ENVIRONMENTAL & ENGINEERING

REPORT

AZCOWARE (PTY) LTD

BASIC ASSESSMENT REPORT
MINING PERMIT APPLICATION
MP 30/5/1/1/3/13325 MP
DRAFT REPORT

REPORT REF: 22-1768-AUTH (AZCOWARE 13325MP BAR)

TO MINE COAL IN RESPECT OF A PORTION OF PORTION 46 OF THE FARM ELANDSFONTEIN 309 JS, EMALAHLENI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

VERSION 0.0

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Quality Control by:

Nature of Signoff:	Responsible Person:	Role / Responsibility	Qualification
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This is a legally binding document and many of the actions and recommendations remain the responsibility of the client (as the owner/lessee of the property).

EAP - was independent and performed the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application; have expertise in conducting environmental impact assessments or undertaking specialist work as required, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity; ensure compliance with these Regulations;

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EXECUTIVE SUMMARY

Background

Azcware (Pty) Ltd (hereinafter referred to as Azcware) is applying for a new Mining Permit (MP) adjacent to the existing Highveld Collieries opencast mining operations. Azcware intends on using the existing infrastructure at Highveld Collieries in order to optimise the MP area for resource extraction. The MP area is located on a portion of Portion 46 of the Farm Elandsfontein 309 in the Mpumalanga Province of South Africa.

Table 1-1.1: Basic Assessment Timeline

Date	Aspect
N/A	Mining Permit Application on SAMRAD.
15/06/2022	Mining Permit Acceptance received from DMR.
05/08/2022	Advert Placed in Witbank News
05/08/2022	Interested and Affected Parties notified via email and SMS.
05/08/2022	30-day Public Participation started for the NEMA Basic Assessment Process.
12/09/2022	Submission of the final Basic Assessment Report.

The obtaining of a Mining Permit from the Department of Mineral Resources (DMR) is governed by the Mineral Petroleum Resources Development Act (MPRDA) (Act 28 of 2002). The MPRDA requires compliance with related legislation, specifically the National Environmental Management Act of 1998 (NEMA). This Basic Assessment Report (BAR) includes, amongst others, the following information as required in terms of the NEMA:

- A description of the environment likely to be affected by the proposed prospecting activities;
- An assessment of potential impacts on the environment, socio-economic conditions, and cultural and heritage aspects;
- A summary of the potential significance of identified impacts;
- Proposed mitigation and management measures to minimise adverse impacts and to optimise benefits; and
- Planned monitoring and performance assessment of the EMP (Environmental Management Plan) and Rehabilitation measures of areas disturbed during prospecting.

Project Description

Table 1-2: Project description

Farm Name:	A portion of Portion 46 of the Farm Elandsfontein 309 JS.
Application area (Ha)	4.995 ha.
Magisterial district:	eMalahleni Local Municipality Nkangala District Municipality
Distance and direction from nearest town	15 km west of eMalahleni Town

21 digit Surveyor General Code for each farm portion	T0JS00000000030900046
Description of the overall activity. (Indicate Mining Right, Mining Permit, Prospecting right, Bulk Sampling, Production Right, Exploration Right, Reconnaissance permit, Technical co-operation permit, Additional listed activity)	Application for Environmental Authorisation submitted in support of a Mining Permit. Application in terms of the MPRDA. Azcoware (Pty) Ltd (hereinafter Azcoware) has applied for a Mining Permit in terms of the MPRDA. Azcoware intends to mine coal resources on a 5ha portion of portion 46 of the farm Elandsfontein 309 JS. The resource will be mined via opencast roll over mining. The following activities will be undertaken on site: • Box cut opencast mining with a roll over rehabilitation sequence; • Mobile crushing and screening of the ROM coal in the pit. The adjacent Highveld Colliery will provide Azcoware with their infrastructure needs, including: • Hauling, access road, haul road; • Mobile office; • Mobile sanitation and change house; • Mobile fuel storage; • Pollution control facility/dam(s); • Clean and dirty water separation system; • Topsoil, subsoil, overburden, ROM stockpiles; • Weighbridge; • Waste management; A basic assessment process is required in terms of the NEMA 2014 amended regulations for the application of a Mining Permit.

Project Schedule

The Basic Assessment (BA) process should be undertaken for project activities that are included under Listing Notices 1 and 3. Impacts of these activities are more generally known and can often be mitigated or easily managed. The BA process is generally shorter and less onerous than the Scoping and Environmental Impact Assessment (S&EIA) process. The BA process must follow the procedure as prescribed in Regulations 19 to 20 of NEMA EIA Regulations 2014, as amended.

Registered Landowner

The registered landowners of the farms were listed as follows:

Table 1-3: Landowners

Farm			Ptn	Owner
ELANDSFONTEIN	309	JS	46(RE)	EVRAZ HIGHVELD STEEL & VANADIUM LTD

Surrounding landowners are listed below:

Farm			Ptn	Owner
ELANDSFONTEIN	309	JS	6(RE)	VAN DER LINDE ANNA MAGDALENA
ELANDSFONTEIN	309	JS	7(RE)	ANKER COAL & MINERAL HOLDINGS SOUTH AFRICA PTY LTD
ELANDSFONTEIN	309	JS	9	TRANSNET LTD
ELANDSFONTEIN	309	JS	25(RE)	EVRAZ HIGHVELD STEEL & VANADIUM LTD
ELANDSFONTEIN	309	JS	26	EVRAZ HIGHVELD STEEL & VANADIUM LTD
ELANDSFONTEIN	309	JS	32	EVRAZ HIGHVELD STEEL & VANADIUM LTD

ELANDSFONTEIN	309	JS	36	EVRAZ HIGHVELD STEEL & VANADIUM LTD
ELANDSFONTEIN	309	JS	44	ANKER COAL & MINERAL HOLDINGS SOUTH AFRICA PTY LTD
ELANDSFONTEIN	309	JS	48	EVRAZ HIGHVELD STEEL & VANADIUM LTD

Details of the Public Participation Process followed

Section 41 of NEMA Regulation 982 set out the Legal and Regulatory Requirement for Public Participation. The Public Participation Process (PPP) aims to involve the authorities and Interested and Affected Parties (IAPs) in the project process, and determines their needs, expectations and perceptions which in turn ensures a complete and comprehensive environmental study. An open and transparent process has and will be followed at all times and is based on reciprocal dissemination of information. The following will be undertaken during the PPP:

1. Identification of I&APs;
2. Notification of IAPs regarding the proposed project;
3. Gathering comments, issues and concerns from IAPs;
4. Responding to IAP comments, issues and concerns;
5. Compilation and submission of results of consultation report to the DMR; and
6. Providing IAPs with the opportunity to review and comment on the basic assessment report.

Location

The study area is located 11 km southwest of eMalahleni, while Clewer is located 4 km to the southeast, Ogies 17 km to the south-southwest and Bronkhorstspruit 39 km to the west-northwest. The study area falls within the Nkangala District Municipality and the eMalahleni Local Municipality in the Mpumalanga Province. In terms of vegetation, the study area falls within the Grassland Biome, which is typically associated with summer rainfall regions. This Biome covers approximately 28% of South Africa. According to the vegetation classification by Mucina & Rutherfords (2006), the study area falls within the Eastern Highveld Grassland vegetation unit.

Impacts

The impacts were assessed, and key impacts rated as Moderate to High after mitigation or as a cumulative impact are summarised below:

Table 1-4: Moderate to High Impact Summary

Activity	Aspect	Impact	Phase	+/-	SU	+/-	SM
Groundwater							
Box cut opening.	Dewatering.	Decrease in water level should the pit floor be lower than the water level.	Construction	Negative	Med - High	Negative	Med - High
Pit dewatering	Dewatering	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level.	Operation	Negative	High	Negative	High
Backfilling of pit	Backfilling of the pit and no more dewatering.	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	Residual	Negative	High	Negative	High
Surface Water and Wetlands							

Open pit Mining	Pit dewatering and drawdown	Reduction in Baseflow.	Operation	Negative	Med - High	Negative	Med - High
Operational activities	Operational activities	Flow alteration due to erosion and sedimentation	Operation	Negative	High	Negative	Med - high
Operational activities	Operational activities	Pollution of watercourse	Operation	Negative	High	Negative	Med - high
Social Economic							
Mine establishment	Mining operations	Employment and income opportunity.	Construction and Operation Phase	Positive	Med	Negative	Med
Mining operations	Mine closure	Job losses.	Decommissioning and Closure	Negative	Med - High	Negative	Med
Mining operations	Mine Closure	Decrease/termination of community investment funds and support to local communities.	Decommissioning and Closure	Negative	Med - High	Negative	Med

Reasoned opinion

The EAP believes that the authorisation for the activity on the portion of Portion 46 of the Farm Elandsfontein 309 should be granted. The site area is located in a modified area and is in close proximity of other mining operations. The risks of the proposed mining activity are minimal and can be mitigated by following the mitigation measures stipulated in the EMP, which will reduce impacts significantly to acceptable levels.

