien invasive plant species management plan.	Site inspections	On-going until closure	Mine Manager and ECO	Prevent
Implement a fire management plan to allow natural fires across the site where possible.	Operation	Fire management plan	Fire management plan	On-going until closure	ECO	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Prevent edge effects to natural open space and monitor open space to ensure the persistence of species diversity.	Operation	N/A	Site inspections	On-going until closure	ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Bush densification, lowered species diversity

7.2.4 Animal life

Information for this section was extracted from the Vertebrate fauna (Mammals & Herpetofauna) Habitat Assessment report (Limnology, 2022):

7.2.4.1 Destruction of sensitive vertebrate habitat

Activity, nature, and consequence of impact:

The sources of these impacts would include the removal of vegetation by clearing the bush and felling of protected trees. The pollution of the Bierspruit and Crocodile River will have an impact on the survival of many vertebrate species. Currently the negative impact has already taken place in some areas of the mine, however the proposed mining in this area will increase the footprint and it will be permanent. This will lead to some terrestrial species becoming permanently and proportionally rarer within local context.

Cumulative impacts:

Mining activities will result in a cumulative impact to the sensitive vertebrate habitat on the study site and even beyond.

Assumptions, uncertainties, and gaps in knowledge:

Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage.

Destruction of sensitive vertebrate habitat				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	3 High	1 Low	2 Moderate	1 Low
Resource replaceability	3 Irreversible	2 Low reversibility	3 Irreversible	2 Low reversibility
Duration	2 Long term	2 Long term	3 Permanent	3 Permanent
Extent or spatial scale	2 Limited to local area.	1 Limited to site.	2 Limited to local area.	1 Limited to site.
Probability	3 The impact will definitely occur.	2 It is highly probable for this impact to occur.	3 The impact will definitely occur.	2 It is highly probable for this impact to occur.
Significance	**13** **High**	**8** **Medium**	**13** **High**	**9** **Medium**

Environmental objective
To prevent the destruction of sensitive vertebrate habitat.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Keep the impact contained in a certain area. Sensitive	Operational until	Mining plan,	Site inspections	Continuous	ECO and site geologist	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
habitat should ideally be cordoned off to prevent access.	closure	Awareness and cordon off tape				
The 100 m buffer outside the urban edge should apply for the Bierspruit and Crocodile Rivers.	Operational until closure	Buffer zones, Layout plan	Site inspections	Continuous	ECO and site geologist	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Impacts on sensitive areas are likely to be permanent unless the development takes place only in the designated area away from the drainage lines.

7.2.4.2 Red Data Mammals

Activity, nature, and consequence of impact:

All Red Data species listed as Critically Endangered, Vulnerable, Near Threatened or Data Deficient are discerning species and became endangered as a result of the deterioration of their preferred habitats. Most of the Red Data mammals have already been killed or driven from the area.

The impacts could include:

- Removal of vegetation
- Pollution of water sources
- Killing of mammals

This could lead to the loss of Red Data mammal species of conservation concern.

Cumulative impacts:

Pollution of the Bierspruit and Crocodile River.

Assumptions, uncertainties, and gaps in knowledge:

Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage.

Red Data Mammals				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	3 High	2 Moderate	3 High	2 Moderate
Resource replaceability	2 Low reversibility	2 Moderate reversibility	2 Low reversibility	2 Moderate reversibility
Duration	2 Long term	2 Long term	3 Permanent	3 Permanent
Extent or spatial scale	2 Limited to local area.	1 Limited to site.	2 Limited to local area.	1 Limited to site.
Probability	2 High probability	1 Low probability	2 High probability	1 Low probability
Significance	**11** **Medium**	**8** **Medium**	**12** **High**	**9** **Medium**

Environmental objective
To prevent driving of red data mammals from the area.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
All new development must be located inside of the	Planning	Approved site	Site insertions, demarcations	Planning to	ECO/Site geologist	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
designated footprint area and adhere to buffers as set out by the wetland report for this project		layout plan		commencement		
Prohibit the use of hunting dogs or traps/snares to catch mammals	Construction	Awareness training	Attendance registers	On-going until closure	ECO	Prevent
Prevent any pollution of the drainage lines	Construction	Waste management procedure	Surface water quality monitoring	On-going until closure	ECO	Prevent
Construct clean water outlets for people and game	Construction	SWMP	Surface water quality monitoring	On-going until closure	ECO/Mine Manager	Minimise
Monitor the area to ensure that the development stays within the disturbed area. Monitor colonisation by exotics or invasive plants and control these as they emerge.	Operational	Approved site layout plan Alien species management plan	Annual audits Vegetation monitoring	On-going until closure	ECO/Site geologist	Minimise

Stakeholder expectations and / or comments
None received.
Residual and latent risks
The decline of mammal species is likely to continue unless the development stays in the designated footprint area.

7.2.4.3 Red Data Herpetofauna

Activity, nature, and consequence of impact:

All Red Data species listed as Critically Endangered, Vulnerable, Near Threatened or Data Deficient are discerning species and became endangered as a result of the deterioration of their preferred habitats. Most of the Red Data herpetofauna have already been killed or driven from the area.

The impacts could include:

- Removal of vegetation
- Pollution of water sources
- Killing of herpetofauna
- This could lead to the loss of Red Data herpetofauna species of conservation concern.

Cumulative impacts:

Erosion upslope from the drainage lines/rivers could increase sedimentation in already degraded watercourses. Possible contamination of rivers and/or groundwater reserves due to hydrocarbon or other spillage and an increase of modified areas (together with surrounding developments) that will affect flora population dynamics and runoff patterns.

Assumptions, uncertainties, and gaps in knowledge:

Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage.

Red Data Herpetofauna				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	3 High	2 Moderate	3 High	2 Moderate
Resource replaceability	2 Low reversibility	2 Moderate reversibility	2 Low reversibility	2 Moderate reversibility
Duration	2 Long term	2 Long term	3 Permanent	3 Permanent
Extent or spatial scale	2 Limited to local area.	1 Limited to site.	2 Limited to local area.	1 Limited to site.
Probability	2	1	2	1

Red Data Herpetofauna				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
	High probability	Low probability	High probability	Low probability
Significance	**11** **Medium**	**8** **Medium**	**12** **High**	**9** **Medium**

Environmental objective

To prevent driving of red data herpetofauna from the area.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
The legal protection and value of a TOPS species like the Southern African Python must be explained to construction and mine workers. Educate workers about herpetofauna in general and snakes specifically by means of sign boards.	Construction	Awareness training Sign boards	Attendance registers	On-going until closure	ECO	Prevent
Prevent any pollution of the Bierspruit and Crocodile River.	Construction	Waste management procedure	Surface water quality monitoring	On-going until closure	ECO	Prevent
Plant indigenous vegetation from the surrounding areas to re-establish indigenous plant cover.	Operational	Indigenous species literature	Vegetation monitoring	On-going until closure	ECO	N/A

Stakeholder expectations and / or comments

None received.

Residual and latent risks

The decline of herpetofauna species is likely to continue unless the development stays within the designated footprint area and if workers are not educated about herpetofauna in particular and Red Data herpetofauna specifically.

7.2.4.4 Poaching of wildlife in the vicinity

Activity, nature, and consequence of impact:

The killing of wildlife like scrub hares, snakes and game birds by residents/ construction workers is a possibility. The site is vulnerable to hunting/trapping by mining/ construction workers. Harassing and hunting of wildlife by residents/ construction workers could be expected.

Cumulative impacts:

Certain species becoming proportionally rarer or even becoming locally extinct.

Assumptions, uncertainties, and gaps in knowledge:

Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage.

Red Data Herpetofauna				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	2 Moderate	1 Low	2 Moderate	1 Low
Resource replaceability	2 High reversibility	1 Reversibility	2 High reversibility	1 Reversibility
Duration	2 Long term	2 Long term	3 Permanent	3 Permanent
Extent or	2	1	2	1

Red Data Herpetofauna				
	Construction phase		**Operational phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
spatial scale	Limited to local area.	Limited to site.	Limited to local area.	Limited to site.
Probability	3 Definite	2 Probable	2 High probability	1 Low probability
Significance	**11** **Medium**	**7** **Low**	**11** **Medium**	**7** **Low**

Environmental objective

To prevent poaching of wildlife in the vicinity.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Education of mining/construction workers about the value of wildlife and environmental sensitivity. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance. The residents/contractor/contractors must ensure that no animals are disturbed, trapped, hunted or killed during the construction phase.	Construction	Awareness training	Attendance registers	On-going until closure	ECO	Prevent
Restrict access to the suitable and sensitive habitats of faunal species.	Operational	Approved site layout plan	Site inspections	On-going until closure	ECO	Prevent

Stakeholder expectations and / or comments

None received.
Residual and latent risks With education, the impact can be kept to a minimum.

7.2.4.5 Avifauna

Please note that only the mitigation measures as per the Avifaunal specialist assessment (Limnology, August 2023) are included.

Environmental objective To prevent impacts to the avifauna in the vicinity.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
The amount of vegetation that is cleared should be kept to the minimum so as to limit habitat loss.	Design phase	Final approved site layout plan	Site inspections	Pre-construction	Mine Manager and ECO	Avoid
The river and riparian area as delineated by an aquatic specialist as well as a buffer zone of 50 m from the edge of the delineated riparian edge as recommended by GDARD's requirements for biodiversity assessments (2014) and should be regarded as of high sensitivity with minimal disturbance and alternation to the habitat system.	Operational until closure	Mining plan, Buffer zone, Awareness and cordon off tape/barrier	Site inspections	Continuous	ECO and site geologist	Prevent
Apart from alien tree and plant species no indigenous vegetation should be disturbed or removed within the riparian area and within the 50 m buffer zone. If exotic trees are to be removed, they should be replaced by indigenous trees and the process done gradually to	Operational until closure	Alien invasive species programme	Site inspections/eradication programme	On-going until closure	Mine Manager and ECO	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
ensure riparian vegetation along the banks of the river.						
A natural barrier should be built to shield the development from the river and to mitigate against the edge affect through human disturbance on these species. Human related activities along the banks of the Crocodile River should be restricted to the minimum, to prevent any disturbance to these sensitive bird species found on site or that are likely to occur on site. This could form part of a limited recreational development plan (trails, bird hides etc.).	Operational until closure	Mining plan, Awareness and cordon off tape/barrier	Site inspections	Continuous	ECO and site geologist	Prevent
It is suggested that where work is to be done close to the drainage lines, these areas be fenced off during construction.	Operational until closure	Mining plan, Fence/barrier	Site inspections	Continuous	ECO and site geologist	Prevent
No activity whatsoever, such as temporary housing, temporary ablutions, disturbance of natural habitat, storing of equipment or any other use of the buffer/flood zone, may be permitted during the construction phase. The demarcated buffer/flood zone must be fenced during the construction phase to prevent any misinterpretation or disturbance of this no-go zone.	Construction	Mining plan, Buffer zone, Awareness and fence /barrier	Site inspections	Continuous	ECO and site geologist	Prevent
Domestic pets, especially domestic cats must be excluded from all areas where possible.	Operational until closure	Awareness	N/A	Continuous	Mine manager	Prevent
No surface storm water generated as a result of the development may be channelled directly into the river, mechanisms are required to prevent erosion and dissipate water energy, such as drainage diversions and	Operational phase until closure	SWMP	Storm water infrastructure maintenance	On-going until rehabilitation and closure	Mine Manager	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
berms.						
Any large indigenous trees should be left as part of the landscaping. Forage and host plants required by pollinator species in the area should also be used in landscaped areas.	Operational until closure	Rehabilitation plan	Vegetation monitoring	Continuous	ECO/Mine manager	Prevent
Areas that are to be rehabilitated should be planted with trees and vegetation natural to the areas on site. The rehabilitation is a long process but, in time, the more common bird species and species that are able to adapt to change will return to these areas to breed and forage	Operational until closure	Rehabilitation plan	Vegetation monitoring	Continuous	ECO/Mine manager	Prevent
Where possible, work should be restricted to one area at a time, as this will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories.	Operational until closure	Mining plan, Fence/barrier	Site inspections	Continuous	ECO and site geologist	Prevent
Where possible the construction of the proposed development should take place during the winter months during the time when most avifaunal species are not breeding.	Operational until closure	N/A	N/A	Continuous	Mine manager	Prevent
No vehicles should be allowed to move in or across the wet areas or drainage lines and possibly get stuck.	Construction/Operational phase	Final approved site layout plan, Fencing/barriers	N/A	Continuous	Mine manager	Prevent
Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.	Construction	Awareness training	Attendance registers	On-going until closure	ECO	Prevent
During the construction phase, noise must be kept to a minimum to reduce the impact of the development on	Construction	Noise survey	Noise monitoring	Continuously throughout	Mine manager	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
the fauna residing on the site.				operation		

Stakeholder expectations and / or comments
None received.
Residual and latent risks
With education, the impact can be kept to a minimum.

7.2.4.6 Impact on bat population

Information for this section was extracted from the Bat Environmental Impact Assessment (Limnology, 2023).

Activity, nature, and consequence of impact:

Possible impact on bat population due to mining activities. As the mining operations are limited to a section along the foot of the mountain the impact of operations on the bat population is expected to be low. The impact can take place throughout construction to decommissioning phase.

Cumulative impacts:

Nearby developments that impact on bat habitat will have a cumulative impact.

Assumptions, uncertainties, and gaps in knowledge:

It is important to note that the R510 road is busy, and the acoustic sampler recorded many “noise” samples.

Impact pre-mitigation:

	Fragmentation	Bat roosting	Bat feeding	Bat migration	Bat population
Intensity and magnitude	1	1	1	1	1
Resource replaceability	1	1	1	1	1
Duration	1	2	2	1	2
Extent or spatial scale	1	1	1	1	1
Probability	2	2	2	2	2
Significance	**6** **Low**	**7** **Low**	**7** **Low**	**6** **Low**	**7** **Low**

Impact post-mitigation:

	Fragmentation	Bat roosting	Bat feeding	Bat migration	Bat population
Intensity and magnitude	1	1	1	1	1
Resource replaceability	1	1	1	1	1
Duration	1	1	1	1	1
Extent or spatial scale	1	1	1	1	1
Probability	1	2	2	1	2
Significance	**5** **Low**	**6** **Low**	**6** **Low**	**5** **Low**	**6** **Low**

Environmental objective
To prevent impacts to the bat population.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Avoidance of the riparian area in terms of operations. It was clear that the riparian areas serve as movement/ feeding corridors for the bats,	Operational until closure	Mining plan, Buffer zone, Awareness and cordon off tape/barrier	Site inspections	Continuous	ECO and site geologist	Prevent
Compilation of monitoring plan to ensure impacts are timeously observed and addressed as soon as possible	Operational	Monitoring plan	Inspections, monitoring plan	On-going until closure	ECO	Prevent
Habitat fragmentation is likely to occur due to loss in vegetation however, the addition of buildings and lights creating new roosting and foraging sites, should off-set the loss in natural habitation and likely increase bat habituation.	Design phase	Final approved site layout plan	Site inspections	Pre-construction	Mine Manager and ECO	Avoid
Installing bat boxes near buildings to mitigate bats seeking to roost inside buildings	Operational	Bat boxes	Inspections, monitoring plan	On-going until closure	ECO	Prevent
Increase awareness of bats to employees of the operations.	Construction and Operational	Awareness training	Attendance registers	On-going until closure	ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
With education, the impact can be kept to a minimum.

7.2.5 Groundwater

Information from this section was extracted from the Geohydrological Study and Impact Assessment (Shangoni AquiScience, 2023).

7.2.5.1 Groundwater quality

Activity, nature, and consequence of impact:

Construction phase:

The impacts on groundwater quality are primarily related to the management of materials, wastes and spills and unauthorised disposal of contaminated substances. Contamination of groundwater may also arise due to incorrect handling and disposal of waste materials. This risk is considered low. Due to the short exposure and small scale of these possible spills, the impacts will be negligible during the construction phase. Except for the lesser oil and diesel spills, there are no activities expected that could impact on regional groundwater quality. This phase should thus cause very little additional impacts. It is expected that the current status quo will be maintained.

Operational phase:

No sulphidic minerals are present in the overburden or waste rock that could result in acidity of drainage or mine water and ABA tests confirmed that no acid potential exists. The mineral waste material is a low risk waste with no acid generating capacity. Trace metals will remain in non-soluble states and is, therefore, of no concern. The impact on the groundwater quality during the operational phase is expected to be low.

Post-mining phase:

The rehabilitation strategy of depositing overburden into the pit as part of roll-over mining does pose a potential post-closure risk on groundwater quality. However, even based on worst-case scenarios no substantial impacts on the groundwater or surface water regime are foreseen. This is largely due to the fact that the overburden material and waste rock are chemically inert and do not have the potential to generate poor quality leachate.

Cumulative impacts:

Rhino Andalusite Mine is located adjacent to Buffelshoek but no cumulative impacts are expected due to the low degree of impacts from both mines.

Assumptions, uncertainties, and gaps in knowledge:

The numerical groundwater model, despite all efforts and advances in software and algorithms, remains a very simplified representation of the very complex and heterogeneous interacting aquifer systems underlying the study area. The integrity of a numerical model depends strongly on the formulation of a sound conceptual model and the quality and quantity (distribution, length of records etc.) of input data.

Groundwater quality						
	Construction phase		**Operational phase**		**Post-mining phase**	
	Impact pre-mitigation	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**	**Impact pre-mitigation**	**Impact post-mitigation**
Intensity and magnitude	2 Moderate	1 Low	2 Moderate	1 Low	2 Moderate	1 Low
Resource replaceability	2 Moderate	2 Moderate	2 Moderate	2 Moderate	2 Moderate	2 Moderate
Duration	1 Short term	1 Short term	1 Short term	1 Short term	1 Short term	1 Short term
Extent or spatial scale	1 Limited to mine boundaries.	1 Limited to mine boundaries.	1 Limited to mine boundaries.	1 Limited to mine boundaries.	1 Limited to mine boundaries.	1 Limited to mine boundaries.
Probability	1 Low likelihood	1 Low likelihood	1 Low likelihood	1 Low likelihood	1 Low likelihood	1 Low likelihood
Significance	**7** **Low**	**6** **Low**	**7** **Low**	**6** **Low**	**7** **Low**	**6** **Low**

Environmental objective

To prevent groundwater pollution.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Prevent or contain groundwater contamination from seepage.	Operational	Groundwater monitoring	Groundwater monitoring	On-going until closure	ECO	Minimise
Surface water should be re- directed around the quarry.	Operational	SWMP	Site inspections	On-going until closure	ECO	Minimise
Recycle and reuse of contaminated water as far as possible.	Operational	Water balance	Water conservation and water demand management (WC/WDM)	On-going until closure	Mine Manager and ECO	Prevent
Separate clean and affected water through diversion canals and an affected water management system that collects affected runoff water from dirty management areas which drain towards the process water storage facilities. Such water should be re-used in the plant as process water, where possible/relevant.	Operational	SWMP & Maintenance of storm water infrastructure	WC/WDM	On-going until closure	Mine Manager and ECO	Prevent
Prevent, minimise or contain contamination of groundwater quality in aquifers and the rehabilitated pit.	Operational	SWMP & Groundwater quality monitoring	Groundwater quality monitoring	On-going until closure	Mine Manager and ECO	Prevent
Minimise recharge of rainwater into the rehabilitated pit by creating free draining slopes and capping with low permeable material.	Operational	SWMP	Site inspections	On-going until closure	Mine Manager and ECO	Minimise
Ponding should be prevented on rehabilitated surfaces.	Operational	SWMP	Site inspections	On-going until closure	Mine Manager and ECO	Prevent
Monitor the groundwater resource in terms of quality.	Operational	Groundwater	Groundwater quality	On-going until	Mine Manager and ECO	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
		quality monitoring	monitoring	closure		
Should it be indicated through monitoring and investigation that groundwater users are impacted upon in terms of quality of borehole water, alternative water sources must be made available to such users by the mine.	Operational	Groundwater quality monitoring	Groundwater quality monitoring	On-going until closure	Mine Manager and ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Localized alteration of soil surface characteristics and loss of flora, and increased fragmentation of remaining CBA.

7.2.6 Surface water

Information from this section was extracted from the Aquatic Ecosystem Delineation (Limnology, 2023) and the SWMP (Rational Environmental, 2023).

7.2.6.1 Impacts on aquatic ecosystem regulating and supporting services

Activity, nature, and consequence of impact:

Wetland indicators were not observed on site, confirming the absence of wetlands on site. Two main river systems occur to on the western boundary (Bierspruit) and the eastern boundary (Crocodile River). Two drainage lines occur running from the mountain down into the site. The development is not expected to impact hydrological functioning due to the location of the activities outside the aquatic ecosystems.

Cumulative impacts:

Mines or developments located near to the river systems may impact on the aquatic ecosystem regulating and supporting services and the riparian area

Assumptions, uncertainties, and gaps in knowledge:

To determine the riparian or wetland boundary, indicators are used. If these are not present during the site visit, it can be assumed that they were dormant or absent and thus if any further indicators are found during any future phases of the project, the author cannot be held responsible due to the indicator's variability. Even though every care was taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time, and budget.

Impact pre-mitigation:

	Flood attenuation and sediment trapping	**Streamflow regulation**	**Phosphate and toxicant assimilation**	**Nitrate assimilation**	**Erosion control**	**Carbon storage**	**Habitat**	**Hydrology**	**Water quality**	**Geomorphology**
Intensity and magnitude	2	2	1	1	3	1	1	2	1	1
Resource replaceability	1	1	1	1	2	1	2	1	2	1
Duration	1	2	1	1	2	1	1	2	1	1
Extent or spatial scale	2	1	1	1	2	1	1	1	1	1
Probability	2	2	1	1	2	1	2	2	2	1
Significance	**8 Medium**	**8 Medium**	**5 Low**	**5 Low**	**11 Medium**	**5 Low**	**7 Low**	**8 Medium**	**7 Low**	**5 Low**

Impact post-mitigation:

	Flood attenuation and sediment trapping	**Streamflow regulation**	**Phosphate and toxicant assimilation**	**Nitrate assimilation**	**Erosion control**	**Carbon storage**	**Habitat**	**Hydrology**	**Water quality**	**Geomorphology**
Intensity and	1	1	1	1	1	1	1	1	1	1

	Flood attenuation and sediment trapping	Streamflow regulation	Phosphate and toxicant assimilation	Nitrate assimilation	Erosion control	Carbon storage	Habitat	Hydrology	Water quality	Geomorphology
magnitude										
Resource replaceability	1	1	1	1	1	1	1	1	2	1
Duration	1	2	2	1	1	1	1	1	1	1
Extent or spatial scale	1	1	1	1	1	1	1	1	1	1
Probability	2	2	2	2	2	2	2	1	2	1
Significance	**6 Low**	**7 Low**	**7 Low**	**6 Low**	**6 Low**	**6 Low**	**6 Low**	**5 Low**	**7 Low**	**5 Low**

Environmental objective

To limit any impact on the riparian areas.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
It is recommended that an Aquatic environmental control officer (AECO) is appointed for the duration of the project. The AECO will be tasked with assessing field conditions and ensure impacts to the aquatic ecosystem is managed.	Planning, construction and operational	AED, riparian buffer zone	Site inspections	On-going until closure	AECO	Prevent
Compilation of systematic adaptive rehabilitation plan. Compilation of monitoring plan to ensure impacts are timeously observed and addressed as soon as possible,	Construction and operational	Rehabilitation plan	Annual updates to the plan Annual audits	Annual	ECO and limnologist	Minimise
Implementation of an early warning system to prevent	Planning,	Emergency	Annual audits	Annual	ECO and limnologist	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
incidences of flooding inundating machinery and decrease risk to human health,	construction and operational	preparedness response procedure SWMP				
Management on site must take cognizance of possible pollution arising from the site, with emphasis on hydrocarbon and sediment pollution,	Operational until closure.	Waste management procedure.	As per the waste management procedure.	Continuously throughout operation.	Mine manager.	Avoid
Signage must also be included to increase awareness of the aquatic ecosystems found on site,	Operational until closure.	Signage	N/A	On-going until closure	Mine manager.	Prevent
Allowance must be made for overtopping of the banks of the system during flooding events,	Planning, construction and operational	SWMP	Stormwater infrastructure/ Site inspections	Continuous	ECO	Minimise
No maintenance (including refueling) of machinery in/ near the aquatic ecosystem,	Planning, construction and operational	Awareness training	Site inspections	On-going until closure	ECO	Prevent
Rainfall and stormwater management must take cognizance of releases into the natural receiving environment. Dirty water must be released into the pit for mitigation from there. Clean water must be released into the receiving environment with diffused flows.	Planning, construction and operational	SWMP	Stormwater infrastructure/ Site inspections	Continuous	ECO	Minimise
Stormwater released into diffused phytoremediation sections to prevent erosion.	Planning, construction and operational	SWMP	Stormwater infrastructure/ Site inspections	Continuous	ECO	Minimise
Installation of phytoremediation/ artificial wetlands at stormwater release points. Dirty water must not be released and managed based on best practices and volumes.	Planning, construction and operational	SWMP	Stormwater infrastructure/ Site inspections	Continuous	ECO	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Diffused flows at release points of stormwater (clean water system only).	Planning, construction and operational	SWMP	Stormwater infrastructure/ Site inspections	Continuous	ECO	Minimise
Lay down areas and construction camps must not be located within any watercourses or drainage lines.	Planning, construction	Environmental sensitivity map	N/A	Planning, construction	ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
If effective management takes place, there should not be residual impacts. No latent impacts foreseen.

7.2.6.2 Flooding risk

Activity, nature, and consequence of impact:

Development of quarry within drainage lines with the potential of flooding. This could cause damage to infrastructure and/or excessive inflow into open quarry and financial/production loss and/or surface water contamination. This impact can take place throughout construction to decommissioning phase

Cumulative impacts:

Natural drainage lines in the system may have a cumulative impact on flooding.

Assumptions, uncertainties, and gaps in knowledge:

Calculations assume uniform rainfall intensities throughout the duration of the storm over the entire catchment areas assessed (Rational Environmental, 2023).

Flooding risk		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	2 Direct surface runoff of the area is affected. Flooding has the potential to cause damage to high walls, roads and other infrastructure that may be placed on site.	1 The intensity and magnitude will be low with management.
Resource replaceability	1 Impact is reversible when repairs are made or dewatering takes place. Planned infrastructure very limited and easy to maintain. Flooding of quarry is easy to dewater and use in the process.	
Duration	1 Temporary impact.	
Extent or spatial scale	1 Flooding of quarry and damage to infrastructure is limited to the direct site.	
Probability	2 The upstream catchment area will probably produce surface runoff with the potential to flood.	1 The impact is less likely with management measures.
Significance	**7** **Low**	**5** **Low**

Environmental objective
To limit the chances of flooding.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Implement all measures under Section 4 of the	Operational phase until closure	SWMP	Regular inspections on all channels, trenches, and	On-going until rehabilitation and	Mine Manager	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
SWMP			berms	closure		

Stakeholder expectations and / or comments
None received.
Residual and latent risks
If effective management takes place, there should not be residual impacts. No latent impacts foreseen.

7.2.7 Air quality

Information for this section was extracted from the AQIA (TiKOTECH, 2023).

7.2.7.1 Particulate (PM_{10} & $PM_{2.5}$) emissions impact on human health

Activity, nature, and consequence of impact:

Open pit mining operation (Removal of all vegetation and topsoil by graders and bulldozers, material handling with excavators and front-end loaders, stockpiling topsoil, unloading overburden as part of roll-over mining and replacing topsoil as part of rehabilitation, transporting of overburden, ore, and product, traveling with LDVs, exploration drilling, blasting and wind erosion). This causes generation of small particulate (PM_{10} and $PM_{2.5}$) air pollution. Exceedances of the NAAQS for PM_{10} and $PM_{2.5}$ over receptors within 10 km of the proposed mine. Exposure to PM_{10} and $PM_{2.5}$ can affect the human heart and lungs. Susceptible groups include the elderly, infants, persons with chronic cardiopulmonary disease, -pneumonia, -influenza and -asthma.

Cumulative impacts:

The proposed Buffelshoek Extension Mine falls within the WBPA. Air quality within the WBPA is impacted on by emissions from listed activities, residential fuel burning, mining and transboundary air pollution. Several mining-, residential, commercial, and industrial (which could have listed activities) areas were

identified within a 50 km radius of the proposed mine. The addition of the proposed Buffelshoek Extension Mine will contribute to the cumulative impact of particulate air pollution in the area. The extent of its contribution should be carefully monitored and controlled.

Assumptions, uncertainties, and gaps in knowledge:

Source parameters for the different types of mining equipment were taken from brochures for equipment of the same or similar size range. Gas exit velocities from vehicle exhaust pipes were estimated from engine information (maximum rpm, stroke, stroke length, bore diameter and exhaust tip (Ram *et al*., 2019)). Refer to the AQIA (TiKOTECH, 2023) for a full list of assumptions and limitations.

Particulate (PM10 & PM2.5) emissions impact on human health		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	3 High, considering: • Long-term exposure to ambient PM2.5 may lead to early mortality (Crouse *et al*., 2015; Dockery *et al*., 1993; Krewski *et al*., 2000; Lepeule *et al*., 2012). • Exposure to ambient PM2.5 is seen as the most significant environmental risk globally (HEI, 2020; GBD 2019 Demographics Collaborators, 2020). • South Africa's NAAQS for PM2.5 are well above those recommended by the WHO and those found harmful to human health (Brauer *et al*., 2019; Shah *et al*., 2013). • The presence of other particulate sources (i.e., mines, residences, commercial activities, and industrial areas) within a 50 km radius of the proposed mine.	
Resource replaceability	3 The proposed mine falls within an airshed priority area, the WBPA.	2 The proposed mine falls within an airshed priority area, the WBPA.
Duration	3 Permanent, considering: • A scenario where a health impact does occur (i.e., health impacts associated with fine particulate air pollution include amongst others: chronic obstructive pulmonary disease, ischemic heart disease, stroke, and acute respiratory infection in children); and	

Particulate (PM10 & PM2.5) emissions impact on human health		
	Impact pre-mitigation	**Impact post-mitigation**
	• The potential to generate PM10 and PM2.5 in exceedance of the NAAQS will remain for the duration of the mining operation and continue to some extent during rehabilitation.	
Extent or spatial scale	2 Local, considering: The atmosphere, weather and topography allow for a pathway to receptors and the bushveld and thornveld on site may act as a natural barrier for dust generated on the haul roads and from wind erosion	2 Risk remains local after management, considering: To reduce PM ground level concentrations to levels that fall within NAAQS may require more water than anticipated. Since water is a scarce resource, this risk assessment considers the impact should more water is be available
Probability	2 The impact will be highly probable without management measures.	1 The impact is less likely with management measures.
Significance	**13** **High**	**11** **Medium**

Environmental objective
To minimise the generation of particulate emissions.

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Wind erosion from exposed surfaces presents a latent risk. Wind erosion from exposed surfaces should be mitigated by proper rehabilitation and revegetation before closure. No residual/remaining impacts were identified at this stage.

7.2.7.2 Exhaust gas emissions impact on human health

Activity, nature, and consequence of impact:

Exhaust emissions from vehicles and mining equipment (NO_2, SO_2 and CO). Exceedances of the NAAQS for NO_2, SO_2 and CO over receptors within 10 km of the proposed mine. Exposure to NO_2, SO_2 and CO can affect human health. Susceptible groups include the elderly, infants, persons with chronic cardiopulmonary disease, -pneumonia, -influenza and -asthma.

Cumulative impacts:

Cumulative impacts: It is anticipated that the cumulative impact from NO_2, SO_2 and CO will be smaller than that of particulate air pollution, considering:

- The 2014 baseline characterisation of the WBPA AQMP found that the predicted NO_2 and SO_2 concentrations generally comply with their respective NAAQS;
- The SO_2 and CO ground level concentrations observed in Thabazimbi from 2020 to June 2023 fall below their respective NAAQS; and
- Of the gases simulated, only NO_2 exceeded the NAAQS, and these exceedances were made on and in proximity to the mine.

Assumptions, uncertainties, and gaps in knowledge:

Source parameters for the different types of mining equipment were taken from brochures for equipment of the same or similar size range. Gas exit velocities from vehicle exhaust pipes were estimated from engine information (maximum rpm, stroke, stroke length, bore diameter and exhaust tip (Ram *et al*., 2019)). Refer to the AQIA (TiKOTECH, 2023) for a full list of assumptions and limitations.

Exhaust gas emissions impact on human health		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	3 High, considering: • The proposed mine falls within an airshed priority area, the WBPA. • The climatic conditions (clear skies, a highly stable vertical atmosphere, low wind	1 Low Low sulphur fuel and proper operation and maintenance of vehicles and equipment.

Exhaust gas emissions impact on human health		
	Impact pre-mitigation	**Impact post-mitigation**
	speeds, frequent surface- and elevated temperature inversions and low rainfall) are unfavourable for the dispersion of air pollution, particularly in winter. • The presence of other combustion sources (i.e., vehicles, industrial activities, residential fuel burning, generators and other stationary combustion) within a 50 km radius of the proposed mine. • SO_2 and NO_2 emissions can form secondary PM2.5.	
Resource replaceability	2 The 2014 baseline characterisation of the WBPA AQMP found that the predicted NO2 and SO2 concentrations because of emission from listed activities, residential fuel burning, mining and transboundary air pollution generally comply with their respective NAAQS.	2 The SO2 and CO ground level concentrations observed in Thabazimbi from 2020 to June 2023 fall below their respective NAAQS
Duration	2 Long-term, considering: • The potential to generate criteria pollutants in exceedance of the NAAQS will remain for the duration of the mining operation and continue to some extent during rehabilitation.	
Extent or spatial scale	2 Local, considering: • The atmosphere, weather and topography allow for a pathway to receptors; and • Considering the WBPA 2015 AQMP predicted ground level concentrations of 99th percentile hourly NO_2 (10 µg/m3, Figure 4-49 in the DEA, 2014), the cumulative impact is estimated to extent to ±1 km from the mine boundary (along active mining).	
Probability	2 The impact will be highly probable/possible.	2 The impact will be highly probable/possible.
Significance	**11** **Medium**	**9** **Medium**

Environmental objective
To minimise the generation of criteria pollutants from exhaust emissions.

Stakeholder expectations and / or comments
None received.
Residual and latent risks
None identified.

7.2.7.3 Dustfall impact on human health

Activity, nature, and consequence of impact:

Open pit mining operation (Removal of all vegetation and topsoil by graders and bulldozers, material handling with excavators and front-end loaders, stockpiling of topsoil, unloading overburden as part of roll-over mining and replacing topsoil as part of rehabilitation, transporting of overburden, ore, and product, traveling with LDVs, exploration drilling, blasting and wind erosion). These activities lead to generation of dust and exceedances of the National Dust Control Regulations for non-residential areas. Dust between 500 mg/m²/day and 1 200 mg/m²/day is considered heavy and can be observed as a fine layer of dust on a surface. Dust can present a nuisance to surrounding residences (assessed at 600 mg/m²/day).

Cumulative impacts:

The proposed mine will contribute to the cumulative impact of dust from the mining and agricultural activities around the proposed mine.

Assumptions, uncertainties, and gaps in knowledge:

Source parameters for the different types of mining equipment were taken from brochures for equipment of the same or similar size range. Gas exit velocities from vehicle exhaust pipes were estimated from engine information (maximum rpm, stroke, stroke length, bore diameter and exhaust tip (Ram *et al*., 2019)). Refer to the AQIA (TiKOTECH, 2023) for a full list of assumptions and limitations.

Dustfall impact on human health		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	2 Medium, considering: • The presence of other dust sources (mining, agriculture, and traffic on unpaved roads) in the area. • The dispersion model results show the daily Dustfall rates exceed the NDCR for non-residential- (1 200 mg/m²/day) up to ±500 m outside the mine boundary (along active mining). Heavy dust (≥500 mg/g/day) up to ±700 m outside the mine boundary (along active mining). • Imerys provided that the haul roads will be approximately 500 m between pit and topsoil stockpiles. Less than was applied for the purpose of this study.	
Resource replaceability	2 The presence of other dust sources (mining, agriculture, and traffic on unpaved roads) in the area.	1 Management of dust is dependent on the availability of water.
Duration	2 Long-term, considering: The potential to generate dustfall in exceedance of the NDCRs will remain for the duration of the mining operation and continue to some extent during rehabilitation.	
Extent or spatial scale	2 Local, considering: • The atmosphere, weather and topography allow for a pathway to receptors; and • The dispersion model results show dustfall reach receptors outside the mine boundaries.	2 Risk remains local after management, considering: Management of dust is dependent on the availability of water.
Probability	2 The impact will be probable.	1 The impact will be possible.
Significance	**10** **Medium**	**7** **Low**

Environmental objective
To minimise the generation of dustfall and particulate emissions.

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Wind erosion from exposed surfaces presents a latent risk. Wind erosion from exposed surfaces should be mitigated by proper rehabilitation and revegetation before closure. No residual/remaining impacts were identified at this stage.

7.2.7.4 Criteria pollutants (NO_2 and SO_2) impact on vegetation

Activity, nature, and consequence of impact:

Exhaust emissions from vehicles and mining equipment may impact agricultural and natural areas (Waterberg Mountain Bushveld and Dwaalboom Thornveld). Generation of fuel combustion emissions, particularly NO_2 and SO_2. This may lead to exceedance of NO_2 and SO_2 critical levels for vegetation, developed by the United Nations Economic Commission for Europe (UNECE).

Cumulative impacts:

The proposed mine will contribute to the cumulative impact of criteria gas pollutants from vehicles and mobile equipment, residential fuel burning and the drying activity at Rhino Andalusite Mine.

Assumptions, uncertainties, and gaps in knowledge:

Source parameters for the different types of mining equipment were taken from brochures for equipment of the same or similar size range. Gas exit velocities from vehicle exhaust pipes were estimated from engine information (maximum rpm, stroke, stroke length, bore diameter and exhaust tip (Ram *et al.*, 2019)). Refer to the AQIA (TiKOTECH, 2023) for a full list of assumptions and limitations.

Criteria pollutants (NO_2 and SO_2) impact on vegetation		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	2 Medium, considering: • The proposed mine falls within an airshed priority area, the WBPA. • The climatic conditions (clear skies, a highly stable vertical atmosphere, low wind speeds, frequent surface- and elevated temperature inversions and low rainfall) are unfavourable for the dispersion of air pollution, particularly in winter. • The operation of a dryer listed in terms of section 21 of NEM: AQA on Rhino Andalusite Mine. • The conservation status of the Waterberg Mountain Bushveld (less threatened) and Dwaalboom Thornveld (less threatened).	1 Low Low sulphur fuel and proper operation and maintenance of vehicles and equipment.
Resource replaceability	2 The conservation status of the Waterberg Mountain Bushveld (less threatened) and Dwaalboom Thornveld (less threatened).	1 The conservation status of the Waterberg Mountain Bushveld (less threatened) and Dwaalboom Thornveld (less threatened).
Duration	2 Long-term, considering: The potential to generate criteria pollutants will remain for the duration of the mining operation and continue to some extent during rehabilitation.	
Extent or spatial scale	2 Local, considering: • The atmosphere, weather and topography allow for a pathway to receptors; and • The dispersion model results show the annual average NO_2 ground level concentrations exceed the critical level for agricultural crops up to ±300 m from the mine boundary (along active mining).	
Probability	2 The impact will be probable.	1 The impact will be possible.