Conditions that must be included in the authorisation

- Adhere to all recommendation and management measures contained in the EMP.
- All relevant permits and authorisation must be obtained prior to construction commencing.
- Adhere to all monitoring requirements.
- A Water Use License (WUL) must be obtained prior to any water uses undertaken on site.
- As 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. Should skeletal remains be exposed during development and construction phases, all activities must be suspended, and the relevant heritage resources authority contacted.
- From a palaeontological perspective – the possibility exists that fossiliferous significant material (plants, insects, bone, coal) may be exposed during the development (construction & operational phase). These materials generally occur below the surface and is of palaeontologic significance. In cases where such material is found, all activities must be suspended pending further palaeontological investigations by a qualified palaeontological scientist.
- Methods of handling the potential decant should be investigated, approved, and set in place prior to mine closure.
- All acoustic screening measures must be in place before commissioning the mining activities.
- No off-road driving, hunting, poaching, or fires should be permitted on the property.
- An incident and complaints register must be present on site and submitted to the Municipality on quarterly basis.
- The applicant must have dust fallout monitoring points around the proposed mining area and have the monitoring reports submitted to the Municipality on quarterly basis.

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Definition of Terms

Audit	a systematic, independent and documented review of operations and practises to ensure that relevant requirements are met. Qualified professionals with relevant auditing experience should conduct audits and, where possible, independent external auditors should also be used.
Borehole	is a narrow shaft bored in the ground, either vertically or horizontally. A borehole may be constructed for many different purposes, including the extraction of water or other liquid (such as petroleum) or gases (such as natural gas), as part of a geotechnical investigation, environmental site assessment, mineral exploration, temperature measurement, as a pilot hole for installing piers or underground utilities, for geothermal installations, or for underground storage of unwanted substances, e.g. in Carbon capture and storage.
Clean Water	clean water is any water that has maintained the chemical, physical, and biological integrity of the waters by preventing point and nonpoint pollution sources.
Compliant	a full achievement of the performance requirement of a particular condition of the license or programme
Conservation	in relation to a water resource means the efficient use and saving of water, achieved through measures such as water saving devices, water-efficient processes, water demand management and water rationing;
Construction	the time period that corresponds to any event, process, or activity that occurs during the Construction phase (e.g., building of site, buildings, and processing units) of the proposed project. This phase terminates when the project goes into full operation or use.
Corrective Action Plan	an action plan developed by the proponent, contractor, or facility owner and approved by the external auditor that describes how the contractor or facility owner intends to resolve the non-conforming item. The Corrective Action Plan should be specific, measurable, achievable, realistic, and timely.
Director-General	means the Director-General of the Department;
Effluent	is defined by the United States Environmental Protection Agency as "wastewater - treated or untreated - that flows out of a treatment plant, sewer, or industrial outfall. Generally, refers to wastes discharged into surface waters". The Compact Oxford English Dictionary defines effluent as "liquid waste or sewage discharged into a river or the sea". Effluent in the artificial sense is in general considered to be water pollution.
Environmental Audit Report	a summary report prepared after an environmental audit that describes the attributes of the audit and the audit findings and conclusions.
Environmental Authorisation	is an environmental authorisation issued by a state department.
Environmental Component	an attribute or constituent of the environment (i.e., air quality; marine water; waste management; geology, seismicity, soil, and groundwater; marine ecology; terrestrial ecology, noise, traffic, socio-economic) that may be impacted by the proposed project.
Environmental Impact	a positive or negative condition that occurs to an environmental component as a result of the activity of a project or facility. This impact can be directly or indirectly caused by the project's different phases (i.e., Construction, Operation, and Decommissioning).
Groundwater	is the water located beneath the earth's surface in soil pore spaces and in the fractures of rock formations. A unit of rock or an unconsolidated deposit is called an aquifer when it can yield a usable quantity of water. The depth at which soil pore spaces or fractures and voids in rock become completely saturated with water is called the water table. Groundwater is recharged from, and eventually flows to, the surface naturally; natural discharge often occurs at springs and seeps, and can form oases or wetlands
Non-conformance	constitutes a non-compliance or an action plan or initial actions taken without tangible deliverables. Non-conformance may also be associated with activities breaching legislation. Non-Conformance findings therefore have a high priority and mitigation measures are mandatory.
Operation	the time period that corresponds to any event, process, or activity that occurs during the Operation (i.e., fully functioning) phase of the proposed project or development. (The Operation phase follows the Construction phase, and then terminates when the project or development goes into the Decommissioning phase.)
Partially Compliant	achievement with shortcomings (such as documented proof and or work in progress) and achievement where there is an obvious shortcoming in the delivery of the performance requirement.
Pollution	is the introduction of contaminants into the natural environment that cause adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as point source or nonpoint source pollution.
Protection	in relation to a water resource, means - (a) Maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way; (b) Prevention of the degradation of the water resource; and (c) the rehabilitation of the water resource;
Proponent	the person, company, or agency that is the primary responsible party for a development project and that is the permit applicant/holder for the project.
Rehabilitation	is the act of restoring something to its original state;
Responsible Authority	in relation to a specific power or duty in respect of water uses, means - (a) if that power or duty has been assigned by the Minister to a catchment management agency, that catchment management agency; or (b) if that power or duty has not been so assigned, the Minister;
Water Resource	includes a watercourse, surface water, estuary, or aquifer;

Wetland	means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

Abbreviations

CARA:	Conservation of Agricultural Resources Act, 43 of 1983
DEA:	Department of Environmental Affairs (The former Department of Environmental Affairs and Tourism)
DMR:	The Department of Mineral Resources (The former Department of Minerals and Energy)
DWA:	Department of Water Affairs (Is now referred to the Department of Water and Sanitation – DWS)
EA :	Environmental Authorisation
ECO:	Environmental Control Officer
EIA :	Environmental Impact Assessment
ELCA :	Environmental Legal Compliance Assessment
EMP :	Environmental Management Plan
EMPPA:	Environmental Management Programme Performance Assessment
EMPR :	Environmental Management Programme
EMS:	Environmental Management System
GM:	General Manager
GN:	Government Notice
I&AP:	Interested & Affected Parties
IEM:	Integrated Environmental Management Series
ISO:	International Standards Organisation
IWULA:	Integrated Water Use Licence Application
IWUL:	Integrated Water Use License
IWWMP:	Integrated Water and Waste Management Plan
KG:	Knowledge Gap
MOC:	Management of Change
MPRDA:	Mineral and Petroleum Resources Development Act, 28 of 2002
MR:	Mining Right
N/R:	Applicable, but not required at the time of the audit
NEMA:	National Environmental Management Act, 107 of 1998
NEMAQA:	National Environmental Management: Air Quality Act, 39 of 2004
NEMBA:	National Environmental Management: Biodiversity Act, 10 of 2004
NEMWA:	National Environmental Management: Waste Act, 59 of 2008
NC:	Non-conformance
NHRA:	National Heritage Resources Act, 25 of 1999
NWA:	National Water Act, 36 of 1998
RWD:	Return Water Dam
ROM:	Run of Mine
SAHRA:	South African Heritage Resources Authority
SHEQ:	Safety, Health, Environment and Quality
SOP:	Standard Operating Procedure
SWMP:	Strategic Water Management Plan
WSA:	Water Services Act, 108 of 1997
WUL*:*	Water Use Licence

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT BASIC ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT: **Azcoware (Pty) Ltd**

TEL NO: 082 500 8838

FAX NO:

POSTAL ADDRESS: PO box 35465
Menlo Park, Pretoria
0102

PHYSICAL ADDRESS: 323 Lynnwood Road
Menlo Park, Pretoria
0102

FILE REFERENCE NUMBER SAMRAD: **MP 30/5/1/1/3/13325 MP**

1. IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

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

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

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

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

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

The objective of the basic assessment process is to, through a consultative process—

a. determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context.
b. identify the alternatives considered, including the activity, location, and technology alternatives.
c. describe the need and desirability of the proposed alternatives,
d. through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
    i. the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    ii. the degree to which these impacts—

aa. can be reversed.
bb. may cause irreplaceable loss of resources; and
cc. can be managed, avoided or mitigated.

e. through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
    i. identify and motivate a preferred site, activity and technology alternative;
    ii. identify suitable measures to manage, avoid or mitigate identified impacts; and
    iii. identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND DRAFT BASIC ASSESSMENT REPORT

3. CONTACT PERSON AND CORRESPONDENCE ADDRESS

3.1 DETAILS OF

3.1.1 Details of the EAP

Name of The Practitioner:	Marungwane Ramashapa
Tel No.:	012 807 0383
e-mail address:	Maru@ecoe.co.za

3.1.2 Expertise of the EAP

3.1.2.1 The qualifications of the EAP

Name and Surname	Marungwane Ramashapa
Company	Eco Elementum (Pty) Ltd
Position	Environmental Consultant
Location	361 Oberon Ave, Glenfield Office Park, Nika Building, 1st Floor, Faerie Glen, Pretoria 0081
Email	Maru@ecoe.co.za
Telephone Number	012 807 0383
Education	MSc Geography, University of Johannesburg BSc Hns Geography, University of Johannesburg BSc Life and Environmental Sciences; Geography and Geology, University of Johannesburg
Professional skills	Project Management. Project Administration. Monitoring and Compliance. Compilation of Environmental Management. Compilation of Environmental Impact Assessment. Government Department Liaison.

Please refer to the CV attached in Appendix A.

3.1.2.2 Summary of the EAP's past experience.

Table 3-1: Qualifications of EAP

Name	Marungwane Ramashapa
Skills	- Environmental Impact Assessments. - Basic assessments - Compilation of Environmental Management Programmes - Compilation of Mining Permit and Mining Right Applications, - Water Use License Application reports. - Environmental Compliance Auditing. - Environmental Control Officer. - Environmental Awareness

	- External & Internal Auditing - Public Consultation & Stakeholder Engagement - Specialist coordination - Project Management - Project Administration
Experience	Marungwane Ramashapa's EAP experience includes the Project administration and management of environmental authorisation process Projects. This has included undertaking Mining Permit, Mining Rights, Basic Assessment, Scoping & EIA report writing. Other environmental processes she has undertaken include Environmental compliance monitoring, auditing and reporting, Water Use Licensing Application and Stakeholder Engagements.

3.2 LOCATION OF THE OVERALL ACTIVITY

Table 3-2: Location of the activity

Farm Name:	A portion of Portion 46 of the Farm Elandsfontein 309 JS.
Application area (Ha)	4.995 ha.
Magisterial district:	eMalahleni Local Municipality Nkangala District Municipality
Distance and direction from nearest town	15 km west of eMalahleni Town
21 digit Surveyor General Code for each farm portion	T0JS00000000030900046
Description of the overall activity. (Indicate Mining Right, Mining Permit, Prospecting right, Bulk Sampling, Production Right, Exploration Right, Reconnaissance permit, Technical co-operation permit, Additional listed activity)	Application for Environmental Authorisation submitted in support of a Mining Permit. Application in terms of the Mineral Petroleum Resources Development Act (MPRDA) (Act 28 of 2002). Azcoware (Pty) Ltd (hereinafter Azcoware) has applied for a Mining Permit in terms of the MPRDA. Azcoware intends to mine coal resources on a 5ha portion of portion 46 of the farm Elandsfontein 309 JS. The resource will be mined via opencast roll over mining. The following activities will be undertaken on site: • Box cut opencast mining with a roll over rehabilitation sequence; • Mobile crushing and screening of the ROM coal in the pit. The adjacent Highveld Colliery will provide Azcoware with their infrastructure needs, including: • Hauling, access road, haul road; • Mobile office; • Mobile sanitation and change house; • Mobile fuel storage; • Pollution control facility/dam(s); • Clean and dirty water separation system; • Topsoil, subsoil, overburden, ROM stockpiles; • Weighbridge; • Waste management. A Basic Assessment process is required in terms of the NEMA 2014 amended regulations for the application of a MP.

3.3 LOCALITY MAP

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

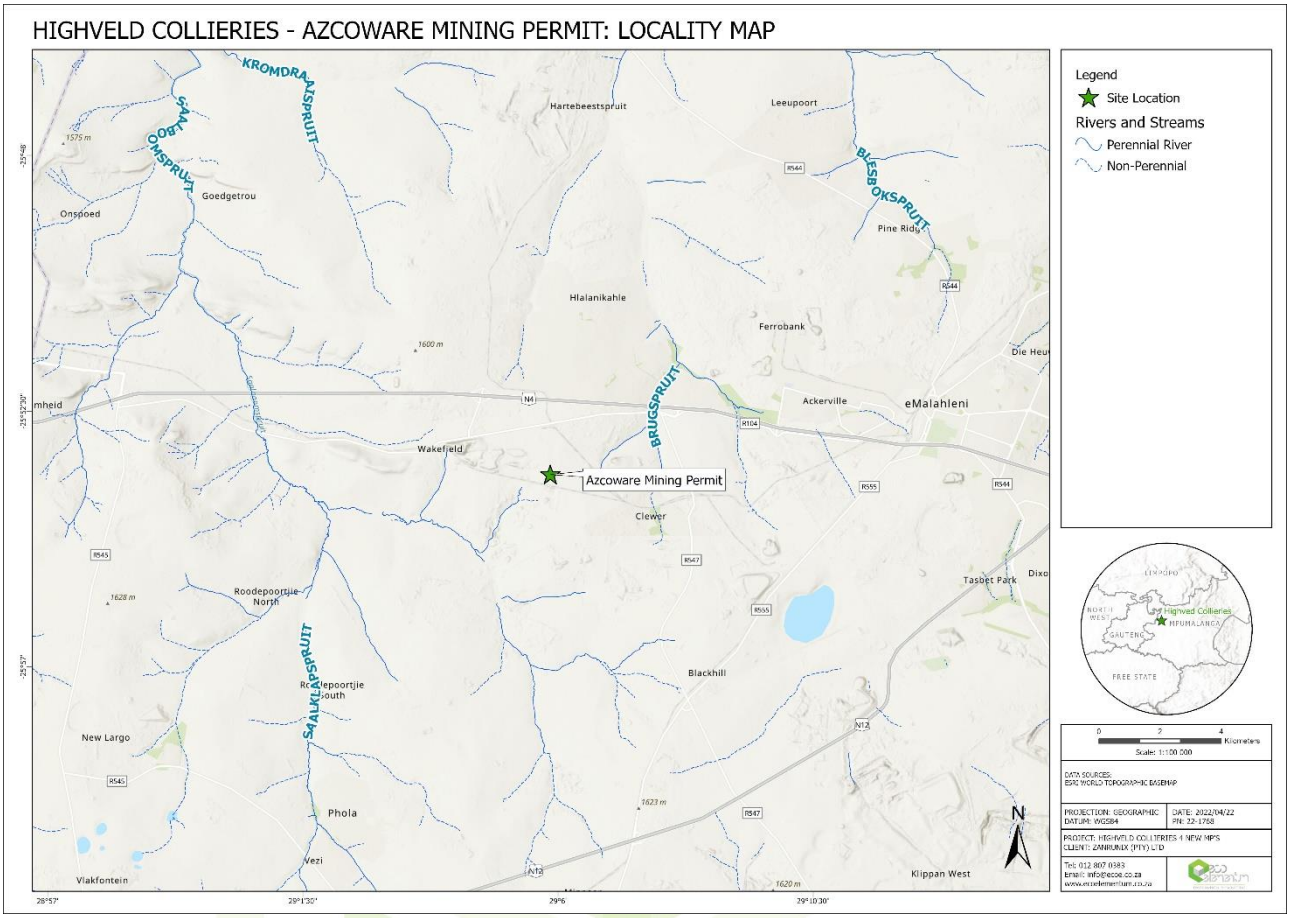


Figure 3.1: Locality Map

3.4 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY.