Criteria pollutants (NO_2 and SO_2) impact on vegetation		
	Impact pre-mitigation	**Impact post-mitigation**
Significance	**10** **Medium**	**7** **Low**

Environmental objective
To minimise the generation of criteria pollutants from exhaust emissions.

Stakeholder expectations and / or comments
None received.
Residual and latent risks
None identified.

7.2.7.5 Dustfall impact on vegetation

Activity, nature, and consequence of impact:

Open pit mining operation (Removal of all vegetation and topsoil by graders and bulldozers, material handling with excavators and front-end loaders, stockpiling of topsoil, unloading overburden as part of roll-over mining and replacing topsoil as part of rehabilitation, transporting of overburden, ore, and product, traveling with LDVs, exploration drilling, blasting and wind erosion). These activities lead to generation of dust. Dust between 500 mg/m²/day and 1 200 mg/m²/day is considered heavy and can be observed as a fine layer of dust on a surface. Dust can disrupt vegetation growth and productivity.

Cumulative impacts:

The proposed mine will contribute to the cumulative impact of dust from the mining and agricultural activities around the proposed mine.

Assumptions, uncertainties, and gaps in knowledge:

Source parameters for the different types of mining equipment were taken from brochures for equipment of the same or similar size range. Gas exit velocities from vehicle exhaust pipes were estimated from engine information (maximum rpm, stroke, stroke length, bore diameter and exhaust tip (Ram *et al*., 2019)). Refer to the AQIA (TiKOTECH, 2023) for a full list of assumptions and limitations.

Dustfall impact on vegetation		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	2 Medium, considering: • The presence of other dust sources (mining, agriculture, and traffic on unpaved roads) in the area. • The conservation status of the Waterberg Mountain Bushveld (less threatened) and Dwaalboom Thornveld (less threatened). • The dispersion model results show the daily Dustfall rates exceed the NDCR for non-residential- (1 200 mg/m2/day) up to ±500 m outside the mine boundary (along active mining). Heavy dust (≥500 mg/g/day) up to ±700 m outside the mine boundary (along active mining). • Imerys provided that the haul roads will be approximately 500 m between pit and topsoil stockpiles. Less than was applied for the purpose of this study.	
Resource replaceability	2 The conservation status of the Waterberg Mountain Bushveld (less threatened) and Dwaalboom Thornveld (less threatened).	1 The conservation status of the Waterberg Mountain Bushveld (less threatened) and Dwaalboom Thornveld (less threatened).
Duration	2 Long-term, considering: The potential to generate slight to very high dustfall will remain for the duration of the mining operation and continue to some extent during rehabilitation.	
Extent or spatial scale	2 Local, considering: • The atmosphere, weather and topography allow for a pathway to receptors; and • The dispersion model results show dustfall over natural areas outside the mine boundaries	

Dustfall impact on vegetation		
	Impact pre-mitigation	**Impact post-mitigation**
Probability	2 The impact will be probable.	1 The impact will be possible.
Significance	**10** **Medium**	**8** **Medium**

Environmental objective
To minimise the generation of dustfall and particulate emissions.

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Wind erosion from exposed surfaces presents a latent risk. Wind erosion from exposed surfaces should be mitigated by proper rehabilitation and revegetation before closure. No residual/remaining impacts were identified at this stage.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Develop a Dustfall and fine particulate (PM10 and PM2.5) management plan in line with the National Dust Control Regulations.	All phases	Dustfall and fine particulate management plan.	Annual review of plan.	Prior to commencement.	Mine manager	Minimise
Develop a Dustfall and fine particulate monitoring programme in line with the National Dust Control Regulations.	All phases	Dustfall and fine particulate Monitoring	Annual review of programme.	Prior to commencement.	Mine manager	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
		programme.				
Dustfall and PM10 and PM2.5 monitoring along the mining operation.	All phases	Dustfall and fine particulate management plan.	Dustfall and fine particulate monitoring programme and reports.	Monthly monitoring	Mine manager	Minimise
Istores Primary School to be relocated.	Before mining phase presents a risk. If mining starts before school is relocated, continuous PM10 and PM2.5 monitoring is required at this school.	Dustfall and fine particulate management plan. Water bowser Relocation of school.	If mining starts before school is relocated, continuous PM10 and PM2.5 monitoring is required at this school. Dustfall and fine particulate monitoring programme and reports.	Before mining phase presents a risk.	Mine manager	Minimise
Dust suppression on haul roads.	All phases	Dustfall and fine particulate management plan. Water bowser	Dustfall and fine particulate monitoring programme and reports. Keep a record of water used for dust suppression.	Daily	Mine manager	Minimise
Set speed limits at ≤ 40 km/hr.	All phases	Dustfall and fine particulate management plan.	Dustfall and fine particulate monitoring programme and reports.	Daily	Mine manager	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
		Signage Agreement with contractors or part of mine policy.				
Cover product on trucks (using e.g., tarpaulin) to prevent material deposition on the surface of paved or tarred public roads.	All phases	Dustfall and fine particulate management plan. Agreement with contractors or part of mine policy.	Dustfall and fine particulate monitoring programme and reports.	Daily	Mine manager	Minimise
Carry out work in such a manner to prevent or reduce the generation of dust. Examples of good material handling practices include: • Reducing the material drop height; and • Loading and unloading material from the downwind side (leeward) of a stockpile.	All phases	Dustfall and fine particulate management plan.	Dustfall and fine particulate monitoring programme and reports.	Daily, when handling material, working on stockpiles and during rehabilitation	Mine manager	Minimise
Concurrent rehabilitation and revegetation of exposed areas.	All phases	Dustfall and fine particulate management	Dustfall and fine particulate monitoring programme and reports.	Concurrent.	Mine manager	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
		plan.				
Register Buffelshoek Extension Mine as a Mine source with the National Atmospheric Emission Inventory System (NAEIS) and report its annual mining emissions on NAEIS on or before the 31st of March of each year.	All phases	NAEIS	Keep records of annual reports for at least five years.	Report on or before the 31st of March of each year.	Mine manager	Minimise
The mitigations mentioned above should be improved on, should the dustfall, PM10, or PM2.5 monitoring results show exceedances of the relevant national standards.	All phases	Dustfall and fine particulate management plan.	Dustfall and fine particulate monitoring programme and reports. Keep records of investigations into improvements.	When dustfall, PM10, or PM2.5 monitoring results show exceedances of the relevant national standards	Mine manager	Minimise

7.2.8 Noise

Activity, nature, and consequence of impact:

The nature of the impact is noise generated from blasting activities.

Cumulative impacts:

Surrounding mines may contribute to a cumulative noise impact, however this is not deemed to be significant.

Assumptions, uncertainties, and gaps in knowledge:

Exact noise levels are unknown; however, mitigation measures will be implemented by the mine.

Noise from blasting activities		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	2 The intensity/magnitude of the noise is moderate as there are few nearby receptors.	1 With mitigation the noise impact will be low, and the cumulative impact is low.
Resource replaceability	1 The resource is not irreparably damaged.	1 The resource is not irreparably damaged.
Duration	1 Blasting does not occur for long durations.	1 Blasting does not occur for long durations.
Extent or spatial scale	1 The extent of the impact only extends in the region of the development activity footprint and local receptors.	1 The extent of the impact only extends in the region of the development activity footprint and local receptors.
Probability	3 The probability of the impact occurring will be high.	3 The probability of the impact occurring will be high with mitigation.
Significance	**8** **Medium**	**7** **Low**

Environmental objective
To ensure that noise impacts are minimised.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Safe blasting techniques to be employed and the noise level at the blasting site may not exceed 120 dBL.	Operational	Noise survey and hearing protection	Noise monitoring	Continuously throughout operation	Mine manager	Minimise
Ground vibration levels and air blast to be	Operational	Noise monitoring and	Noise monitoring	Continuously	Mine manager	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
monitored during each blast. Such information must be kept on record.		hearing protection	records	throughout operation		
Local business and residents should be informed regarding blasting times.	Operational	Public liaison officer	Noise monitoring	Continuously throughout operation	Mine manager	Minimise
Noise survey to be carried out to monitor the noise levels during blasting.	Operational	Noise survey	Noise monitoring	Continuously throughout operation	Mine manager	Minimise
Personal protective equipment (PPE) including hearing protection to be required for all employees in areas of loud noise.	Operational	Health and safety training SoP for PPE	Inspections	Continuously throughout operation	Mine manager	Minimise
Noise zones may only be entered by persons wearing adequate hearing protection.	Operational	Noise survey and hearing protection	Noise monitoring	Continuously throughout operation	Mine manager	Minimise

Stakeholder expectations and / or comments
None received.
Residual and latent risks
No residual/latent impacts foreseen.

7.2.9 Topography and visual aspects

Activity, nature, and consequence of impact:

Removal of the andalusite will lead to an open pit which will be concurrently rehabilitated as roll-over mining commences.

Cumulative impacts:

There is visible scarring from previous mining activities on the land north of the proposed mine. Please that Imerys is not responsible for these historical impacts.

Assumptions, uncertainties, and gaps in knowledge:

Information for this risk was extracted from similar EMPs.

Visual impact of pit on the topography and landscape		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	1 The proposed pit location will occur on low elevational areas and hence visual impacts are not expected to be observed from a distance. Roll over-mining will be implemented throughout the mining activity.	1 After the pit has been rehabilitated and revegetated, the visual impact will be minimised.
Resource replaceability	1 The resource is not irreparably damaged.	1 The resource is not irreparably damaged.
Duration	2 The visual and topographical impact is medium term.	2 The visual and topographical impact is medium term.
Extent or spatial scale	1 The extent of the impact only covers the development footprint and is only visible locally.	1 The extent of the impact only covers the development footprint and is only visible locally.
Probability	2 The probability of the impact occurring will be high.	1 The probability of the impact having a lasting effect after rehabilitation is minimal.
Significance	**7** **Low**	**6** **Low**

Environmental objective
To ensure that visual and topographical impacts are minimised.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Ensure that concurrent rehabilitation is practiced.	Operational	Noise survey and hearing protection	Rehabilitation plan	Continuously throughout operation	Mine manager	Rehabilitate
Ensure that roll-over areas are covered in topsoil (if available during mining activities) and revegetated as soon as possible.	Operational until closure	Inspections	Rehabilitation plan	Closure	Mine surveyor and mine manager	Rehabilitate

Stakeholder expectations and / or comments
None received.
Residual and latent risks
No residual/latent impacts foreseen aside from pre-existing scarring north of the mine.

7.2.10 Archaeological, historical and cultural aspects

7.2.10.1 Surface and subsurface impact on heritage resources due to mining development

Activity, nature, and consequence of impact:

During the development, construction and operational phases, surface and subsurface impacts take place. These activities can lead to irreparable damage or complete destruction of heritage resources if not correctly managed.

Cumulative impacts:

Based on current observation impact to LIA and historical sites, as well as burial sites might occur.

Assumptions, uncertainties, and gaps in knowledge:

Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the rehabilitation phase. Potential heritage surface indicators are therefore rather considered sites than assuming the presence of a natural feature. Due to extremely dense vegetation cover associated with the study area, a few locked gates and a large project area, the entire area could not be inspected.

Surface and subsurface impact on heritage resources due to mining development		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	2 Potential destruction of culturally significant material.	1 The proposed project can avoid and monitor the identified heritage sites and implement precautionary measures, thereby limiting/avoiding impact.
Resource replaceability	3 Damage is irreversible.	3 Resources will be completely lost.
Duration	3 The impact will not cease after the operational life of the activity ceases but will be permanent.	1 The impact will be short-lived.
Extent or spatial scale	1 The impact will be site specific.	1 The impact will be site specific.
Probability	3 The impact will definitely occur.	1 With correct management, it is unlikely that the impact will occur.
Significance	**12** **High**	**7** **Low**

Environmental objective
To ensure that heritage resources are not negatively impacted.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Heritage awareness must be included in normal site induction for all employees, contractors and visitors to the subject properties. This will ensure that the general level of heritage awareness is raised and that there is compliance with the act. The sections of the NHRA must be highlighted to each visitor, contractor and employee or any other person acting on the sites or immediate surrounds.	Development, construction, operational	General awareness	Site inspections	Inspections during Development, construction, operational	ECO	General awareness
All actions on the property will be subject to the provisions of the NHRA and any transgressions of the act will make the transgressor liable in terms of the act.	Development, construction, operational	NHRA	Site inspections	Inspections during Development, construction, operational	ECO	Prevent
The demarcated project boundary must be enforced to limit the footprint of the impact of activities outside the project area.	Development, construction, operational	General awareness	Site inspections	Inspections during Development, construction, operational	ECO	Prevent
If culturally significant material is exposed during the development and construction phases, all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).	Development, construction, operational	General awareness	Site inspections	Inspections during Development, construction, operational	ECO	Prevent

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Prior to the commencement of any work or action that will impact or effect a heritage resource, the relevant authorisation must be obtained from SAHRA.	Planning	N/A	N/A	N/A	N/A	N/A
Where there is uncertainty with regard to the status of a heritage resource, object, place or artefact, or any legislative or other policy issue the SAHRA can be contacted for clarity.	Development, construction, operational	General awareness	Site inspections	Inspections during Development, construction, operational	ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
If effective management takes place, there should not be residual impacts. No latent impacts foreseen.

Pre- and post-mitigation impacts per site:

Site No (2427CB)	**B01**		**B02**		**B04**		**B05**		**B06**	
Site Type	**Building 1947**		**Building 1963**		**Building 1980**		**Building 1980**		**Building 1947**	
Activity	**No impact to heritage resources foreseen (based on current project boundary)**									
Impact	**Pre-mitigation**	**Post-mitigation**	**Pre-mitigation**	**Post-mitigation**	**Pre-mitigation**	**Post-mitigation**	**Pre-mitigation**	**Post-mitigation**	**Pre-mitigation**	**Post-mitigation**
Intensity and magnitude	1	1	1	1	1	1	1	1	1	1
Resource	3	3	3	3	3	3	3	3	3	3

Site No (2427CB)	B01		B02		B04		B05		B06	
Site Type	Building 1947		Building 1963		Building 1980		Building 1980		Building 1947	
Activity	No impact to heritage resources foreseen (based on current project boundary)									
Impact	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation
replaceability										
Duration	2	1	2	1	2	1	2	1	2	1
Extent or spatial scale	1	1	1	1	1	1	1	1	1	1
Probability	1	1	1	1	1	1	1	1	1	1
Significance	**8 Medium**	**7 Low**	**8 Medium**	**7 Low**	**8 Medium**	**7 Low**	**8 Medium**	**7 Low**	**8 Medium**	**7 Low**

Site No (2427CB)	B07		F05		F07		F08		F09	
Site Type	Building 1947		Building foundation		Cement dam		Cement dam		Cement dam	
Activity	No impact to heritage resources foreseen (based on current project boundary)									
Impact	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation
Intensity and magnitude	1	1	2	1	1	1	1	1	1	1
Resource replaceability	3	3	2	2	1	1	1	1	1	1
Duration	2	1	2	1	2	1	2	1	2	1
Extent or spatial	1	1	1	1	1	1	1	1	1	1

Site No (2427CB)	B07		F05		F07		F08		F09	
Site Type	Building 1947		Building foundation		Cement dam		Cement dam		Cement dam	
Activity	No impact to heritage resources foreseen (based on current project boundary)									
Impact	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation
scale										
Probability	1	1	3	1	1	1	1	1	1	1
Significance	**8 Medium**	**7 Low**	**10 Medium**	**6 Low**	**6 Low**	**5 Low**	**6 Low**	**5 Low**	**6 Low**	**5 Low**

Site No (2427CB)	F10		F11		F12		F13	
Site Type	Mining marker		Mining marker		Mining marker		Mining Trenching	
Activity	No impact to heritage resources foreseen (based on current project boundary)							
Impact	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation	Pre-mitigation	Post-mitigation
Intensity and magnitude	1	1	1	1	1	1	1	1
Resource replaceability	1	1	1	1	1	1	1	1
Duration	2	1	2	1	2	1	2	1
Extent or spatial scale	1	1	1	1	1	1	1	1
Probability	1	1	1	1	1	1	1	1
Significance	**6 Low**	**5 Low**	**6 Low**	**5 Low**	**6 Low**	**5 Low**	**6 Low**	**5 Low**

Site No (2427CB)	**B03**		**B11**		**F14**		**B08 - B10, F01 - F04, F06**	
Site Type	**Hut 1963**		**Cemetery**		**Graves**		**Sensitive Area: Stone tools, grinders, stonewalling, feeding trough, ceramics, potsherds, metal remains**	
Activity	**Potential destruction of heritage resources**							
Impact	**Pre-mitigation**	**Post-mitigation**	**Pre-mitigation**	**Post-mitigation**	**Pre-mitigation**	**Post-mitigation**	**Pre-mitigation**	**Post-mitigation**
Intensity and magnitude	2	1	2	1	2	1	2	1
Resource replaceability	3	3	3	3	3	3	3	3
Duration	3	1	3	1	3	1	3	1
Extent or spatial scale	1	1	1	1	1	1	1	1
Probability	3	1	3	1	3	1	3	1
Significance	**12 High**	**7 Low**	**12 High**	**7 Low**	**12 High**	**7 Low**	**12 High**	**7 Low**

Environmental objective

To ensure that heritage resources are not negatively impacted.

Site	**Management measures to be applied**	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
B03 – Hut 1963	Avoid, destruction permit if buildings can't be avoided. Monitoring of subsurface	Construction & Development	General awareness	Site inspections	Inspection during construction, development and	ECO	Prevent

Site	Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
	material at demolished huts.				blasting		
B11 - Cemetery	Conservation buffer of 50 m, 100 m no mining, monitoring.	Construction & Development	General awareness	Site inspections	Inspection during construction, development and blasting	ECO	Prevent
F05 – Building foundation	Monitor subsurface material	Construction & Development	General awareness	Site inspections	Inspection during construction and development	ECO	Prevent
F14 - Graves	Conservation buffer of 50 m, 100 m no mining, monitoring	Construction & Development	General awareness	Site inspections	Inspection during construction, development and blasting	ECO	Prevent
B08 - B10, F01 - F04, F06: Sensitive Area: Stone tools, grinders, stonewalling, feeding trough, ceramics, potsherds, metal remains	Avoid, Conduct Phase 2 assessment if not possible to avoid	Construction & Development	General awareness	Site inspections	Inspection during construction, development and blasting	ECO	Prevent

Stakeholder expectations and / or comments
None received.
Residual and latent risks
If effective management takes place, there should not be residual impacts. No latent impacts foreseen.

7.2.10.2 Potential destruction of fossil heritage

Information for this section was extracted from the Palaeontological Impact Assessment: Desktop Study (Fourie, 2023).

Activity, nature, and consequence of impact:

The development footprint is situated on a geological layer with a high palaeontological sensitivity. The nature of the impact is the destruction of Fossil Heritage. Loss of fossil heritage will have a negative impact.

Cumulative impacts:

With Mitigation the impact will be low and the cumulative impact is low

Assumptions, uncertainties, and gaps in knowledge:

The accuracy and reliability of the report **may be** limited by the following constraints:

1. Most development areas have never been surveyed by a palaeontologist or geophysicist.
2. Variable accuracy of geological maps and associated information.
3. Poor locality information on sheet explanations for geological maps.
4. Lack of published data.
5. Lack of rocky outcrops.
6. Inaccessibility of site.
7. Insufficient data from developer and exact lay-out plan for all structures (for this report all required data/information was provided).

Destruction of fossil heritage		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	2 The intensity/magnitude of the impact is moderate as it may continue in a modified way. The loss of resources occurs but natural cultural and social processes continue, albeit in a modified manner.	1 With Mitigation the impact will be low and the cumulative impact is low.

Destruction of fossil heritage		
	Impact pre-mitigation	**Impact post-mitigation**
Resource replaceability	3 The resource is irreplaceable.	
Duration	3 In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent.	3 The expected duration of the impact is assessed as potentially permanent.
Extent or spatial scale	1 The extent of the impact only extends in the region of the development activity footprint and may include transport routes.	
Probability	3 The probability of the impact occurring will be high.	2 Impacts on palaeontological heritage during the construction and preconstruction phase could potentially occur but are regarded as having a moderate possibility.
Significance	**12** **High**	**10** **Medium**

Environmental objective
To ensure that fossil heritage is not impacted.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**
Threats to the National Heritage are earth moving equipment/machinery (for example haul trucks, front end loaders, excavators, graders, dozers) during construction, the sealing-in or destruction of the fossils by development, vehicle traffic, and	Construction	N/A	Site inspections	Continuously throughout construction	Mine manager and construction personnel	Avoid

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
human disturbance. Special care must be taken during the digging, drilling, blasting and excavating of foundations, trenches, channels and footings and removal of overburden as a desktop study could have missed fossiliferous outcrops.						
For a chance find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation. Construction workers must be informed that this is a no-go area.	Construction	N/A	Site inspections	Continuously throughout construction	Mine manager and construction personnel	Avoid
It is recommended to include the involvement of a palaeontologist for pre-construction training of the ECO or during the digging and excavation phase of the development.	Pre-construction, digging and excavation	N/A	Site inspections	Continuously throughout construction	Palaeontologist	Avoid
The ECO must visit the site after clearing, drilling, excavations and blasting and keep a photographic record.	After clearing, drilling, excavations and blasting	N/A	Photographic record	After clearing, drilling, excavations and blasting	ECO	Avoid

Stakeholder expectations and / or comments
None received.
Residual and latent risks
No residual/latent impacts foreseen.

7.2.11 Safety: Fly rock due to blasting activities

Activity, nature, and consequence of impact:

Blasting activities may lead to fly rock, which can be a risk to the safety of nearby individuals and nearby structures/equipment.

Cumulative impacts:

None anticipated.

Assumptions, uncertainties, and gaps in knowledge:

Information for this risk was extracted from similar EMPs.

The risk of fly rock harming people or structures		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	3 Severe harm could occur if no mitigation measures are put in place.	1 Little to no harm will occur if adequate mitigation measures are put in place.
Resource replaceability	3 The impact on human health is seen as potentially irreplaceable.	1 Irreparable damage is not foreseen with suitable protection and mitigation measures.
Duration	2 The impact is for the duration of the project.	2 The impact is for the duration of the project.
Extent or spatial scale	1 The extent of the potential impact covers the area surrounding the blasting site.	1 The extent of the potential impact covers the area surrounding the blasting site.
Probability	3 The probability of the impact occurring will be high without management measures.	1 The probability of the impact occurring is minimal with suitable mitigation measures.
Significance	**12** **High**	**6** **Low**

Environmental objective

To limit the chances of fly rock from blasting activities.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
All blasting activities must comply with the Explosives Act no 26 of 1956 (as amended).	Operational	Explosives Act no 26 of 1956 (as amended)	The mine must appoint a competent person to supervise the contractor	Continuously throughout operation	Mine manager	Avoid
Contractors employed for blasting need to be competent, as per the MHSA, experienced and hold the relevant permits/licenses.	Operational	Permit/license	Competent person to supervise the contractor	Continuously throughout operation	Mine manager	Avoid
Only licensed explosive suppliers may be used.	Operational	Permit/license	N/A	Continuously throughout operation	Mine manager	Avoid
Safe blasting techniques to be employed.	Operational	Blasting code of practice	Competent person to supervise the contractor	Continuously throughout operation	Mine manager	Avoid
Blasting reports need to be kept for each blasting event	Operational	Blasting reports	Blasting reports	Continuously throughout operation	Mine manager	Avoid

Stakeholder expectations and / or comments

None received.

Residual and latent risks

No residual/latent impacts foreseen.

7.2.12 Socio-economic

Activity, nature, and consequence of impact:

The proposed development will create jobs which is a socio-economic benefit. However, new mine workers in the area may lead to an increase in social pathologies (including crime or alcoholism).

Cumulative impacts:

Nearby mines or other developments may hire additional staff that may move to the community.

Assumptions, uncertainties, and gaps in knowledge:

The mine expects to employ the majority of the new employees from the nearby community.

Change in employment figures	
Intensity and magnitude	2 The mine expects to employ roughly 57 individuals as part of the mining team. The vast majority will be from the local community.
Resource replaceability	1 The increased employment figures and positive impact does not impact on a natural resource.
Duration	2 The positive impact will remain for the entire operational phase and potentially rehabilitation but will become negative at any point that operations cease.
Extent or spatial scale	2 The positive impact will spread to the local community.
Probability	3 The positive impact will occur.
Significance	**10** **Medium (Positive)**

Potential increase is social pathologies		
	Impact pre-mitigation	**Impact post-mitigation**
Intensity and magnitude	1 Instances of social pathologies are not expected to be significant.	1 Little to no harm will occur if adequate mitigation measures are put in place.
Resource replaceability	3 The impact is seen as potentially irreplaceable.	1 Irreparable damage is not foreseen with suitable protection and mitigation measures.
Duration	2 The impact is for the duration of the project.	2 The impact is for the duration of the project.
Extent or spatial scale	2 The extent of the potential impact covers the area surrounding the mine.	1 The extent of the impact is reduced with mitigation measures.
Probability	2 The probability of the impact occurring will be medium without management measures.	1 The probability of the impact occurring is minimal with suitable mitigation measures.
Significance	**10** **Medium**	**6** **Low**

Environmental objective
To limit the instances of social pathologies.

Management measures to be applied	**Phase applicable to management measure**	**Management tools**	**Monitoring programmes**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**	**Mitigation hierarchy**

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Daily alcohol level testing will take place for all mine employees using a breathalyser.	Operational until closure	Logging of employee breathalyser information & Disciplinary procedure	Daily testing	Continuously throughout operation	Mine manager	Prevent
The site will be monitored by a security guard and fenced off to prevent instances of crime.	Operational phase until closure	Training and awareness, Gate maintenance register	Gate inspections and site inspections	On-going until rehabilitation and closure	Mine manager	Prevent

7.2.13 HCS and Waste

Activity, nature, and consequence of impact:

The potential pollution of surface water, groundwater and soil due to HCS and waste.

Cumulative impacts:

Nearby mines may contribute to impacts from HCS and waste.

Assumptions, uncertainties, and gaps in knowledge:

Information for this risk was extracted from similar EMPs.

Refer to Section 7.2.2 for the soil impact assessment and sections 7.2.5 and 7.2.6 for the impact assessments on groundwater and surface water.

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Develop and maintain a Standard Operating Procedure (SoP) to contain and remediate any accidental hydrocarbon or other chemical spillages.	Operational until closure.	Spill handling procedure	Site inspections.	Continuously throughout operation.	Mine manager and site employees.	Minimise

Management measures to be applied	Phase applicable to management measure	Management tools	Monitoring programmes	Management timeframe and schedule	Responsibilities for implementation and long-term maintenance	Mitigation hierarchy
Accidental spillages must be minimised and contained, immediately when it occurs.	Operational until closure.	Spill handling procedure.	Inspections of roads.	Continuously throughout operation.	Mine manager and site employees.	Minimise
Contain spillage, excavate and dispose of soil if required. Utilisation of spill kits and/or excavation of affected soil with subsequent disposal at an accredited disposal site is crucial.	Operational until closure.	Spill handling procedure, spill kits	Site inspections.	Continuously throughout operation.	Mine manager and site employees.	Minimise
Any contaminated soil due to leakages or spillages must be removed as hazardous waste.	Operational phase until closure	Spill handling procedure, spill kits	Site inspections.	On-going until rehabilitation and closure	Mine Manager	Prevent
All HCS fluids must be contained within its properly constructed enclosures with concrete flooring. Fuel tanks should be operated such that an accidental spillage is minimised and contained	Operational until closure.	Spill handling procedure. And storage designs.	Inspections of storage areas.	Continuously throughout operation.	Mine manager.	Minimise
Solid waste must be stored on site in the approved locations and removed to a licenced site.	Operational until closure.	Waste management procedure.	As per the waste management procedure.	Continuously throughout operation.	Mine manager.	Avoid
All vehicles and machinery must be maintained and regularly serviced off-site to prevent soil pollution.	Operational phase until closure	Inspections Maintenance register.	Maintenance as per maintenance register.	On-going until rehabilitation and closure	Mine Manager	Prevent

7.3 Impact assessment on alternatives

7.3.1 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

No alternatives are applied for.

7.3.2 The possible mitigation measures that could be applied and the level of risk

Refer to Part A, Section 7.2 for all mitigation measures that could be applied and the level of risk.

7.3.3 Motivation where no alternative sites were considered

There is no alternative to the selected site and layout. The layout was chosen to limit the impact on the surrounding environment. The activities in this report are the most effective way to mine and rehabilitate the area.

7.3.4 Statement motivating the preferred site

Not applicable. No alterative considered.

7.3.5 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

Refer to Part A, Section 7.1 and 7.2 above for a 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.

7.3.6 Assessment of each identified potentially significant impact and risk

Refer to Part A, Section 7.2 above for a full description of all impacts as well as their significance. This includes potentially significant impact and risks

7.4 Summary of specialist reports

The recommendations and mitigation measures for the below reports are included underneath the impact tables in section 7.2 of this report.

Phase I Archaeological Impact Assessment:

The project area is associated with a combination of intact, damaged, dilapidated, and demolished heritage sites and cemeteries, some of which are protected by legislation. Should the recommendations made in this study be adhered to and with the approval of SAHRA, the proposed Buffelshoek Mining Project may proceed.

Desktop Palaeontological Impact Assessment:

The Desktop Study was undertaken in February 2023 in the summer in wet and hot conditions, the season and time has an influence, and the following is reported:

The Project includes one locality Option present on the Pretoria and Chuniespoort Groups:

Recommendation:

The potential impact of the development on fossil heritage is high and therefore a field survey may be necessary for this development (according to SAHRA protocol). There is no objection to the development/mining, it may be necessary to request a Phase 1 Palaeontological Impact Assessment: Field Study if fossils are found during mining.

Geohydrological Study and Impact Assessment

The specialist groundwater investigation relating to this application concluded and recommended the following:

- No substantial groundwater related impacts, quality and quantity, are foreseen during construction, operation or post-closure phases.
- Surface and groundwater monitoring should be implemented as recommended in this report.
- Monitoring should include quality and water level monitoring with bi-annual interpretation of results by a qualified and professional geohydrologist.
- Decommissioning of the facilities should entail final rehabilitation, i.e. re-shaping to enhance free drainage / surface run-off, top soiling and seeding.
- Monitoring and management of the natural surface water environment should also receive priority. Degradation of these natural systems should be avoided.
- Discharge or seepage of affected water into the natural surface water environment should be avoided.
- The management measures as recommended in this report should be used in the EMP or closure plan and conditions should apply to the environmental authorisation.

Based on the findings of the geohydrological assessment, no fatal flaws have been identified that may limit the expansion activities. It is the opinion of the specialist that the proposed project may proceed on condition that all mitigation measures as outlined and discussed in this report are adhered to.

Aquatic Ecosystem Delineation

Summary of findings:

Aquatic ecosystem classification	Riparian
PES	Crocodile River= B

<table>
<tr><td></td><td>Bierspruit= B/C</td></tr>
<tr><td>EIS</td><td>Crocodile River = High (2.3)
Bierspruit = Very High (3.1)</td></tr>
<tr><td>Recommended Ecological Management Class (EIS/REMC)</td><td>Improve & Maintain</td></tr>
<tr><td>SASS results</td><td>
<table>
<tr><th>Site</th><th>SASS score</th><th>Number of taxa</th><th>ASPT</th></tr>
<tr><td>Crocodile River</td><td>21</td><td>8</td><td>2.6</td></tr>
<tr><td>Bierspruit</td><td>62</td><td>16</td><td>3.9</td></tr>
</table>
</td></tr>
<tr><td>IHAS score</td><td>Crocodile River 82.95%
Bierspruit 77.35%</td></tr>
<tr><td>Impact assessment</td><td>None/ Low</td></tr>
<tr><td>Buffers (calculated)</td><td>113 meters for all aquatic ecosystems</td></tr>
<tr><td>Notice 509 GA or WUL score</td><td>Low Risk</td></tr>
<tr><td>Sensitivity of aquatic ecosystems</td><td>High (red)</td></tr>
<tr><td>Does the specialist support the development?</td><td>Yes - the footprint of the activities is outside the extent of the aquatic ecosystems and setbacks.</td></tr>
<tr><td>Major concerns</td><td>Separation of clean and dirty water must be designed into stormwater management.</td></tr>
<tr><td>Recommendations</td><td>Refer to Table 38 of the original specialist report</td></tr>
</table>

Air Quality Impact Assessment Report

It is TiKOTECH's opinion that the project may continue if the applicant commits to implementing the mitigation measures recommended in section 10 of the original specialist report and continually ensuring compliance to the national ambient air quality standards. Going forward, the applicant should improve on the recommended mitigation measures when and where the dustfall or particulate monitoring results show exceedances of the dustfall or particulate standards.

Storm Water Management Plan

Storm water control infrastructure within this document is design to withstand a 1:50 year flood event. In the event of runoff breaching infrastructure it is important to first ensure the safety of the people on site.

Regular inspections should be conducted on all channels, trenches, and berms to ensure function and capacity of infrastructure is maintained as well as maintenance where signs of erosion become evident. High risk erosion areas include all road and berms where surface water is concentrated into sheet flow.

No affected water from the mining areas is allowed to spill into the clean water environment. This should be ensured through design as well as operational control measures.

Erosion prevention measures (e.g. grass, cement or rock) should be in place at all concentration points on the mine. These areas specifically include high velocity trenches and drains diverting clean runoff around the quarry.

Terrestrial Vegetation Impact Assessment

The area assessed is not within a listed ecosystem and the Waterberg Mountain Bushveld and the Dwaalboom Thornveld are currently not threatened. However, the area assessed comprised mainly of natural vegetation, situated entirely within a CBA 1 and 2, and should be regarded as sensitive to vegetation clearing and mining. Furthermore, according to the Limpopo Biodiversity Assessment and Conservation Plan, mining is not a permissible land use in CBAs. The specialist is not in the position to know the development applications within CBAs in the Province and the decision to allow mining in a CBA 1 and 2 rest with the Limpopo conservation authority. In order to mitigate the loss of CBA, an offset might need to be discussed with the approving authority.

Although some operational impacts can be mitigated, the destruction of good condition vegetation in the open cast footprint cannot be mitigated. Bushveld vegetation can be restored to a functional status, however, species diversity will likely remain low.

The main long-term impact is the disruption of ecological processes and the destruction of a CBA. Fire will be suppressed around the mine, which could have an impact on the remaining vegetation structure and composition, resulting in bush densification and a loss of species diversity. The main mitigation measure to consider is to ensure that open, naturally vegetated areas remain through the cleared areas as ecological corridors, while clustering the mining activities areas as far as possible. This could assist the movement of pollinators and the continuation of ecological processes.

Vertebrate fauna (Mammals & Herpetofauna) Habitat Assessment

Important topographical features occur on or near the study site in the form of the Bierspruit, which forms the western border of the site and the Crocodile River, which forms the eastern border of the site.

The Endangered Species treat the site as part of their home ranges / territories. There is a possibility that ten mammal species with Red Data status may occur on the site. The Blasius's Peak-saddle horseshoe bat, African marsh rat, swamp musk shrew, ground pangolin, Southern African hedgehog, Cape clawless otter, leopard, serval, brown hyena and African striped weasel are included as a precautionary measure.

The South African Python and giant bullfrog occur on the study site. The Southern African python's national status has changed from Vulnerable (Branch, 1988) to regional Least Concern (Alexander, 2014), although it is currently still a ToPS-listed species (Threatened or Protected Species).

The study site falls inside the natural range of Sensitive species 1 and the Bierspruit and Crocodile Rivers have potential habitat to support a few indivualsindividuals on or near the site. There is a possibility that this species may move onto the study site, especially during floods.

The study site falls in the distribution range of Sensitive animal species 12. This species prefers rocky hillsides and rocky outcrops. There is an area of such habitat available on the site and other rupicolous habitat on nearby properties. It is possible that some individuals may occur on the study site. The development would affect this species negatively. The education of construction staff about the value of wildlife and environmental sensitivity must be properly done. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.

Education of construction and mining staff about the value of wildlife and environmental sensitivity is imperative.

The removal of invasive plants will increase the quality of habitat for mammals and herpetofauna and only plants indigenous to the area must be used for rehabilitation. That will reduce the edge effect of invasive species.

Measures will have to be taken to prevent any mining or construction of roads or any other development near the Bierspruit and Crocodile River.

The access roads to the new mining areas must be kept to a minimum and must lead directly from the existing road network to the property. This will minimise habitat destruction and dust pollution.

If the development should go ahead, a very important indirect effect would be the likely impact that the proposed development might have on the water quality of the Bierspruit and Crocodile River due to the wastewater and surface water runoff. This could have a negative impact on both mammals and herpetofauna.

Most of the surrounding properties are used for game farming and with the exception of the R510 tar road south of the site, connectivity is good. However, game fences inhibit large mammal movement. Real opportunities for migration exist along the Bierspruit and Crocodile River.

Animal species sensitivity is given as High by the screening tool for Buffelshoek Mine. After the site visit, the impression is that the animal species sensitivity for mammals and herpetofauna is rather Medium. The nearby game reserves and game farms have probably inflated the estimate of animal species sensitivity. The Terrestrial Biodiversity is regarded as Very High by the screening tool. After the site visit, the impression is that the Terrestrial Biodiversity for mammals and herpetofauna is rather High. The Aquatic Biodiversity is regarded as Very High by the screening tool, and this impression is the same (Very High) after the site visit.

Therefore, from a mammal and herpetological perspective, there is no objection against the proposed development if the mitigation measures are adhered to and no development occurs near the Bierspruit and Crocodile River.

Avifaunal Assessment

The only sensitive topographical feature is the river and riparian vegetation habitat system that, apart from biodiversity richness, form and important movement corridor for many species.

Species richness: Only the more common woodland avifaunal species are likely to occur within the study area and in general the species richness is high.

Endangered species: The habitat systems on the study site will not favour any of the threatened avifaunal species recorded for the 2427CB q.d.g.c. due a lack of suitable and optimal habitat. These species are only likely to move through the area on rare occasions.

If the development should go ahead, a very important indirect effect would be the likely impact that the proposed development might have on the water quality of the drainage line due to surface water runoff.

The development will have a negative impact on the conservation of the general biodiversity and the maintaining of ecological functioning in the long term.

Connectivity: The connectivity on and around the study site itself is high all around the entire study area.

Management recommendation: The River and riparian area and its buffers must not be negatively affected by any development and must be improved by clearing of alien vegetation and prevention of pollution in general.

General: There is no objection against the development from an avifaunal perspective.

Bat Environmental Impact Assessment

The identification of eight species of bats in the area indicates the ecological system is functional and the ecological services of the study site is intact. An average of 300 “hits” was made by the echolocator per hour indicating a large population. Most common was *Tadarida aegyptiaca* possibly due to its ability to inhabit human structures.