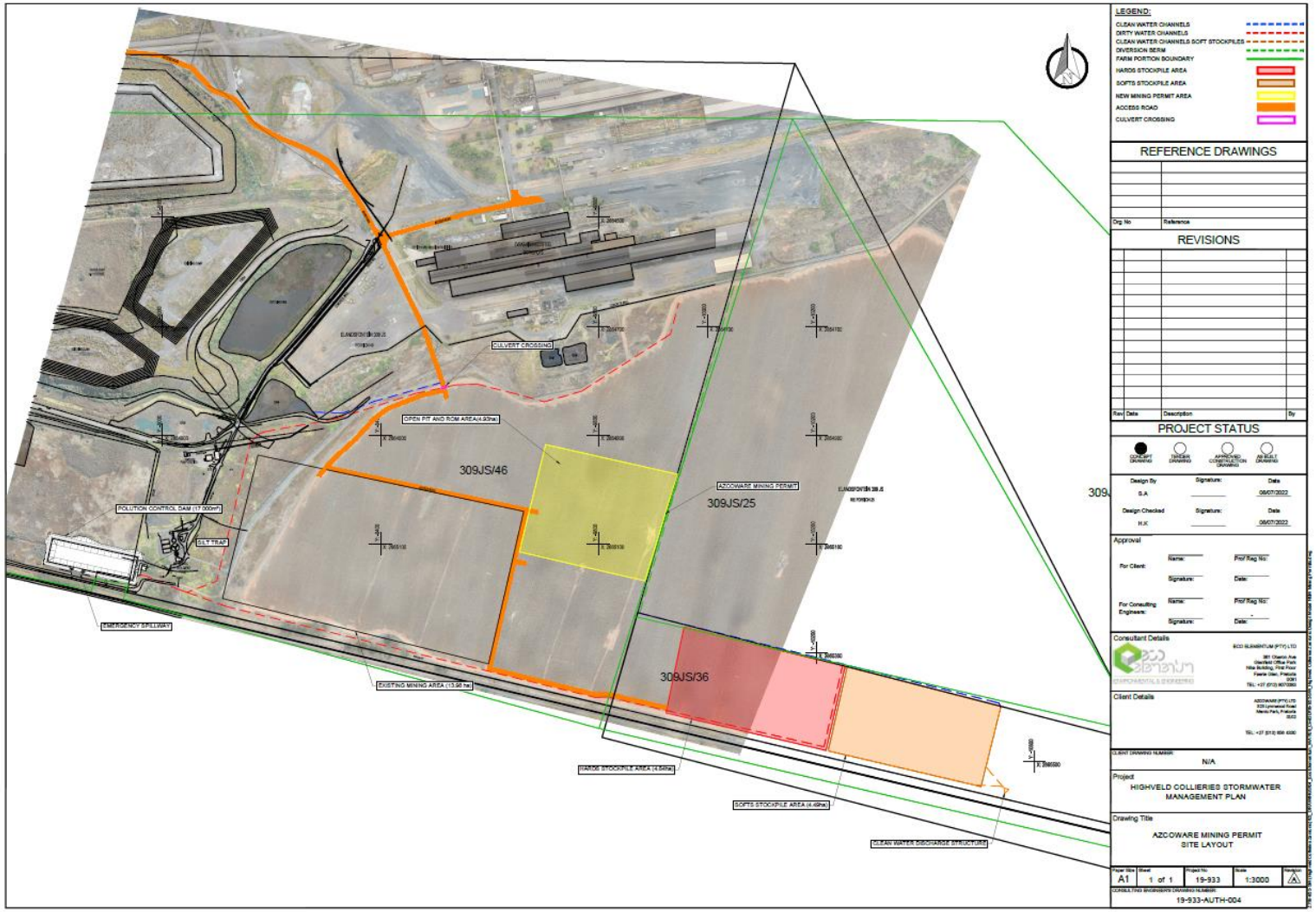


Figure 3.2: Activities Map

3.4.1 Listed and specified activities

Section 16 of the MPRDA, 2002 requires, upon request by the Minister that an EMP be submitted, and that the applicant must notify and consult with Interested and Affected Parties (I&APs). Section 24 of the NEMA requires that activities, which may impact on the environment must obtain an environmental authorisation from a relevant authority before commencing with the activities. Such activities are listed under Regulations Listing Notice 1. Please refer to the following table for the details in terms of the listed activities.

Table 3-3: Listed and specific activities

APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985; as amended).		Name of Activity	Aerial extent of the Activity Ha or m²	Waste Management Authorisation
Listing Notice 1 (GNR 983)				
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Stormwater management structures.	<5ha	No
10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Process / Waste / Return Water pipeline infrastructure.	<5ha	No
21	Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including — (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.	Application for a mining permit.	~5 ha	No

27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Application for a mining permit	<5ha	No

3.4.2 Description of Activities to be Undertaken

Azcoware intends to mine coal resources on a 5ha portion of portion 46 of the farm Elandsfontein 309 JS. The resource will be mined via opencast roll over mining. The following activities will be undertaken on site:

- Box cut opencast mining with a roll over rehabilitation sequence;
- Mobile crushing and screening of the ROM coal in the pit.

The adjacent Highveld Colliery will provide Azcoware with their infrastructure needs, including:

- Hauling, access road, haul road;
- Mobile office;
- Mobile sanitation and change house;
- Mobile fuel storage;
- Pollution control facility/dam(s);
- Clean and dirty water separation system;
- Topsoil, subsoil, overburden, ROM stockpiles;
- Weighbridge;
- Waste management;

Site Preparation

Site preparation mainly deals with the stripping and stockpiling of topsoil prior to the mining activities commencing as this might affect the quality and quantity of available valuable topsoil resources. The main objectives of soil management are to:

- Minimal removing and stockpiling of topsoil due to historical mining activities;
- Optimise the preservation and recovery of topsoil for rehabilitation;
- Identify soil resources and stripping guidelines;
- Identify surface areas requiring stripping (to minimise over clearing);
- Manage topsoil reserves to not degrade the resource;
- Identify stockpile locations and dimensions; and
- Identify soil movements for rehabilitation use.

In accordance with the objective of providing sufficient stable soil material for rehabilitation and to optimise soil recovery, the following strategies have been adopted:

- Stockpiles to be located outside proposed mine disturbance areas;
- Construction of stockpiles by dozers rather than scrapers to minimise structural degradation;
- Construction of stockpiles with a “rough” surface condition to reduce erosion hazard, improve drainage and promote revegetation; and
- Revegetation of stockpiles with appropriate fertiliser and seed to minimise weed infestation, maintain soil organic matter levels, soil structure and microbial activity and maximise the vegetative cover of the stockpile depending on the exposure timeframes.

Disturbance areas will be stripped progressively (i.e. only as required) to reduce erosion and sediment generation, to reduce the extent of topsoil stockpiles and to utilise stripped topsoil as soon as possible for rehabilitation. Rehabilitation of disturbed areas (i.e. roads, embankments and stripped mining footprint) will be undertaken as practicable after these structures are completed or as areas are no longer required. Soil surveys over the open cut area, beneath proposed mine waste emplacements and other infrastructure areas will determine the depth of topsoil. It should be noted that it is important that for topsoil recovered from the areas it is required that underlying material is not inadvertently collected since it is unsuitable for reuse in rehabilitation.

A general protocol for soil handling is presented below and includes soil handling measures which optimise the retention of soil characteristics (in terms of nutrients and micro-organisms) favourable to plant growth:

- The surface of the completed stockpiles will be left in a "rough" condition to help promote water infiltration and minimise erosion prior to vegetation establishment;
- Topsoil stockpiles to have a maximum height of 3 m to limit the potential for anaerobic conditions to develop within the soil pile;
- Topsoil stockpiles to have an embankment grade of approximately 1V:4H (to limit the potential for erosion of the outer pile face);
- Topsoil stockpiles will be seeded and fertilised; and
- Soil rejuvenation practices will be undertaken if required prior to re-spreading as part of rehabilitation works.

Box Cut Opencast Mining with a Roll-over Rehabilitation Sequence

Opencast mining using the truck and shovel lateral sequential rollover mining method will be undertaken. Mining will commence from the initial box cut. A haul road that will be extended from the nearby existing road will be used as access to the mining area.

The soft overburden will be removed by mechanical methods. The hard overburden will be drilled and blasted and then removed by mechanical methods. The coal will be drilled and blasted prior to removal.

Replacement of overburden materials into the mining pit will be according to the following sequence:

1. Placement of hard overburden at base of pit;
2. Placement of soft overburden; and
3. Final cover of topsoil (minimum 500 mm).

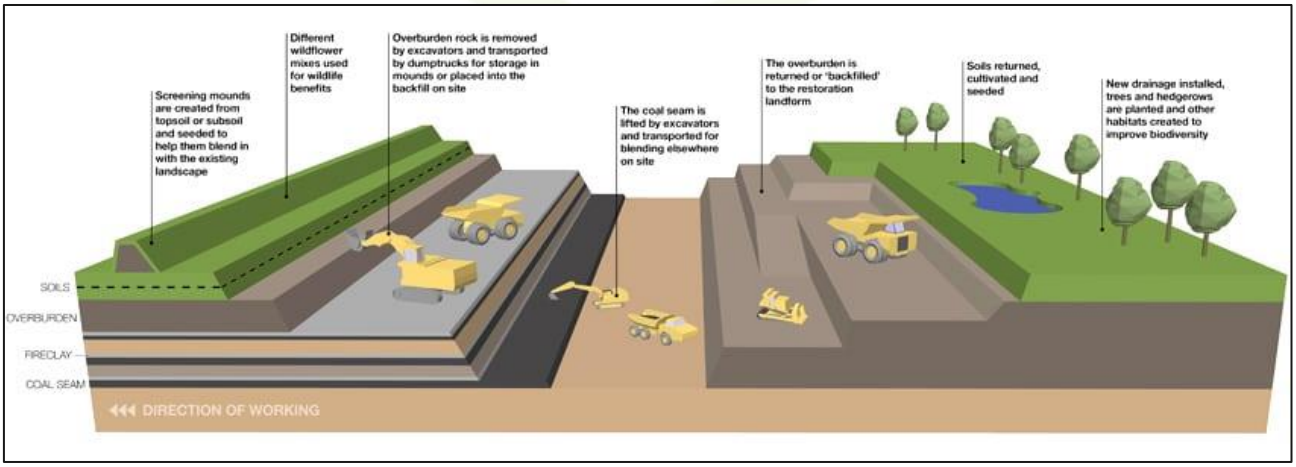


Figure 3.3: Typical Opencast Concurrent Roll Over Rehabilitation Mining Technique

ROM Coal

The Run of Mine (RoM) will be handled in pit with a mobile crushing and screening station.

Access and Haul Roads Construction

The mine access road will lead off one of the Highveld Industrial Complex roads. The dirt road will be upgraded to the applicable standards which includes a gravel road leading into the mine. The road will be used to access the mine offices, ablution facilities, workshop complex, and mining area. Coal transportation trucks will also use this road to enter and exit the mine premises, including travelling to the weighbridge.

Semi Temporary Site and Security Offices

The site offices for the project, including a small security hut at the entrance of the mining area next to the main entrance road will consist of container-type offices that is commercially available as off the shelve products, as illustrated in the image below. This ensures minimal construction requirements on site and also minimal footprint. Keeping the disturbance area minimal and ensuring ease of mine closure and rehabilitation after life of mine make the temporary offices ideal, especially considering the short duration of the proposed activities and requirement of these offices.

Figure 3.4: Typical semi temporary site offices and security office

Semi Temporary Sanitation and Change House

Similar to the structure indicated in the section above, will the semi temporary sanitation and change house also be container type facilities which can easily be brought to site and also removed after life of mine. For the change house and ablution facility a septic tank system will be implemented which is temporary of nature and can also be decommissioned easily. The septic tank system will ensure a 'honey-sucker' type sewage removal vehicle can remove and dispose of sewage at an appropriate facility off site. This ensures no major construction and approval is required for a full-scale sewage treatment facility. Mobile chemical toilets will also be used where necessary and supplied by an approved contractor who will be responsible for the management of these toilets. Water requirements relating to ablutions and drinking water are expected to be minimal and if water cannot be sourced on site from a borehole it will be brought in by a tanker.

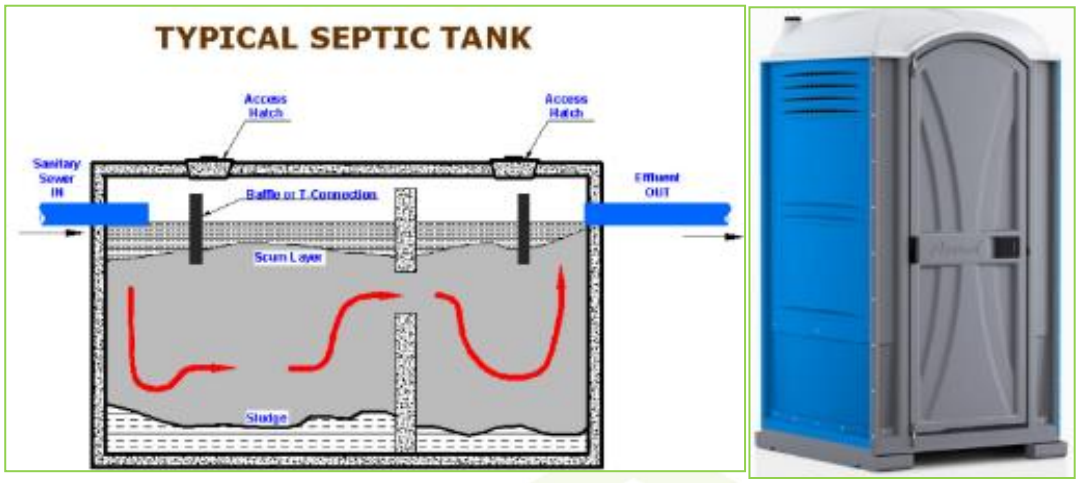


Figure 3.5: Typical septic tank cross section and chemical toilet illustration

Mobile Fuel Storage

The main fuel storage will be diesel in a mobile fuel storage tank with a drip tray designed to hold 110% the capacity of the tanks. The fuel bowser will be stored off site.

Figure 3.6: Typical mobile fuel storage trailer with bunded tray

Pollution Control Facility/Dam (Evaporation and Dust Suppression Usages)

Pollution control dams (PCDs) form an integral and important part of the water management systems on a mine. Different types of PCDs may exist on a mine site, such as process water dams, storm water dams, evaporation dams and other dams, possibly including excess mine water dams and natural pans.

The purpose of PCDs for the mine and in the water management circuits are to:

- Minimise the impact of polluted water on the water resource;
- Minimise the area that is polluted as far as possible, by separating out clean and dirty catchments; and
- Capture and retain the dirty water contribution to the PCDs that cannot be discharged to the water resource, due to water quality constraints, and manage this dirty water through recycling, reuse, evaporation and/or treatment and authorised discharge.

The image below is an illustration of the typical PCD that will be constructed.

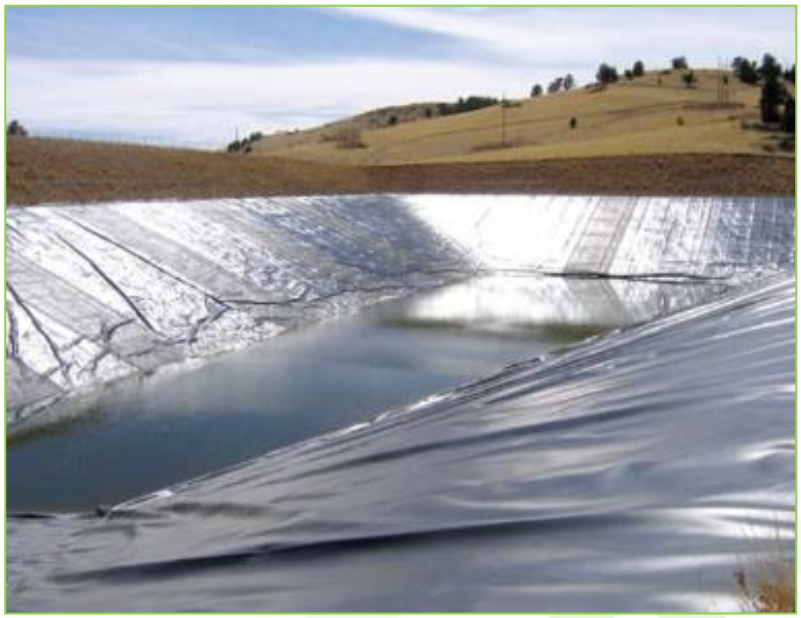


Figure 3.7: Lined PCD illustration

Clean and Dirty Water Separation

A detailed surface water management plan will be drawn up as part of the Water Use License Application (WULA) including the determination of flood lines, identification of sensitive receptors and existing surface water systems and flow paths, and civil engineering design reports for the required trenches and water management facilities. The Geohydrological investigation will also feed into these designs as the anticipated pollution will be modelled. Trenching around the mining area forms part of the clean and dirty water separation and is to a large extent based on the water balance as calculated by the civil engineering team. The image below is a typical illustration of aspects to consider during the calculation of the opencast mining area water balance.

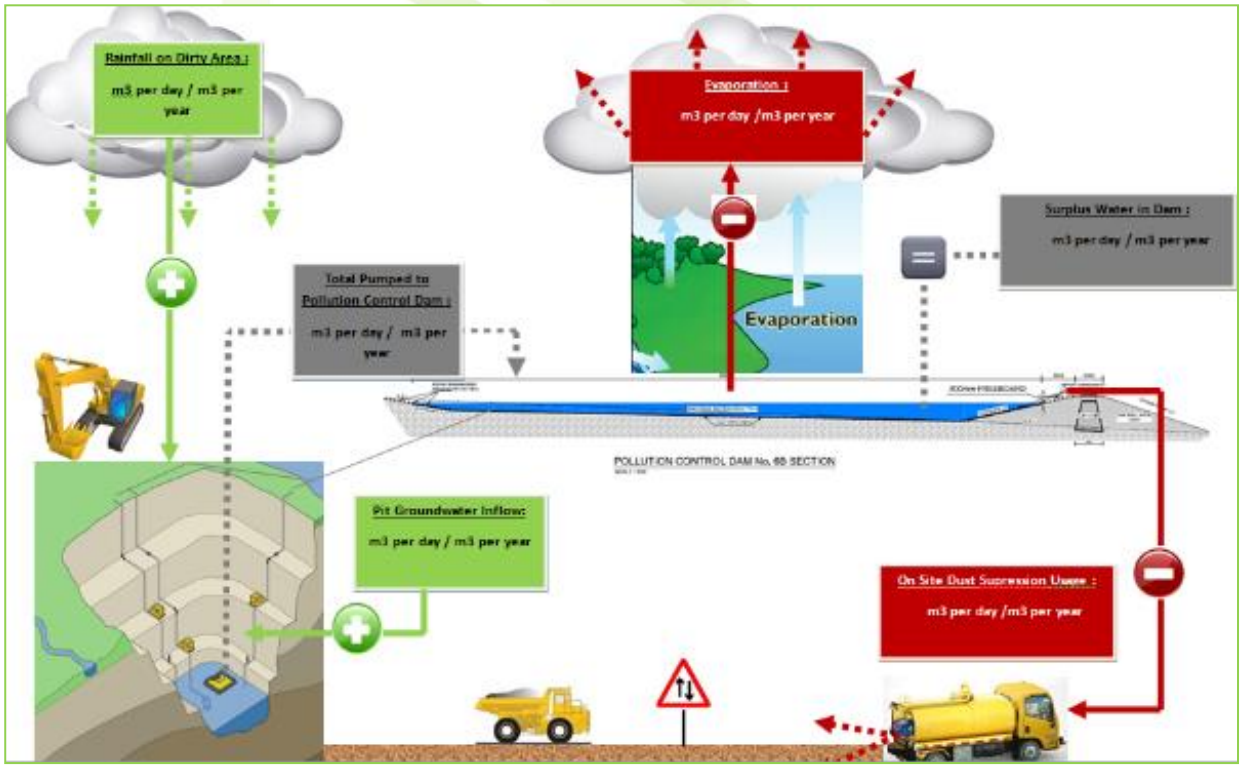


Figure 3.8: Typical water balance considerations during the design of a clean and dirty water separation system

Further images for clarification purposes have been provided below to indicating cross sections of both the dirty water and clean water diversion trenches which will be constructed around the mining area. These designs will also form part of the final master plan to be implemented during the WULA.