The proposed activity of roll over mining includes the destruction of natural habitat such as foraging areas of insectivorous bats. However, since there will be infrastructure development such as erecting buildings with artificial light sources, the impact of the proposed mining activity is expected to be mitigated because of the activity itself. Artificial lights at night should create foraging areas and likely favour species such as Neoromicia capensis which has been shown to increase moth consumption under artificial lights. The impact assessment of the site was calculated to Low “The project can be authorised in respect of the impact in question”.

The mitigation of the foreseen impacts to bats roosting inside the buildings can be managed to a certain extent using bat boxes on site to prevent bats from habituating buildings. It is suggested to implement a monitoring plan to determine how the population is affected.

7.5 Environmental impact statement

7.5.1 Summary of the key findings of the environmental impact assessment

Phase I Archaeological Impact Assessment:

The demarcated Sensitive Area consists of various sites (B08 – B10, F01 – F04, F06) that include MSA tools, LIA material, historic and contemporary infrastructure. It is therefore recommended that the demarcated area be avoided by the proposed mining development. It should also be noted that due to the dilapidated state of the sites and consequential poor visibility, the sites might exceed the indicated boundary and care should therefore be exercised when developing in the general vicinity of the boundary. Should impact to the demarcated sensitive area be unavoidable, a Phase 2 AIA must be conducted. The Phase 2 AIA should map the sensitive area in detail and should include test pit excavations. A surface collection of the stone age material should also be conducted in the event of a Phase 2 AIA.

Site B03 used to be associated with huts exceeding 60 years of age. The huts, however, were demolished and new buildings potentially exceeding 60 years of age were constructed. These buildings were demolished as well and only two remain intact. Since the two intact buildings are likely to exceed 60 years of age, these buildings are protected by the NHRA. Should the need exist to demolish these buildings, a destruction permit will be required from the Provincial Heritage Resources Authority. Also, the area where the huts were located should be considered to be potentially sensitive

since significant subsurface cultural material might be unearthed during the proposed development. Care should therefore be exercised when developing within the demarcated boundary.

Cemetery B11 is significant and sensitive from a heritage perspective and is likely to be impacted by the proposed mining development. Site F14 consists of three graves located approximately 27 m south of the demarcated study area and 84 m south of the proposed impact area. It is likely that some of the graves exceed 60 years of age. Therefore, the Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925), as well as the NHRA apply. It is recommended that no blasting takes place within 100 m of the cemetery and graves. Since the site appears not to be in use anymore and in order to prevent accidental damage to the graves, a fenced-off conservation buffer of 50 m must be established and maintained for effective in-situ preservation of the graves. The proposed fence infrastructure, which should be at least 1.8 m high, must include a gate to allow access by the family of the deceased individuals. A distance of at least 2 m must be maintained between the graves and fence. Should relocation of the graves be considered in the future, a full 60 days consultation process as stipulated in the NHRA Regulations of 2000 must be implemented to identify the family of the deceased individuals who must then be consulted to give consent for the relocation. Also, the ECO should monitor the condition of the cemetery on a quarterly basis and before and after blasting. Should any damage as a result of the proposed mining activities be observed, a qualified archaeologist must be contacted as soon as possible.

Since archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority must be contacted (NHRA section 36 (6)).

From a heritage point of view, development may proceed on the demarcated area, subject to the abovementioned conditions, recommendations, and approval by SAHRA.

Desktop Palaeontological Impact Assessment

The potential impact of the development on fossil heritage is high and therefore a field survey may be necessary for this development (according to SAHRA protocol). There is no objection to the development/mining, it may be necessary to request a Phase 1 Palaeontological Impact Assessment: Field Study if fossils are found during mining.

Geohydrological Study and Impact Assessment

Based on the geochemical assessments conducted, the risk of contaminated migration to reach unacceptable levels are very low. For this reason, instead of using a source concentration for TDS or any other conservative tracer, a 100% initial concentration was assigned.

As stated before, because the excavated pit will not intersect the groundwater table, no groundwater quantity impact is expected.

At some time after closure, a contamination plume is expected to develop that may seep to groundwater and migrate with the groundwater flow. Plume migrations from the backfilled pit were modelled and exported after various post-closure timesteps. The figures show that plume migration continues to move with groundwater flow towards the Bierspruit, but the plume will not reach it within the modelled timeframe. Based on the geochemical results, the constituent levels will in any effect be too low to result in any significant impact. In addition to this, no sensitive groundwater receptor is located within this migration pathway.

The specialist groundwater investigation relating to this application concluded and recommended the following:

- No substantial groundwater related impacts, quality and quantity, are foreseen during construction, operation or post-closure phases.
- Surface and groundwater monitoring should be implemented as recommended in this report.
- Monitoring should include quality and water level monitoring with bi-annual interpretation of results by a qualified and professional geohydrologist.
- Decommissioning of the facilities should entail final rehabilitation, i.e. re-shaping to enhance free drainage / surface run-off, top soiling and seeding.
- Monitoring and management of the natural surface water environment should also receive priority. Degradation of these natural systems should be avoided.
- Discharge or seepage of affected water into the natural surface water environment should be avoided.
- The management measures as recommended in this report should be used in the EMP or closure plan and conditions should apply to the environmental authorisation.

Based on the findings of the geohydrological assessment, no fatal flaws have been identified that may limit the expansion activities. It is the opinion of the specialist that the proposed project may proceed on condition that all mitigation measures as outlined and discussed in this report are adhered to.

Aquatic Ecosystem Delineation

The proposed mining footprint will be outside the aquatic ecosystems. Two riparian systems, the Crocodile River and Bierspruit systems, are located to the east and west of the site. These systems are in varying conditions with most of the systems scoring a PES of B/C. The EIS of the systems is also between 2.3 and 3.2. This indicates the aquatic ecosystems of the site to be in good condition with various ecological services.

The proposed activity includes the open cast mining of andalusite. The main impacts of the proposed activity will be removal /stripping of the topsoil layer, stockpiling of topsoil and deposition of overburden into the pit as part of roll-over mining, and re-vegetation of disturbed areas. The impact assessment of the site was calculated to Low. The ecological risk was calculated to "Low ecological risk".

The mitigation of the foreseen impacts to the aquatic ecosystem can be managed to a certain extent using buffers on site. A calculated buffer of 113 meters is recommended. It is also recommended that a systematic rehabilitation plan to mitigate the impact of the construction phase is compiled. The efficiency of the rehabilitation plan must be measured using a monitoring plan for the development. It is recommended that a comprehensive aquatic ecosystem rehabilitation plan for the development must be compiled to ensure the functionality of the system remains post development.

Air Quality Impact Assessment Report

The key outcomes of the air quality impact assessment are that the proposed mine presents:

- A high health risk associated with fine Particulate Matter (PM10 and PM2.5) without mitigation and medium risk with mitigation.
- A medium health risk, associated with Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2) and Carbon monoxide (CO), with and without mitigation.
- A medium risk from dustfall without mitigation and low risk with mitigation.
- A medium risk to agriculture from NO_2 without mitigation and low risk with mitigation.
- A medium risk from dustfall on vegetation, with and without mitigation.

It is TiKOTECH's opinion that the project may continue if the applicant commits to implementing the mitigation measures recommended in section 10 of the original specialist report and continually ensuring compliance to the national ambient air quality standards. Going forward, the applicant should improve on the recommended mitigation measures when and where the dustfall or particulate monitoring results show exceedances of the dustfall or particulate standards.

Storm Water Management Plan

A risk assessment is conducted for the storm water management of the site, to quantify the potential impacts that can be expected as a result of surface water runoff. Significant risks should be prioritised for implementation, inspections and maintenance.

Aspects that may have a potential significant impact on the environment is listed below. The significance of the potential environmental impact of each of these listed aspects is quantified using the matrix in Table 7 of the original specialist report and is conducted for both the preferred as well as the alternative activities.

Aspects with potential significant environmental impacts include:

- Flooding:
    - Quarry
    - Infrastructure

- Erosion and siltation:
    - Upstream diversion trenches and defined channels
    - Topsoil stockpiles
    - Downstream water environment

Terrestrial Vegetation Impact Assessment

The proposed area assessed is about 475 ha in extent. According to the Limpopo Biodiversity Assessment and Conservation Plan, the site is entirely within a CBA1. The assessment found that most of the vegetation was in a natural to seminatural state, although some degradation was noted (e.g., encroachment by *Dichrostachys cinerea* (sickle-bush), compacted and sparsely vegetated areas and modified land). The mine proposes to commence mining around the existing test pit in the western extent of the site, gradually expand eastward through the CBA1.

On 8 September 2023, the specialist received a proposed layout and areas to be impacted on as depicted in Addendum 1B. The proposed disturbance footprint, as received from the EAP (BECS Environmental (Pty) Ltd), totals 144.63 ha, excluding areas where edge effects can take place.

Table 49 indicates that the mine will destroy and/or indirectly impact on about 0.005% of the Limpopo CBA1's. Although the area is small, it will impact on the functionality of the CBAs and at best reduce it to an Ecological Support Area. The cumulative effect of small impacts in CBAs will inevitably impact on the conservation targets of the province.

Table 49: Extent of Limpopo CBAs that will be impacted on

Conservation category	Area (ha)	Area of site in CBA1 (ha)	% of the provinces CBA1
CBA1	2,903,477.92	144.63	0,005%

Although some operational impacts can be mitigated, the destruction of good condition vegetation in the open cast footprint cannot be mitigated. Bushveld vegetation can be restored to a functional status; however, species diversity will likely remain low.

The main long-term impact is the disruption of ecological processes and the destruction of a CBA. Fire will be suppressed around the mine, which could have an impact on the remaining vegetation structure and composition, resulting in bush densification and a loss of species diversity. The main mitigation measure to consider is to ensure that open, naturally vegetated areas remain through the cleared areas as ecological corridors, while clustering the mining activities areas as far as possible. This could assist the movement of pollinators and the continuation of ecological processes.

Vertebrate fauna (Mammals & Herpetofauna) Habitat Assessment

The Endangered Species treat the site as part of their home ranges / territories. There is a possibility that ten mammal species with Red Data status may occur on the site.

The South African Python and giant bullfrog occur on the study site. The Southern African python's national status has changed from Vulnerable (Branch, 1988) to regional Least Concern (Alexander, 2014), although it is currently still a TOPS-listed species.

The study site falls inside the natural range of Sensitive species 1 and the Bierspruit and Crocodile Rivers have potential habitat to support a few individuals on or near the site. There is a possibility that this species may move onto the study site, especially during floods.

The study site falls in the distribution range of Sensitive animal species 12. This species prefers rocky hillsides and rocky outcrops. There is an area of such habitat available on the site and other rupicolous habitat on nearby properties. It is possible that some individuals may occur on the study site. The development would affect this species negatively.

If the development should go ahead, a very important indirect effect would be the likely impact that the proposed development might have on the water quality of the Bierspruit and Crocodile River due to the wastewater and surface water runoff. This could have a negative impact on both mammals and herpetofauna.

Animal species sensitivity is given as High by the screening tool for Buffelshoek Mine. After the site visit, the impression is that the animal species sensitivity for mammals and herpetofauna is rather

Medium. The nearby game reserves and game farms have probably inflated the estimate of animal species sensitivity. The Terrestrial Biodiversity is regarded as Very High by the screening tool. After the site visit, the impression is that the Terrestrial Biodiversity for mammals and herpetofauna is rather High. The Aquatic Biodiversity is regarded as Very High by the screening tool, and this impression is the same (Very High) after the site visit.

Avifaunal Assessment

Species richness: Only the more common woodland avifaunal species are likely to occur within the study area and in general the species richness is high.

Endangered species: The habitat systems on the study site will not favour any of the threatened avifaunal species recorded for the 2427CB q.d.g.c. due a lack of suitable and optimal habitat. These species are only likely to move through the area on rare occasions.

Sensitive species and/or areas (Conservation ranking): The study site falls inside the Dwaalboom Thornveld (SVcb 1) and Waterberg Mountain Bushveld, which has a least threatened conservation status.

Habitat(s) quality and extent: The majority of the vegetation on site consists of natural bushveld and thornveld habitat that will favour a variety of woodland bird. In areas where the vegetation has been disturbed by past human activities, dense bush encroachment has occurred.

Impact on species richness and conservation: The mining areas and the edge effect thereof have already had a significant negative and lasting effect on sensitive avifaunal species and as a result have created low species richness and species of conservation concern. Further development would involve enlarging the current human footprint, which will also result in more human related disturbances and transformation of areas that has already been disturbed and transformed. The development will have a permanent footprint.

Bat Environmental Impact Assessment

The proposed activity of roll over mining includes the destruction of natural habitat such as foraging areas of insectivorous bats. However, since there will be infrastructure development such as erecting buildings with artificial light sources, the impact of the proposed mining activity is expected to be mitigated because of the activity itself. Artificial lights at night should create foraging areas and likely favour species such as Neoromicia capensis which has been shown to increase moth consumption under artificial lights. The impact assessment of the site was calculated to Low “The project can be authorised in respect of the impact in question”.

7.5.2 Final Site Map

Refer to Addendum 1 for all the maps.

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

Due to the type of activity, there are no alternatives.

SECTION 8: CONCLUSION

8.1 Proposed impact management objectives and the impact management outcomes for inclusion in the environmental management programme

Refer to Part A, Section 7.2 for all Proposed impact management objectives and the impact management outcomes for inclusion in the EIA/EMP Part B.

8.2 Final proposed alternatives

There are no alternatives.

8.3 Aspects for inclusion as conditions of Authorisation

All management measures set out in this EIA/EMP must be complied to. The mine must further comply with any conditions set out under other authorisations such as the IWULA that is currently underway. All necessary permitting and authorisations must be obtained prior to the commencement of any construction activities.

8.4 Description of any assumptions, uncertainties, and gaps in knowledge

Various specialist studies were conducted as part of the application. All impact assessments and management measures are based on either the new specialist studies conducted, previous studies or on acceptable general standards.

The following assumptions were given in the specialist studies:

Phase 1 Archaeological Impact Assessment

The majority of the study area is associated with impenetrable vegetation that prohibited free movement and visibility. Investigation was therefore limited to clearings, areas associated with sparser vegetation and roads. The south-western section of the demarcated study area on the southern side of the R510 secondary road, as well as the south-eastern corner of the study area, could not be accessed due to locked gates. These areas, however, do not fall within the proposed impact area.

Desktop Palaeontological Impact Assessment

The accuracy and reliability of the report may be limited by the following constraints:

1. Most development areas have never been surveyed by a palaeontologist or geophysicist.
2. Variable accuracy of geological maps and associated information.
3. Poor locality information on sheet explanations for geological maps.
4. Lack of published data.
5. Lack of rocky outcrops.
6. Inaccessibility of site – no site visit was done.

7. Insufficient data from developer and exact lay-out plan for all structures - sufficient.

Geohydrological Study and Impact Assessment

The numerical groundwater model, despite all efforts and advances in software and algorithms, remains a very simplified representation of the very complex and heterogeneous interacting aquifer systems underlying the study area. The integrity of a numerical model depends strongly on the formulation of a sound conceptual model and the quality and quantity (distribution, length of records etc.) of input data. Nonetheless, a numerical model can be used successfully to assess the effectiveness of various management and remediation options/techniques, especially if the shortcomings in information and assumptions made in the construction and calibration of the model are clearly listed and kept in mind during modelling.

Aquatic Ecosystem Delineation

To determine the riparian or wetland boundary, indicators (as discussed above) are used. If these are not present during the site visit, it can be assumed that they were dormant or absent and thus if any further indicators are found during any future phases of the project, the author cannot be held responsible due to the indicator's variability. Even though every care was taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time, and budget. Discussions and proposed mitigations are to some extent made on reasonable and informed assumptions built on bona fide information sources, as well as deductive reasoning. No biomonitoring or physical chemical aspects of water found on the study were done. The safety of the delineator is of priority and thus in areas deemed, as unsafe limited time was spent.
If the location of the study site is on and near underlying granitic geology the possible presence of cryptic wetlands must be investigated by a suitably qualified soil scientist with field experience.

Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions and migrations. Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage.

As aquatic systems are directly linked to the frequency and quantity of rain it will influence the systems drastically. If during dry months or dry seasons studies are done, the accuracy of the report's findings could be affected.

Limnology can thus not accept responsibility for conclusions and mitigation measures made in good faith based on own databases or on the information provided at the time of the directive. This report should therefore be viewed and acted upon with these limitations in mind.

Air Quality Impact Assessment Report

The following assumptions and limitations have a bearing on the air quality impact assessment:

- Source parameters for the different types of mining equipment were taken from brochures for equipment of the same or similar size range.
- Gas exit velocities from vehicle exhaust pipes were estimated from engine information (maximum rpm, stroke, stroke length, bore diameter and exhaust tip (Ram *et al*., 2019)).
- The exit gas temperature of an engine is linked to the total load on the engine (Teja *et al*., 2016). The gas exit temperature from vehicle exhausts was based on an average of full load and no-load temperature ranges for diesel-cycle engines (Shaik & Yuvarajan, 2023; Lietti, & Castoldi, 2018).
- There was no emission factor for Particulate Matter 2.5 (PM2.5) from drilling. As a conservative measure the PM2.5 from this activity was assumed equivalent to Particulate Matter 10 (PM10).
- There was no emission factor for PM2.5 from unloading of material by Articulated Dump Trucks (ADTs). PM2.5 for this activity was estimated based on the particle size multiplier equation in the United States Environmental Protection Agency (US EPA) AP42 13.2.4 Aggregate and Storage Piles.
- There was no emission factor for PM2.5 from wind erosion. PM2.5 for this activity was estimated based on the particle size multiplier equation in the US EPA AP42 13.2.4 Aggregate and Storage Piles. The same emission factor for wind erosion was applied to both active and inactive stockpiles.
- There was no emission factor for PM2.5 from LDVs on unpaved roads. PM2.5 for this activity was estimated based on PM2.5/PM10 from emission factors determined for HDVs on unpaved roads.
- There was no site-specific silt- or moisture content available for the material removed during site clearance.
- Default values for silt and moisture were taken from the NPi EETM for Mining V3.1 (2012).
- There was no site-specific haul road surface silt content available. The surface silt content was based on an average of the silt contents for stone quarrying and processing and Taconite mining and processing taken from Table 13.2.2-1 taken from the US EPA AP42 13.2.2 Unpaved Roads.
- There was no site-specific paved road silt loading available. The silt loading applied is based on that for public paved roads with <500 vehicles per day taken from the US EPA AP42 13.2.1 Paved Roads.
- The emissions were estimated on emission factors with ratings from C to U.
- The NPi Sulphur dioxide (SO2) emission factors for industrial vehicles are based on a 10 ppm maximum sulphur content in diesel. In South Africa diesel is sold at standard grade (500 ppm) and ultra-low diesel (10 ppm).

- The SO2 emission factor for LDVs was based on 2000 g/L.
- The estimated Oxides of Nitrogen (NOx) exhaust emissions were converted to Nitrogen dioxide (NO2) using the ratio (0.8) (DEA, 2014).
- The secondary PM2.5 exhaust emissions were estimated using the SO2 offset ratio (40) and the NO2 offset ratio (150).
- Blasting was not included in the model, it was however, included in the emission inventory and considered in the risk assessment.
- There was no site-specific meteorological data available. The dispersion model used pre-processed WRF-MMIF meteorological data (2020 to 2022).
- To reduce model complexity the site clearance, excavation and loading and unloading sources were simulated from fixed points within the approximate centre of the active areas.

Storm Water Management Plan

Calculations assume uniform rainfall intensities throughout the duration of the storm over the entire catchment areas assessed. Storm water control recommendations are based on industry experience and best practice. Designs are based on capacity sizing and should be used as a guide in the preparation of the site. Contour elevation data used during the assessment is received from the Surveyor-general and the data is assumed to be accurate. This storm water management plan does not distinguish between existing or proposed measures and should be viewed as an operation document for the complete management of all storm water requirements.

Terrestrial Vegetation Impact Assessment

Vegetation studies should be conducted during the growing season of all plant species that may potentially occur. This may require more than one season's survey with two visits undertaken preferably during November and February. This report relied on a site visit undertaken on the 15th of February 2023. However, good rains preceded the site visit and most plants had flowers or seeds that assisted plant identification. Good rains resulted in lush growth and smaller plants could have been obscured by a tall and dense grass layer. However, this assessment focussed on suitable habitat for species of conservation concern and this limitation was not regarded as challenging to this report. Comprehensive vegetation assessments and plant species assessments (search for species of conservation concern) were not undertaken. Although no plant species of conservation concern were recorded in walked transects around proposed activities footprint, this does not mean that the species are absent. Due to numerous recent leopard sightings (Pers comm, Ms Thato Moropa of Rhino Mines), the mountainous areas is likely under sampled as sampling plots remained close to the vehicle. Rain fell during the site visit. The cloudy conditions could influence the accuracy of coordinates. Other than proposing to start mining around an existing test pit on the site, no other layout plans were available for the proposed mining.

Vertebrate fauna (Mammals & Herpetofauna) Habitat Assessment

Limnology Biodiversity and Aquatic Specialists are committed to the conservation of biodiversity but concomitantly recognise the need for economic development. Even though we appreciate the opportunity to learn through the processes of constructive criticism and debate, we reserve the right to form and hold our own opinions and therefore will not willingly submit to the interest of other parties or change statements to appease them.

Even though every care is taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time and budget. To some extent, conclusions are drawn and proposed mitigation measures suggested based on reasonable and informed assumptions based on bone fide information sources, as well as deductive reasoning. Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions and migrations. Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage. Limnology Biodiversity and Aquatic Specialists can therefore not accept responsibility for conclusions drawn and mitigation measures suggested in good faith based on own databases or on the information provided at the time of the directive. This report should therefore be viewed and acted upon with these limitations in mind.

Avifaunal Assessment

The author has appropriate training and registration, as well as extensive practical experience and access to wide-ranging data bases to consider the derived species lists with high limits of accuracy. In this instance the biodiversity of all Alignments has to a greater or lesser extent been jeopardized, which renders the need for field surveys unnecessary. In instances where uncertainty exists regarding the presence of a species it is listed as a potential occupant, which renders the suggested mitigation measures and conclusions more robust.

Even though every care is taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time and budget. Discussions and proposed mitigations are to some extent made on reasonable and informed assumptions built on bone fide information sources, as well as deductive reasoning. Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions and migrations. Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage. Limnology can thus not accept responsibility for conclusions and mitigation measures made in good faith based on own databases or on the information provided at the time of the directive. This report should therefore be viewed and acted upon with these limitations in mind.

The on-site bird survey was done outside the main breeding season of most species and during the time when all Palaearctic and intra-African migrants had already migrating to the north. This, however, will not have an effect on recording Red Data species, since most Red Data species are resident to South Africa and the few Red Data species that are Palaearctic migrants are mainly threatened in their northern hemisphere distribution ranges.

The site surveys was done during several hours in one day and not on a regular basis during several season over a period of time thus the avifaunal biodiversity could change slightly as more species are confirmed from the various habitat system within the study area. The time of the day and weather condition also as has an effect on the number of species recorded in the study area during the site visit.

The general assessment of species rests mainly on the 1987 atlas for birds of the then-Transvaal (Tarboton *et al*. 1987), the 1997 SABAP1 atlas data (Harrison *et al.* 1997) and the current data for the SABAP2 period for comparison, so any limitations in either of those studies will by implication also affect this survey and conclusions.

The general assessment of species rests mainly on the 1997 SABAP1 atlas data (Harrison et al. 1997) for comparison with the current SABAP2 atlas, so any limitations in either of those studies will by implication also affect this survey and conclusions.

Furthermore the number of atlas cards received and the diversity of habitat systems surveyed for avifaunal species within a q.d.g.c. or pentad or lack thereof could also have an effect on avifaunal diversity that could potentially occur on the study site.

Bat Environmental Impact Assessment

To determine the riparian or wetland boundary, indicators (as discussed above) are used. If these are not present during the site visit, it can be assumed that they were dormant or absent and thus if any further indicators are found during any future phases of the project, the author cannot be held responsible due to the indicator's variability. Even though every care was taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time, and budget. Discussions and proposed mitigations are to some extent made on reasonable and informed assumptions built on bona fide information sources, as well as deductive reasoning. No biomonitoring or physical chemical aspects of water found on the study were done. The safety of the delineator is of priority and thus in areas deemed, as unsafe limited time was spent.

If the location of the study site is on and near underlying granitic geology the possible presence of cryptic wetlands must be investigated by a suitably qualified soil scientist with field experience.

Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions and migrations. Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage.

As aquatic systems are directly linked to the frequency and quantity of rain it will influence the systems drastically. If during dry months or dry seasons studies are done, the accuracy of the report's findings could be affected.

Limnology can thus not accept responsibility for conclusions and mitigation measures made in good faith based on own databases or on the information provided at the time of the directive. This report should therefore be viewed and acted upon with these limitations in mind.

8.5 Reasoned opinion as to whether the proposed activity should or should not be authorised

8.5.1 Reasons why the activity should be authorised or not

The proposed activity should be authorised as it will contribute largely to the production of Andalusite which is a refractory mineral that can contribute largely to South Africa's GDP as South Africa has one of the highest Andalusite reserves in the world. The site layout has been developed considering the various sensitivities of the receiving environment in terms of ecology, vegetation, the protection of heritage resources, and implementation of buffer zones for the protection of the riparian areas of the two major rivers on either side of the site. The project will also ensure that locals are involved and will create opportunities for skill transfer between the mine and locals.

8.5.2 Conditions that must be included in the authorisation

The mine must update the water monitoring requirements as soon as DWS has issued an IWUL. The mine must further comply with any conditions set out under other authorisations such as the IWULA that is currently underway.

8.6 Period for which the Environmental Authorisation is required

The authorisation will be required for the duration of the Mining Right (until 16th April 2044).

8.7 Undertaking

The undertaking required to meet the requirements of this section is provided at the end of the EMP and is applicable to both the EIA report and the EMP.

8.8 Financial Provision

8.8.1 Annual forecasted financial provision calculation

The financial provision calculation below was based on the Buffelshoek Closure Liability Report 2022 (Shangoni Management Services (Pty) Ltd, 2022). Shangoni is also updating the financial provision report for 2023. This will be submitted once finalised.

Table 50: Financial provision calculations for 2022 (Shangoni Management Services (Pty) Ltd, 2022)

Description	**Unit**	**A**	**B**	**C**	**D**	**E=A*B*C*D**
		Quantity	**Master Rate**	**Multiplication factor**	**Weighting factor 1**	**Amount (Rands)**
Rehabilitation of access roads	m²	1,760	R45.92	1	1	R80,826.24
Opencast rehabilitation including final voids and ramps	ha	1.25	R261,207.96	1	1	R326,509.95
General surface rehabilitation	ha	1.3	R142,084.16	1	1	R184,709.41
2 to 3 years of maintenance and aftercare	ha	1.3	R18,908.54	1	1	R24,581.10
Sub-total 1						**R616,626.70**
Preliminary and General						**R73,995.20**
Contingencies						**R61,662.67**
Total (Excl. VAT)						**R752,284.57**

8.8.2 Confirmation of the amount that will be provided should the right be granted

Please note that the right has been granted. The Mining Right commenced on the 17th of April 2014 and is valid until the 16th of April 2044. Refer to Section 8.8 above for the amount that will be provided extracted from the Buffelshoek Closure Liability Report 2022 (Shangoni Management Services (Pty) Ltd, 2022). Shangoni is also updating the financial provision report for 2023. This will be submitted once finalised.

8.8.3 Method of providing financial provision contemplated in regulation 53

This amount will be provided using a bank guarantee.

8.8.4 Capacity to manage and rehabilitate the environment

This will form part of the financial provision.

8.9 Deviations from the approved scoping report and plan of study

There have been no deviations to the methodology used in determining the significance of potential environmental impacts and risks.

8.10 Other Information required by the competent Authority

8.10.1 Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998)

8.10.1.1 Impact on the socio-economic conditions of any directly affected person

Refer to Part A, Section 7.2 above.

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

Refer to Part A, Section 7.2 above.

8.11 Other matters required in terms of sections 24(4)(a) and (b) of the Act

24 (4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment-	
(a) must ensure, with respect to every application for an EA-	
i. Coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;	DMRE is the only applicable authority for the proposed EA and thus the only organ of state. DWS is, however the competent authority for the IWULA. All other organs of state and stakeholders will receive the EIA/EMP as for review.
ii. That the findings and recommendations flowing from an investigation, the general objectives of integrated environmental management laid down in this Act and the	All the findings from investigations have been included in this EIA/EMP.

principles of environmental management set out in section 2 are taken into account in any decision made by an organ of state in relation to any proposed policy, programme, process, plan or project;	
iii. That a description of the environment likely to be significantly affected by the proposed activity is contained in such application;	Environmental baseline information, based on specialist studies, has been included in this EIA/EMP.
iv. Investigation of the potential consequences for or impacts on the environment of the activity and assessment of the significance of those potential consequences or impacts; and	Investigation of impact on the environment and assessment of the significance of the potential impacts have been done by specialists. Refer to Part A, Section 7.2 above.
v. Public information and participation procedures which provide all I&APs, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures; and	Refer to Part A, Section 5 for the PPP.
(b) must include, with respect to every application for an EA and where applicable-	
i. Investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;	Investigation of impact on the environment and assessment of the significance of the potential impacts have been done by specialists. Refer to Part A, Section 7.2 above.
ii. Investigation of mitigation measures to keep adverse consequences or impacts to a minimum;	Investigation of mitigation measures were done by the specialists.
iii. Investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act;	A Phase I Archaeological Impact Assessment was conducted for the site (Coetzee, 2023). Some of the areas within the demarcated study area are significant from a heritage perspective. These sites are listed in PART A, Section 6.13 above. A full impact assessment has done with mitigation measures in order to prevent any disturbance to the heritage sites. Refer to PART A, section 7.2.10 for this. Further, it is not envisaged that any permits will need to be applied for as the mine does not intend to demolish any heritage sites.
iv. Reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;	All gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information is included in PART A, section 8.4 above.

v. Investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation;	A monitoring plan is included in the EIA/EMP.
vi. Consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3); and	Environmental attributes identified were taken into consideration during the process.
vii. Provision for the adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question.	Refer to Part A, Section 2 for adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SECTION 1: DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

1.1 Determination of closure objectives

1.1.1 End land use

Rehabilitation of disturbed landforms is an integral part of the closure process. In order to achieve closure objectives, it is vital for rehabilitation to commence as soon as possible during the life of the mine. Rehabilitation at Buffelshoek Mine will be implemented on a progressive basis as mining advances (in the form of roll-over mining), in order to minimise the long-term impact and to prevent prolonged maintenance after closure.

The end land-use has been identified as grazing and game farming. Water accumulating within the final void will be utilised and optimised to compliment the end land-use. Sloping should be at a safe angle for cattle and other animals to graze on site and provide easy access to the water. Sloping should allow for free drainage and prevent siltation of the water resources. If exotic species are introduced, they can be managed through a land management plan and the biodiversity action plan.

1.1.2 Residual impacts

If adequate concurrent rehabilitation takes place, soil and geology will be replaced, thereby reinstating the current land capability and land use. The visual impacts will also be mitigated, and surface water flow in the form of drainage lines will be normal. Once mining has ceased, any dust pollution and environmental noise will also cease. No impacts from the mine will take place on heritage resources after closure. Once revegetation of rehabilitated pits has occurred, the impact on the ecological sensitive areas will be reduced. Mine closure will lead to retrenchment and loss of employment. This is managed through the Social and Labour Plan (SLP). The following residual impacts are envisaged if rehabilitation does not take place successfully.

1.1.2.1 Geology

The removal of andalusite and hence geology will be permanent and therefore the impact will be permanent and therefore a residual risk.

1.1.2.2 Soil, pre-mining land capability and land use

Erosion of rehabilitated areas and erosion of final void edges will occur along with potential safety risks caused by water filling the final void. This will be mitigated through concurrent rehabilitation.

1.1.2.3 Vegetation and animal life

Invasive alien vegetation establishing on areas that have not been rehabilitated in a residual risk. This will be mitigated through vegetation monitoring.

1.1.2.4 Surface water

A natural depression will remain post-closure where surface water will likely accumulate. The depth of the depression depends on the success of concurrent rehabilitation and amount of material available to fill the depression.

1.1.2.5 Groundwater

No measurable impacts on the groundwater quality, quantity or flow regime are foreseen. Therefore no/little residual impacts are expected if effective practices are in place during mining. Groundwater levels are expected to remain unaffected by the proposed opencast mining activities since the water table is not expected to be intersected given the depth of final excavation.

1.1.3 Closure objectives

According to the Approved Environmental Management Programme for Buffelshoek Mine, LP166MR:

The closure objective is to restore the land to a self-sustaining, aesthetically pleasing landform that could be used for grazing.

- The rehabilitation must be to such quality that the natural vegetation could reestablish after a period of time and the capability of the land as grazing field need to be strived for as an end-result.
    - For this reason it is critical to ensure the re-establishment of indigenous and grazing vegetation and prevent the establishment of exotic vegetation.
    - To ensure that this will be achieved a detailed assessment of the requirements to ensure an effective land use need to be done. With a proper continuous rehabilitation plan, natural vegetation will quickly re-establish as is evident in the decommissioned slimes dams and areas not mined for a period of time (at the existing, adjacent Rhino Andalusite Mine).
    - It is essential to keep the land under permanent vegetation cover for a number of years to re-establish organic carbon status and the natural nutrient recycling processes.
- Prior to mining the land capability and land use is game farming. After rehabilitation the land will be capable of providing an area for game farming.
    - Internal haul roads not needed for future management of the farm after rehabilitation must be ripped up, covered with topsoil and vegetated.

1.1.4 Rehabilitation process

The Rhino Rehabilitation Implementation Strategy and Implementation Programme (RSIP) will be updated to include areas under LP166MR for the year 2023 and steps will be put in place to ensure that the land will be rehabilitated to an adequate state.

1.2 Rehabilitation plan

1.2.1 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

An annual rehabilitation plan will be submitted to the DMRE and will be relevant for a period of 1 year. This will include the 2023 financial provision, currently being compiled by Shangoni Management Services.

Objectives of the plan include a review concurrent rehabilitation and remediation activities already implemented (if applicable); establishing rehabilitation and remediation goals and outcomes for the forthcoming 12 months, which contribute to the gradual achievement of the post-mining land use, closure vision and objectives identified in the holder's final rehabilitation, decommissioning and mine closure plan, establishing a plan, schedule and budget for rehabilitation for the forthcoming 12 months, identifying and addressing shortcomings experienced in the preceding 12 months of rehabilitation (if applicable); and evaluating and updating the cost of rehabilitation for the 12-month period and for closure, for purposes of supplementing the financial provision guarantee or another financial provision instrument.

1.2.2 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives

The closure objectives in this EMP were taken from the Buffelshoek Mine approved EMP for LP166MR. The rehabilitation plans outline how the closure objectives are to be achieved and they work simultaneously with activities on site.

1.3 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

1.3.1 Potential risk of acid mine drainage

Geohydrological Study and Impact Assessment (Shangoni AquiScience, 2023):

ABA conducted during previous groundwater related studies (Geo Pollution Technologies, 2010) revealed that both the rock and tailings material contain very low concentrations of sulphur and is non-acid forming.

Sulphate is an important chemical indicator parameter of impacts related to the oxidation of iron sulphides (AMD). Groundwater Complete (2016) measured the quality of water contained in the Motswere Quarry and Quarry 4/5 and found that the sulphate contents are < 20 mg/l and 70 mg/l, respectively. These concentrations are well below the maximum permissible SANS value of 500 mg/l and are more or less representative of the ambient groundwater sulphate content.

Water samples from both quarries are neutral to slightly alkaline, which is yet another indication of the absence of AMD. The water is considered to be of good quality and show no signs of impacts related to AMD or the generation of poor-quality leachate.

1.3.2 Steps taken to investigate, assess, and evaluate the impact of acid mine drainage

Refer above, not necessary.

1.3.3 Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

Refer above, not necessary.

1.3.4 Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage

Refer above, not necessary.

1.3.5 Volumes and rate of water use required for the mining, trenching or bulk sampling operation

This is not applicable for the proposed activities.

SECTION 2: MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON

Baseline monitoring is required to establish existing conditions that will help to define the requirements for site restoration and provide a basis for comparison of effects during the operation. Compliance monitoring should be carried out during the operation to ensure that the specified target limits are being met. The following environmental monitoring will be conducted at the mine.

2.1 Monitoring of impact management actions

2.1.1 Geology and topography including drainage patterns and visual aspects

Mechanism for monitoring compliance:

- After reshaping the resultant topography must be surveyed to determine the degree to which the final topography meets planned objectives
- Surface drainage and slope must meet land capability objectives, a surveyor must assess this
- Deviations from plan must be documented, and the final reshaped surface should be signed off by the responsible person prior to the replacement of topsoil.

Environmental component affected and impact	Monitoring and reporting frequency	Responsible persons
• Visual aspect. Change in topography	Once after reshaping	Mine manager / site geologist and surveyor.

2.1.2 Soil pollution and erosion

Mechanism for monitoring compliance:

Monitoring will take place in accordance with the rehabilitation plan.

- Maintenance of vehicles and machinery as per maintenance register.
- Inspections should be conducted on all channels, trenches and berms to ensure function and capacity of infrastructure is maintained
- Erosion monitoring as per the Erosion Management Plan.
- Inspections of routes for any pollution.
- Surface water quality monitoring; groundwater quality monitoring; and monitoring of surface water drainage systems in accordance with the water monitoring programme (this will be put in place in accordance with the IWUL, once granted)
- Spill handling procedures should be adopted in the event of a spillage.
- Store topsoil in a protected are until re-used for rehabilitation. Never mix topsoil with subsoils or other spoil materials.

Environmental component affected and impact	Monitoring and reporting frequency	Responsible persons
• Soils, land capability, surrounding land use and landscape character. Pollution of topsoil and erosion • Surface and groundwater: Runoff or infiltration of spillages	Weekly basis.	Mine manager / site geologist.

2.1.3 Vegetation

Mechanism for monitoring compliance:

- A thorough footprint investigation by a botanist to detect all affected protected and/or threatened plant species that must be removed.
- This report must inform any permitting for protected trees and search and rescue prior to vegetation clearance.
- These species must then be pinned using a GPS and marked as per the management measures.
- Relocated species of conservation concern should be monitored for at least 3 years after construction.
- A vegetation rehabilitation plan must be implemented to prevent bush densification.
- Regular alien invasive species monitoring.
- Regular alien invasive species removal as per Alien invasive species programme until 3 years cost closure.
- Implement a fire management plan to allow natural fires across the site where possible.

Environmental component affected and impact	Monitoring and reporting frequency	Responsible persons
• Vegetation: Destruction of protected plants and plants of conservation concern • Impact on Ecological Processes and CBAs	A per above monitoring	ECO / botanist
• Potential increase in invasive vegetation and bush densification	Annual	ECO
• Ecological processes: Lowland-highland interface	As per fire management plan	ECO

2.1.4 Animal life

Mechanism for monitoring compliance:

- Mining as per the mining plan
- Biodiversity awareness training (including poaching) with attendance registers
- Cordon off tape
- Surface water quality monitoring

- Site inspections
- Vegetation monitoring

Environmental component affected and impact	Monitoring and reporting frequency	Responsible persons
• Destruction of sensitive vertebrate habitat	On-going as recommended by ECO	ECO
• Impact on Red data mammals and herpetofauna	On-going as recommended by ECO	ECO
• Poaching of wildlife in the vicinity	On-going as recommended by ECO	ECO
• Avifauna and bats	On-going as recommended by ECO	ECO

2.1.5 Ground water monitoring

Please note, the groundwater monitoring below is only a recommendation. The IWUL will include the final groundwater monitoring requirements. This EMP must therefore be read with the IWUL, whereby the IWUL will be followed.

Mechanism for monitoring compliance:

Ground water monitoring will take place as per the water monitoring programme. The WIUL has not yet been granted therefore ground water monitoring will take place as per the geohydrological study.

The following parameters are proposed to be included in the groundwater monitoring programme.

- pH, EC
- TDS
- Major cations including Ca, Mg, Na, K
- Major anions including Cl, SO4, T-Alk (HCO3-/CO3-)
- Minor cations/metals including Fe, Al, Mn, Si, F
- Nutrients including PO4-, NO3-, NH4+
- Groundwater levels

At present no monitoring boreholes exist at Buffelshoek. It is recommended that three boreholes of approximately 30 m be drilled. Two of these should be drilled on the western side of the proposed open pit as source monitoring boreholes while the other should be drilled as a background borehole to the east of the pit. The borehole targets should be identified by a professional geohydrologist through using geophysical techniques. Water quality analyses should be undertaken as a once-off initially and then bi-annually when mining commences.

The estimated positions of the boreholes are displayed in Figure 127. Note that these are only estimated positions and it is recommended that geophysics be used to site and identify preferential

flow pathways. If the boreholes fall within future mine plan areas, the boreholes to the west should be moved nearer to the Bierspruit and the one to the east, more south and out of the mineral resource footprint.

Table 51: Proposed borehole potions for monitoring

Borehole	Coordinates	
Proposed monitoring borehole 1	-24.677705°	27.329883°
Proposed monitoring borehole 2	-24.679469°	27.330293°
Proposed monitoring borehole 3	-24.675228°	27.342721°

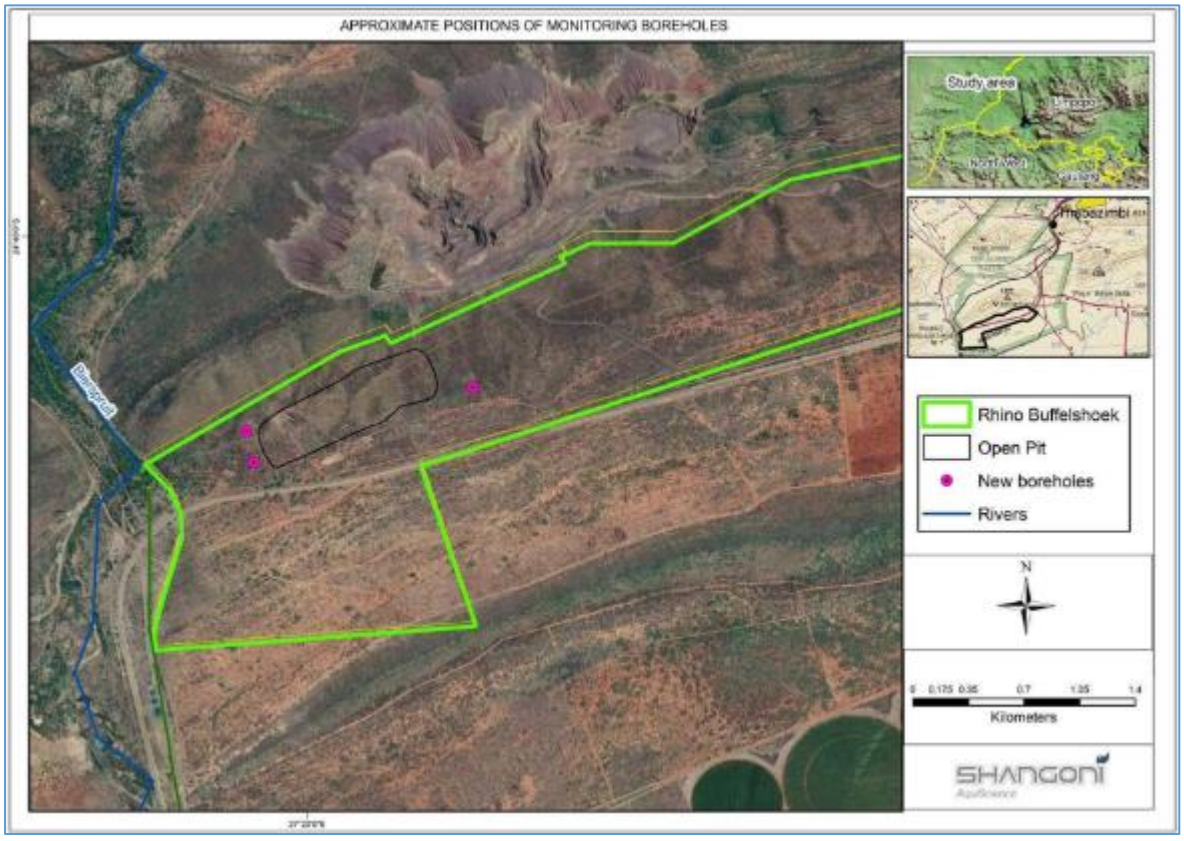


Figure 127: Proposed borehole potions for monitoring (Shangoni AquiScience, 2023)

2.1.6 Surface water monitoring

Please note, the surface water monitoring below is only a recommendation. The IWUL will include the final surface water monitoring requirements. This EMP must therefore be read with the IWUL, whereby the IWUL will be followed.

Mechanism for monitoring compliance:

Surface water monitoring will take place as per the water monitoring programme. The IWUL has not yet been granted therefore surface water monitoring will take place as per the geohydrological study.

The following parameters are proposed to be analysed for in the surface water monitoring programme.

- pH, EC
- TDS
- Major cations including Ca, Mg, Na, K
- Major anions including Cl, SO4, T-Alk (HCO3-/CO3-)
- Minor cations/metals including Fe, Al, Mn, Si, F
- Nutrients including PO4-, NO3-, NH4+

2.1.7 Air quality

Mechanism for monitoring compliance:

- Dustfall and fine particulate (PM10 and PM2.5) management plan in line with the NDCR.
- Dustfall and fine particulate monitoring programme in line with the NDCR.
- Dust suppression register
- Signage to indicate speed limits at ≤ 40km/hr.
- Agreement with contractors/part of mine policy that product on trucks needs to be covered.
- Submit Buffelshoek annual mining emissions on NAEIS

Environmental component affected and impact	Monitoring and reporting frequency	Responsible persons
• Particulate emissions, exhaust gas and dust fall impact on human health. • Criteria pollutants and dust fall impact on vegetation	As per the Dustfall and fine particulate management plan and monitoring programme	Mine manager

2.1.8 Noise

Mechanism for monitoring compliance:

- Results of noise monitoring surveys to be kept
- A SoP for PPE use related to noise needs to be implemented
- Ground vibration levels and air blast to be monitored and kept on record.
- Site inspections

Environmental component affected and impact	Monitoring and reporting frequency	Responsible persons
• Particulate emissions, exhaust gas and dust fall impact on human health.	As per the Dustfall and fine particulate management plan and monitoring programme, as well as the SoP for PPE use	Mine manager

Environmental component affected and impact	Monitoring and reporting frequency	Responsible persons
• Criteria pollutants and dust fall impact on vegetation		

2.1.9 Archaeological, historical and cultural heritage

Mechanism for monitoring compliance:

Since archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases. This will require:

- Inspections during Development, construction, operation incl. blasting
- Heritage awareness training with attendance registers

2.1.10 Safety: fly rock from blasting

Mechanism for monitoring compliance:

- The mine must appoint a competent person employed for blasting.
- Blasting reports need to be kept for each blasting event.

2.1.11 Social pathologies (including crime and alcoholism)

Mechanism for monitoring compliance:

- Logging of employee breathalyser information
- Disciplinary procedure if necessary
- Gate and fence maintenance register to be used

2.2 Indicate the frequency of the submission of the performance assessment report

The performance of the EIA/EMP will be assessed every two years. A financial provision will submitted for the year 2023 will be updated on an annual basis. An audit on the IWUL will also be done (once granted) to ensure compliance in all water uses and activities taking place on the mine.

SECTION 3: ENVIRONMENTAL AWARENESS PLAN

This section includes:

1. Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
2. Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

3.1 Induction training

1. Imerys shall ensure that all people employed on the mine shall undergo an environmental induction.
    a. All people employed by Imerys shall do a refresher course on the environmental induction.
    b. The refresher course shall be as specified by the training procedure.
2. Imerys shall also ensure that contractors, contracted on the mine shall undergo an environmental induction.
    a. The environmental induction for contractors shall be valid for the period of access to the site unless access is for longer than 18 months.
    b. If a contractor is on the mine for a period longer than 18 months, the contractor shall do a refresher course.
3. Environmental induction material for employees and contractors (Environmental training) shall include an overview of all environmental aspects taken from various sources such as the EIA/EMP (once approved), environmental legislation, etc.
    a. Any amendments to the environmental induction shall be approved by the mine's appointed Employer Representative, or the ECO.
4. All visitors to the mine shall undergo a shortened environmental induction (Visitor Induction), based on the environmental induction material for employees and contractors.
    a. Any amendments to the visitor's environmental induction shall be approved by either the mine's appointed Employer Representative or the ECO.

3.2 General environmental awareness training

1. Imerys shall keep an updated training needs matrix.
    a. This matrix shall provide a list of all relevant job positions for both employees and contractors on the mine.
    b. The list of all relevant job positions shall be cross-reference with environmental aspects and impacts and/or environmental procedures to be trained on.
    c. These environmental aspects and impacts shall be taken from various sources such as the EIA/EMP (once approved), legislation, etc.

d. Job position shall therefor only be trained on the necessary environmental aspects and impacts or environmental procedures as indicated with the cross-reference.

2. Each environmental aspect and impact shall have training material that has been approved by either the mine's appointed Employer Representative or the ECO.
   a. The training material (Environmental Training) shall also include an attendance register of all persons who must be trained on the training material. This attendance register (see Annexure 1 of this procedure) shall include:
      i. the names of all persons per position that must be trained on the training material;
      ii. date of the training;
      iii. signature of each person trained; and
      iv. signature of the Safety Officer or Mine Manager.
3. Imerys shall keep a training schedule of timeframes.
4. Imerys shall ensure that any person that has not attended training on training material, necessary for that position, shall be trained on a later stage, as agreed upon by the Employer Representative or the ECO.

3.3 Competency training

1. Management will identify job-related training needs for all employees who have or can have a significant impact on the environment.
2. A training needs matrix will be completed for Imerys.
3. Job specific training will convey the importance of conformance with the environmental procedures. Simplified summaries of these procedures may be used to ensure better understanding at lower levels of the organisation.
4. Management will identify specialised training needs. for personnel performing tasks, which can cause significant environmental impacts, or personnel who needs specialised environmental knowledge for areas of responsibility.

3.4 Development of training material

1. The Health and Safety Officer or appointed person will develop and maintain training material for induction training, general environmental awareness, and competency training. This excludes specialised competency training which will be externally sourced.
2. This training material will be based on the approved and operational EMP as well as environmental procedures. Additional topics will also be included for general environmental awareness.
3. Training material will be reviewed using results from audits, changes to plant/operation, competency assessments and new significant aspects.

3.5 Scheduling of training

1. Once training topics and material have been compiled, the Health and Safety Officer or appointed person will ensure employees are scheduled according to the needs identified.

3.6 Training records

1. Upon completion of training, a training record will be completed. This may be in the following formats:
   a. Attendance registers;
   b. Sign off on procedure to demonstrate understanding of procedure; and/or
   c. Certificates of attendance/completion.
2. All training records will be kept for the period of employment.

3.7 Reconciliation to determine gaps in attendance

1. All employees and contractors must undergo all training as identified (as per training needs analysis). Reconciliation will be done on all training attendance registers, against the training schedules, to identify any shortcomings in training performed and reschedule if necessary.

3.8 Competency assessment

1. An evaluation will be conducted on all employees and contractors. The aim is to identify both the effectiveness of training as well as the competence in performing the job.
2. Competency evaluation records will be completed by the approved training assessor and will be included with the attendance records.

SECTION 4: SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

4.1 Environmental scoping report comments from DMRE

The acceptance of the final scoping report received from DMRE on the 6th of July 2023, included comments for the consideration of the EAP. A formal response letter was sent to DMRE on the 28th of July 2023. The comments and responses are covered in the table below including an indication of how the comments have been addressed in the EIA.

Comment raised	EAP's Response	Section reference in this EIA where issues and or response were incorporated
1. The Department has evaluated the submitted SR and Plan of Study for Environmental Impact Assessment and is satisfied that the documents comply with the minimum requirements of Appendix 2(2) of National Environmental Management Act, 1998 (as amended) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014. The SR is hereby accepted by the Department in terms of regulation 22(a) of the NEMA EIA Regulations, 2014.	The comment was noted.	N/A
2. You may proceed with the environmental impact assessment process in accordance with the tasks contemplated in the Plan of Study for Environmental Impact Assessment as required in terms of the NEMA EIA Regulations, 2014.	The comment was noted.	N/A
3. Please ensure that comments from all relevant stakeholders are submitted to the Department with the Environmental Impact Assessment Report (EIAR). This includes but is not limited to the Provincial Heritage Resources Authority, Provincial Environmental Department, Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation (DWS) and the local municipality. Proof of correspondence with	The Environmental scoping report was uploaded on the SAHRIS online system and the report was sent to DMRE, LEDET, & DARD on 23 May 2023. The report was sent to all other stakeholders on 25 May 2023 and to DWS on 26 May 2023. All abovementioned stakeholders will be sent the draft EIA and comments/proof of the attempts made to obtain comments will be submitted with the final	Addendum 4F: Proof of draft and final ESR sent to I&APs and stakeholders Addendum 4G: Proof of

Comment raised	EAP's Response	Section reference in this EIA where issues and or response were incorporated
the various stakeholders must be included in the EIAR. Should you be unable to obtain comments, proof of the attempts that were made to obtain comments should be submitted to the Department.	EIAR.	draft EIA sent out Addendum 4H: Comments received and responses Addendum 5B: Acceptance and comments on Final Scoping Report by DMRE including EAPs response Addendum 5C: Comments on the Final Scoping Report by LEDEDT including EAPs response Addendum 5D: Comments on the Draft EIA from DFFE including EAPs response

Comment raised	EAP's Response	Section reference in this EIA where issues and or response were incorporated
4. In addition, the following amendments and additional information are required for the EIAR and EMPr: a) Details of the future land use for the site and infrastructure after decommissioning in 20-30 years.	The end land-use has been identified as grazing and game farming.	PART B, Section 1 Description of impact management objectives including management statements
b) The total footprint of the proposed development should be indicated.	The footprint of the open cast mining area to be concurrently rehabilitated via roll-over mining is 294,483 m² (29.45 ha) for the first 5 years of mine production, thereafter, the future exploration and mining area will cover 859,090 m² (85.91 ha). Roll over mining will continue in an eastern direction within the ore body extension. Vegetation will also be cleared for the topsoil stockpile area as well as the haul road. Refer to the table below for the disturbance footprint of the various activities. The total footprint of the disturbance is 144.63 ha.	PART A, Section 1.5 Description of the activities to be undertaken Table 5: Disturbance footprint of the various activities
c) Should a Water Use License be required, proof of application for a license needs to be submitted.	The mine is currently applying for an IWUL with DWS, please refer to Addendum 6A for proof of the IWULA in progress. A pre-application meeting took place with DWS on 26 September 2023. Minutes of the meeting are still being finalised.	Addendum 6A: Proof of IWULA in progress
d) Possible impacts and effects of the development on the vegetation ecology with regard to lowland-highland interface in the locality should be indicated.	The site includes the interface between the higher lying Waterberg Mountain Bushveld in the north and the Dwaalboom Thornveld on the lower lying southern areas. Please refer to PART A, Section 7.2.3.6 under the impact assessment for this impact as well as the	PART A, Section 7.2.3.6

Comment raised	EAP's Response	Section reference in this EIA where issues and or response were incorporated
	required mitigation measures.	
e) The impacts of the proposed facility on avifauna and bats must be assessed in the EIA phase.	Please note that mitigation measures as per the Avifaunal specialist assessment and the impacts and mitigations from the Bat Environmental Impact Assessment Report (Limnology, 2023) are included in PART A, Section 7.2.4.5 and Section 7.2.4.6 of the report.	PART A, Section 7.2.4.5
f) Possible impacts and effects of the development on the surrounding industrial area.	The development is not expected to directly impact the surrounding industrial area, however, potential impacts of the proposed mine on the surrounding industrial area include air quality impacts and socio-economic impacts. Please refer to the impact assessment under PART A, section 7.2, which covers all possible impacts and effects identified as part of the proposed project as well as the required mitigation measures.	This table & PART A Section 7.2
g) A construction and operational phase EMP to include mitigation and monitoring measures.	Refer to PART A Section 7.2 and PART B Section 2	PART A Section 7.2 PART B Section 2
h) Should blasting be required, appropriate mitigation measures should be provided.	Please refer to PART A, Section 7.2.8 and PART B, Section 2.1.8	PART A Section 7.2.8 PART B Section 2.1.8
5. The applicant is hereby reminded to comply with the requirements of regulation 3 of the EIA Regulations, 2014 with regards to the time period allowed for complying with the requirements of the Regulations.	This is noted. The time frames will be adhered to.	N/A
6. Please ensure that the EIAR includes the A3 size locality maps of the area and illustrates the exact location of the proposed development. The	This has been included, please note that there are no alternatives to the proposed project.	Addendum 1A and B

Comment raised	EAP's Response	Section reference in this EIA where issues and or response were incorporated
maps must be of acceptable quality and as a minimum, have the following attributes: • Maps are relatable to one another; • Co-ordinates; • Legible legends; • Indicate alternatives; • Scale and • Vegetation types of the study area.		
7. Further, it must be reiterated that, should an application for Environmental Authorisation be subjected to any permits or authorisations in terms of the provisions of any Specific Environmental Management Acts (SEMAs), proof of such application will be required.	This is noted. No permits or authorisations in terms of other SEMAs are currently required.	N/A
8. . You are requested to submit four (3) hard copies of the EIAR and EMPr and at least one electronic copy (CD/DVD) of the complete EIAR and EMPr to this Regional Office.	This is noted. Four copies and at least one electronic copy will be submitted the Limpopo Regional office.	N/A
9. Your attention is brought to Section 24F of the NEMA which stipulates "that no activity may commence prior to an environmental authorisation being granted by the competent authority".	This is noted. No activities will commence prior to an EA being granted.	N/A

4.2 Environmental scoping report comments from LEDET

LEDET sent a letter with comment on the ESR on the 19th of June 2023. A formal response letter was sent on the 5th of July 2023. The comments and responses are covered in the table below including an indication of how the comments have been addressed in the EIA.

Comment raised	EAP's Response	Section reference in this EIA where issues and or response were incorporated
1. The Environmental Scoping Report submitted by Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine received by the Department on 23 May 2023, has reference.	This is noted. NEMBA has been included under PART A, Section 2.3 - the Policy and Legislative Requirements section of this EIA report.	PART A, Section 2.3
2. It is noted though that Activity 12 of Listing Notice 3 is included (page 7).		
3. The National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) should be included in Section 3: Policy and Legislative Requirements.		
4. The reference to the Conservation Plan on page 37 can also be updated with the Waterberg Bioregional Plan, which was Gazetted in Provincial Notice 1 of 2019, No 2966 of 04 January 2019 in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004), for projects within the Waterberg district.	Reference to the conservation plan was updated with the Waterberg Bioregional Plan under section 6.6.3.1 under PART A of this report.	PART A, Section 6.6.3.1
5. It is noted that the Mining Right had already been issued prior to the initiation of the Environmental Impact Assessment (EIA) process to consider Environmental Authorisation but the reasons or circumstances are not clarified. The implications that the 'proposed' mining will have on meeting Biodiversity targets should be addressed where applicable.	The Mining Right commenced on 17th April 2014 and unless cancelled or suspended, will remain in force until 16th April 2044. An application for EA was conducted as part of this application and the mine has an EMP associated with this. As no activities have commenced since the issuing of the Mining Right, an updated EIA is required to include the listed activities to be undertaken, which will require an EA. Furthermore, an IWUL is being applied for as part of the proposed activities. The implications of the proposed mining project on biodiversity targets is addressed in PART A, Section 7.2.3 of this EIA report. Specialist studies have also been done as	PART A, Section 7.2.3

Comment raised	EAP's Response	Section reference in this EIA where issues and or response were incorporated
	part of the project to assess potential impacts and management thereof. These include a terrestrial vegetation assessment, a vertebrate fauna (mammals & herpetofauna) habitat assessment and an aquatic ecosystem delineation. Refer to PART A, Section 7.2 for these impact assessments.	

4.3 Environmental Impact Assessment report comments from LEDET

LEDET gave comment on the draft EIA on the 16th of October 2023. A formal response letter was sent on the 17th of October 2023. This is tabled below.

Comment raised	EAP's Response	Section reference in this EIA
1) The above-mentioned draft Environmental Impact Assessment Report (EIAR) submitted in respect of the application for Environmental Authorisation (EA) by Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine on the above-mentioned properties received by the Department on 19 September 2023 for commenting purposes, has reference.	This is noted.	Addendum 5C
2) The Department takes note of the indication that an EIA was conducted at the time the mining right was issued and that this process represents an updated EIA. The Department was unable to obtain records of the history at the site.	This is noted. A copy of the EIA and associated Environmental Management Programme (EMP) report for the above process is kept on record electronically by the client. This report and any other records which Imerys Refractory Minerals South Africa (Imerys) may have can be made available to LEDET upon request.	
3) The Department request more information on the required relocation of the Istores Primary School (page 272). The planning of such related	It is currently not required to relocate the school as only the proposed future prospecting and mining area is located nearby to the school. It will take several	

Comment raised	EAP's Response	Section reference in this EIA
activities must be addressed in a concurrent manner to avoid preventable short notice demands on other stakeholders.	years for the mine to reach this area. However, as recommended by the Air Quality specialist, Dustfall and Particulate Matter (PM) 2.5 and PM10 monitoring will be required from the commencement of mining. Air quality monitoring points will be positioned between the open pit and the school to determine whether the emissions are within the limits of the National Dust Control Standards and National Ambient Air Quality standards for PM2.5 and PM10.	
4) On page 254 it is indicated that two drainage lines occur running from the mountain down into the site but indicates that the mining is not expected to impact hydrological functioning of the activities outside of the aquatic ecosystems. Could these drainage lines be indicated on the general lay-out plan in order to clarify the situation.	Please refer to Addendum 1B of the report for the surface layout plan which has been amended to indicate the above-mentioned drainage lines.	Addendum 1B

SECTION 5: UNDERTAKING

5.1 Report compiler

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&APs ☒

c) the inclusion of inputs and recommendations from the specialist reports where relevant ☒

d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed ☒

I, Christopher Delport (9507265046081), hereby declare that I have no conflict of interest related to the work of this report. Specially, I declare that I have no business, personal, or financial interests in the property and/or mining permit being assessed in this report, and that I have no personal or financial connections to the relevant property owners, or mine. I declare that the opinions expressed in this report are my own and a true reflection of my professional expertise and that there are no circumstances that may compromise my objectivity in performing such work.

The EIA/EMP will, should it comply with the provisions of section 24N of NEMA as well as the applicable EIA Regulations i.t.o. NEMA, be approved, become an obligation in terms of the approved EIA/EMP and mining right.

Herewith I, the person whose name and identity number are stated below, confirm that I am the person authorised to act as representative of the, and confirm that the above EIA & EMP compiled in accordance with Appendices 3 & 4 of the EIA Regulations.

Full Names and Surname	Christopher Allen Delport
Identity Number	9507265046081
Designation	Environmental Consultant
Signature	

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&APs ☒

c) the inclusion of inputs and recommendations from the specialist reports where relevant ☒

d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed ☒

5.2 Report reviewer

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&APs ☒

c) the inclusion of inputs and recommendations from the specialist reports where relevant ☒

d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed ☒

I, Salome Beeslaar (8310190032081), hereby declare that I have no conflict of interest related to the work of this report. Specially, I declare that I have no business, personal, or financial interests in the property and/or mining permit being assessed in this report, and that I have no personal or financial connections to the relevant property owners, or mine. I declare that the opinions expressed in this report are my own and a true reflection of my professional expertise and that there are no circumstances that may compromise my objectivity in performing such work.

The EIA/EMP will, should it comply with the provisions of section 24N of NEMA as well as the applicable EIA Regulations i.t.o. NEMA, be approved, become an obligation in terms of the approved EIA/EMP and mining right.

Herewith I, the person whose name and identity number are stated below, confirm that I am the person authorised to act as representative of the, and confirm that the above EIA & EMP compiled in accordance with Appendices 3 & 4 of the EIA Regulations.

Full Names and Surname	Salome Beeslaar
Identity Number	8310190032081
Designation	EAP
Signature	

-END-

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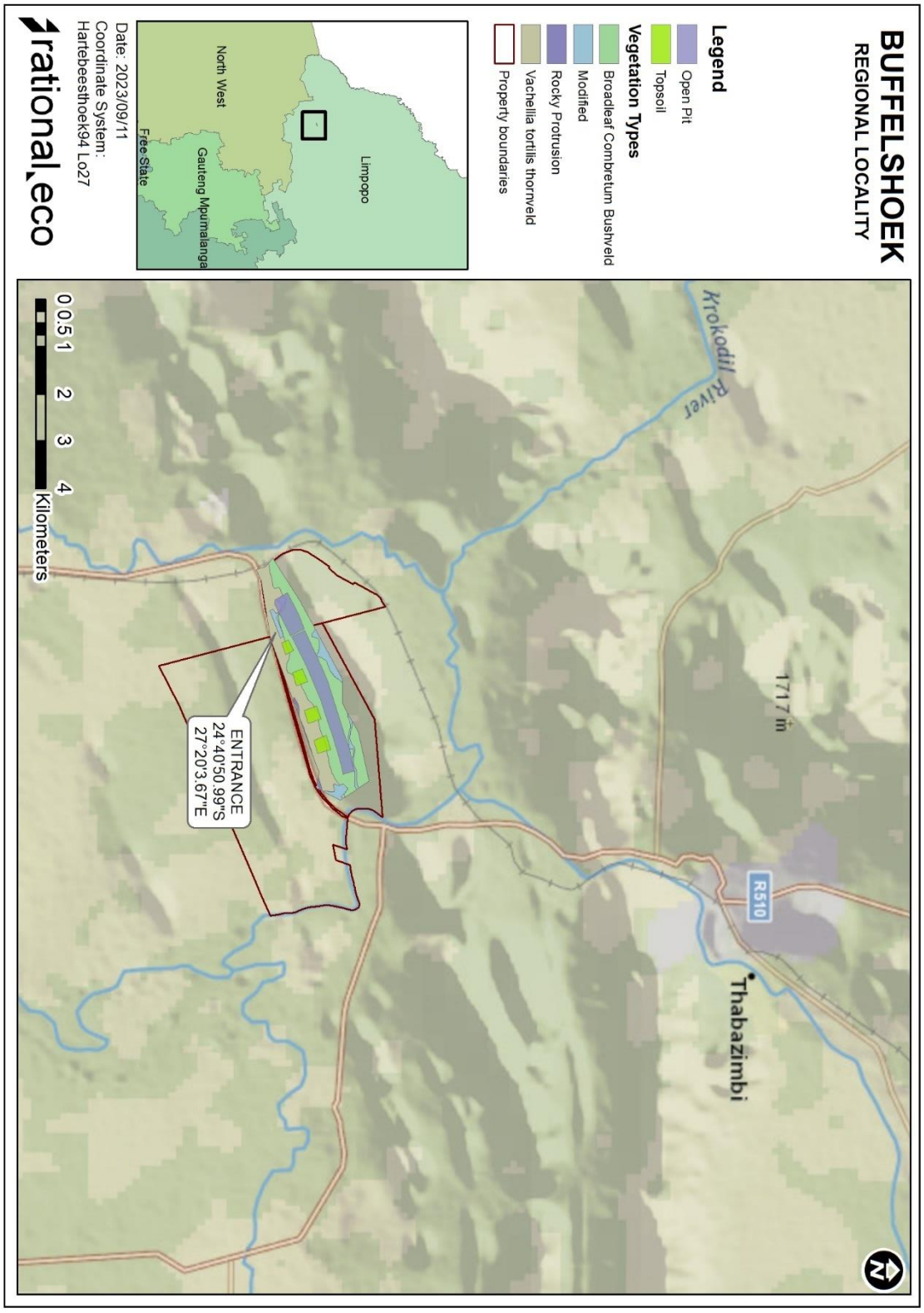
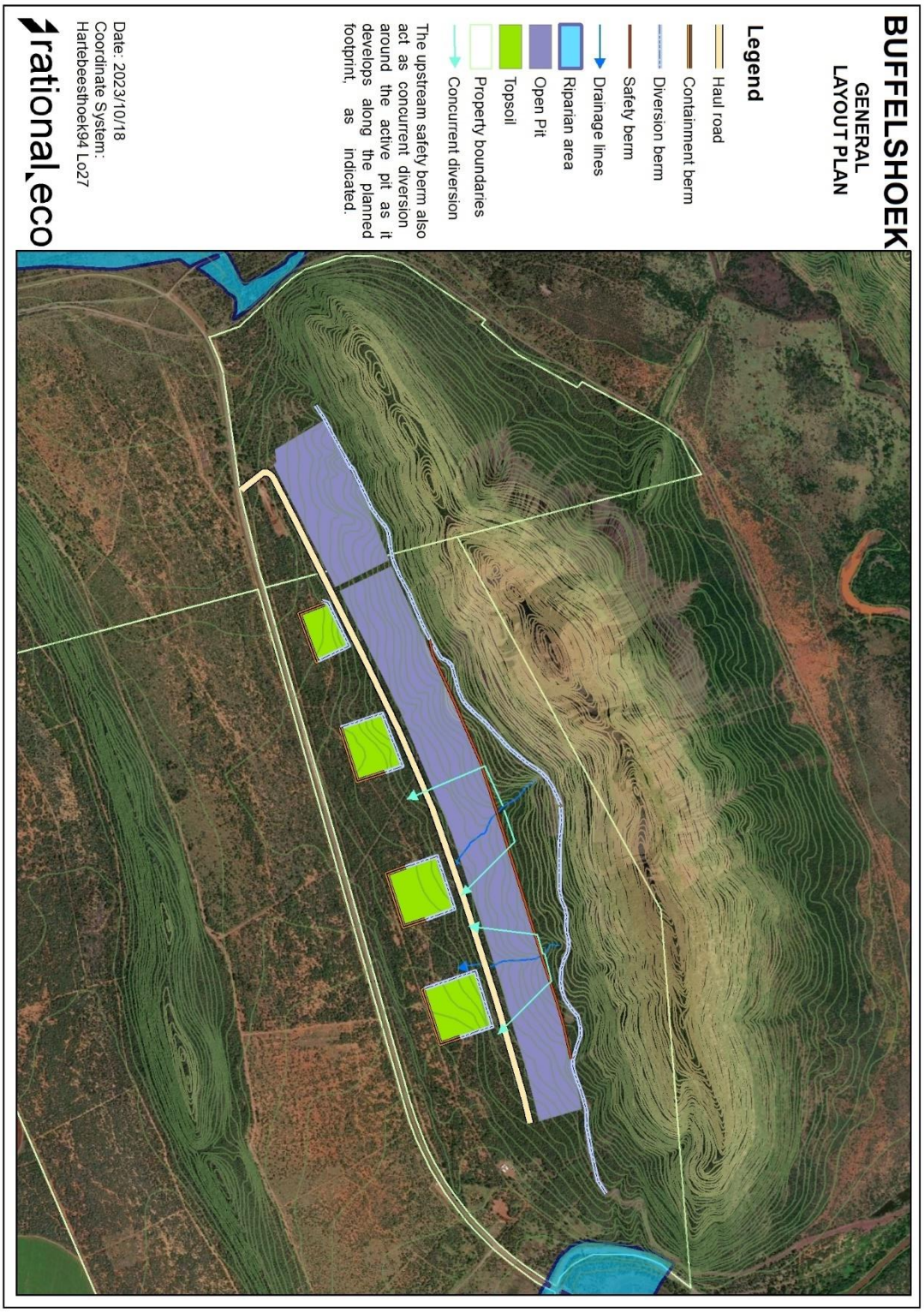
ADDENDUM 1: MAPS AND PLANS

Addendum 1A: Locality map



Addendum 1B: Surface layout plan



Addendum 1C: Environmental sensitivity map

ADDENDUM 2: CURRICULUM VITAE

Addendum 2A: Salome Beeslaar

CURRICULUM VITAE: SALOME BEESLAAR (VENTER)

PERSONAL DETAILS

Surname:	Beeslaar
Full name:	Salome
Identity number:	8310190032081

EDUCATIONAL QUALIFICATIONS

Institution:	University of Pretoria
Qualification:	M Sc Geography
Year:	2013
Institution:	University of Pretoria
Qualification:	B Sc Honours Geography
Year:	2006
Institution:	University of Pretoria
Qualification:	B Sc Environmental Science
Year:	2005

REGISTRATIONS

- IAIAsa Membership number: 5853
- SACNASP Professional Scientist (Environmental Science): 400385/14
- EAPASA Environmental Assessment Practitioner: 2020/846

EMPLOYMENT HISTORY

August / September 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022:
University of Pretoria

September 2014 - Present:
Director and senior environmental consultant with BECS Environmental & BECS Services

March 2008 – September 2014:
Senior environmental consultant with Shangoni Management Services

July 2007 – March 2008:
Environmental consultant with Rock Environmental Consulting

January 2007 – June 2007:
Environmental consultant with Tekplan Environmental Consulting

Addendum 2B: Christopher Delport

CURRICULUM VITAE: CHRISTOPHER DELPORT

PERSONAL DETAILS

Surname:	Delport
Full name:	Christopher
Identity number:	9507265046081

EDUCATIONAL QUALIFICATIONS

Institution:	University of Pretoria
Qualification:	BSc Honours Geography and Environmental Sciences
Year:	2018
Institution:	University of Pretoria
Qualification:	B Sc Environmental Science
Year:	2017

REGISTRATIONS

- IAIAsa Membership number: 6643
- SACNASP Candidate Scientist (Environmental Science): 144476
- EAPASA Candidate Environmental Assessment Practitioner: 2022/4844

EMPLOYMENT HISTORY

January 2021 - Present:

Environmental Assessment Practitioner/consultant with BECS Environmental

ADDENDUM 3: SPECIALIST STUDIES

Addendum 3A: Phase 1 Archaeological Impact Assessment

Addendum 3B: Palaeontological Impact Assessment

Addendum 3C: Geohydrological Study and Impact Assessment

Addendum 3D: Aquatic Ecosystem Delineation Report

Addendum 3E: Air Quality Impact Assessment Report

Addendum 3F: Storm Water Management Plan

Addendum 3G: Terrestrial Vegetation Impact Assessment

Addendum 3H: Vertebrate fauna (Mammals & Herpetofauna) Habitat Assessment

Addendum 3I: Avifaunal Assessment Report

Addendum 3J: Bat Environmental Impact Assessment Report

ADDENDUM 4: PUBLIC PARTICIPATION PROCESS

Addendum 4A: Title deeds: Project properties

WinDeed Property
LIMPOPO, BUFFELSHOEK, KQ, 351, 0

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SEARCH CRITERIA			
Search Date	2023/02/07 05:47		
Reference	-		
Report Print Date	2023/02/07 05:49		
Property Details	-		

REGISTERED PROPERTY DETAILS			
Property Type	FARM	Diagram Deed Number	DB174/40
Farm Number	351	Registered Size	1859.9250H
Portion Number	0	Municipality	THABAZIMBI LOCAL MUNICIPALITY
Farm Name	BUFFELSHOEK	Province	LIMPOPO
Registration Division	KQ	Coordinates (Lat/Long)	-24.677280 / 27.365420
Deed Office	LIMPOPO		

OWNER INFORMATION (1)			
THABAZIMBI IRON ORE MINE PTY LTD			Owner 1 of 1
Person Type	COMPANY	Title Deed	T11130/2019
Name	THABAZIMBI IRON ORE MINE PTY LTD	Purchase Date	2017/10/30
Registration Number	2006034408O7	Purchase Price (R)	115 263 000
Share (%)	-	Registration Date	2019/11/27

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MAPS

Satellite

Street

PROPERTY INFORMATION

No property information to display

MUNICIPAL VALUATION

No municipal valuation to display

SALES

Sales shows the details of the most recent transfers in close proximity to the specified property.

RECENTLY REGISTERED TRANSFERS

	Address / Property Information	Size (m²)	Sales Price (R)	Distance (m)	Sold	Transferred
A	,	2 980 000	3 500 000	4 792	2019/11/15	2020/03/10

SALES ANALYSIS

1 properties used in the analysis.

Note: Where there is no monetary value or extent it has been ignored.

	Price (R)	R/m²	Extent (m²)
Highest Priced Property	3 500 000	1	2 980 000
Average Priced Property	3 500 000	1	2 980 000
Lowest Priced Property	3 500 000	1	2 980 000

BONDS AND OTHER DOCUMENTS (12)			
#	Document Number	Institution	Amount (R)
1	CONVERTED FROM PTA	-	-
2	CAVEAT - TR80 T103881/2002PTA	-	-
3	K6954/2002RMPTA	SAMREC PTY LTD	-
4	K3977/2000RMPTA	HERNIC PREMIER REFRACTORIES PTY LTD	-
5	K3978/2000RMPTA	MIRCAL SOUTH AFRICA PTY LTD	-
6	K2167/1991SPTA	-	-
7	K2041/1985SPTA	-	-
8	K1303/1978SPTA	-	-
9	KQ,351PTA	-	-
10	CAVEAT - TR9249 T103881/2002	-	-
11	CAVEAT - TR10998 T103881/2002	-	-
12	CL-THABAZIMBI TLC	-	-

PROPERTY HISTORY (3)			
#	Document	Amount (R)	Holder
1	T103881/2002PTA	2 541 000	SISHEN IRON ORE CO PTY LTD
2	K141/1981LPTA	-	-
3	T15872/1929PTA	-	SOUTH AFRICAN IRON & STEEL IND CORP LTD

AMENITIES (1)			
#	Name	Type	Distance (m)
1	ISTORES PRIMARY	EDUCATION	1 199

SUBURB TRENDS

The Suburb Trend graphs show the average price and total volume of sales in the suburb.