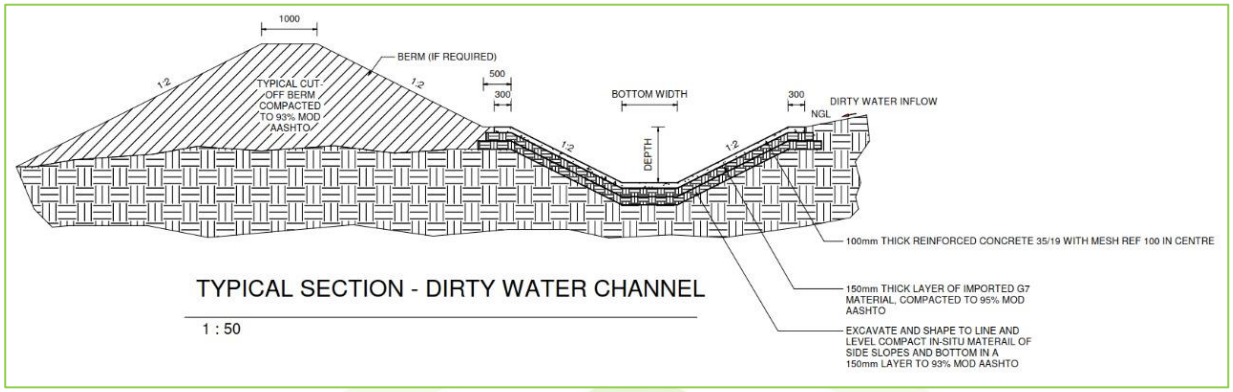


Figure 3.9: Typical Channel / Berm Cross Section for Polluted Water Diversion

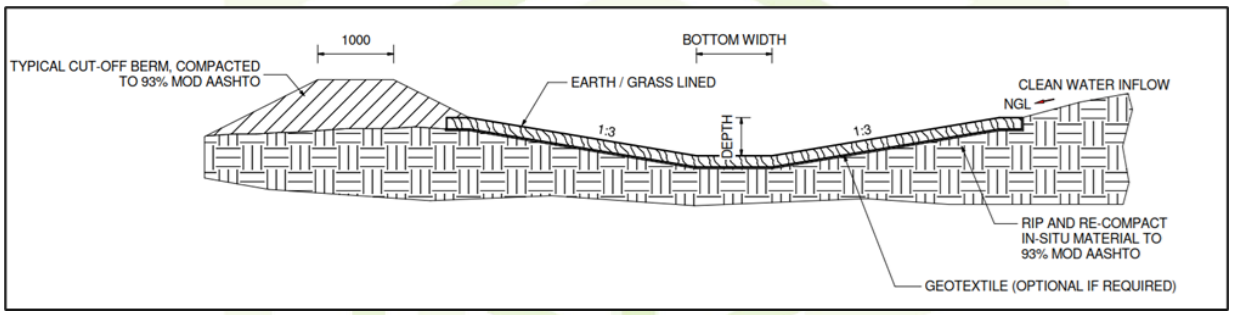


Figure 3.10: Typical channel/berm cross section for clean water diversion

Fencing

Fencing of the entire mining area will be required as a means of ensuring safety and also keeping trespassers at bay. Fences will be clearly demarcated, and appropriate signage will be displayed, similar to the signs in the images below. Fencing of the sensitive receptors such as wetlands will also take place ensuring no mining personnel will enter these areas and that it will remain protected for the duration of the project. Sites of archaeological and heritage importance will also need to be fenced off while safe access to these sites will be provided. The necessary signage will also be erected at sites of archaeological and/or heritage importance to ensure visitors can easily and safely access the premises.

Figure 3.11: Typical mine fence signage

Staff and Visitors Parking

Designated parking areas will be constructed by compaction of the subsoil after removal, storage and preservation of the valuable layer of topsoil. Storm water management control around these areas will be implemented while the necessary signage will be erected to ensure optimal safety while reverse parking will be implemented at all parking bays. The necessary waste receptacles as well as oil spill kits will be provided at these sites in case of accidental spillage or leakage of hydrocarbon fuel/oil/greases from the vehicles.

Drilling and Blasting

Blasting of mine overburden to allow efficient recovery of the underlying coal can have impacts on the surrounding community. These impacts mainly include vibration through the air (overpressure) and earth (ground vibration) along with the generation of dust and fume. Overpressure and ground vibration limits in place for private residences and heritage structures are prescribed by government based on standards. Blasts are designed and managed to minimise the risk of exceeding these limits, and to minimise impacts they have on the community, surrounding structures and environment.

Due to the nature of the activities associated with open cast activities, blasting might occur during the construction phase of the initial box cut, however, subsequent blasting to remove overburden and gain access to the mineral reserve will also take place during the life of mine. A suitably qualified blasting contractor will be appointed to construct a blasting design and conduct blasting activities. There will be no explosives magazine on site and the blasting contractor will be required to supply the explosives and consumables required to blast if blasting is required.

Topsoil, Subsoil, Overburden Stockpiles

All topsoil, subsoil and overburden material will be removed during the mining operation and stockpiled separately for the purpose of backfill rehabilitation. The topsoil stockpiles will not exceed a height of six meters which is high enough to reduce leaching impacts of stockpiled topsoil. The subsoil and overburden stockpiles will however exceed this height.

Waste Management

Waste will be generated from the start to the decommissioning of the project. It is proposed that the waste that would be generated on site would be managed by reducing, reusing and recycling as far as possible. A certified and approved external contractor will be responsible for the removal and disposal of the waste at a registered landfill.

3.5 Policy and Legislative Context

Table 3-4: Policy and legislative table

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT? (E.g., In terms of the National Water Act a Water Use License has/ has not been applied for.)
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)	The project requires a Mining Permit authorisation from the Department of Mineral Resources.	A mining permit application was accepted on 15/06/2022 by the DMR.
NEMA Environmental Impact Assessment (EIA) Regulations, as Amended 2017	This Basic Assessment and Environmental Management Plan to be conducted. Specialist environmental information of the project area will be assessed. Mitigation measures and recommendations where provided according to best practice standards.	An Application for Environmental Authorisation will be submitted to the Mpumalanga DMR with the mining permit application lodgement on SAMRAD.
The South African Constitution **The South African Constitution (Act 108 of 1996) constitutes the supreme law of the country and guarantee the rights of all people in South Africa**	Applied at potential impacts identification as well as mitigation measures and public participation.	A public participation process is followed and consultations are accordingly undertaken. An EMP and awareness plan will be designed according to the issues raised during this process.
National Environmental Management: Waste Act	Provisions of the waste act were consulted to determine whether a waste license was required for any aspect of the proposed development.	The mine does not plan to store general or hazardous waste on site.
Section 38 of the National Heritage Resources Act (Act No. 25 of 1999)	Legislation consulted during the impact assessment process, to determine what legal requirements with regards to the management of national heritage resources were relevant to this application.	An upload of the BAR will be done on the SAHRIS online system for comment.
National Environmental Biodiversity Act The National Environmental Management Biodiversity Act (NEM:BA), 2004 (Act No.10 of 2004), provides for:	Baseline review of the biodiversity on the site	SANBI database will be used to determine conservancy status as well as mitigation measures for alien invasive species encroaching the project area.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT? (E.g., In terms of the National Water Act a Water Use License has/ has not been applied for.)
(i) the management and conservation of South Africa`s biodiversity within the framework of the National Environmental Management Act, 1998; (ii) the protection of species and ecosystems that warrant national protection; (iii) the sustainable use of indigenous biological resources; (iv) the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; (v) the establishment and functions of a South African National Biodiversity Institute;		
National Water Act The NWA (Act No. 36 of 1998)	The proposed activities do require a water use license.	The department has been notified of the proposed project and comments will be addressed. An IWULA in terms of the NWA Section 21 water uses is being applied for in a separate standalone process. The IWULA will be applied for as part of the project.
National Environmental Management: Air Quality Act, 2004 (Act no.39 of 2004);	Dust monitoring on site during the operation.	As part of the EMP dust suppression methods will be used.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996);	Health and Safety Policy.	Risk Impact Assessment to be conducted.
National Development Plan (2012) **The National Development Plan outlines what we should do to eradicate poverty, increase employment and reduce inequality by 2030. The Plan has the target of developing people's capabilities to be to improve their lives through education and skills development, health care, better access to public transport, jobs, social protection, rising income, housing and basic services, and safety.**	Used to identify project Need and Desirability and alignment with National Policy.	To form part of the project background and socio-economic evaluation.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT? (E.g., In terms of the National Water Act a Water Use License has/ has not been applied for.)
Municipal Systems Act, 2000 (Act No. 32 of 2000) **Section 100 of the Mineral and Petroleum Resources Development Act (MPRDA) tasks the Minister to establish, assess and where necessary, revise the framework and targets for the entry and ongoing participation of historically disadvantaged South Africans into the sector**	The project must be tested against the local and district IDP and SDF.	Used to assess the need and desirability of the project.
Mining Charter **Section 100 of the Mineral and Petroleum Resources Development Act (MPRDA) tasks the Minister to establish, assess and where necessary, revise the framework and targets for the entry and ongoing participation of historically disadvantaged South Africans into the sector**	The project must align itself with the principles of the Charter.	The project will align itself with the principals of the charter. Where possible, the project will aim to employ the local community and engage the community throughout project inception.
Mpumalanga SDF	Used in the BAR to identify Need and Desirability.	Guideline considered during the assessment of the need and desirability of the proposed development, at the provincial scale.
Nkangala District Municipality	Source of background demographic and socio-economic information.	Utilized as a source of demographic and socio-economic information for the Nkangala District.

3.6 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES.