WinDeed Database D/O Property

KQ, GROOTFONTEIN, 352, 1 (REMAINING EXTENT), LIMPOPO

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SEARCH CRITERIA			
Search Date	2023/04/14 09:25	Farm Number	352
Reference	-	Registration Division	KQ
Report Print Date	2023/04/14 09:25	Portion Number	1
Farm Name	-	Remaining Extent	NO
Deeds Office	Limpopo	Search Source	WinDeed Database

PROPERTY INFORMATION			
Property Type	FARM	Diagram Deed Number	T3727/896
Farm Name	GROOTFONTEIN	Local Authority	THABAZIMBI LOCAL MUNICIPALITY
Farm Number	352	Province	LIMPOPO
Registration Division	KQ	Remaining Extent	NO
Portion Number	1 (REMAINING EXTENT)	Extent	913.6715H
Previous Description	-	LPI Code	T0KQ00000000035200001

OWNER INFORMATION (1)			
THABAZIMBI IRON ORE MINE PTY LTD			Owner 1 of 1
Company Type	COMPANY	Document	T11130/2019
Registration Number	200603440807	Microfilm / Scanned Date	-
Name	THABAZIMBI IRON ORE MINE PTY LTD	Purchase Price (R)	115 263 000
Multiple Owners	NO	Purchase Date	2017/10/30
Multiple Properties	NO	Registration Date	2019/11/27
Share (%)	-		

ENDORSEMENTS (12)				
#	Document	Institution	Amount (R)	Microfilm / Scanned Date
1	CONVERTED FROM PTA	-	-	-

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ENDORSEMENTS (12)				
#	Document	Institution	Amount (R)	Microfilm / Scanned Date
2	CAVEAT - TR9249 T103881/2002	-	-	-
3	CAVEAT - TR10998 T103881/2002	-	-	-
4	K1303/1978SPTA	-	-	-
5	K2041/1985SPTA	-	-	-
6	K2167/1991SPTA	-	-	-
7	KQ.352.1PTA	-	Unknown	-
8	K1784/1978SPTA	-	Unknown	-
9	K241/1957SPTA	-	Unknown	-
10	K2630/1982SPTA	-	Unknown	-
11	K3439/1989SPTA	-	Unknown	-
12	CAVEAT - TR80 T103881/2002PTA	-	-	-

HISTORIC DOCUMENTS (3)				
#	Document	Institution	Amount (R)	Microfilm / Scanned Date
1	T103881/2002PTA	SISHEN IRON ORE CO PTY LTD	2 541 000	2008 0532 3644
2	T15872/1929PTA	SOUTH AFRICAN IRON & STEEL IND CORP LTD	Unknown	-
3	K141/1981LPTA	-	Unknown	-

WinDeed Database D/O Property

KQ, BUFFELSHOEK, 351, 4, LIMPOPO

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SEARCH CRITERIA			
Search Date	2023/04/14 09:22	Farm Number	351
Reference	-	Registration Division	KQ
Report Print Date	2023/04/14 09:23	Portion Number	4
Farm Name	-	Remaining Extent	NO
Deeds Office	Limpopo	Search Source	WinDeed Database

PROPERTY INFORMATION			
Property Type	FARM	Diagram Deed Number	T16781/939
Farm Name	BUFFELSHOEK	Local Authority	THABAZIMBI LOCAL MUNICIPALITY
Farm Number	351	Province	LIMPOPO
Registration Division	KQ	Remaining Extent	NO
Portion Number	4	Extent	8565.0006QM
Previous Description	-	LPI Code	T0KQ00000000035100004

OWNER INFORMATION (2)			
SISHEN IRON ORE CO PTY LTD			Owner 1 of 2
Company Type	COMPANY	Document	T103881/2002PTA
Registration Number	2000011085O7	Microfilm / Scanned Date	2008 0532 3644
Name	SISHEN IRON ORE CO PTY LTD	Purchase Price (R)	2 541 000
Multiple Owners	NO	Purchase Date	2001/04/10
Multiple Properties	NO	Registration Date	2002/08/28
Share (%)	-		

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OWNER INFORMATION (2)			
THABAZIMBI IRON ORE MINE PTY LTD			Owner 2 of 2
Company Type	COMPANY	Document	111130/2019
Registration Number	2006034408O7	Microfilm / Scanned Date	-
Name	THABAZIMBI IRON ORE MINE PTY LTD	Purchase Price (R)	115 263 000
Multiple Owners	NO	Purchase Date	2017/10/30
Multiple Properties	NO	Registration Date	2019/11/27
Share (%)	-		

ENDORSEMENTS (9)				
#	Document	Institution	Amount (R)	Microfilm / Scanned Date
1	CONVERTED FROM PTA	-	-	-
2	CAVEAT - TR9249 T103881/2002	-	-	-
3	CAVEAT - TR10998 T103881/2002	-	-	-
4	CL-THABAZIMBI TLC	-	-	-
5	CAVEAT - TR80 T103881/2002PTA	-	-	-
6	K3978/2000RMPTA	MIRCAL SOUTH AFRICA PTY LTD	-	-
7	K3977/2000RMPTA	HERNIC-PREMIER REFRACTORIES PTY LTD	-	-
8	K6954/2002RMPTA	SAMREC PTY LTD	-	-
9	KQ,351,4PTA	-	-	-

HISTORIC DOCUMENTS (1)				
#	Document	Institution	Amount (R)	Microfilm / Scanned Date
1	G198/1954PTA	SOUTH AFRICAN IRON & STEEL IND CORP LTD	Unknown	-

Addendum 4B: Copy and proof of advertisement

21 APRIL 2023, PLATINUM BUSHVELDER

Keeping warm like a pro!

[letter to the editor]

Laerskool Thaba se 2023 netbalkapteine

Laerskool Thabazimbi verwelkom twee nuwe personeel

NOTIFICATION OF LAND DEVELOPMENT APPLICATIONS TO THE THABAZIMBI LOCAL MUNICIPALITY IN TERMS OF THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT 2013 (ACT 16 OF 2013) AS READ WITH SECTION 16(1) OF THE THABAZIMBI LAND USE MANAGEMENT BYLAW, 2016:

Public Participation Notice

KENNISGEWING VAN GRONDONTWIKKELING AANSOEKE AAN DIE THABAZIMBI PLAASLIKE MUNISIPALITEIT IN TERME VAN DIE WET OP RUIMTELIKE BEPLANNING EN GRONDGEBRUIKBESTUUR, 2013 (WET 16 VAN 2013) GELEES MET ARTIKEL 16(1) EN VAN DIE THABAZIMBI GRONDGEBRUIKBESTUUR BYWET, 2016:

LOCAL AUTHORITY NOTICE 02/2023
THABAZIMBI LAND USE SCHEME, 2014 | AMENDMENT SCHEME 091

PLAASLIKE OWERHEID KENNISGEWING 02/2023
THABAZIMBI GRONDGEBRUIKSKEMA, 2014 | WYSIGINGSKEMA 091

NOTICE OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT NO. 107 OF 1998 (AS AMENDED) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT NO. 28 OF 2002 (AS AMENDED) AND AN INTEGRATED WATER USE LICENSE APPLICATION IN TERMS OF THE NATIONAL WATER ACT NO. 36 OF 1998 (AS AMENDED)

Applicant: Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine

Location of the activities:
Portion 4 of the Farm Buffelshoek 351 KQ, the Remaining Extent of the farm Buffelshoek 351 KQ and the Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ, situated in the Waterberg District Municipality and the Thabazimbi Local Municipality of the Limpopo Province.

Nature of proposed activity, applicable legislation, and listed activity applied for:
A scoping and environmental impact assessment procedure as well as an integrated water use license application will be completed.

Listed activities applied for, for the Environmental Authorisation:
- Activity 30 of GNR 983 of 2014 (as amended by GN 327 of 2017, and GN 517 of 2021)
- Activity 6 of GNR 984 of 2014 (as amended by GN 325 of 2017, and GN 517 of 2021)
- Activity 15 of GNR 984 of 2014 (as amended by GN 325 of 2017, and GN 517 of 2021)
- Activity 12 (a)(i) of GNR 985 of 2014 (as amended by GN 324 of 2017, and GN 517 of 2021)

Water uses applied for, for the Integrated Water Use License Application:
Section 21a, 21b, 21g and 21j of the National Water Act no 36 of 1998 NWA (as amended)

NOTE: The above water uses are preliminary. Additional water uses may be added.

Competent authority and relevant reference number:
Department of Mineral Resources and Energy, Polokwane, Limpopo | Reference number: LP166MR
Department of Water and Sanitation, Hartebeespoort | Reference number: WU20201

Additional information:
Letters are sent to all I&APs and stakeholders on the 20th of April 2023. A site notice will be placed at the site on the 20th of April 2023. A public meeting will be held as part of the PPP on the 18th of May 2023 at Rhino Andalusite Mine.

Register as an interested and affected party (I&AP):
To register as an I&AP of this project, to obtain more information, or submit comments, please request a Registration Form from BECS Environmental and return it to the details provided below before the 23rd of May 2023.

Contact details for more information:
To obtain additional information, please contact the Environmental Assessment Practitioner (EAP) at the details provided below. | BECS Environmental (Pty) Ltd. Christopher Delport: 081 693 8888 (WhatsApp), 082 726 2847 (cell), chris@becsenv.co.za

NOTICE OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT NO. 107 OF 1998 (AS AMENDED) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT NO. 28 OF 2002 (AS AMENDED) AND AN INTEGRATED WATER USE LICENSE APPLICATION IN TERMS OF THE NATIONAL WATER ACT NO. 36 OF 1998 (AS AMENDED)

Applicant: Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine

Location of the activities:
Portion 4 of the Farm Buffelshoek 351 KQ, the Remaining Extent of the farm Buffelshoek 351 KQ and the Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ, situated in the Waterberg District Municipality and the Thabazimbi Local Municipality of the Limpopo Province.

Nature of proposed activity, applicable legislation, and listed activity applied for:
A scoping and environmental impact assessment procedure as well as an integrated water use license application will be completed.

Listed activities applied for, for the Environmental Authorisation:

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- Activity 6 of GNR 984 of 2014 (as amended by GN 325 of 2017, and GN 517 of 2021)
- Activity 15 of GNR 984 of 2014 (as amended by GN 325 of 2017, and GN 517 of 2021)
- Activity 12 (e)(i) of GNR 985 of 2014 (as amended by GN 324 of 2017, and GN 517 of 2021)

Water uses applied for, for the Integrated Water Use License Application:
Section 21a, 21b, 21g and 21j of the National Water Act no 36 of 1998 NWA (as amended).

NOTE: The above water uses are preliminary. Additional water uses may be added.

Competent authority and relevant reference number:
Department of Mineral Resources and Energy, Polokwane, Limpopo. | Reference number: LP166MR
Department of Water and Sanitation, Hartebeespoort | Reference number: WU29201

Additional information:
Letters are sent to all I&APs and stakeholders on the 20th of April 2023. A site notice will be placed at the site on the 20th of April 2023. A public meeting will be held as part of the PPP on the 18th of May 2023 at Rhino Andalusite Mine.

Register as an interested and affected party (I&AP):
To register as an I&AP of this project, to obtain more information, or submit comments, please request a Registration Form from BECS Environmental and return it to the details provided below before the 22nd of May 2023.

Contact details for more information:
To obtain additional information, please contact the Environmental Assessment Practitioner (EAP) at the details provided below. **BECS Environmental (Pty) Ltd, Christopher Delport: 081 598 8698 (WhatsApp), 082 726 2947 (cell), chris@becsenv.co.za**

Addendum 4C: Copy and proof of site notice including map of site notice

NOTICE OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT NO. 107 OF 1998 (AS AMENDED) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT NO. 28 OF 2002 (AS AMENDED) AND AN INTEGRATED WATER USE LICENSE APPLICATION IN TERMS OF THE NATIONAL WATER ACT NO. 36 OF 1998 (AS AMENDED)

Applicant:
Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine

Location of the activities:
Portion 4 of the Farm Buffelshoek 351 KQ, the Remaining Extent of the farm Buffelshoek 351 KQ and the Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ, situated in the Waterberg District Municipality and the Thabazimbi Local Municipality of the Limpopo Province.

Nature of proposed activity, applicable legislation, and listed activity applied for:
A scoping and environmental impact assessment procedure as well as an integrated water use license application will be completed.

Listed activities applied for, for the Integrated Environmental Authorisation:

- Activity 30 of GNR 983 of 2014 (as amended by GN 327 of 2017, and GN 517 of 2021) in terms of the National Environmental Management: Act of 1998 (as amended)
- Activities 6 and 15 of GNR 984 of 2014 (as amended by GN 325 of 2017, and GN 517 of 2021) in terms of the National Environmental Management: Act of 1998 (as amended)
- Activity 12 (a) (ii) of GNR 985 of 2014 (as amended by GN 324 of 2017, and GN 517 of 2021) in terms of the National Environmental Management: Act no. 107 of 1998 (as amended)

Integrated Water Use License Application:
Section 21a, 21b, 21g and 21j of the National Water Act no 36 of 1998 NWA (as amended).

The process to be followed:
This letter forms part of the first phase public participation process (PPP) for the Environmental Authorisation, as well as the Integrated Water Use License Application (IWULA). An advertisement will be placed in 'Platinum Bushvelder' on the 20th of April 2023. Letters are sent to all I&APs and stakeholders on or before the 20th of April 2023. An Environmental Scoping Report (ESR) will be submitted to the Department of Mineral Resources and Energy (DMRE) within 44 from the date of submission of the application form, therefore on or before 25th of May 2023. The ESR and Environmental Impact Assessment Report / Environmental Management Programme (EIA/EMP) will be sent to all registered Interested and Affected Parties and stakeholders (I&APs) as part of the PPP. DMRE will then assess the EIA/EMP and decide on the EA. The adjacent landowners as well as stakeholders have 60 days in which to give comments on this application.

Competent authority and relevant reference number:
Department of Mineral Resources and Energy, Polokwane, Limpopo.
Reference number: LP166MR

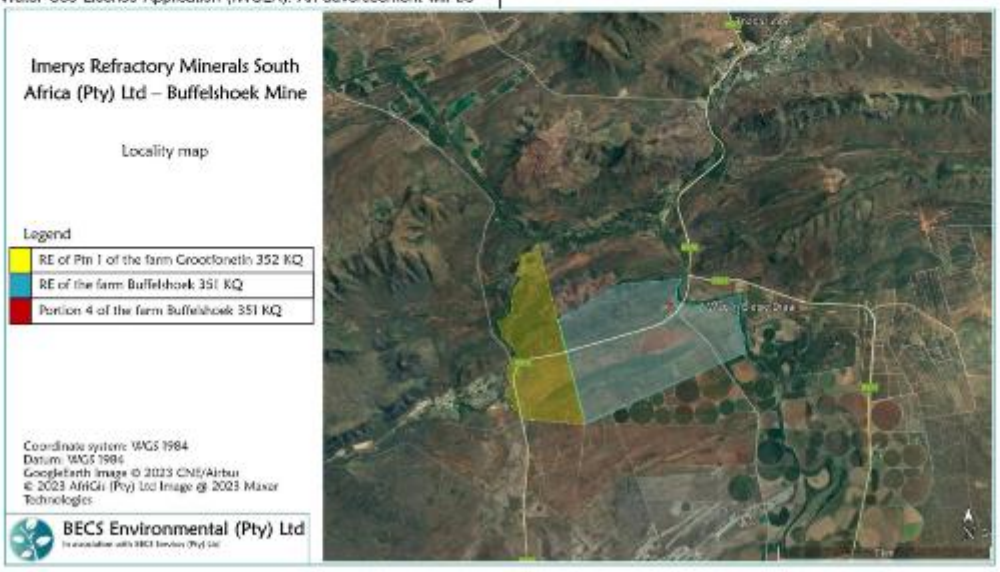
Department of Water and Sanitation, Hartebeespoort
Reference number: WU29201

To register as an I&AP of this project, to obtain more information, or submit comments, please request a Registration Form from BECS and return it to the details provided below, on or before the 22nd of May 2023.

A public meeting will be held as part of the PPP on the 18th of May 2023 at Rhino Andalusite Mine. The environmental consultant can be contacted as per details below.

BECS Environmental (Pty) Ltd.
Christopher Delport: 081 598 8698 (WhatsApp), 082 726 2947 (cell), chris@becsenv.co.za

Locality and layout plan

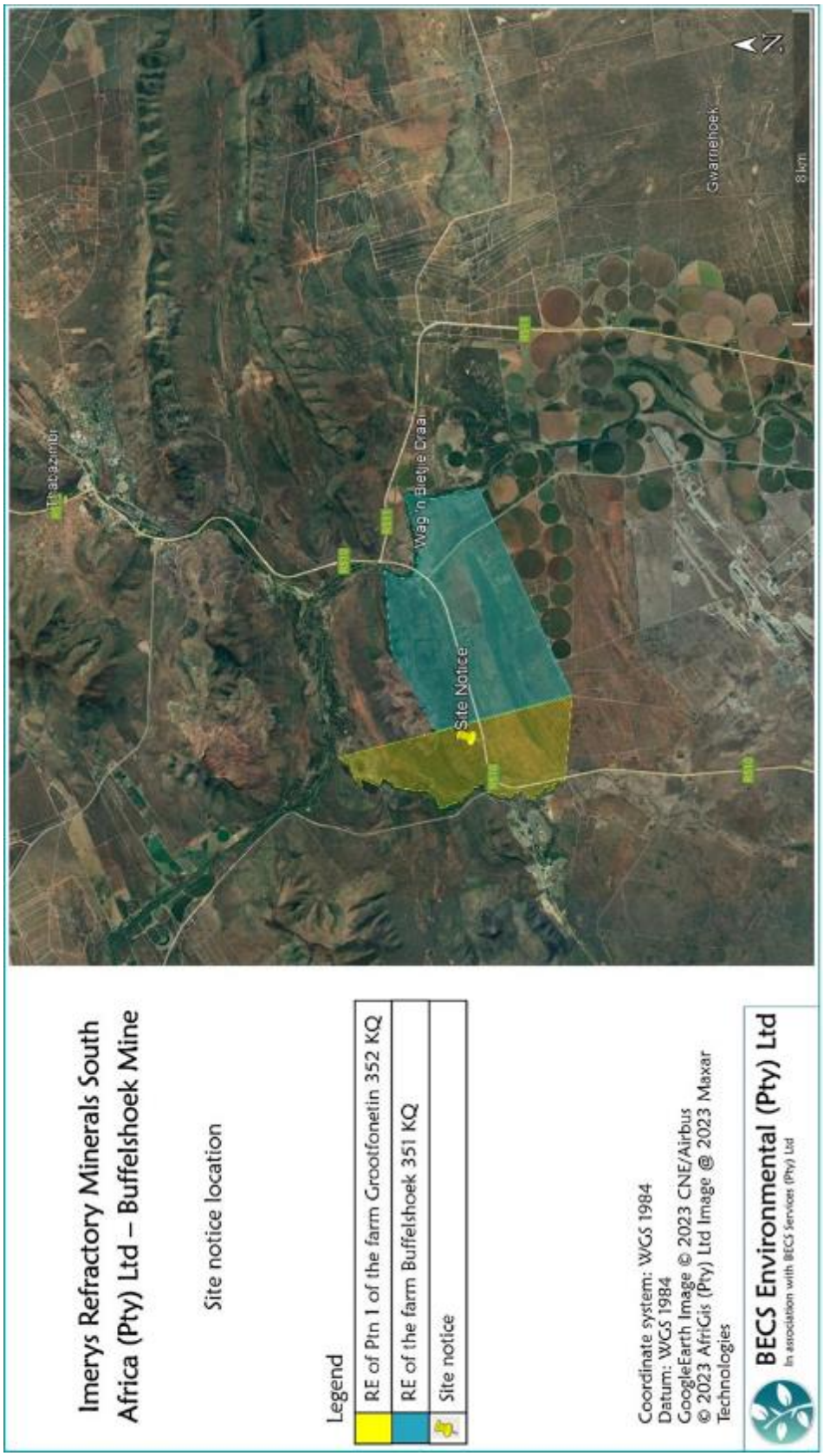


DISCLAIMER: As per the Protection of Personal Information Act (Act No. 4 of 2013) please note that there will be a database of stakeholders and I&APs in the reports to follow, however no contact details will be provided. Please inform us if you would like your name omitted from the reports to follow.

Site notice: Visible from the road

Site notice: Close up

Map of site notice



Addendum 4D: Copy and proof of the letters sent to I&APs and stakeholders

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

20th April 2023

To whom it may concern

RE: IMERYS REFRACTORY MINERALS SOUTH AFRICA (PTY) LTD — APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT NO. 107 OF 1998 (AS AMENDED) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT NO. 28 OF 2002 (AS AMENDED) AND AN INTEGRATED WATER USE LICENSE APPLICATION IN TERMS OF THE NATIONAL WATER ACT NO. 36 OF 1998 (AS AMENDED)

Dear Sir/Madam

Notice of application for an Environmental Authorisation, and Integrated Water Use License Application.

Applicant:
Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine

Location of the activities:
Portion 4 of the Farm Buffelshoek 351 KQ, the Remaining Extent of the farm Buffelshoek 351 KQ and the Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ, situated in the Waterberg District Municipality and the Thabazimbi Local Municipality of the Limpopo Province.

Refer to Page 6 for the location of the activities.

Nature of proposed activity, applicable legislation, and listed activity applied for:
A scoping and environmental impact assessment procedure as well as an integrated water use license application will be completed.

Listed activities applied for, for the Environmental Authorisation:

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

- Activity 30 of GNR 983 of 2014 (as amended by GN 327 of 2017, and GN 517 of 2021) in terms of the National Environmental Management: Act no. 107 of 1998 (as amended) - Any process or activity identified in terms of section 53(1) of the NEMBA.
- Activity 6 of GNR 984 of 2014 (as amended by GN 325 of 2017, and GN 517 of 2021) in terms of the National Environmental Management: Act no. 107 of 1998 (as amended) - The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution, or effluent.
- Activity 15 of GNR 984 of 2014 (as amended by GN 325 of 2017, and GN 517 of 2021) in terms of the National Environmental Management: Act no. 107 of 1998 (as amended) - The clearance of an area of 20ha or more of indigenous vegetation.
- Activity 12 (e) (ii) of GNR 985 of 2014 (as amended by GN 324 of 2017, and GN 517 of 2021) in terms of the National Environmental Management: Act no. 107 of 1998 (as amended) - The clearance of an area of 300m² 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.
  e. Limpopo
  ii. Within critical biodiversity areas identified in bioregional plans

Water uses applied for, for the Integrated Water Use License Application:

- Section 21a of the National Water Act no 36 of 1998 (as amended): Taking water from a water resource.
- Section 21b of the National Water Act no 36 of 1998 (as amended): Storing water.
- Section 21g of the National Water Act no 36 of 1998 (as amended): Disposing of waste in a manner which may detrimentally impact on a water resource.
- Section 21j of the National Water Act no 36 of 1998 (as amended): Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people).

NOTE: The above water uses are preliminary. Additional water uses may be added.

The process to be followed:

The following specialist studies and or specialist opinions are to be undertaken:

- Archaeological and Cultural Heritage Impact Assessment

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

- Palaeontology Impact Assessment
- Aquatic Ecosystem Delineation
- Terrestrial Vegetation Assessment
- Vertebrate fauna (Mammals & Herpetofauna) Habitat Assessment
- Ambient Air Quality Impact Assessment
- Storm Water Management Plan
- Geohydrological Impact Assessment

Additional studies not listed above may be required if requested by the department or competent authorities.

Public Participation Process

This letter forms part of the first phase public participation process (PPP) for the Environmental Authorisation, as well as the Integrated Water Use License Application (IWULA). An advertisement will be placed in 'Platinum Bushvelder' on the 20th of April 2023. A site notice will be placed at the mine on the 20th of April 2023 and a public meeting will be held as part of the PPP on the 18th of May 2023 at Rhino Andalusite Mine.

An Environmental Scoping Report (ESR) must be submitted to the Department of Mineral Resources and Energy (DMRE) within 44 days from the date of submission of the application form, therefore on or before 25th of May 2023. The ESR will be sent to all stakeholders on or before the 25th of May 2023, and all registered Interested and Affected Parties (I&APs). This will then form the second part of the PPP. All registered I&APs will have 30 days to comment on the ESR.

All comments from registered I&APs, stakeholders, as well as the competent authority, will be included in the Environmental Impact Assessment Report / Environmental Management Programme (EIA/EMP). This draft report will first be distributed to all registered I&APs and stakeholders as the third part of the PPP. The final EIA/EMP will include all comments and will be submitted to DMRE. This EIA/EMP will be submitted within 106 days from acceptance of the ESR.

DMRE will then assess the EIA/EMP and decide on the EA. In the case of a positive authorisation, DMRE and the relevant stakeholders will then allow the activities to commence.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Integrated Water use License Application

The IWULA application forms will be uploaded onto the Electronic Water Use Licence Application and Authorisation System (e-WULAAS). The Department of Water and Sanitation (DWS) Hartebeespoort will then arrange a site inspection whereby the water uses applied for, will be assessed.

As soon as the first phase PPP is finished and DWS conducted the site inspection, the IWULA forms will be uploaded onto e-WULAAS. The reports will only be sent to registered I&APs and stakeholders if requested.

DWS will then assess the IWULA and decide whether to issue an Integrated Water Use Licence.

According to GN 267, Regulations Regarding the Procedural Requirements for Water Use Licence Applications and Appeals of 2017 i.t.o the National Water Act no 36 of 1998 (as amended):

."*A procedure for public participation must be conducted as contemplated in section 41(4) of the Act, as part of the water use licence application process*"

and

"*Where a PPP has already been undertaken through the Environment Impact Assessment processes or any other public consultation process, and that PPP contains and covers all issues pertaining to water use activities, then that public participation process report may, subject to approval by the responsible authority, be submitted for the requirements of the water use licence application.*"

The process followed adheres to Appendix 8 of GN 267, Regulations Regarding the Procedural Requirements for Water Use Licence Applications and Appeals of 2017 i.t.o the National Water Act no 36 of 1998 (as amended). Imerys Refractory Minerals South Africa (Pty) Ltd have thus appointed BECS Environmental as the independent Environmental Assessment Practitioner (EAP) to apply for the Water Use License.

The adjacent landowners as well as stakeholders have 60 days in which to give comments on this application.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Competent authority and relevant reference number:

Department of Mineral Resources and Energy, Polokwane, Limpopo.
Reference number: LP166MR

Department of Water and Sanitation, Hartebeespoort
Reference number: WU29201

Register as an Interested and affected party (I&AP):

To register as an I&AP of this project, to obtain more information, or submit comments, please request a Registration Form from BECS Environmental and return it to the details provided below before the 22nd of May 2023.

Please also fill in page 7 of the comment report and send back to the EAP.

Contact details for more information:

To obtain additional information, please contact the EAP at the details provided below.
BECS Environmental (Pty) Ltd,
Christopher Delport: 081 598 8698 (WhatsApp), 082 726 2947 (cell), chris@becsenv.co.za
Regards;

Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine

Locality map

Legend

RE of Ptn 1 of the farm Grootfontein 352 KQ
RE of the farm Buffelshoek 351 KQ
Portion 4 of the farm Buffelshoek 351 KQ

Coordinate system: WGS 1984
Datum: WGS 1984
GoogleEarth Image © 2023 CNE/Airbus
© 2023 AfriGis (Pty) Ltd Image @ 2023 Maxar Technologies

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

Location of the activities

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@beesenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

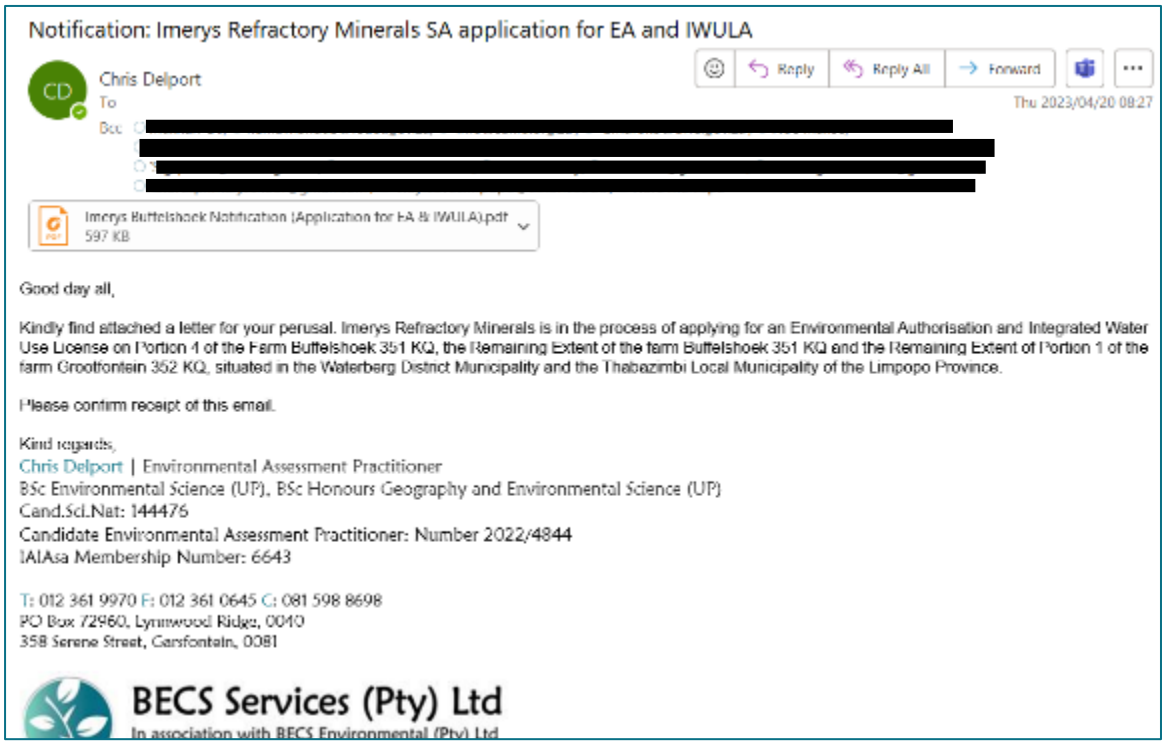
IMERYS REFRACTORY MINERALS SOUTH AFRICA (PTY) LTD — APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT NO. 107 OF 1998 (AS AMENDED) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT NO. 28 OF 2002 (AS AMENDED) AND AN INTEGRATED WATER USE LICENSE APPLICATION IN TERMS OF THE NATIONAL WATER ACT NO. 36 OF 1998 (AS AMENDED)	
Date:	

PARTICULARS OF THE INTERESTED AND AFFECTED PARTY	
Name:	Postal address:
Tel nr:	
Fax nr:	
Cell nr:	
e-mail:	

COMMENTS REPORT

DISCLAIMER: As per the Protection of Personal Information Act (Act No. 4 of 2013) please note that there will be a database of stakeholders and I&APs in the reports to follow, however no contact details will be provided. Please inform us if you would like your name omitted from the reports to follow.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za



Notification: Imerys Refractory Minerals SA application for EA and IWULA

Chris Delport
To
Bcc [redacted]

Reply | Reply All | Forward
Thu 2023/04/20 08:27

Imerys Buffelshoek Notification (Application for EA & IWULA).pdf
597 KB

Good day all,

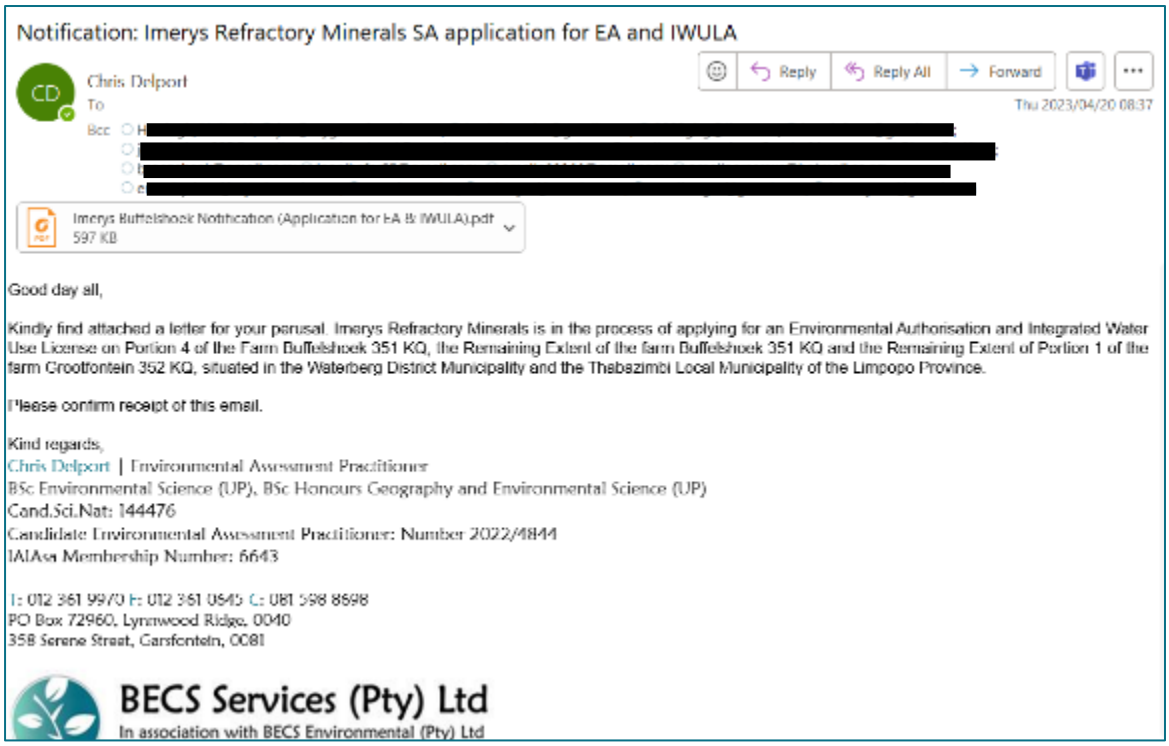
Kindly find attached a letter for your perusal. Imerys Refractory Minerals is in the process of applying for an Environmental Authorisation and Integrated Water Use License on Portion 4 of the Farm Buffelshoek 351 KQ, the Remaining Extent of the farm Buffelshoek 351 KQ and the Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ, situated in the Waterberg District Municipality and the Thabazimbi Local Municipality of the Limpopo Province.

Please confirm receipt of this email.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

T: 012 361 9970 F: 012 361 0645 C: 081 598 8698
PO Box 72960, Lynnwood Ridge, 0040
358 Serene Street, Garsfontein, 0081

BECS Services (Pty) Ltd
In association with BECS Environmental (Pty) Ltd



Notification: Imerys Refractory Minerals SA application for EA and IWULA

Chris Delport
To
Bcc [redacted]

Reply | Reply All | Forward
Thu 2023/04/20 08:37

Imerys Buffelshoek Notification (Application for EA & IWULA).pdf
597 KB

Good day all,

Kindly find attached a letter for your perusal. Imerys Refractory Minerals is in the process of applying for an Environmental Authorisation and Integrated Water Use License on Portion 4 of the Farm Buffelshoek 351 KQ, the Remaining Extent of the farm Buffelshoek 351 KQ and the Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ, situated in the Waterberg District Municipality and the Thabazimbi Local Municipality of the Limpopo Province.

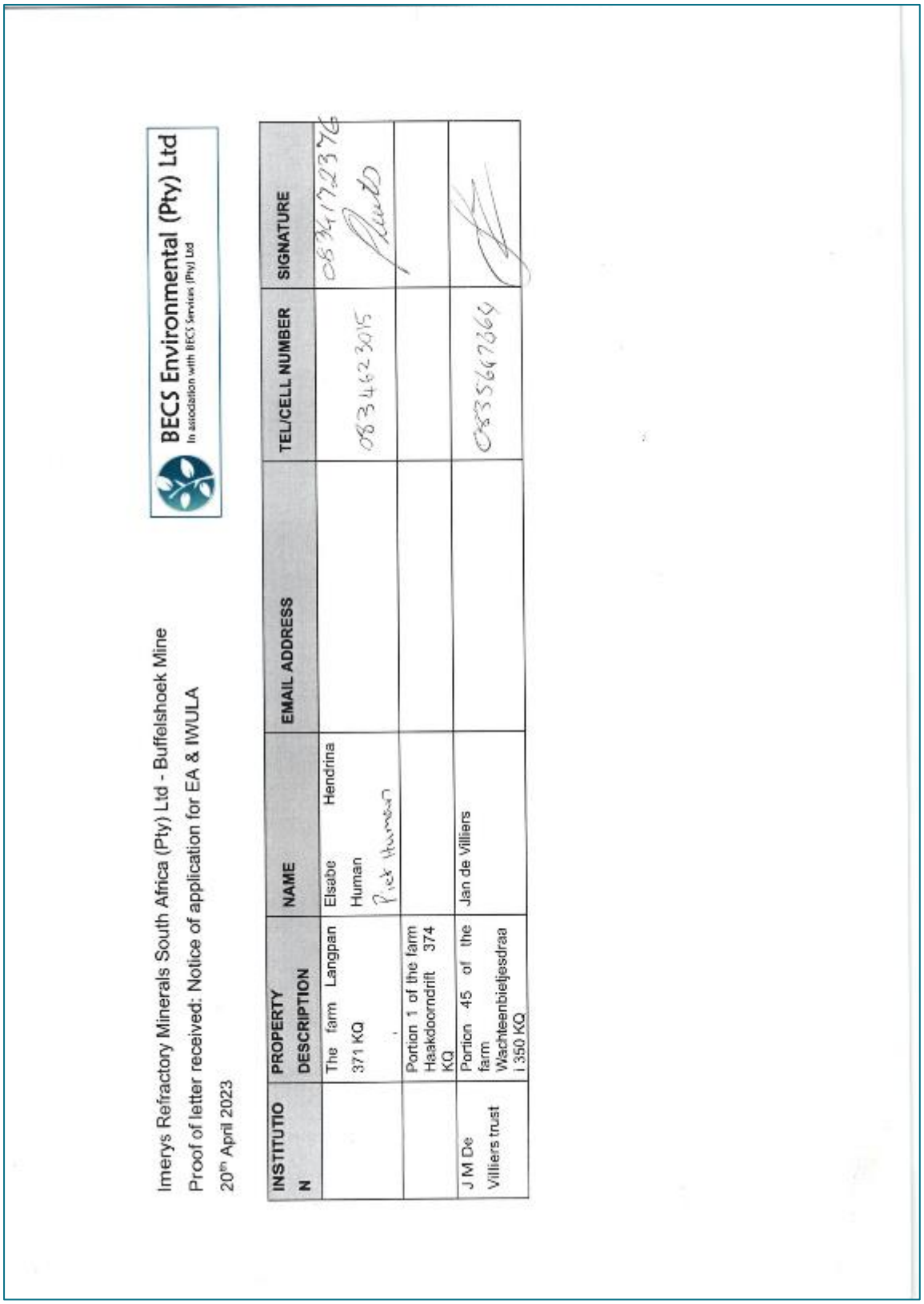
Please confirm receipt of this email.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

T: 012 361 9970 F: 012 361 0645 C: 081 598 8698
PO Box 72960, Lynnwood Ridge, 0040
358 Serene Street, Garsfontein, 0081

BECS Services (Pty) Ltd
In association with BECS Environmental (Pty) Ltd

*NOTE: In accordance with the Protection of Personal Information Act (Act No. 4 of 2013) personal details are omitted.



BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

Imerys Refractory Minerals South Africa (Pty) Ltd - Buffelshoek Mine

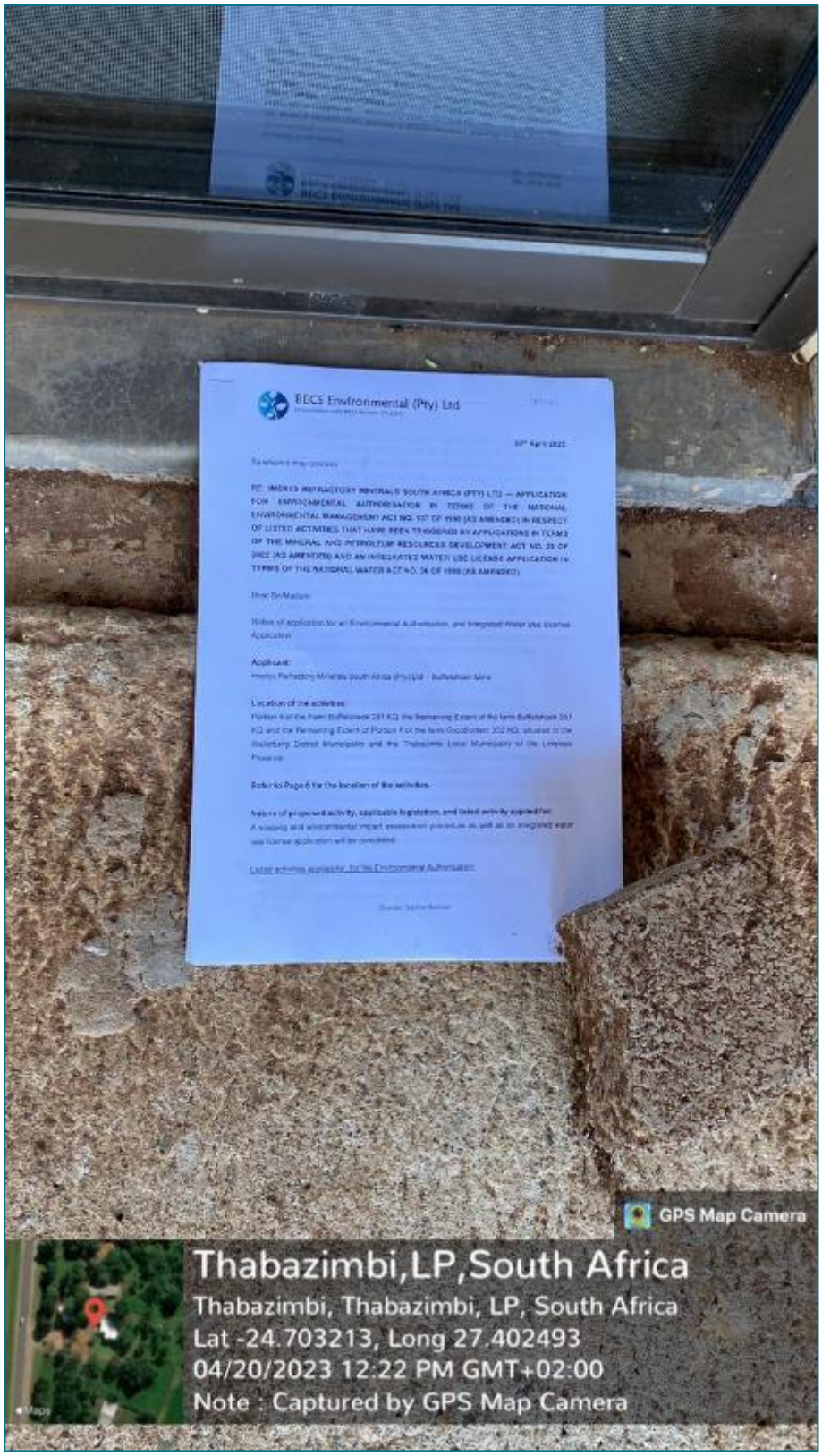
Proof of letter received: Notice of application for EA & IWULA

20th April 2023

INSTITUTION	PROPERTY DESCRIPTION	NAME	EMAIL ADDRESS	TEL/CELL NUMBER	SIGNATURE
	The farm Langpan 371 KQ	Elsabe Hendrina Human		0834623015	0834172376
	Portion 1 of the farm Haakdoorndrift 374 KQ				
J M De Villiers trust	Portion 45 of the farm Wachteenbietjesdraai 350 KQ	Jan de Villiers		0835697369	

Proof of letters hand delivered to adjacent properties (The farm Langpan 371 KQ and Portion 45 of the farm Wachteenbietjiesdraai 350 KQ)

Proof of letter placed outside house on Portion 1 of the farm Haakdoorndrift 374 KQ



Close up of letter placed outside house on Portion 1 of the farm Haakdoorndrift 374 KQ

Addendum 4E: Public meeting attendance register

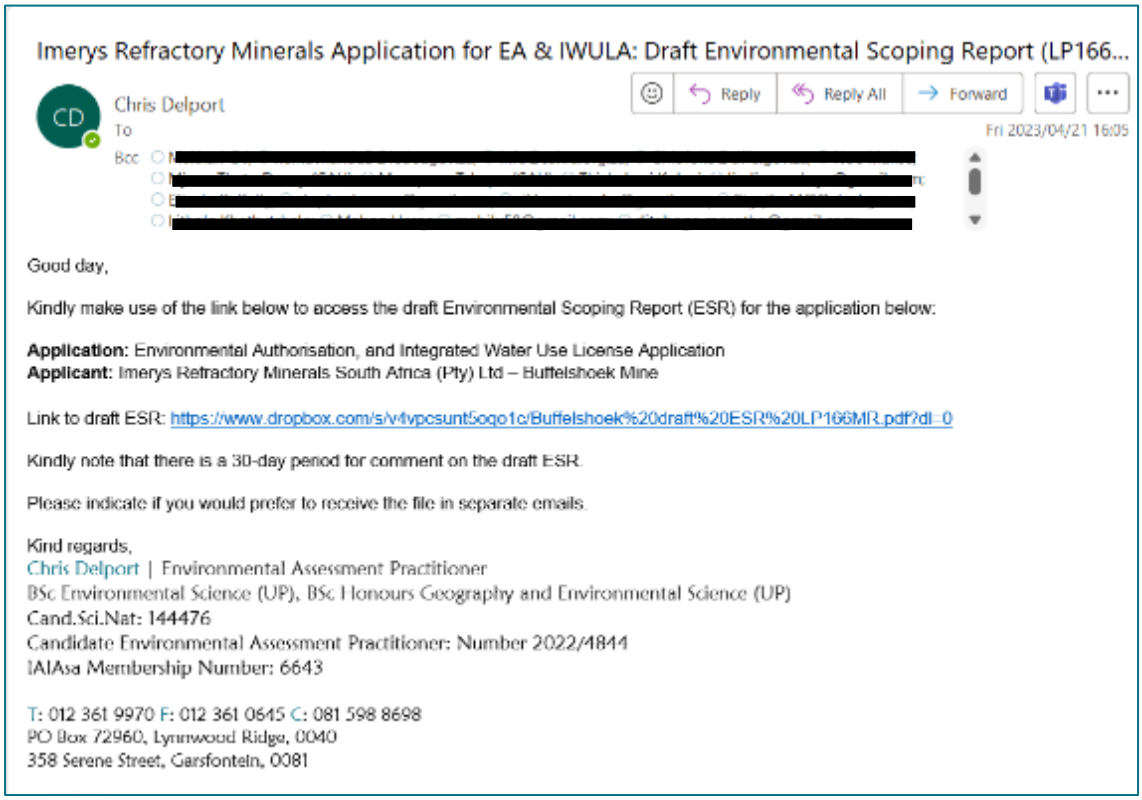
BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

ATTENDANCE REGISTER –Public meeting as part of EIA and IWULA
Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
18 May 2023, 9h00
[redacted]

NAME & SURNAME	COMPANY & DESIGNATION	TEL/ CELL NUMBER	E-MAIL ADDRESS	SIGNATURE
Miles Longhurst	BECS	0827262947	miles @becs.env.com	
Phumudzo Rambau	Imerys	063509 6614	phumudzo.rambau@imerys.com	
Sakhile Mthembu	Imerys	073 0012160	sakhile.mthembu@imerys.com	
Marcus Sekano	IMERYS	082904 8059	marcus.sekano@imerys.com	

Addendum 4F: Proof of the draft & final ESR being sent to I&APs and stakeholders

Proof: Draft ESR sent out



Imerys Refractory Minerals Application for EA & IWULA: Draft Environmental Scoping Report (LP166...

Reply | Reply All | Forward

Chris Delport
To
Bcc [redacted]
Fri 2023/04/21 16:05

Good day,

Kindly make use of the link below to access the draft Environmental Scoping Report (ESR) for the application below:

Application: Environmental Authorisation, and Integrated Water Use License Application
Applicant: Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine

Link to draft ESR: https://www.dropbox.com/s/v4vpcsunt5oqo1c/Buffelshoek%20draft%20ESR%20LP166MR.pdf?dl=0

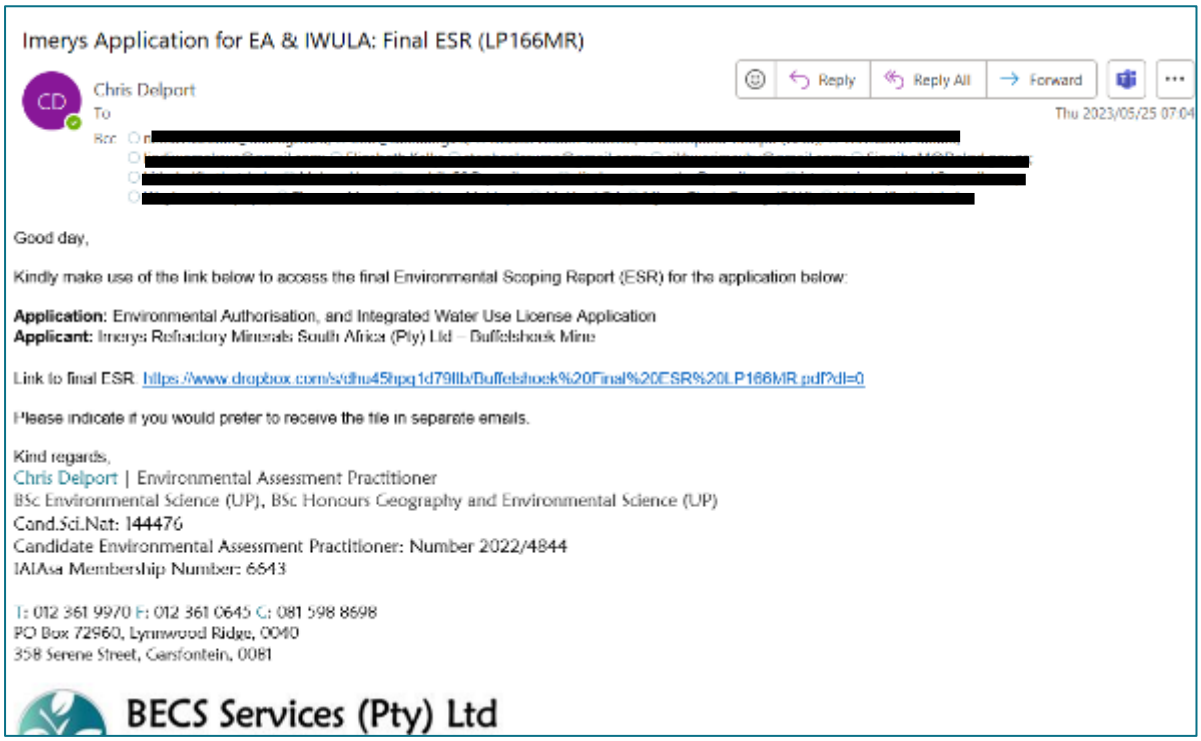
Kindly note that there is a 30-day period for comment on the draft ESR.

Please indicate if you would prefer to receive the file in separate emails.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

T: 012 361 9970 F: 012 361 0645 C: 081 598 8698
PO Box 72960, Lynnwood Ridge, 0040
358 Serene Street, Garsfontein, 0081

Proof: Final ESR sent out



Imerys Application for EA & IWULA: Final ESR (LP166MR)

Reply | Reply All | Forward

Chris Delport
To
Bcc [redacted]
Thu 2023/05/25 07:04

Good day,

Kindly make use of the link below to access the final Environmental Scoping Report (ESR) for the application below:

Application: Environmental Authorisation, and Integrated Water Use License Application
Applicant: Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine

Link to final ESR: https://www.dropbox.com/s/dhu45lpq1d79llb/Buffelshoek%20Final%20ESR%20LP166MR.pdf?dl=0

Please indicate if you would prefer to receive the file in separate emails.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

T: 012 361 9970 F: 012 361 0645 C: 081 598 8698
PO Box 72960, Lynnwood Ridge, 0040
358 Serene Street, Garsfontein, 0081

BECS Services (Pty) Ltd

Proof of submission of ESR to DMRE

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

24 May 2023

Department of Mineral Resources and Energy
Per hand: Registry, BROLL Building, 101 Dorp Street, POLOKWANE

RE: FINAL ENVIRONMENTAL SCOPING REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I,_____, hereby acknowledge receipt of **three** hard copies of the Final Environmental Scoping Report and associated addenda for the above-mentioned project.

RECEIVED
MINERAL RESOURCES
23/05/23

_____
Signature

_____
Date

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Proof of submission of ESR to DARD

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

23 May 2023

Department of Agriculture and Rural Development
Per hand: Registry, 67 Biccard St, Polokwane Central, Polokwane, 0700

RE: FINAL ENVIRONMENTAL SCOPING REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I,_____, hereby acknowledge receipt of one hard copy of the Final Environmental Scoping Report and associated addenda for the above-mentioned project.

_____
Signature

DEPARTMENT OF AGRICULTURAL AND RURAL DEVELOPMENT
REGISTRY RECEIVED
2023 -05- 23
TIME:.....
P/BAG X9487
POLOKWANE 0700

_____
Date

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Proof of submission of ESR to LEDET

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

23 May 2023

Limpopo Department of Economic Development, Environment & Tourism
Per hand: Registry, 20 Hans Van Rensburg St, Polokwane Central, Polokwane, 0700

RE: FINAL ENVIRONMENTAL SCOPING REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I,_____, hereby acknowledge receipt of one hard copy of the Final Environmental Scoping Report and associated addenda for the above-mentioned project.

DEPARTMENT OF ECONOMIC DEVELOPMENT ENVIRONMENT & TOURISM
HEAD OFFICE
REGISTRY SECTION
23 MAY 2023
RECEIVED
PRIVATE BAG X 9484 POLOKWANE 0700
LIMPOPO PROVINCE

Signature

23/05/2023
Date

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Proof of submission of ESR to DWS

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

26 May 2023

Department of Water and Sanitation
Per hand: Registry, DWS, North West Provincial Operations, Water Resource Management

RE: FINAL ENVIRONMENTAL SCOPING REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I, Botshe Matjila, hereby acknowledge receipt of **one** hard copies of the Final Environmental Scoping Report and associated addenda for the above-mentioned project.

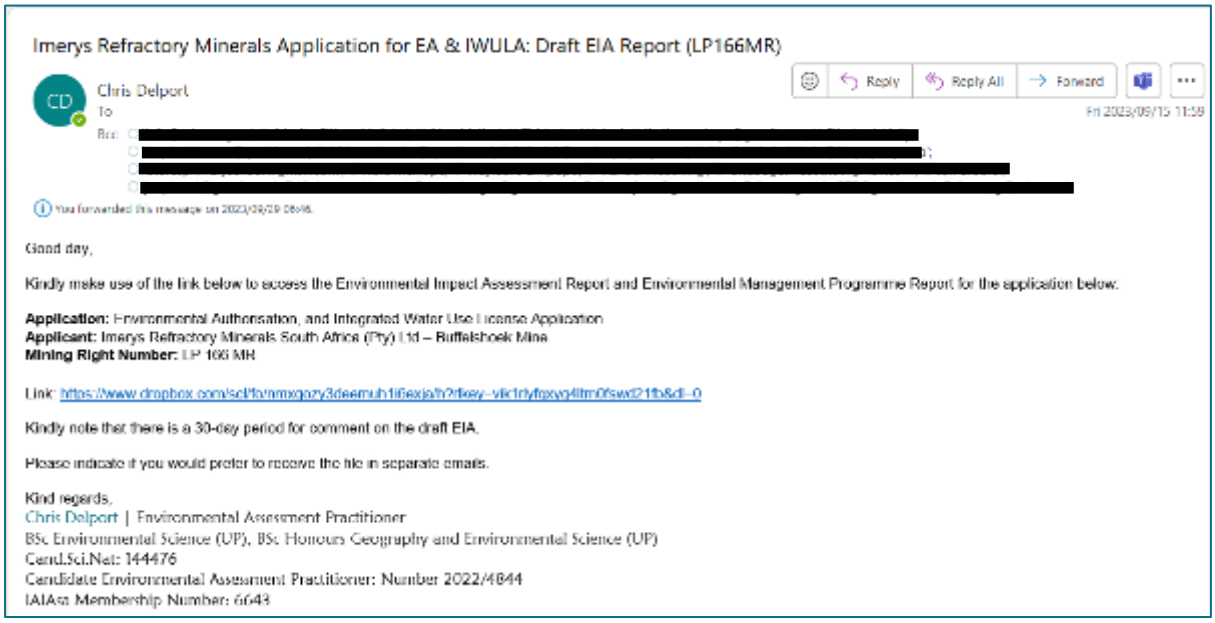
Matjila
Signature

26/05/2023
Date

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Addendum 4G: Proof of draft EIA sent out

Proof: Draft EIA sent out



Imerys Refractory Minerals Application for EA & IWULA: Draft EIA Report (LP166MR)

Chris Delport
To [redacted]
Cc [redacted]

Reply | Reply All | Forward

Fri 2023/09/15 11:59

You forwarded this message on 2023/09/29 09:46.

Good day,

Kindly make use of the link below to access the Environmental Impact Assessment Report and Environmental Management Programme Report for the application below:

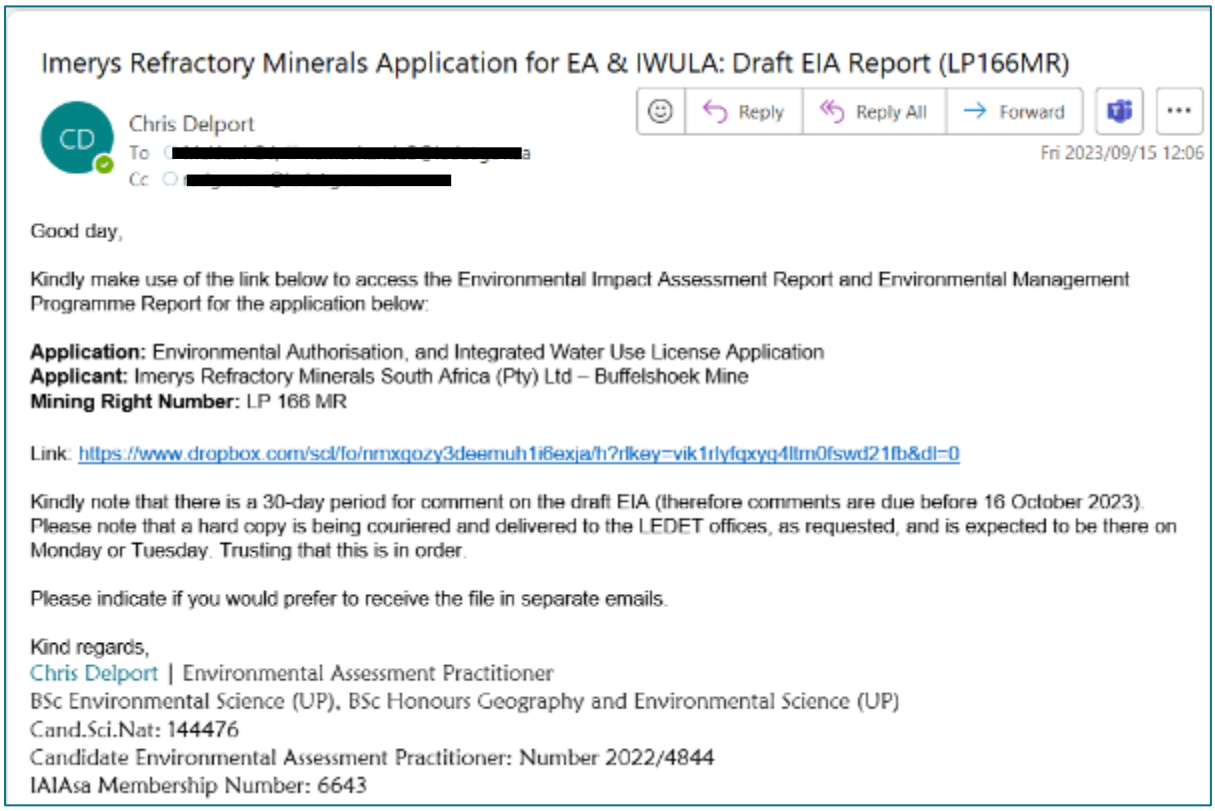
Application: Environmental Authorisation, and Integrated Water Use License Application
Applicant: Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine
Mining Right Number: LP 166 MR

Link: https://www.dropbox.com/scl/fo/nmxqozy3deemuh1i6exja/h?rlkey=vik1rlyfqxyq4lltm0fswd21fb&dl=0

Kindly note that there is a 30-day period for comment on the draft EIA.

Please indicate if you would prefer to receive the file in separate emails.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643



Imerys Refractory Minerals Application for EA & IWULA: Draft EIA Report (LP166MR)

Chris Delport
To [redacted]
Cc [redacted]

Reply | Reply All | Forward

Fri 2023/09/15 12:06

Good day,

Kindly make use of the link below to access the Environmental Impact Assessment Report and Environmental Management Programme Report for the application below:

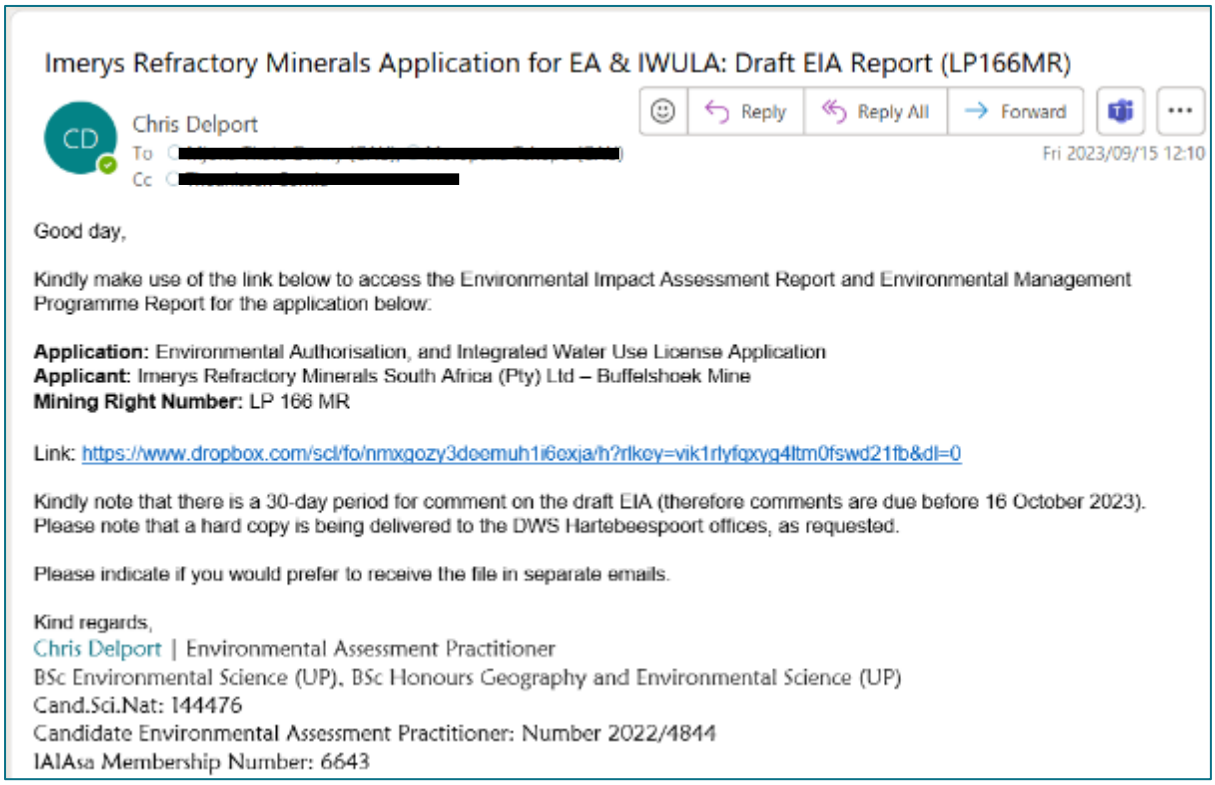
Application: Environmental Authorisation, and Integrated Water Use License Application
Applicant: Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine
Mining Right Number: LP 166 MR

Link: https://www.dropbox.com/scl/fo/nmxqozy3deemuh1i6exja/h?rlkey=vik1rlyfqxyq4lltm0fswd21fb&dl=0

Kindly note that there is a 30-day period for comment on the draft EIA (therefore comments are due before 16 October 2023). Please note that a hard copy is being couriered and delivered to the LEDET offices, as requested, and is expected to be there on Monday or Tuesday. Trusting that this is in order.

Please indicate if you would prefer to receive the file in separate emails.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643



Imerys Refractory Minerals Application for EA & IWULA: Draft EIA Report (LP166MR)

CD Chris Delport

To [redacted]

Cc [redacted]

Reply | Reply All | Forward

Fri 2023/09/15 12:10

Good day,

Kindly make use of the link below to access the Environmental Impact Assessment Report and Environmental Management Programme Report for the application below:

Application: Environmental Authorisation, and Integrated Water Use License Application
Applicant: Imerys Refractory Minerals South Africa (Pty) Ltd – Buffelshoek Mine
Mining Right Number: LP 166 MR

Link: https://www.dropbox.com/scl/fo/nmxgozy3deemuh1i6oxja/h?rlkey=vik1rlyfqxyg4ltm0fswd21fb&dl=0

Kindly note that there is a 30-day period for comment on the draft EIA (therefore comments are due before 16 October 2023). Please note that a hard copy is being delivered to the DWS Hartebeespoort offices, as requested.

Please indicate if you would prefer to receive the file in separate emails.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

*NOTE: In accordance with the Protection of Personal Information Act (Act No. 4 of 2013) personal details are omitted.

Proof of submission of draft EIA to DARD

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

18 September 2023

Department of Agriculture and Rural Development
Per hand: Registry, 67 Biccard St, Polokwane Central, Polokwane, 0700

RE: VOLUME 1: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Reference No:	LP 30/5/1/2/3/2/1 (0166) EM
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I,_____, hereby acknowledge receipt of **one hard copy** of **Volume 1** of the Draft Environmental Impact Assessment Report and associated addenda for the above-mentioned project.

_____
Signature

DEPARTMENT OF AGRICULTURAL AND RURAL DEVELOPMENT
REGISTRY RECEIVED
2023 -09- 19
TIME:.....
P/BAG X9487
POLOKWANE 0700

_____
Date

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

18 September 2023

Department of Agriculture and Rural Development
Per hand: Registry, 67 Biccard St, Polokwane Central, Polokwane, 0700

RE: VOLUME 2: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Reference No:	LP 30/5/1/2/3/2/1 (0166) EM
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I,_____, hereby acknowledge receipt of **one hard copy** of **Volume 2** of the Draft Environmental Impact Assessment Report and associated addenda for the above-mentioned project.

_____
Signature

_____
Date

DEPARTMENT OF AGRICULTURAL AND RURAL DEVELOPMENT
REGISTRY RECEIVED
2023 -09- 19
TIME:.....
P/BAG X9487
POLOKWANE 0700

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Proof of submission of draft EIA to LEDET

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

18 September 2023

Limpopo Department of Economic Development, Environment & Tourism
Per hand: Registry, 20 Hans Van Rensburg St, Polokwane Central, Polokwane, 0700

RE: VOLUME 1: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Reference No:	12/1/9/CR-W254
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I,_____, hereby acknowledge receipt of **one hard copy** of the **Volume 1** of the Draft Environmental Impact Assessment Report and associated addenda, as well as **one electronic copy (USB drive)** for the above-mentioned project.

Signature

DEPARTMENT OF ECONOMIC DEVELOPMENT
ENVIRONMENT & TOURISM
HEAD OFFICE
REGISTRY SECTION
19 SEP 2023
RECEIVED
PRIVATE BAG X9484 POLOKWANE 0700
LIMPOPO PROVINCE

_____
Date

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970. Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

18 September 2023

Limpopo Department of Economic Development, Environment & Tourism
Per hand: Registry, 20 Hans Van Rensburg St, Polokwane Central, Polokwane, 0700

RE: VOLUME 2: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Reference No:	12/1/9/CR-W254
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I,_____, hereby acknowledge receipt of **one hard copy** of the **Volume 2** of the Draft Environmental Impact Assessment Report and associated addenda for the above-mentioned project.

Signature

DEPARTMENT OF ECONOMIC DEVELOPMENT
ENVIRONMENT & TOURISM
HEAD OFFICE
REGISTRY SECTION
19 SEP 2023
RECEIVED
PRIVATE BAG X9484 POLOKWANE 0700
LIMPOPO PROVINCE

Date

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Proof of submission of draft EIA to DWS

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

18 September 2023

Department of Water and Sanitation

Per hand: Registry, DWS, North West Provincial Operations, Water Resource Management

RE: VOLUME 1: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Reference No:	LP 30/5/1/2/3/2/1 (0166) EM
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I, Mothemane Pleasure, hereby acknowledge receipt of **one hard copy** of **Volume 1** of the Draft Environmental Impact Assessment Report and associated addenda for the above-mentioned project.

Signature
RW REGION
INSTITUTIONAL
ESTABLISHMENT
DEPARTMENT OF WATER AND SANITATION
HAARTBEESPOORT

2023 -09- 18

Date
DEPARTEMENT VAN WATERWESE
PRIVAATSAK X387
HARTBEESPOORT
0216

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

18 September 2023

Department of Water and Sanitation
Per hand: Registry, DWS, North West Provincial Operations, Water Resource Management

RE: VOLUME 2: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT (RE) OF THE FARM BUFFELSHOEK 351 KQ AND THE RE OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE

Client:	Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
Mining Right:	LP 30/5/1/2/2/166 MR
Reference No:	LP 30/5/1/2/3/2/1 (0166) EM
Properties:	Portion 4 of the Farm Buffelshoek 351 KQ The Remaining Extent of the farm Buffelshoek 351 KQ The Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ

Proof of submission

I, Pleasure Mothemane, hereby acknowledge receipt of **one hard copy** of **Volume 2** of the Draft Environmental Impact Assessment Report and associated addenda for the above-mentioned project.

Signature

NW REGION
INSTITUTIONAL
ESTABLISHMENT
DEPARTMENT OF WATER AND SANITATION
HAARTBEESPOORT

Date 2023 -09- 18

PRIVAATSAK
PRIVATE BAG
X3067
HARTBEESPOORT
0216

Director: Salome Beeslaar
Environmental assessment practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Addendum 4H: Comments received and responded to

Comments from JAVAVU Game farm and Lodge

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

IMERYS REFRACTORY MINERALS SOUTH AFRICA (PTY) LTD — APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT NO. 107 OF 1998 (AS AMENDED) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT NO. 28 OF 2002 (AS AMENDED) AND AN INTEGRATED WATER USE LICENSE APPLICATION IN TERMS OF THE NATIONAL WATER ACT NO. 36 OF 1998 (AS AMENDED)	
Date: 21-04-2023	

PARTICULARS OF THE INTERESTED AND AFFECTED PARTY	
Name: J.J. Jansen van Vuuren	Postal address:
Tel nr: [redacted]	[redacted]
Fax nr:	[redacted]
Cell nr: [redacted]	
e-mail: [redacted]	

COMMENTS REPORT
Concerned about water levels in boreholes
Noise impact as we are in the Eco Tourism business.

DISCLAIMER: As per the Protection of Personal Information Act (Act No. 4 of 2013) please note that there will be a database of stakeholders and I&APs in the reports to follow, however no contact details will be provided. Please inform us if you would like your name omitted from the reports to follow.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Chris Delport

From:	Chris Delport
Sent:	Wednesday, 03 May 2023 09:51
To:	Cobus van Vuuren
Cc:	Salome Beeslaar
Subject:	I&AP request to be registered

Tracking:	**Recipient**	**Delivery**
	Cobus van Vuuren	
	Salome Beeslaar	Delivered: 2023/05/03 09:51

Good day J.J. Jansen Van Vuuren,

Your request to be registered is acknowledged, you have now been registered as an interested and affected party for this project.

With regard to your concern regarding groundwater levels, please be informed that groundwater abstraction is not part of the scope of the Integrated Water Use License Application (IWULA) which the mine will be applying for at this stage. However, if this changes you will be informed. Studies have also indicated that the pits will not intersect groundwater. Furthermore, regarding noise, the Environmental Impact Assessment (EIA) Report will include an impact assessment and mitigation measures that will be incorporated to ensure that noise impacts are minimised.

All impacts to groundwater and noise levels will be covered in the EIA report, which you will receive a copy of.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: [redacted]>
Sent: Friday, April 21, 2023 12:37 PM
To: Chris Delport <chris@becsenv.co.za>
Subject:

Regards
Cobus van Vuuren

Van Vuuren African Safaris
JAVAVU Game farm and Lodge
[redacted]

1

*NOTE: In accordance with the Protection of Personal Information Act (Act No. 4 of 2013) personal details are omitted.

Comments from Grootfontein Private Game Reserve

Chris Delport

From: Chris Delport
Sent: Friday, 19 May 2023 08:07
To: Bertus Grobler
Subject: RE: Notification: Imerys Refractory Minerals SA application for EA and IWULA

Good day Bertus,

I hope you are well.

Your registration form has been received and you have been registered as an I&AP for this project. Both of your email addresses have been taken down.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Bertus Grobler <[redacted]
Sent: Tuesday, April 25, 2023 8:18 PM
To: Chris Delport <chris@becsenv.co.za>
Subject: RE: Notification: Imerys Refractory Minerals SA application for EA and IWULA

Hi good day Chris

Please email registration form as an I&AP.

Attached is p.7 of the comment report – filled in.

Regards / Thanks / Dankie

Bertus Grobler
[redacted]

For E-mail disclaimer see VKB Website

From: Jan Grobler [redacted]
Sent: Thursday, April 20, 2023 4:00 PM
To: Bertus Grobler [redacted]
Subject: Fwd: Notification: Imerys Refractory Minerals SA application for EA and IWULA

1

Vriendelike groete,

Jan Grobler
FARMER, ECO WARRIOR
[redacted]
[redacted]
R510 | Thabazimbi | Limpopo Province | South Africa
[redacted]

Grootfo
PRIVATE GAME

Begin forwarded message:

From: Chris Delport <chris@becsenv.co.za>
Subject: Notification: Imerys Refractory Minerals SA application for EA and IWULA
Date: 20 April 2023 at 08:36:39 SAST

Good day all,

Kindly find attached a letter for your perusal. Imerys Refractory Minerals is in the process of applying for an Environmental Authorisation and Integrated Water Use License on Portion 4 of the Farm Buffelshoek 351 KQ, the Remaining Extent of the farm Buffelshoek 351 KQ and the Remaining Extent of Portion 1 of the farm Grootfontein 352 KQ, situated in the Waterberg District Municipality and the Thabazimbi Local Municipality of the Limpopo Province.

Please confirm receipt of this email.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

T: 012 361 9970 F: 012 361 0645 C: 081 598 8698
PO Box 72960, Lynnwood Ridge, 0040
358 Serene Street, Garsfontein, 0081

BECS Services (Pty) Ltd
In association with BECS Environmental (Pty) Ltd

2

*NOTE: In accordance with the Protection of Personal Information Act (Act No. 4 of 2013) personal details are omitted.

Chris Delport

From: Chris Delport
Sent: Friday, 12 May 2023 12:20
To: Bertus Grobler; Jan Grobler
Subject: RE: Notification: Imerys Refractory Minerals SA application for EA and IWULA

Good afternoon,

Not a problem. I will send you the minutes afterwards.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Bertus Grobler <[redacted]
Sent: Friday, May 12, 2023 11:49 AM
To: Jan Grobler <[redacted]; Chris Delport <chris@becsenv.co.za>
Subject: RE: Notification: Imerys Refractory Minerals SA application for EA and IWULA

Hi Chris
Stuur minutes asb.
Ek is dan in Pietersburg.

Bertus Grobler
Kredietbesluurder:Credit Manager
[redacted]
For E-mail disclaimer see VKB Website

From: Jan Grobler <[redacted]>
Sent: Friday, May 12, 2023 11:25 AM
To: Chris Delport <chris@becsenv.co.za>
Cc: Bertus Grobler <[redacted]>
Subject: Re: Notification: Imerys Refractory Minerals SA application for EA and IWULA

Dankie...

Ek is in Joburg 18de...Bertus?

Chris, kan jy vir ons die minutes van die meeting aanstuur na die vergadering asb.

1

On 12 May 2023, at 10:11, Chris Delport <chris@becsenv.co.za> wrote:

Good day Jan

Yes, the activities will be South/East of the mountain. It is adjacent to the R510. These are the approximate coordinates: -24.678550, 27.335591.

https://goo.gl/maps/2SDQFzUsExayjNz46

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Jan Grobler <[redacted]>
Sent: Wednesday, May 10, 2023 5:53 PM
To: Chris Delport <chris@becsenv.co.za>
Cc: Bertus Grobler [redacted]
Subject: Re: Notification: Imerys Refractory Minerals SA application for EA and IWULA

Thanks Chris....so basically the new mining activities will be on Buffelsfontein, South/East of the mountain, on the right hand side of the Thaba-Northam Road, before the Makoppa turnoff?

That will be good news from our portion of Grootfontein's perspective.