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

The mining sector has been described as the "Continuous Sunrise Sector" by President Cyril Ramaphosa at the 'Investing in African Mining Indaba' in Cape Town during May 2022, due to the significant contribution which the sector continues to have on the country's economy. Despite the many challenges created by the Covid-19 Pandemic, the mining sector continues to contribute substantially to export earnings, is a critical source of foreign direct investment and provides employment for a considerable number of people.

As the economic effects of the Covid-19 Pandemic begin to subside, the mining sector has significantly contributed to the recuperation of South Africa's economy. In 2021, the mining sector registered a growth of 11.8%, the largest grown seen across all the industries in the economy. The sector was able to recover production close to pre-covid conditions.

In 2019 StatsSA provided a report detailing the statistics on mineral production, finances, employment, and exports and imports. The results of the census conducted revealed the importance of the South African Mining Industry.

The industry is a critical pillar of our economy, with R527,5 billion in total sales generated in 2019. Of this, 61% (R323,8 billion) was sourced from outside the country through exports. Coal dominates production in South African. It covers about 75% of the total mass of all minerals produced in SA. In 2019, 306 million metric tons of coal was produced. Almost two-thirds of mining sales are from abroad, with 39% of coal produced being exported.

The extracting and processing of minerals requires a great deal of machinery and workforce. The South African mining industry employed 514 859 individuals in 2019, with 39% employed in the platinum group metals sector, 21% in the coal sector and 20% employed in the gold sector.

Recent statistics note that mining in South Africa still directly employs over half a million people post-covid. At the 4th South African Investment Conference in 2022, investments of approximately R46 billion was pledged towards mining and mineral beneficiation, showing investor confidence in South Africa's mining potential and operations.

3.7 MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE.

The area is located within the Witbank Coal Field. The site is preferred due to the shallow coal reserve and the site's already modified state (cultivated land). No Alternative mining site locations were considered during the study. The project location was however bound to the current location due to the underlying geology and acceptance of the application for the specific Mining Permit. The Mining Permit is dependent on the area chosen being susceptible to possible coal deposits and therefore no alternative site could be considered. Azcoware Colliery will use the infrastructure of the adjacent Highveld Colliery. The stormwater management infrastructure of the proposed site will be based on the most effective way to handle clean and dirty water separation.

In terms of the technologies and activities proposed, roll-over mining is seen as the most efficient way to undertake concurrent rehabilitation as mining progresses, therefore also reducing the cost required for rehabilitation after cessation of mining activities.

The option of not approving the activities will result in the loss of employment opportunity and skills development which would have possible if the project progresses.

3.8 FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE.

The resource location was determined through drilling exercises in order to locate the areas that will be most economical to mine, and the extent of the resource that will be mined. Azcoware Colliery will use the infrastructure of the adjacent Highveld Colliery. The stormwater management infrastructure of the proposed site will be based on the most effective way to handle clean and dirty water separation. The environmental sensitivities of the area will be considered when considering any possible infrastructure.

3.8.1 Details of the development footprint alternatives considered.

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

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

The portion of Portion 46 of the Farm Elandsfontein 390 JS is located 15km west of Emalahleni. This falls within the Witbank Coal Field. The majority of the application area overlaps with heavily transformed landscape and with extensive alterations from agricultural land and industrial activities. The project location is bound to the current location due to the underlying geology.

b) The type of activity to be undertaken;

Opencast roll-over mining is seen as the most efficient way to undertake concurrent rehabilitation as mining progresses, therefore also reducing the cost required for rehabilitation after cessation of mining activities. Underground mining was not considered due to the small nature of the mining area and the extremely shallow nature of the coal reserve.

c) The design or layout of the activity;

Location of infrastructure on site will be based on the most effective and cost sensitive way to handle clean and dirty water separation as well as the location of the coal resource and surrounding wetlands.

d) The technology to be used in the activity

The technology proposed will be the most economically viable technology for the proposed operation.

e) The operational aspects of the activity; and

No feasible alternative technologies are available to conduct the rollover mining. Alternative technologies to the management of water, dust, and noise will be considered as mitigation measures in this report.

f) The option of not implementing the activity.

Should the applicant not have the opportunity to mine a very viable coal reserve, the opportunity for job creation and resource utilisation will be lost.

3.8.2 Details of the Public Participation Process Followed

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

Section 41 of NEMA Regulation 982 (as amended) set out the Legal and Regulatory Requirement for Public Participation. The Public Participation Process (PPP) aims to involve the authorities and I&APs in the project process, and determines their needs, expectations and perceptions which in turn ensures a complete and comprehensive environmental study. An

open and transparent process has and been followed at all times and is based on reciprocal dissemination of information. The following will be undertaken during the PPP:

1. Identification of Interested and Affected Parties (IAPs);
2. Notification of IAPs regarding the proposed project;
3. Gathering comments, issues and concerns from IAPs;
4. Responding to IAP comments, issues and concerns;
5. Compilation and submission of results of consultation report to the DMR; and
6. Providing IAPs with the opportunity to review and comment on the basic assessment report.

Landowner and property detail

The registered owners of the farms were listed as follows:

Table 3-5: Directly affected landowners

Farm			Ptn	Owner
ELANDSFONTEIN	309	JS	46(RE)	EVRAZ HIGHVELD STEEL & VANADIUM LTD

Surrounding landowners who were contacted are listed below:

Farm			Ptn	Owner
ELANDSFONTEIN	309	JS	6(RE)	VAN DER LINDE ANNA MAGDALENA
ELANDSFONTEIN	309	JS	7(RE)	ANKER COAL & MINERAL HOLDINGS SOUTH AFRICA PTY LTD
ELANDSFONTEIN	309	JS	9	TRANSNET LTD
ELANDSFONTEIN	309	JS	25(RE)	EVRAZ HIGHVELD STEEL & VANADIUM LTD
ELANDSFONTEIN	309	JS	26	EVRAZ HIGHVELD STEEL & VANADIUM LTD
ELANDSFONTEIN	309	JS	32	EVRAZ HIGHVELD STEEL & VANADIUM LTD
ELANDSFONTEIN	309	JS	36	EVRAZ HIGHVELD STEEL & VANADIUM LTD
ELANDSFONTEIN	309	JS	44	ANKER COAL & MINERAL HOLDINGS SOUTH AFRICA PTY LTD
ELANDSFONTEIN	309	JS	48	EVRAZ HIGHVELD STEEL & VANADIUM LTD

Site Notices

Site notices (Figure 3.12) were placed around the proposed mining site in accordance with Regulation 41(2)(a), (3) and (4) of the Environmental Impact Assessment Regulations Published under Government Notice R982 in *Government Gazette* 38282 of 4 December 2014 (as amended).

PUBLIC PARTICIPATION NOTICE
ENVIRONMENTAL AUTHORISATION FOR MINING PERMIT: AZCOWARE (PTY) LTD

DMR REF: MP 30/5/1/1/3/13325 MP | **ECO ELEMENTUM REF: 22-1768-AUTH** | **DATE OF PUBLICATION OF THIS NOTICE: 05 August 2022**

NOTICE AND INVITATION TO PARTICIPATE IN A PUBLIC PARTICIPATION PROCESS FOR THE PROPOSED ENVIRONMENTAL AUTHORISATIONS AND MINING PERMIT APPLICATION FOR THE MINING OF COAL IN RESPECT OF A PORTION OF PORTION 46 (REMAINING EXTENT) OF THE FARM ELANDSFONTEIN 309 JS, EMALAHLENI LOCAL MUNICIPALITY, NKANGALA DISTRICT, MPUMALANGA PROVINCE OF SOUTH AFRICA

Notice is hereby given in terms of the Minerals and Petroleum Resources Development Act (Act No.28 of 2002) (MPRDA), together with Regulation 3 (6) of the National Environmental Management Act (Act No 107 Of 1998): Environmental Impact Assessment Regulations 2014 (As Amended) (NEMA) and the National Water Act,1998 (Act No. 36 of 1998) (NWA), that **Azcoware (Pty) Ltd** applied for a Mining Permit **MP 30/5/1/1/3/13325 MP**. Eco Elementum has been appointed to undertake the Environmental Authorisations and would like to engage the local property owners, Interested and Affected Parties in respect of the activities proposed on a portion of portion 46 (remaining extent) of the farm Elandsfontein 309 JS, Local Magisterial District of Emalahleni, Mpumalanga Province of South Africa.