<image001.png>

> On 10 May 2023, at 13:04, Chris Delport <chris@becsenv.co.za> wrote:
>
> Good day Jan.
>
> You and Bertus have been registered as Interested and Affected parties for the project.
>
> The meeting will take place at 9 A.M. on the 18th of May.
>
> In response to your comment, your farm portion is located behind the Iron formation mountains and within the Dolomite Geological terrain approximately 3.5km straight

2

line distance. The proposed activities will not intersect your potential aquifer. The Historical quarries 1 - 3 are located closer to your property than any of the Buffelshoek future operations and there has been no impact from these quarries in the past. The previous Geohydrological Reports state the following: "No significant groundwater level impacts are expected to occur as a result of the opencast mining. No significant mine dewatering should be required since the quarry floor is planned to remain largely above the local groundwater level. This statement is also supported by a groundwater study conducted for the adjacent Rhino Andalusite Mine, which found that none of the mine's active quarries require any dewatering (Geohydrological Study for Rhino Minerals – Rhino Andalusite Mine, 2010)." Whilst this study is not for the exact same area we plan to operate on Buffelshoek, the vast majority of the operational conditions remain the same and we will be located further away from your property than before.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Jan Grobler <[redacted]
Sent: Tuesday, May 2, 2023 4:36 PM
To: Chris Delport <chris@becsenv.co.za>
Cc: Bertus Grobler <[redacted]
Subject: Re: Notification: Imerys Refractory Minerals SA application for EA and IWULA

Middag Chris,

Kan jy my en my broer Bertus lys as I&AP vir die Rhino aansoeke asb.

Ons verteenwoordig die Jan & Marita Trust, eienaar van die aangrensende Grootfontein KQ714, Portion 3 (2 titelaktes).

Enigste comment vir nou: Ons bied al vir dekades jag, toerisme en akkommodasie en dit sal verseker nadelig wees as op aangrensende plaas gemyn word...met moontlike impak op watertafel ens.

Hoe laat is die vergaderihg op 18 Mei 2023?

Dankie,

*NOTE: In accordance with the Protection of Personal Information Act (Act No. 4 of 2013) personal details are omitted.

Memo on the Buffelshoek project public meeting sent to Grootfontein Private Game Reserve

Chris Delport

From: Chris Delport
Sent: Friday, 26 May 2023 09:44
To: Bertus Grobler; Jan Grobler
Cc: Salome Beeslaar
Subject: RE: Notification: Imerys Refractory Minerals SA application for EA and IWULA
Attachments: Public Meeting Memo 25 May 2023.pdf

Tracking:

Recipient	Delivery
Bertus Grobler	
Jan Grobler	
Salome Beeslaar	Delivered: 2023/05/26 09:44

Good day Bertus and Jan,

Trusting that you are well.

Please see the attached document for a memo on the Buffelshoek project public meeting.

Please let me know if you have comments.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Bertus Grobler[redacted]
Sent: Friday, May 12, 2023 11:49 AM
To: Jan Grobler <[redacted]>; Chris Delport <chris@becsenv.co.za>
Subject: RE: Notification: Imerys Refractory Minerals SA application for EA and IWULA

Hi Chris
Stuur minutes asb.
Ek is dan in Pietersburg.

Memo sent to Grootfontein Private Game Reserve

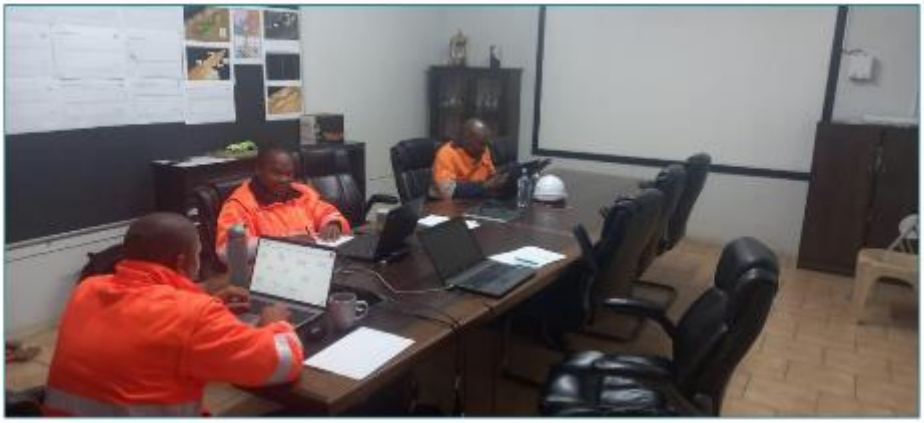
BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

25th May 2023

SUMMARY OF PUBLIC MEETING HELD ON 18 MAY 2023

BECS Environmental and Imerys Refractory Minerals South Africa staff were present at Rhino Andalusite Mine on the 18th of May 2023 from 9:00 until 10:00 AM for the public meeting. Please refer below for a photograph taken on the day as well as Addendum 1 below for the attendance register.

The meeting presentation is attached as Addendum 2 below. Please let us know if you have any comments.



Mine personnel waiting in the Rhino Andalusite Mine boardroom.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

ADDENDUM 1: Attendance Register

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

ATTENDANCE REGISTER –Public meeting as part of EIA and IWULA
Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine
18 May 2023, 9h00

NAME & SURNAME	COMPANY & DESIGNATION	TEL/ CELL NUMBER	E-MAIL ADDRESS	SIGNATURE
Miles Longhurst	BECS	0827762947	miles@becsenv.co.za	[signature]
Pfumudzo Ramana	Imerys	063 509 6814	pfumudzo.ramana@imerys.com	[signature]
Sakhile Mthembu	Imerys	073 0071 64	sakhile.mthembu@[illegible]	[signature]
Marcus Sekano	IMERYS	082 904 8059	marcus.sekano@[illegible].com	[signature]

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

ADDENDUM 2: Presentation

Imerys Refractory Minerals (Pty) Ltd – Buffelshoek Mine

Environmental Authorization & Integrated Water Use License Application for LP166MR

Public and stakeholder meeting at Rhino Andalusite Mine

18 May 2023, 10h00

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

AGENDA

- Introduction and meeting protocol
- Purpose of the meeting
- Background to the mine
- Procedures to be followed
- Application for Environmental Authorisation
- Integrated Water Use License Application (IWULA)
- Proposed timeline
- Discussion and questions

INTRODUCTION & MEETING PROTOCOL

- This meeting is presented by Imerys Refractory Minerals South Africa and BECS Services.
- Please sign the meeting attendance register.
- Feel free to ask questions at the end of presentation.
- Questions and or comments must be related to the project.

PURPOSE OF THE MEETING

- To present the proposed project to the interested & affected parties (I&APs) and stakeholders.
- To present the process to be followed and discuss the application for Environmental Authorization (EA) and the Integrated Water Use License (IWUL)
- Any questions, comments, and information from those attending the public meeting will be included in the authorization process.

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In association with BECS Services (Pty) Ltd

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BACKGROUND TO THE MINE

- Study Site: Portion 4 of the farm Buffelshoek 351 KQ, the Remaining Extent (RE) of the farm Buffelshoek 351 KQ and the RE of Portion 1 of the farm Grootfontein 352 KQ, within the Waterberg District Municipality, Thabazimbi Local Municipality, Limpopo Province
- Quaternary catchment: A24F and A24H quaternary catchment
- Imerys Refractory Minerals (Pty) Ltd proposes to mine Andalusite using opencast mining methods.
- The proposed mine will be a continuation of the already existing mine, Rhino Andalusite Mine, to the south east.

PROCEDURES TO BE FOLLOWED

- An Environmental Impact Assessment (EIA) and Integrated Water Use License Application (IWULA) will be undertaken.
- All comments will be included in the final environmental scoping report (ESR) and the EIA report as well as the IWULA public participation report.
- The EIA report and the IWULA public participation report will be submitted to the Department of Mineral Resources and Energy (DMRE) and the Department of Water and Sanitation (DWS), respectively.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Mikel Longhurst, Chantelle Tollmanslev
Telephone: 012 361 9970, Facsimile: 012 361 0665
Email: salome@becsenv.co.za

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In association with BECS Services (Pty) Ltd

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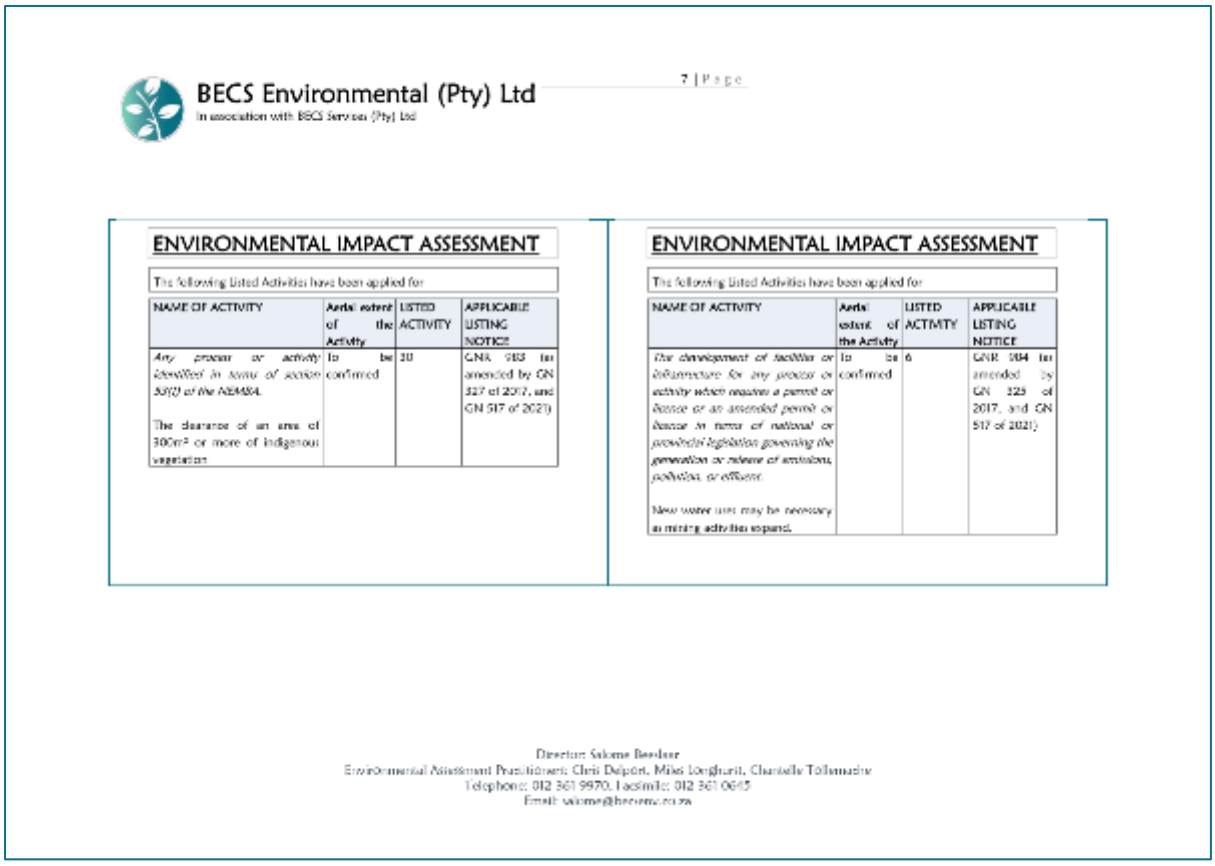
LOCALITY MAP

SITE LAYOUT PLAN

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Mikel Longhurst, Chantelle Tollmanslev
Telephone: 012 361 9970, Facsimile: 012 361 0665
Email: salome@becsenv.co.za



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In association with BECS Services (Pty) Ltd

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ENVIRONMENTAL IMPACT ASSESSMENT

The following Listed Activities have been applied for

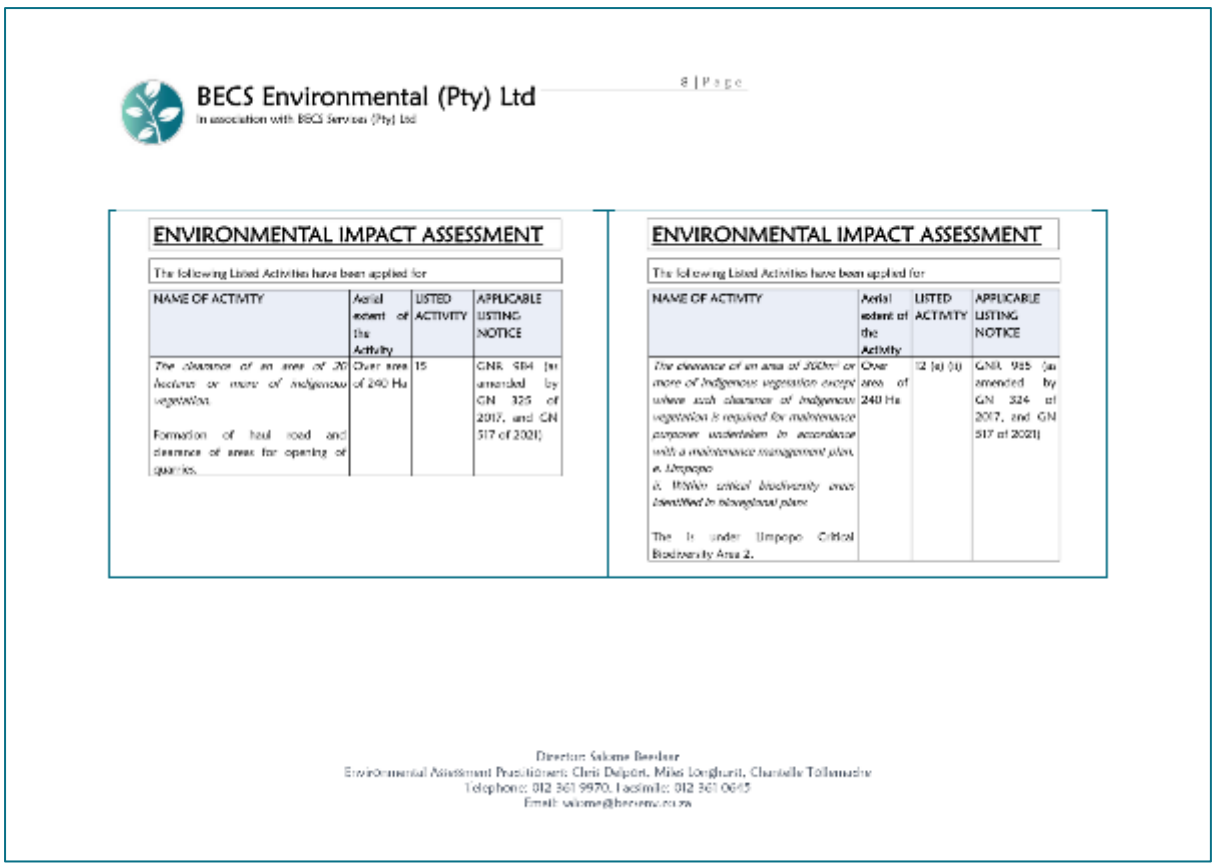
NAME OF ACTIVITY	Aerial extent of the Activity	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
Any process or activity identified in terms of section 53(1) of the NEMBA. The clearance of an area of 300m² or more of indigenous vegetation	To be confirmed	20	GNR 983 (as amended by GN 327 of 2017, and GN 517 of 2021)

ENVIRONMENTAL IMPACT ASSESSMENT

The following Listed Activities have been applied for

NAME OF ACTIVITY	Aerial extent of the Activity	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution, or effluent. *New water use may be necessary as mining activities expand.*	To be confirmed	6	GNR 984 (as amended by GN 325 of 2017, and GN 517 of 2021)

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Mikel Longhurst, Chantelle Tollmanzie
Telephone: 012 361 9970, Facsimile: 012 361 0665
Email: salome@becsenv.co.za



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ENVIRONMENTAL IMPACT ASSESSMENT

The following Listed Activities have been applied for

NAME OF ACTIVITY	Aerial extent of the Activity	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
The clearance of an area of 20 hectares or more of indigenous vegetation. Formation of haul road and clearance of areas for opening of quarries.	Over area of 240 Ha	15	GNR 984 (as amended by GN 325 of 2017, and GN 517 of 2021)

ENVIRONMENTAL IMPACT ASSESSMENT

The following Listed Activities have been applied for

NAME OF ACTIVITY	Aerial extent of the Activity	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
The clearance of an area of 300m² 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. *a. Limpopo* *b. Within critical biodiversity areas identified in bioregional plans* The is under Limpopo Critical Biodiversity Area 2.	Over area of 240 Ha	12 (a) (i)	GNR 985 (as amended by GN 324 of 2017, and GN 517 of 2021)

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Mikel Longhurst, Chantelle Tollmanzie
Telephone: 012 361 9970, Facsimile: 012 361 0665
Email: salome@becsenv.co.za

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INTEGRATED WATER USE LICENSE

- The following water uses are being applied for under the IWULA:
  - Section 21(a) water uses: Taking water from a water resource
    - *Dewatering the open pit of rainwater*
  - Section 21(b) water uses: Storing water
    - *Storing water in 5000 litre JoJo tank for drinking water for mining crew*

INTEGRATED WATER USE LICENSE

- The following water uses are being applied for under the IWULA:
  - Section 21(j) water uses: removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.
    - *Dewatering the open pit*
  - Section 21(g) water uses: disposing of waste in a manner which may detrimentally impact on a water resource.
    - *Dust suppression of haul roads*

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Mike Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

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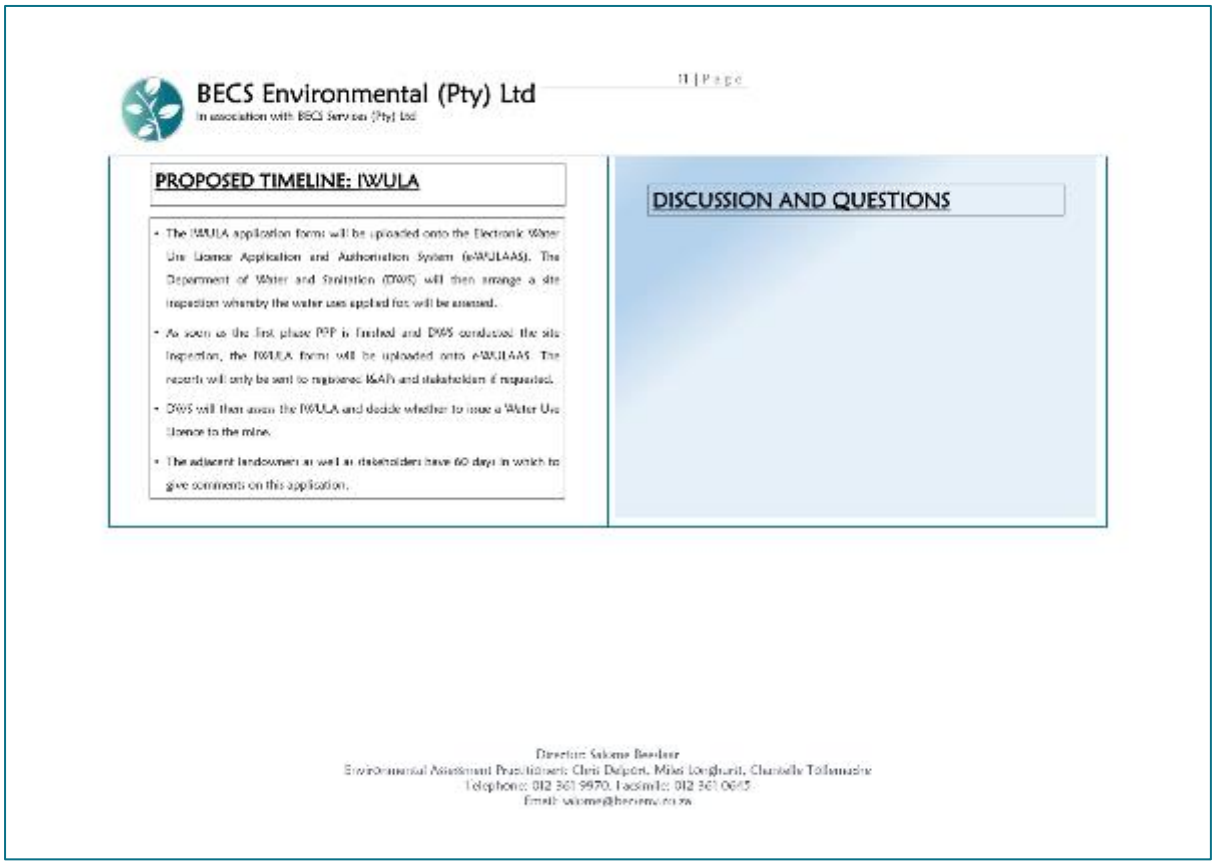
SPECIALIST STUDIES

- The following specialist studies are being conducted for the above-mentioned application:
  - Archaeological and Cultural Heritage Impact Assessment
  - Palaeontology Impact Assessment
  - Aquatic Ecosystem Delineation
  - Terrestrial Vegetation Assessment
  - Vertebrate fauna (Mammals & Herpetofauna) Habitat Assessment
  - Ambient Air Quality Impact Assessment
  - Storm Water Management Plan
  - Geohydrological Impact Assessment

PROPOSED TIMELINE

Date	Description
In progress	Specialist studies
11 April 2023	Submission of application to DMRE
Acknowledgement not yet received	Acceptance of application form. DMRE has not yet sent the acceptance letter for the application.
20 April 2023	Commencement of first phase PPP
21 April 2023	BSR to I&APs and stakeholders
25 May 2023	Final BSR to DMRE
August 2023	Draft EIA/EMP to I&APs and stakeholders.
September 2023	Final EIA/EMP to DMRE

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Mike Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za


BECS Environmental (Pty) Ltd
PROPOSED TIMELINE: IWULA
• The IWULA application form will be uploaded onto the Electronic Water Use Licence Application and Authorisation System (e-WULAAS). The Department of Water and Sanitation (DWS) will then arrange a site inspection whereby the water uses applied for will be assessed.
• As soon as the first phase PPP is finished and DWS conducted the site inspection, the IWULA form will be uploaded onto e-WULAAS. The reports will only be sent to registered I&AP's and stakeholders if requested.
• DWS will then assess the IWULA and decide whether to issue a Water Use Licence to the mine.
• The adjacent landowners as well as stakeholders have 60 days in which to give comments on this application.
DISCUSSION AND QUESTIONS

Comments from Eskom: 25 April 2023

Chris Delport

From:	Chris Delport
Sent:	Monday, 22 May 2023 12:11
To:	Zwanga Budeli
Cc:	Wayleave Limpopo; Salome Beeslaar
Subject:	RE: Imerys Refractory Minerals Application for EA & IWULA: Draft Environmental Scoping Report (LP166MR)
Attachments:	Response Eskom Wayleave 22 May.pdf

Tracking:

Recipient	Delivery
Zwanga Budeli	
Wayleave Limpopo	
Salome Beeslaar	Delivered: 2023/05/22 12:11

Good day,

Thank you for your comments, please find attached a response letter for your attention.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Zwanga Budeli [redacted]
Sent: Tuesday, April 25, 2023 4:15 PM
To: Chris Delport <chris@becsenv.co.za>
Cc: Wayleave Limpopo <[redacted]>; Salome Beeslaar <salome@becsenv.co.za>
Subject: RE: Imerys Refractory Minerals Application for EA & IWULA: Draft Environmental Scoping Report (LP166MR)

Good day

Please find the attached comments for you wayleave application.

Kind Regards
Budeli Zwanga Portia
Land and Rights Officer
Distribution Division | Limpopo Operating Unit
PO Box 3499, 92 Hans van Rensburg Street, Polokwane 0700
T: [redacted]

From: Chris Delport <chris@becsenv.co.za>
Sent: Monday, 24 April 2023 15:28
To: Mususumeli Mukhethi <[redacted]>
Cc: Wayleave Limpopo <[redacted]>; Salome Beeslaar <salome@becsenv.co.za>
Subject: [CAUTION:EXTERNAL EMAIL] RE: Imerys Refractory Minerals Application for EA & IWULA: Draft Environmental Scoping Report (LP166MR)

Good day sir,

1

Please see the attached document for the requested information.

Please let me know if you would like any other information.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Mususumeli Mukhethi <[redacted]
Sent: Monday, April 24, 2023 1:33 PM
To: Chris Delport <chris@becsenv.co.za>
Cc: Wayleave Limpopo <[redacted]>
Subject: Imerys Refractory Minerals Application for EA & IWULA: Draft Environmental Scoping Report (LP166MR)

Hi Chris

Please send cover letter and locality map including coordinates

Kindly note that we don't accept link documents

Regards
Mususumeli Mukhethi
Land & Rights Negotiator
Pr. Pln A/2122/2015
Distribution Division | Limpopo Operating Unit
PO Box 3499, 92 Hans van Rensburg Street, Polokwane 0700
[redacted]

Disclaimer

NB: This Email and its contents are subject to the Eskom Holdings SOC Ltd EMAIL LEGAL NOTICE which can be viewed at https://www.eskom.co.za/about-eskom/email-legal-spam-disclaimer/

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Eskom

BECS Environmental (Pty) Ltd

Date: 25 April 2023
Enquiries: Zwanga Budeli
[redacted]

ATTENTION: Salome Beeslaar

RE: APPLICATION FOR ENVIRONMENTAL AUTHORISATION WAYLEAVE AT PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ AT BUFFELSHOEK MNE IN THE LIPOPO PROVINCE.

We refer to your application dated March 2023

This application does affects any Eskom Distribution's services. The following services are affected : **THABAZIMBI RURAL / GROOTKUIL 22kV Overhead Line, THABAZIMBI COMBINED AMANDEL 132KV, NORTHAM / THABAZIMBI RURAL 88kV LINE Overhead Line, THABAZIMBI RURAL / INMALKAAR 22kV Overhead Line andTHABAZIMBI RURAL / MAKOPPA 22kV Overhead Line**

However,Eskom has no objection to the above mentioned application, the following conditions must be adhered :

a) The rights for the 22 KV lines are protected by a Way leave agreement ensuring a safe environment. However, it is required that each affected erf of the township must be registered, subject to Eskom's servitude and at the developer's expense.
b) Eskom's services and equipment must be acknowledged at all times and may not be tempered with or interfered with.
c) No construction work may be executed closer than ten meters from any Eskom Distribution structure or structure-supporting mechanism.
d) Natural ground level must be maintained within Eskom reserve areas and servitudes.
e) All work within Eskom reserve areas and servitudes must be carried out in accordance with the requirements of the Occupational Health and Safety Act 85 of 1983 as amended. Special attention must be given to the clearances between Eskom's conductors, structures, cables, electrical apparatus and proposed work as stipulated by Regulations R15 of the Electrical Installations Regulations of the aforementioned Act or any other legal requirements.
f) 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, his/her agent, contractors, employees, successors in title and assignees.
g) The applicant indemnifies Eskom against loss, claims or damages, including claims pertaining to interference with Eskom services, apparatus or otherwise.

Limpopo Operating Unit
Land Development
92 has Van Rensburg
Polokwane 0700
[redacted]

Eskom

h) Eskom shall at all times have unobstructed access to and egress from its services.

i) No dumping shall be allowed within Eskom Distribution Services.
j) Any development which necessitates the relocation of Eskom's services will be to the account of the developer.

Should the applicant or his/her contractor damage any of Eskom's services during execution of any work whatsoever, the incident must be reported to Eskom's 24-hour Contact Centre (086 000 1414) immediately.

The above conditions should be accepted in writing before any work within Eskom Services commences.

Yours faithfully,

.....
Budeli Zwanga
For Land Development and Environmental Manager

Limpopo Operating Unit
Land Development
92 has Van Rensburg
Polokwane 0700
[redacted]
Eskom Holdings SOC Limited Reg No 2002/015527/06

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

22 May 2023

Limpopo Operating Unit

Land Development

92 has Van Rensburg

Polokwane 0700

Eskom Holdings SOC Limited

Attention: Zwanga Budeli

Email: BudeliPZ@eskom.co.za

DMRE reference: LP 30/5/1/2/2/166 MR

APPLICATION FOR ENVIRONMENTAL AUTHORISATION WAYLEAVE AT PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ AT BUFFELSHOEK MNE IN THE LIPOPO PROVINCE.

Dear Zwanga Budeli

We hereby acknowledge receipt of the Eskom comments dated 25 April 2023. Kindly refer below for responses to the points raised.

This application does affects any Eskom Distribution's services. The following services are affected:

THABAZIMBI RURAL / GROOTKUIL 22kV Overhead Line, THABAZIMBI COMBINED AMANDEL 132KV, NORTHAM / THABAZIMBI RURAL 88kV LINE Overhead Line, THABAZIMBI RURAL / INMALKAAR 22kV Overhead Line andTHABAZIMBI RURAL / MAKOPPA 22kV Overhead Line

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

However, Eskom has no objection to the above-mentioned application, the following conditions must be adhered:

a) The rights for the 22 KV lines are protected by a Way leave agreement ensuring a safe environment. However, it is required that each affected erf of the township must be registered, subject to Eskom's servitude and at the developer's expense.

a) Response

This information is duly noted. Kindly furnish the details and process necessary to ensure that the developer can cover the expense for the registration of the affected erfs.

b) Eskom's services and equipment must be acknowledged at all times and may not be tempered with or interfered with.

b) Response

This requirement is noted. The mine will take measures to prevent any tampering or interference with the equipment.

c) No construction work may be executed closer than ten meters from any Eskom Distribution structure or structure-supporting mechanism.

c) Response

This is noted and will be communicated to all individuals on site. Further, the site layout plan will include these areas and a ten-metre buffer to ensure that the infrastructure is not affected.

d) Natural ground level must be maintained within Eskom reserve areas and servitudes.

d) Response

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

Note that the proposed project consists of open pit mining, however the natural ground level will be maintained on all land not used for opening of the pit.

e) All work within Eskom reserve areas and servitudes must be carried out in accordance with the requirements of the Occupational Health and Safety Act 85 of 1983 as amended. Special attention must be given to the clearances between Eskom's conductors, structures, cables, electrical apparatus and proposed work as stipulated by Regulations R15 of the Electrical Installations Regulations of the aforementioned Act or any other legal requirements.

e) Response

The requirements of the aforementioned act will be adhered to throughout the project.

f) 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, his/her agent, contractors, employees, successors in title and assignees.

f) Response

This statement is acknowledged by the mine. Eskom shall not be held liable for any such event.

g) The applicant indemnifies Eskom against loss, claims or damages, including claims pertaining to interference with Eskom services, apparatus or otherwise.

g) Response

This statement is acknowledged by the mine.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

h) Eskom shall at all times have unobstructed access to and egress from its services.

h) Response

This statement is acknowledged by the mine.

i) No dumping shall be allowed within Eskom Distribution Services.

i) Response

Dumping within Eskom Distribution Services will be prohibited and this will be communicated to all employees working on site.

j) Any development which necessitates the relocation of Eskom's services will be to the account of the developer.

j) Response

This is noted. Currently, no such relocation is required.

If you have any other questions or need any further information please contact us.

Regards,

15 May 2023
Christopher Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd
Cand. EAP (EAPASA): Number 2022/4844

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Comments from Eskom: 2 May 2023

Chris Delport

From: Chris Delport
Sent: Monday, 22 May 2023 12:15
To: Thomas Mavunda
Subject: RE: Imerys Refractory Minerals Application for EA & IWULA: Draft Environmental Scoping Report (LP166MR)
Attachments: Response Eskom May 22.pdf

Good day,

We acknowledge receipt of your comments and have noted them. Kindly find attached correspondence.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Thomas Mavunda <[redacted]
Sent: Tuesday, May 2, 2023 1:33 PM
To: Chris Delport <chris@becsenv.co.za>
Subject: RE: Imerys Refractory Minerals Application for EA & IWULA: Draft Environmental Scoping Report (LP166MR)

Good day,

Kindly receive our comments.

Kindly be informed that we are affected by this development.

Warm Regards
Thomas Mavunda
[redacted]

Eskom | Powering your world

"A Quitter never wins and a Winner never quits". Napoleon Hill

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

22 May 2023

Limpopo Operating Unit

92 Hans Van Rensburg

PO Box 3499

Polokwane 0700 SA

Eskom Holdings SOC Limited

Attention: Thomas Mavunda

Email: MavundNT@eskom.co.za

DMRE reference: LP 30/5/1/2/2/166 MR

RE: IMERYS REFRACTORY MINERALS SOUTH AFRICA (PTY)LTD- APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT NO. 107 OF 1988 (AS AMENDED) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT NO. 28 OF 2002 (AS AMENDED) AND AN INTEGRATED WATER USE LICENSE APPLICATION IN TERMS OF THE NATIONAL WATER ACT NO. 36 OF 1998 (AS AMENDED)

Dear Zwanga Budeli

We hereby acknowledge receipt of the Eskom comments dated 02 May 2023. Kindly refer below for responses to the points raised.

This application affects our Eskom Distribution services. The following services are affected:

- **Thabazimbi rural / Immakaar 22kV power lines**
- **Thabazimbi rural – Makoppa 22kV power lines**
- **Northam / Thabazimbi 88kV lines**

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

- **Amandel / Thabazimbi Combined 132kV power lines**

Eskom Distribution has no objection in principle of the abovementioned application, on the following conditions:

1) There is 9, 11 and 18 meters building and tree restriction on either side of the centre line of the 22kV, 88kV & 132kV power lines respectively, which must be adhered to in all future development.

1) Response

This is noted and no tree or building will be put in place on either side of the centre line of these powerlines as part of the development.

2) Eskom Distribution's services and equipments must be acknowledged at all times and may not be tampered or interfered with.

2) Response

This requirement is noted. The mine will take measures to prevent any tampering or interference with the equipment. This will include buffering the areas adjacent to the equipment.

3) All work within Eskom Distribution reserve area must be done in accordance with the requirements of the Occupational Health and Safety Act No.85 of 1993 as amended.

3) Response

The requirements of the aforementioned act will be adhered to throughout the project.

4) Special attention must be given to the clearances between Eskom's conductors, structures, cables and electrical apparatus and the proposed work as stipulated by

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

Regulation R15 of the Electrical Installations Regulations of the aforementioned Act or any other legal requirements.

4) Response

These regulations will be used to ensure that the relevant clearances are maintained between the relevant infrastructure and the proposed works.

5) No construction work may be executed closer than 9 metres from any of Eskom's structures from the middle of the power line and no squatting to be allowed in the restriction area

5) Response

A buffer with a minimum of 9-metres will be implemented when designing the site layout to ensure that no structures are affected. Squatting in the area is prohibited and the mine will endeavour to ensure that no squatting takes place.

6) No tree shall be planted within the restriction area or be allowed to grow to a height in excess of the horizontal distance of that tree from the nearest conductor of any power line or to grow in such a manner as to endanger that line should it fall or be cut down.

6) Response

Tree planting is not expected to take place until rehabilitation, however, should tree planting be necessary, no tree will be planted within the restriction area or be allowed to reach a height that exceeds the horizontal distance of that tree from the nearest conductor.

7) Natural ground level must be maintained within Eskom Distribution restriction area.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

7) Response

Note that the proposed project consists of open pit mining, however the natural ground level will be maintained on all land not used for opening of the pit.

8) Eskom Distribution shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of the encroachment or of the use of the area where Eskom Distribution has its services, by the applicant, his/her agent, contractors, employees, successors in title and assigns.

8) Response

This statement is acknowledged by the mine. Eskom shall not be held liable for any such event.

9) The applicant indemnifies Eskom against loss, claims or damages including claims pertaining to interference with Eskom Distribution services or apparatus or otherwise. The applicant's attention is drawn to section 27(3) of the Electricity Act 1987, as amended in 1994, which stipulates that the applicant can be fined and/or imprisoned as a result of damage to Eskom's apparatus.

9) Response

The Eskom Distribution Services will be buffered in order to ensure protection. It is the intention of the mine to ensure that no damage occurs.

10) Eskom shall at all times have unobstructed access to and egress from its services.

10) Response

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

This statement is acknowledged by the mine. The mine will allow Eskom to access the site at any time.

11) The ineffective management and handling of waste is of crucial importance. No dumping shall be allowed within Eskom Distribution restriction areas. All unwanted waste (gaseous, liquid or solids) should be disposed of at a registered waste disposal site as stipulated under Section 20 of the Environmental Conservation Act (Act 73 of 1989).

11) Response

Dumping within Eskom Distribution restriction areas will be prohibited and this will be communicated to all employees working on site. The mine will implement a waste management procedure that will include the disposal of waste at a registered waste disposal site.

12) Any relocation of Eskom's services, due to this development, will be for the account of the Developer. The Developer will also be responsible for granting Eskom an alternative route for the power line. Please contact Eskom Customer Contact Centre; 08600 37566 in connection with cost.

12) Response

This is noted. Currently, no such relocation is required.

13) The Eskom's authorised area representative for Thabazimbi Technical Service Area, Dumaduma Masimene Telephone Number: 014 777 8273 / 073 528 2696, masimeda@eskom.co.za.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

13) Response

Should we need to contact the representative for the Thabazimbi Technical Service Area, the above details will be used.

If you have any other questions or need any further information please contact us.

Regards,

22 May 2023
Christopher Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Cand. EAP (EAPASA): Number 2022/4844

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

*NOTE: In accordance with the Protection of Personal Information Act (Act No. 4 of 2013) personal details are omitted.

Request for additional information from ESKOM – August

Chris Delport

From: Xander Neethling [redacted]>
Sent: Friday, 11 August 2023 11:05
To: Chris Delport
Cc: [redacted]
Subject: RE: Imerys Buffelshoek EIA Servitude locations - URGENT
Attachments: TG42 Coordinates.xlsx; TG42.dgn; TG42.dxf; TG42.kmz; Nov 2020 Wayleave example.pdf

Hi Chris

The network as indicated is our Thabazimbi Rural Grootkuil 22 kV powerline, specifically the TG42 T Off.

Attached please find the following:

- Coordinate list (In Hartebeesthoek LO 27)
- CAD file (Microstation and DXF)
- Kmz file
- Example of our Standard Wayleave contract

The land rights are held by Eskom under a Wayleave Agreement (not servitude) of which an example is attached.

Additional notes:

a) The source of the geographical data attached is a data capture (unchecked) survey dating back to 2010; some network sections might have been added or removed since then.
b) It is noticed from your kmz file that our (1)Thabazimbi Rural 88kV substation, (2) Northam Thabazimbi Rural 88 kV powerline and all the 22 kV feeder powerlines from the substation are within the Mineral Area. Please note that (1) and (2) above are held under a servitude, and should be approached in a different manner than our Medium Volt (22 kV) powerlines.
c) Eskom plans to construct a new 132kV substation adjacent (south) of the existing Thabazimbi Rural 88 kV substation with a new 132 kV powerline feeding it (from the west). Please indicate how this would affect your project

Regards

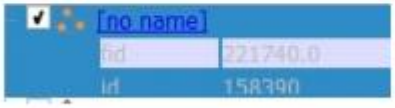
Xander Neethling
Land & Rights
Land Development & Environmental Management
Limpopo Distribution | LimLanga Cluster
92 Hans van Rensburg Street POLOKWANE 0699
[redacted]

From: Chris Delport <chris@becsenv.co.za>
Sent: 11 August 2023 09:20
To: Xander Neethling <[redacted]
[redacted]
Good day Xander,

1

I hope you are well.

Thank you for sending the KMLs. We would like to find out the specific details of the below servitude(s) for the section falling within the farm near the school. (**coordinates**: 24°40'3.00"S; 27°22'19.94"E).



fid: 221740.0
id: 158390

We need a dxf file with the conditions and coordinates. Please could you send this?

This would be greatly appreciated.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Xander Neethling [redacted]
Sent: Thursday, August 10, 2023 8:26 AM
To: Chris Delport <chris@becsenv.co.za>
[redacted]
Subject: RE: Imerys Buffelshoek EIA Servitude locations - URGENT

Good day Chris,

Attached please find the Transmission network

Regards

Xander Neethling
Land & Rights

2

Chris Delport

From: Thomas Mavunda <[redacted]
Sent: Tuesday, 08 August 2023 11:26
To: Xander Neethling; Trienie Scholtz
Cc: Salome Beeslaar; Jurie Snyman; Phumudzo Rambau; Ross Lewis; Chris Delport
Subject: RE: Imerys Buffelshoek EIA Servitude locations - URGENT

Thank you so much.

Warm Regards
Thomas Mavunda
[redacted]

Eskom | Powering your world

" A Quitter never wins and a Winner never quits". Napoleon Hill

From: Xander Neethling <NeethlX@eskom.co.za>
Sent: Tuesday, 08 August 2023 11:24
To: [redacted]
Cc: [redacted]
Subject: RE: Imerys Buffelshoek EIA Servitude locations - URGENT

Hi all,

The attached should cover all the line routes requested; let me know if you require the Transmission network as well

Regards

Xander Neethling
Land & Rights
Land Development & Environmental Management
Limpopo Distribution | LimLanga Cluster
92 Hans van Rensburg Street POLOKWANE 0699
[redacted]

From: Thomas Mavunda <MavundNT@eskom.co.za>
Sent: 08 August 2023 11:16
To: [redacted]
Cc: [redacted]

1

[redacted]
Subject: RE: Imerys Buffelshoek EIA Servitude locations - URGENT

Good day Trienie,

Can you kindly assist Mr. Chris Delport with the KML/KMZ of the power lines below if possible.

Thabazimbi rural / Immakaar 22kV power lines
Thabazimbi rural – Makoppa 22kV power lines
Northam / Thabazimbi 88kV lines
Amandel / Thabazimbi Combined 132kV power lines

Thank you in advance.

Warm Regards
Thomas Mavunda
[redacted]

Eskom | Powering your world

" A Quitter never wins and a Winner never quits". Napoleon Hill

---

From: Chris Delport <chris@becsenv.co.za>
Sent: Tuesday, 08 August 2023 10:14
To: Thomas Mavunda <[redacted]
Cc: [redacted]
Subject: [CAUTION:EXTERNAL EMAIL] Imerys Buffelshoek EIA Servitude locations - URGENT

Good morning,

Hoping that you are well.

Thank you for discussing with me over the phone this morning.

As mentioned, I urgently need the KML/KMZ files of the power lines that occur over the properties as we need to include this in our map for the EIA.

The letter received indicates that the following services are affected:

Thabazimbi rural / Immakaar 22kV power lines
Thabazimbi rural – Makoppa 22kV power lines
Northam / Thabazimbi 88kV lines
Amandel / Thabazimbi Combined 132kV power lines

I have attached a KML of the development area for the EIA (for your reference).

Please do cc in the technical staff, if necessary, to assist with locating of the powerlines on the ground.

2

Your prompt assistance with this would be greatly appreciated.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

From: Chris Delport
Sent: Wednesday, May 24, 2023 5:54 AM
To: Thomas Mavunda [redacted]>
Cc: Salome Beeslaar <salome@becsenv.co.za>; Zwanga Budeli [redacted]
Subject: RE: Imerys Refractory Minerals Application for EA & IWULA: Draft Environmental Scoping Report (LP166MR)

Good day sir,

I hope that you are doing well.

We kindly request that you send us the KML files of the powerlines that occur on the properties.

The lines traversing the planned pit are not visible from the plan provided.

We would like to get the correct servitudes from Eskom directly to avoid possible misalignment or future discrepancies.

Trusting that you find this in order, looking forward to hearing from you.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

*NOTE: In accordance with the Protection of Personal Information Act (Act No. 4 of 2013) personal details are omitted.

Addendum 4I: Stakeholder database

Stakeholder
LEDET
SAHRA
DFFE
DWS National
DWS Hartebeespoort
DMRE
Thabazimbi LM - Municipal manager
Waterberg DM - Municipal manager
Ward councillor - Ward 3 TLM
Ward councillor - Ward 6 TLM
DALRRD
LIHRA
DARD Limpopo
DAFF
Istores Primary School
Eskom
Roads Agency

Institution	Physical Address
Thabazimbi Iron Ore Mine Pty Ltd	RE Buffelshoek 351 KQ
Thabazimbi Iron Ore Mine Pty Ltd	Portion 1 Buffelshoek 351 KQ
Thabazimbi Iron Ore Mine Pty Ltd	Portion 3 Buffelshoek 351 KQ
Thabazimbi Iron Ore Mine Pty Ltd	Portion 4 Buffelshoek 351 KQ
Thabazimbi Iron Ore Mine Pty Ltd	RE of Portion 1 Grootfonetin 352 KQ
	Portion 4 Grootfontein 352 KQ
Imerys Refractory Minerals South Africa	Portion 3 Grootfontein 352 KQ
	Langpan 371 KQ
	Portion 1 Haakdoorndrift 374 KQ
	Portion 1 Haakdoorndrift 373 KQ
Alfafa trust	Portion 2 Haakdoorndrift 373 KQ
Alfafa trust	Portion 3 Haakdoorndrift 373 KQ
Thabazimbi Iron Ore Mine Pty Ltd	Portion 1 Wachteenbietjesdraai 350 KQ
Thabazimbi Iron Ore Mine Pty Ltd	Portion 2 Wachteenbietjesdraai 350 KQ
Sandrivier familie trust	Portion 15 Wachteenbietjesdraai 350 KQ
	Portion 16 Wachteenbietjesdraai 350 KQ
	Portion 17 Wachteenbietjesdraai 350 KQ
Combo braai CC	Portion 21 Wachteenbietjesdraai 350 KQ
	Portion 22 Wachteenbietjesdraai 350 KQ
	Portion 23 Wachteenbietjesdraai 350 KQ
	Portion 24 Wachteenbietjesdraai 350 KQ
	Portion 25 Wachteenbietjesdraai 350 KQ
J M De Villiers trust	Portion 45 Wachteenbietjesdraai 350 KQ
	Portion 1 Roodedam 368 KQ
	Portion 9 Roodedam 368 KQ
	Portion 16 Roodedam 368 KQ
	Hanover 629 KQ

Registered I&APs	
	Portion 32 Wachteenbietjesdraai 350 KQ
	Portion 18 Wachteenbietjesdraai 350 KQ

Project properties are indicated in green.

*NOTE: In accordance with the Protection of Personal Information Act (Act No. 4 of 2013) personal details are omitted.

ADDENDUM 5: COMPETENT AUTHORITIES' CORRESPONDENCE

Addendum 5A: Acknowledgement of environmental application from DMRE

mineral resources & energy
Department:
Minerals Resources and Energy
REPUBLIC OF SOUTH AFRICA

Private Bag X 9467, Polokwane, 0700, Tel: 015 287 4700, Fax: 086 7101 045
DME Building, 101 Dorp Street, Polokwane, 0699

Enquiries: Mudau M.D. **Ref:** LP 30/1/2/3/2/1(0166) EM
E-Mail Address: Daisy.Mudau@dmre.gov.za
Sub-Directorate: Mine Environmental Management

REGISTERED MAIL

The Director(s):
Imerys Refractory Minerals South Africa (Pty) Ltd (Buffelshoek Mine)
P.O. Box 8118
Centurion
0046

For attention: Hendrik Jones **Email**: Hendrik.jones@imerys.com
Cc: Salome Beeslaar **Email**: salome@becsenv.co.za

ACKNOWLEDGEMENT OF AN APPLICATION FOR ENVIRONMENTAL AUTHORISATION LODGED IN TERMS OF SECTION 24 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998) AS AMENDED (NEMA) READ WITH REGULATION 21 (1) AND 23 (1) OF THE ENVIRONMENTAL IMPACT ASSESSMENT 2014, FOR AN EXISTING MINING RIGHT AND RELATED INFRASTRUCTURAL ACTIVITIES ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED WITHIN THABAZIMBI LOCAL MUNICIPALITY OF WATERBERG DISTRICT: LIMPOPO REGION.

The above matter has reference;

I refer to the abovementioned matter and confirm that your application for Environmental Authorisation herein referred to as "EA" lodged on **11th April 2023** is hereby acknowledged.

Application for Integrated Environmental Authorisation Ref No LP30/5/1/2/3/2/1 (0166) EM Page 1of 2

You are requested in terms of Section 24 K of National Environmental Management Act, Act 107 of 1998, as amended to consult with any organ of state responsible for administering legislation relating to matters affecting the environment and submit three (3) copies of **Scoping Report (SR)** in terms of Regulation **21 of 2014 EIA Regulation.** The said **SR** must also include proof and results of consultation undertaken with the above mentioned state Departments.

Acknowledgement of your application does not grant you permission to commence with the activities applied for. Commencement of a listed activity without Granted Environmental Authorisation constitutes an offence in terms of Section 49A (1) (a) of NEMA, 1998 (Act 107 of 1998) as amended and upon conviction for such an offence, a person is liable to a fine not exceeding R10 million or to imprisonment for a period not exceeding ten years, or to both such fine and such imprisonment.

Kind Regards,

REGIONAL MANAGER: MINERAL AND PETROLEUM REGULATION

LIMPOPO REGION

DATE: 2023/05/30

Application for Integrated Environmental Authorisation Ref No LP30/5/1/2/3/2/1 (0166) EM Page 2of 2

Addendum 5B: Acceptance and comments on Final Scoping Report by DMRE including EAPs response

mineral resources & energy
Department
Minerals Resources and Energy
REPUBLIC OF SOUTH AFRICA

Private Bag X 9467, Polokwane, 0700, Tel: 015 287 4700, Fax: 086 7101 045
DME Building, 101 Dorp Street, Polokwane, 0699

Enquiries: Mudau M.D. **Ref:** LP 30/5/1/2/3/2/1 (0166) EM
E-Mail Address: Daisy.Mudau@dmre.gov.za
Sub-Directorate: Mine Environmental Management

REGISTERED MAIL

The Director(s):
Imerys Refractory Minerals South Africa (Pty) Ltd (Buffelshoek Mine)
P.O. Box 8118
Centurion
0046

For attention: Hendrik Jones — **Email**: Hendrik.jones@imerys.com
CC: Salome Beeslaar — **Email**: salome@becsenv.co.za

APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 of 1998) AS AMENDED (NEMA) AND THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 ON PORTION 4 OF THE FARM BUFFELDHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED WITHIN THABAZIMBI LOCAL MUNICIPALITY OF WATERBERG DISTRICT: LIMPOPO REGION.

The Scoping Report (SR) and Plan of Study for Environmental Impact Assessment dated 24 May 2023 and received by the Department on 23 May 2023 refer.

1. The Department has evaluated the submitted SR and Plan of Study for Environmental Impact Assessment and is satisfied that the documents comply with the minimum requirements of Appendix 2(2) of National Environmental Management Act, 1998 (as amended) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014. The SR is hereby **accepted** by the Department in terms of regulation 22(a) of the NEMA EIA Regulations, 2014.

2. You may proceed with the environmental impact assessment process in accordance with the tasks contemplated in the Plan of Study for Environmental Impact Assessment as required in terms of the NEMA EIA Regulations, 2014.

3. Please ensure that comments from all relevant stakeholders are submitted to the Department with the Environmental Impact Assessment Report (EIAR).

Acceptance of Scoping Report Reference Number: LP 30/5/1/2/3/2/1(0166) Page 1 of 2

This includes but is not limited to the Provincial Heritage Resources Authority, Provincial Environmental Department, Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation (DWS) and the local municipality.
Proof of correspondence with the various stakeholders must be included in the EIAR. Should you be unable to obtain comments, proof of the attempts that were made to obtain comments should be submitted to the Department.

4. In addition, the following amendments and additional information are required for the EIR and EMPr:

a) Details of the future land use for the site and infrastructure after decommissioning in 20-30 years.
b) The total footprint of the proposed development should be indicated.
c) Should a Water Use License be required, proof of application for a license needs to be submitted.
d) Possible impacts and effects of the development on the vegetation ecology with regard to lowland-highland interface in the locality should be indicated.
e) The impacts of the proposed facility on avifauna and bats must be assessed in the EIA phase.
f) Possible impacts and effects of the development on the surrounding industrial area.
g) A construction and operational phase EMP to include mitigation and monitoring measures.
h) Should blasting be required, appropriate mitigation measures should be provided.

5. The applicant is hereby reminded to comply with the requirements of regulation 3 of the EIA Regulations, 2014 with regards to the time period allowed for complying with the requirements of the Regulations.

6. Please ensure that the EIAR includes the A3 size locality maps of the area and illustrates the exact location of the proposed development. The maps must be of acceptable quality and as a minimum, have the following attributes:

- Maps are relatable to one another;
- Co-ordinates;
- Legible legends;
- Indicate alternatives;
- Scale and
- Vegetation types of the study area.

7. Further, it must be reiterated that, should an application for Environmental Authorisation be subjected to any permits or authorisations in terms of the provisions of any Specific Environmental Management Acts (SEMAs), proof of such application will be required.

8. You are requested to submit four (3) hard copies of the EIAR and EMPr and at least one electronic copy (CD/DVD) of the complete EIAR and EMPr to this Regional Office.

9. Your attention is brought to Section 24F of the NEMA which stipulates "that no activity may commence prior to an environmental authorisation being granted by the competent authority".

Yours faithfully,

.....
REGIONAL MANAGER: MINERAL AND PETROLEUM REGULATION
LIMPOPO REGION
DATE: 2023/01/06

Acceptance of Scoping Report: Ref No LP30/5/1/2/3/2/1 (0166) Page 2 of 2

EAPs response - 28 July 2023

Chris Delport

From: Chris Delport
Sent: Friday, 28 July 2023 04:40
To: Daisy Mudau
Cc: Salome Beeslaar; Hendrik Jones
Subject: Emailing: SR Acceptance 0166 MR
Attachments: Response DMRE SR Acceptance 28 July 2023.pdf

Tracking:

Recipient	Delivery
Daisy Mudau	
Salome Beeslaar	Delivered: 2023/07/28 04:41
Hendrik Jones	

Good day,

Hoping you are well.

We acknowledge receipt of the DMRE acceptance letter for the Scoping Report (Reference: LP 30/5/1/2/3/2/1 (0166) EM) dated 6 July 2023.

Kindly refer to the attached letter for responses to the points raised.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

T: 012 361 9970 F: 012 361 0645 C: 081 598 8698
PO Box 72960, Lynnwood Ridge, 0040
358 Serene Street, Garsfontein, 0081

BECS Services (Pty) Ltd
In association with BECS Environmental (Pty) Ltd

1

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

28 July 2023

Limpopo Department of Mineral Resources and Energy

Attention: Mudau M.D.

Email: Daisy.Mudau@dmre.gov.za

Reference: LP 30/5/1/2/3/2/1 (0166) EM

RE: APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 of 1998) AS AMENDED (NEMA) AND THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED WITHIN THABAZIMBI LOCAL MUNICIPALITY OF WATERBERG DISTRICT: LIMPOPO REGION.

Dear Daisy Mudau

We hereby acknowledge receipt of the Limpopo Department of Mineral Resources and Energy (DMRE) comments dated 6 July 2023. Kindly refer below for responses to the points raised.

1) The Department has evaluated the submitted SR and Plan of Study for Environmental Impact Assessment and is satisfied that the documents comply with the minimum requirements of Appendix 2(2) of National Environmental Management Act, 1998 (as amended) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014. The SR is hereby accepted by the Department in terms of regulation 22(a) of the NEMA EIA Regulations, 2014.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

2) You may proceed with the environmental impact assessment process in accordance with the tasks contemplated in the Plan of Study for Environmental Impact Assessment as required in terms of the NEMA EIA Regulations, 2014.

RESPONSE

These comments are noted and we will proceed accordingly.

3) Please ensure that comments from all relevant stakeholders are submitted to the Department with the Environmental Impact Assessment Report (EIAR). This includes but is not limited to the Provincial Heritage Resources Authority, Provincial Environmental Department, Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation (DWS) and the local municipality. Proof of correspondence with the various stakeholders must be included in the EIAR. Should you be unable to obtain comments, proof of the attempts that were made to obtain comments should be submitted to the Department.

RESPONSE

The Environmental scoping report was uploaded on the SAHRIS online system and the report was sent to DMRE, LEDET, & DARD on 23 May 2023. The report was sent to all other stakeholders on 25 May 2023 and to DWS on 26 May 2023. All abovementioned stakeholders will be sent the draft EIA and comments/proof of the attempts made to obtain comments will be submitted with the final EIAR.

4) In addition, the following amendments and additional information are required for the EIAR and EMPRr:

a) Details of the future land use for the site and infrastructure after decommissioning in 20-30 years.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

RESPONSE

This information will be included in the EIAR.

b) The total footprint of the proposed development should be indicated.

RESPONSE

This information will also be included in the EIAR.

c) Should a Water Use License be required, proof of application for a license needs to be submitted.

RESPONSE

An Integrated Water Use License Application (IWULA) will be required. This application is still ongoing. Proof of the application will be included in the EIAR.

d) Possible impacts and effects of the development on the vegetation ecology with regard to lowland-highland interface in the locality should be indicated.

RESPONSE

This information will be included in the EIAR.

e) The impacts of the proposed facility on avifauna and bats must be assessed in the EIA phase.

RESPONSE

This information will be included in the EIAR.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

f) Possible impacts and effects of the development on the surrounding industrial area.

RESPONSE

All possible impacts on the surrounding industrial area will be included in the final EIAR.

g) A construction and operational phase EMP to include mitigation and monitoring measures.

RESPONSE

This will be included in the EIAR.

h) Should blasting be required, appropriate mitigation measures should be provided.

RESPONSE

Appropriate mitigation measures for blasting will be included in the EIAR.

5. The applicant is hereby reminded to comply with the requirements of regulation 3 of the EIA Regulations, 2014 with regards to the time period allowed for complying with the requirements of the Regulations.

RESPONSE

This is noted. The time frames will be adhered to when submitting the draft and final EIA/EMP reports.

6. Please ensure that the EIAR includes the A3 size locality maps of the area and illustrates the exact location of the proposed development. The maps must be of acceptable quality and as a minimum, have the following attributes:

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

Maps are relatable to one another;

Co-ordinates;

Legible legends;

Indicate alternatives;

Scale and

Vegetation types of the study area.

RESPONSE

This will be done, however, please note that there are no alternatives to the proposed project.

7. Further, it must be reiterated that, should an application for Environmental Authorisation be subjected to any permits or authorisations in terms of the provisions of any Specific Environmental Management Acts (SEMAs), proof of such application will be required.

RESPONSE

This is noted. No permits or authorisations in terms of other SEMAs are currently required.

8. You are requested to submit four (3) hard copies of the EIAR and EMPr and at least one electronic copy (CD/DVD) of the complete EIAR and EMPr to this Regional Office.

RESPONSE

This is noted. Four copies and at least one electronic copy will be submitted the Limpopo Regional office.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

9. Your attention is brought to Section 24F of the NEMA which stipulates that no activity may commence prior to an environmental authorisation being granted by the competent authority.

RESPONSE

This is noted. No activities will commence prior to an Environmental Authorisation being granted.

Trusting that the above is in order. Kindly confirm receipt of the responses.

Regards,

28 July 2023
Christopher Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Cand. EAP (EAPASA): Number 2022/4844

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Addendum 5C: Comments on the Final ESR & draft EIA by LEDET including EAPs response

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
ECONOMIC DEVELOPMENT, ENVIRONMENT & TOURISM

2023 -06- 19

Enq: Ms Rodgers MC Tel: 015 293 8540 / 083 443 5749 E-mail: rodgersmc@ledet.gov.za Ref: 12/1/9/CR-W254

BECS Environmental (Pty) Ltd
PO Box 72960
LYNNWOODRIDGE
0040

Attention: Ms S Beeslaar **E-mail:** salome@becsenv.co.za

RE: FINAL ENVIRONMENTAL SCOPING REPORT FOR APPLICATION FOR ENVIRONMENTAL AUTHORISATION FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ, PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, WITHIN THE THABAZIMBI LOCAL MUNICIPALITY OF WATERBERG DISTRICT – MINING RIGHT LP 30/5/1/2/2/166 MR

1. The Environmental Scoping Report submitted by Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine received by the Department on 23 May 2023, has reference.
2. It is noted though that Activity 12 of Listing Notice 3 is included (page 7).
3. The National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) should be included in Section 3: Policy and Legislative Requirements.
4. The reference to the Conservation Plan on page 37 can also be updated with the Waterberg Bioregional Plan, which was Gazetted in Provincial Notice 1 of 2019, No 2966 of 04 January 2019 in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004), for projects within the Waterberg district.
5. It is noted that the Mining Right had already been issued prior to the initiation of the Environmental Impact Assessment (EIA) process to consider Environmental Authorisation but the reasons or circumstances are not clarified. The implications that the 'proposed' mining will have on meeting Biodiversity targets should be addressed where applicable.

Please do not hesitate to contact the Department should you have any queries in this respect.

Yours faithfully

DEPUTY DIRECTOR
ENVIRONMENTAL IMPACT MANAGEMENT
DATE: 19/6/2023

HEAD OFFICE

EAPs response - 5 July 2023

Chris Delport

From:	Chris Delport
Sent:	Wednesday, 05 July 2023 11:31
To:	Ngoasheng T R
Cc:	Salome Beeslaar; Rodgers M C
Subject:	CR W254 Buffelshoek
Attachments:	Response LEDET 5 July 2023.pdf

Tracking:	**Recipient**	**Delivery**
	Ngoasheng T R	
	Salome Beeslaar	Delivered: 2023/07/05 11:31
	Rodgers M C	

Good day,

Kindly find attached a response letter to the comments received on 22 June (dated 19 June).

Kindly confirm receipt.

Kind regards,
Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

T: 012 361 9970 F: 012 361 0645 C: 081 598 8698
PO Box 72960, Lynnwood Ridge, 0040
358 Serene Street, Garsfontein, 0081

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In association with BECS Environmental (Pty) Ltd

1

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

05 July 2023

Limpopo Department of Economic Development, Environment & Tourism

Attention: Ms Rodgers MC

Tel: 015 293 8540 / 083 443 5749

Email: rodgersmc@ledet.gov.za

Reference: 12/1/9/CR-W254

RE: FINAL ENVIRONMENTAL SCOPING REPORT FOR APPLICATION FOR ENVIRONMENTAL AUTHORISATION FOR LISTED ACTIVITIES ASSOCIATED WITH A MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ, PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, WITHIN THE THABAZIMBI LOCAL MUNICIPALITY OF WATERBERG DISTRICT — MINING RIGHT LP 30/5/1/2/2/166 MR

Dear Ms Rodgers MC

We hereby acknowledge receipt of the Limpopo Department of Economic Development, Environment & Tourism (LEDET) comments dated 19 June 2023. Kindly refer below for responses to the points raised.

Points 1 - 3) The Environmental Scoping Report submitted by Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine received by the Department on 23 May 2023, has reference. It is noted though that Activity 12 of Listing Notice 3 is included (page 7). The National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) should be included in Section 3: Policy and Legislative Requirements.

1 - 3) Response

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

This is noted and the National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) (as amended) (NEMBA) will be included under the Policy and Legislative Requirements section of the Environmental Impact Assessment (EIA) report.

4) The reference to the Conservation Plan on page 37 can also be updated with the Waterberg Bioregional Plan, which was Gazetted in Provincial Notice 1 of 2019, No 2966 of 04 January 2019 in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004), for projects within the Waterberg district.

4) Response

This statement is noted, and the reference to the conservation plan will be updated with the Gazetted Waterberg Bioregional Plan and included in the EIA report.

5. It is noted that the Mining Right had already been issued prior to the initiation of the Environmental Impact Assessment (EIA) process to consider Environmental Authorisation but the reasons or circumstances are not clarified. The implications that the 'proposed' mining will have on meeting Biodiversity targets should be addressed where applicable.

5) Response

The Mining Right (MR) commenced on 17th April 2014 and unless cancelled or suspended, will remain in force until 16th April 2044. An application for Environmental Authorisation was conducted as part of this application and the mine has an Environmental Management Programme (EMP) associated with this. As no activities have commenced since the issuing of the MR, an updated EIA is required to include the listed activities to be undertaken, which will require an EA. Furthermore, an Integrated Water Use License (IWUL) is being applied for as part of the proposed activities. The implications of the proposed mining project on meeting

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

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In association with BECS Services (Pty) Ltd

Biodiversity targets will be fully addressed in the EIA report. Specialist studies have also been done as part of the project to assess potential impacts and management thereof. These include a terrestrial vegetation assessment, a vertebrate fauna (mammals & herpetofauna) habitat assessment and an aquatic ecosystem delineation.

Trusting that the above is in order.

Regards,

05 July 2023
Christopher Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Cand. EAP (EAPASA): Number 2022/4844

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Comments on the draft EIA – 16 October 2023

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
ECONOMIC DEVELOPMENT, ENVIRONMENT & TOURISM

DEPARTMENT OF ECONOMIC DEVELOPMENT ENVIRONMENT & TOURISM ENVIRONMENTAL IMPACT MANAGEMENT WATERBERG DISTRICT
2023 -10- 16
P.O.BOX 55464, POLOKWANE 0700 TEL: 015 297 1313 LIMPOPO PROVINCE

Enq: Ms Rodgers MC Tel: 015 293 8540 / 083 443 5749 E-mail: rodgersmc@ledet.gov.za Ref: 12/1/3/CR-W254

BECS Environmental (Pty) Ltd
PO Box 72960
LYNNWOODRIDGE
0040

Attention: Ms S Beeslaar **E-mail:** salome@becsenv.co.za

RE: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR LISTED ACTIVITIES ASSOCIATED APPLICATION FOR MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ, PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, WITHIN THE THABAZIMBI LOCAL MUNICIPALITY OF WATERBERG DISTRICT – MINING RIGHT LP 30/5/1/2/2/166 MR

1. The above-mentioned draft Environmental Impact Assessment Report (EIAR) submitted in respect of the application for Environmental Authorisation (EA) by Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine on the above-mentioned properties received by the Department on 19 September 2023 for commenting purposes, has reference.

2. The Department takes note of the indication that an EIA was conducted at the time the mining right was issued and that this process represents an updated EIA. The Department was unable to obtain records of the history at the site.

3. The Department request more information on the required relocation of the Istores Primary School (page 272). The planning of such related activities must be addressed in a concurrent manner to avoid preventable short notice demands on other stakeholders.

4. On page 254 it is indicated that two drainage lines occur running from the mountain down into the site but indicates that the mining is not expected to impact hydrological functioning of the activities outside of the aquatic ecosystems. Could these drainage lines be indicated on the general lay-out plan in order to clarify the situation.

Please do not hesitate to contact the Department should you have any queries in this respect.

Yours faithfully

DEPUTY DIRECTOR
ENVIRONMENTAL IMPACT MANAGEMENT
DATE: 16/10/2023
Cc: Imerys Refractory Mines South Africa (Pty) Ltd Buffelshoek Mine **E-mail:** hendrik.jones@imerys.com

HEAD OFFICE
20 Hans Van Rensburg Street / 19 Biccard Street, Polokwane, 0700, Private Bag X 9484, Polokwane, 0700
(Switchboard) Tel: +27 15 293 8300 Website: www.ledet.gov.za
YouTube LimpopoLEDET LimpopoLEDET www.Facebook.com/LimpopoLEDET @LimpopoLEDET

development is about people!

EAPs response – 17 October 2023

Chris Delport

From:	Chris Delport
Sent:	Tuesday, 17 October 2023 13:11
To:	Ngoasheng T R
Cc:	Hendrik Jones; Salome Beeslaar; Rodgers M C
Subject:	CR W254 Grootfontein
Attachments:	CR W254 Response LEDET 17 October 2023.pdf

Tracking:

Recipient	Delivery
Ngoasheng T R	
Hendrik Jones	
Salome Beeslaar	Delivered: 2023/10/17 13:11
Rodgers M C	

Good day,

Kindly find attached the response to the comments on the Buffelshoek Mine EIA, received from LEDET on 16 October 2023.

Kind regards,

Chris Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Candidate Environmental Assessment Practitioner: Number 2022/4844
IAIAsa Membership Number: 6643

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358 Serene Street, Garsfontein, 0081

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In association with BECS Environmental (Pty) Ltd

1

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

17 October 2023

Limpopo Department of Economic Development, Environment & Tourism

Attention: Ms Rodgers MC

Tel: 015 293 8540 / 083 443 5749

Email: rodgersmc@ledet.gov.za

Reference: 12/1/9/CR-W254

RE: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR LISTED ACTIVITIES ASSOCIATED APPLICATION FOR MINING RIGHT ON PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ, PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, WITHIN THE THABAZIMBI LOCAL MUNICIPALITY OF WATERBERG DISTRICT — MINING RIGHT LP 30/5/1/2/2/166 MR

Dear Ms Rodgers MC

We hereby acknowledge receipt of the Limpopo Department of Economic Development, Environment & Tourism (LEDET) comments dated 16 October 2023. Kindly refer below for responses to the points raised.

1) The above-mentioned draft Environmental Impact Assessment Report (EIAR) submitted in respect of the application for Environmental Authorisation (EA) by Imerys Refractory Minerals South Africa (Pty) Ltd: Buffelshoek Mine on the above-mentioned properties received by the Department on 19 September 2023 for commenting purposes, has reference.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

RESPONSE

This is noted.

2) The Department takes note of the indication that an EIA was conducted at the time the mining right was issued and that this process represents an updated EIA. The Department was unable to obtain records of the history at the site.

RESPONSE

This is noted. A copy of the EIA and associated Environmental Management Programme (EMP) report for the above process is kept on record electronically by the client. This report and any other records which Imerys Refractory Minerals South Africa (Imerys) may have can be made available to LEDET upon request.

3) The Department request more information on the required relocation of the Istores Primary School (page 272). The planning of such related activities must be addressed in a concurrent manner to avoid preventable short notice demands on other stakeholders.

RESPONSE

It is currently not required to relocate the school as only the proposed future prospecting and mining area is located nearby to the school. It will take several years for the mine to reach this area. However, as recommended by the Air Quality specialist, Dustfall and Particulate Matter (PM) 2.5 and PM10 monitoring will be required from the commencement of mining. Air quality monitoring points will be positioned between the open pit and the school to determine whether the emissions are within the limits of the National Dust Control Standards and National Ambient Air Quality standards for PM2.5 and PM10.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

4) On page 254 it is indicated that two drainage lines occur running from the mountain down into the site but indicates that the mining is not expected to impact hydrological functioning of the activities outside of the aquatic ecosystems. Could these drainage lines be indicated on the general lay-out plan in order to clarify the situation.

RESPONSE

Please refer to Addendum 1B of the report for the surface layout plan which has been amended to indicate the above-mentioned drainage lines.

Trusting that the above is in order.

Regards,

17 October 2023
Christopher Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Cand. EAP (EAPASA): Number 2022/4844

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

Addendum 5D: Comments on the Draft EIA from DFFE including EAPs response

forestry, fisheries & the environment
Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Enq: Mrs. N.A Mudau
78 Hans van Rensburg street
Old mutual building, 2nd floor
Polokwane
0700

Tel: 015 287 9964
Email: namudau@dffe.gov.za

BECS Environmental (Pty) Ltd
PO Box 72960
LYNNWOOD RIDGE
0400

Attention: Chris Delport

COMMENTS FOR THE ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE.

The Department of Forestry, Fisheries and the Environment acknowledge the receipt of the proposed Portion 4 of the farm Buffelshoek 351 KQ, the remaining extent of the farm Buffelshoek 351 KQ and the remaining extent of Portion 1 of the farm Grootfontein 352 KQ, situated in the Waterberg District Municipality and the Thabazimbi Local Municipality of the Limpopo Province.

The Department is the custodian of the National Forests Act (act no 84 of 1998) as amended, which among others provide special measures for the protection of forests and trees. The list of trees is gazetted annually.

In terms of section 7 (1) No person may cut, disturb, damage, destroy or remove any indigenous tree in; or remove or receive any such tree from a Natural Forest except when a license to do such has been issued.

In terms of section 15 (1), No person may-:

a) Cut, disturb, damage, destroy or remove any protected tree; or

1 | Page

b) Collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.

According to the National Forests Act (act No. 84 of 1998) as amended, a tree includes any tree seedling, sapling, transplant or coppice shoot of any age and any root, branch, or other part of it.

As indicated in the report on section 6.2.7.4. page 76 that data obtained from field surveys, the following protected tree species occur in the area: *Sclerocarya birrea subsp. caffra*, *Combretum imberbe*, *Boscia albitrunca* and *Berchemia zeyheri*. If any activity of the project might affect the Natural Forest and Protected Trees, application form for a License must be completed and forwarded to the department for processing. Upon granting the License, the project can proceed with the activities, which will affect the Natural Forest or Protected Trees.

The footprint of disturbance must be kept as small as possible and must be rehabilitated as soon as possible. A specific application form listing all the protected trees that are going to be directly affected by the project should be indicated. Mitigation efforts need to be taken if the application for a license will affect large number of protected trees.

Yours faithfully

DEPUTY DIRECTOR
FORESTRY RESOURCE PROTECTION

DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT
12/10/2023
DATE
PRIVATE BAG X 2413, MAKHADO, 0920
TEL: 015 519 3300
FORESTRY REGULATIONS SUPPORT LIMPOPO

EAPs response – 16 October 2023

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

16 October 2023

Department of Forestry, Fisheries and the Environment

Attention: Mrs. N. A. Mudau

Email: namudau@dffe.gov.za

Tel: 015 287 9964

78 Hans van Rensburg street

Old mutual building, 2nd floor

Polokwane

0700

RE: COMMENTS FOR THE ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED PORTION 4 OF THE FARM BUFFELSHOEK 351 KQ, THE REMAINING EXTENT OF THE FARM BUFFELSHOEK 351 KQ AND THE REMAINING EXTENT OF PORTION 1 OF THE FARM GROOTFONTEIN 352 KQ, SITUATED IN THE WATERBERG DISTRICT MUNICIPALITY AND THE THABAZIMBI LOCAL MUNICIPALITY OF THE LIMPOPO PROVINCE.

Dear Mrs. N. A. Mudau

We hereby acknowledge receipt of the Department of Forestry, Fisheries and the Environment (DFFE) comments dated 12 October 2023. Kindly refer below for responses to the points raised.

1) The Department is the custodian of the National Forests Act (act no 84 of 1998) as amended, which among others provide special measures for the protection of forests and trees. The list of trees is gazetted annually.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

In terms of section 7 (1) No person may cut, disturb, damage, destroy or remove any indigenous tree in; or remove or receive any such tree from a Natural Forest except when a license to do such has been issued.

RESPONSE

This comment is noted. Please note that the farms that form part of this Mining Right Area do not fall under a Natural Forest, furthermore, the mine does not intend to receive trees from a Natural Forest. No indigenous vegetation clearance has commenced on site as part of this application yet, however, if protected trees must be removed or pruned, the mine will apply for a permit from the local DFFE prior to commencement .

In terms of section 15 (1), No person may-

a) Cut, disturb, damage, destroy or remove any protected tree; or

b) Collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.

According to the National Forests Act (act No. 84 of 1998) as amended, a tree includes any tree seedling, sapling, transplant or coppice shoot of any age and any root, branch, or other part of it. As indicated in the report on section 6.2.7.4. page 76 that data obtained from field surveys, the following protected tree species occur in the area: *Sclerocarya birrea subsp. caffra*, *Combretum imberbe*, *Boscia albitrunca* and *Berchemia zeyheri*. If any activity of the project might affect the Natural Forest and Protected Trees, application form for a License must be completed and forwarded to the department for processing. Upon granting the License, the project can proceed with the activities, which will affect the Natural Forest or Protected Trees.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

RESPONSE

The Terrestrial Vegetation Specialist Assessment conducted as part of the application includes the following mitigation measures:

- Record protected trees in the initial and subsequent mining footprints. Where protected trees must be removed or pruned, apply for a permit from the local DFFE prior to commencement.
- A terrestrial plant species assessment must be undertaken, based on a botanical walkthrough, to determine if plant species of conservation concern are present within the development footprint.
- This report must inform any permitting for protected trees, the relocation of plant species of conservation concern as well as deviations to the routes to avoid such plants. Search and Rescue for such plants should be conducted prior to vegetation clearance."

These conditions are included in the EIA report and will form part of the mine's operational and pre-operational Environmental Management Plan (EMP) if an Environmental Authorisation (EA) is granted.

Therefore it is already a condition of the EMP that an application form for a License must be completed and forwarded to the department for processing, should protected trees be present within the development footprint.

The footprint of disturbance must be kept as small as possible and must be rehabilitated as soon as possible. A specific application form listing all the protected trees that are going to be directly affected by the project should be indicated. Mitigation efforts need to be taken if the application for a license will affect large number of protected trees.

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

RESPONSE

The footprint of disturbance will not extend beyond the proposed surface layout area. Further, as stated above, an application form for a License must be completed and forwarded to the department for processing, should protected trees be confirmed as present within the proposed development footprint.

Trusting that the above is in order. Kindly confirm receipt of the responses.

Regards,

16 October 2023
Christopher Delport | Environmental Assessment Practitioner
BSc Environmental Science (UP), BSc Honours Geography and Environmental Science (UP)
Cand.Sci.Nat: 144476
Cand. EAP (EAPASA): Number 2022/4844

Director: Salome Beeslaar
Environmental Assessment Practitioners: Chris Delport, Miles Longhurst, Chantelle Tollemache
Telephone: 012 361 9970, Facsimile: 012 361 0645
Email: salome@becsenv.co.za

ADDENDUM 6: SUPPORTING DOCUMENTATION

Addendum 6A: Proof of IWULA in progress

From: Ewulaas_Do_Not_Reply@dws.gov.za <Ewulaas_Do_Not_Reply@dws.gov.za>
Sent: Wednesday, 12 April, 2023 10:57 AM
To: Salome Beeslaar <salome@becsenv.co.za>
Subject: Pre-Application Water Use Enquiry has been submitted to the department (WU29201)

Dear Mrs Salome Beeslaar (),

A request for consultation for the following Pre-Application Water Use Enquiry has been submitted to the department :

IWULA for mining of andalusite at Buffelshoek Mine (WU29201)

Your request for consultation was submitted to :

Name : Mr T. Mjona ()
e-Mail : MjonaT@dws.gov.za
Tel : 0123921499

Click Here to access the Application

Kind Regards,

e-WULAAS on Behalf of **Department of Water and Sanitation**

Private Bag X313, Pretoria, 0001
Sedibeng Building, 185 Francis Baard Street, Pretoria, 0001
Tel: (012) 336 7500
Fax: (012) 323-4472
Website: www.dws.gov.za
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water & sanitation
Department:
Water and Sanitation
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