PROPOSED PROJECT:

The applicant intends to mine coal resources on a 5ha portion of portion 46 (remaining extent) of the farm Elandsfontein 309 JS. The resource will be mined via opencast roll over mining. The following activities will be undertaken on site:

- Box cut opencast mining with a roll over rehabilitation sequence;
- Mobile crushing and screening of the ROM coal in the pit;
- Hauling, access road, haul road,
- Mobile offices; Mobile sanitation and change house;
- Mobile fuel storage;
- Pollution control facility/dam(s);
- Clean and dirty water separation system;
- Topsoil, subsoil, overburden, discard and ROM stockpiles;
- Weighbridge;
- Waste management

The intent to mine requires the following applications and subsequent approvals prior to commencement:

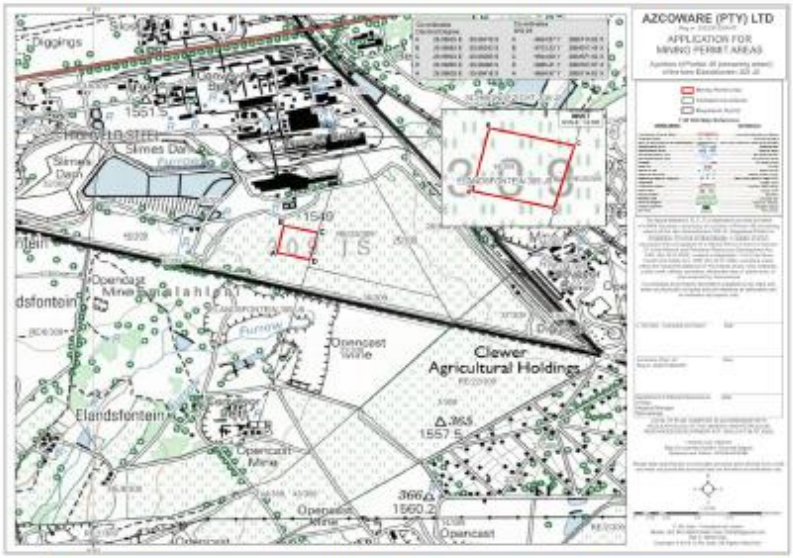
- Mining Permit (MPRDA):
- Environmental Authorisation (NEMA and EIA Regulations) namely: GNR 983 – Activities 9, 10, 21, 27
- An Integrated Water Use License Application in terms of the NWA Section 21 water uses is being applied for in a separate standalone process.

An integrated environmental application process will be followed for the mining permit by means of a Basic Assessment Process. A Basic Assessment Report (BAR) for the mining permit will be available for review for 30 days from **05 August 2022 to 05 September 2022**; through electronic copies sent (upon request) and on Eco Elementum's website: http://ecoelementum.co.za/downloads **Interested and affected parties (I&APs) are invited to register and provide written comments. I&APs should refer to the relevant reference number(s), and must provide their comments together with their name, contact details and an indication of any direct business, financial, personal or other interest which they have in the application to the contact person indicated below by latest 05 September 2022.**

Queries regarding this matter should be referred to:

Maru Ramashapa
Office: 012 807 0383
Email: Maru@ecoe.co.za
Project ref: 22-1768-AUTH (Azcoware MP)

In order to ensure that you are identified and registered as an interested and/or affected party, please submit your name, contact information and interest in the matter to the contact person by latest **05 September 2022.**



When registering as an I&AP a person consents to the lawful processing of personal information for the intended purposes, as described by the Protection of Personal Information Act. 2013 (Act no.4 of 2013). Your information will be used for this project, including the application as well as subsequent related appeals, amendments, or audits where you are registered as an I&AP. By registering, a person agrees that by submitting comment to inform this profess, your contact details will where be required by a public body, be reflected in regulated reports that must be compiled and submitted to the public, registered stakeholder, organs of authority for consideration and decision making.

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Figure 3.12: Mining Permit Site Notice prepared for the project

Background Information Document

A Background Information Document (BID) was compiled and sent to I&APs in accordance with Regulation 41(2)(b) and (3) of the Environmental Impact Assessment Regulations Published under Government Notice R982 in *Government Gazette* 38282 of 4 December 2014 (as amended).

Advert placement

An Advert was placed in Witbank News and will be published Friday 5 August 2022 in accordance with Regulation 41(2)(c) and (3) of the EIA Regulations Published under Government Notice R982 in *Government Gazette* 38282 of 4 December 2014 (as amended).

Proof of notification

Email

An email notifying the I&APs of the proposed project, the public participation process, draft report review and how to comment, will be sent to all identified I&APs.

SMS

A SMS notifying the I&APs of the proposed project, the public participation process, draft report review and how to comment, will be sent to all identified I&APs.

Submission of Draft Basic Assessment Report

The Draft Report will be submitted to the following Commenting Authorities for comment:

Department	Attention to
Mpumalanga Provincial Government DARDLEA.	Pamela Ntuli / Dineo Tswai
Nkangala District Municipality.	Charles Makula
eMalahleni Local Municipality	Ordain Riba
Mpumalanga Tourism and Park Agency.	Phumla Nkosi / Komilla Narasoo
Department of Agriculture forestry and fisheries.	Doreen Sithole
Department of Mineral Resources.	Prisca Maluleka
Department of Water and Sanitation	Adivhaho Rambuda
South African Heritage Resources Agency.	Online submission

3.8.3 Summary of issues raised by I&APs

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

The inputs from I&APs will be provided and issues raised will be addressed by the EAP. This section will be completed after the initial commenting period.

3.8.4 The Environmental attributes associated with the alternatives. (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

3.8.4.1 Baseline Environment

3.8.4.1.1 Type of environment affected by the proposed activity.

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

CLIMATE

The study area falls within the summer rainfall region and the average annual rainfall is roughly 760 mm. The average annual temperature is 16.3 °C. The average summer temperature is 19.9 °C, while the winter temperature averages 10.1 °C (Climate-data.org accessed 17/07/2022). Rain in this area occurs almost exclusively as showers (mild to heavy) and thunderstorms mainly in summer (October/March), with the maximum in December to February. The winter months are normally dry. Climatic data were obtained from the DWS weather station eMalahleni (rainfall data and evaporation data) at the Witbank Dam 1 (**Table 3-6**). The proposed mining site is located in the summer rainfall region of Southern Africa with precipitation usually occurring in the form of convectional thunderstorms. The average annual rainfall (measured over a period of 70 years) is approximately 873.6 mm, with the high rainfall months between November and April. Recharge is estimated at an average of 3.5% of annual rainfall, i.e. 25 mm/a.

Table 3-6: Rainfall Data

Month	Average monthly rainfall (mm)	Mean monthly evaporation
January	127.5	166.3
February	92.1	139.4
March	73.1	130.6
April	40.4	97.6
May	14.1	79.9
June	6.0	65.7
July	3.0	72.2
August	8.3	98.6
September	21.2	136.7
October	76.3	163.2
November	120.4	158.7
December	115.5	164.2
Annual	697.3	1476.7

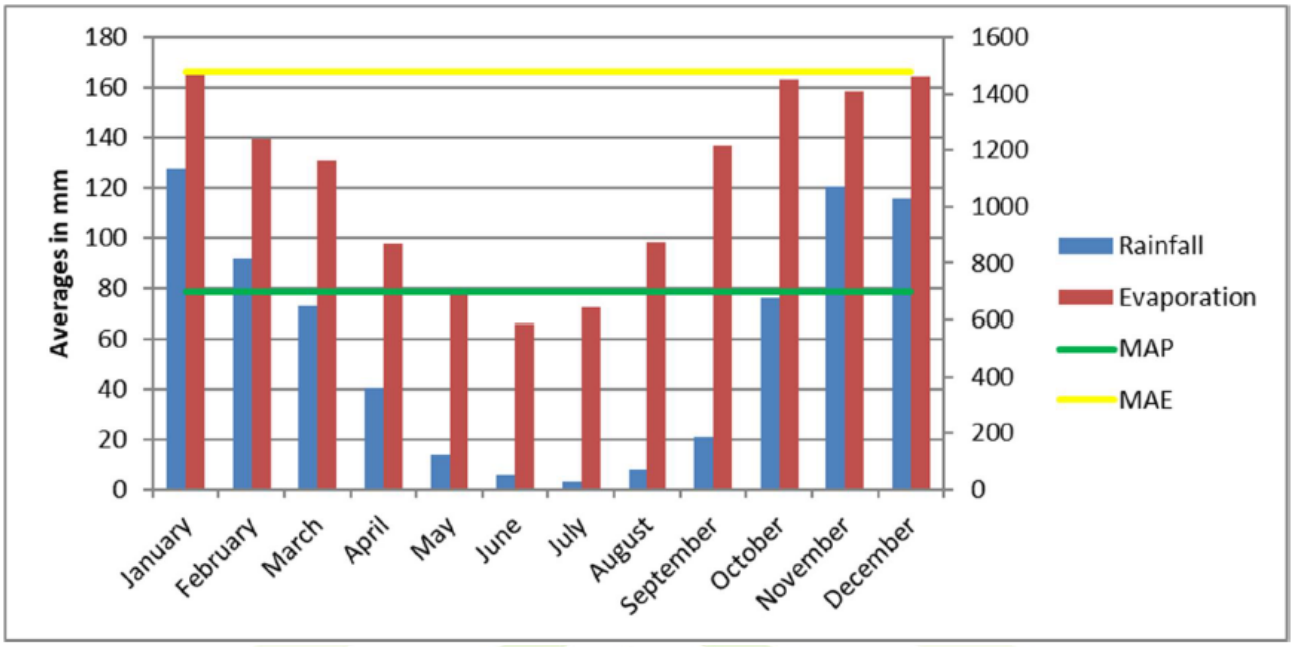


Figure 3.13: Monthly precipitation in the proposed study area

GEOLOGY

Regional Geology

The Azcoware MP area is underlain by rocks from the Karoo Supergroup. The site is also situated in the Witbank Coalfields which is the most important coal producing coalfields in South Africa (**Figure 3.14**). Five coal seams exist in the coal field, but not all are economically viable. These coal seams are hosted in Vryheid Formation the middle Ecca Group sediments. The number 1 seam is the lowest or deepest while the 5 seam is the upper most coal seam. The number 2 and 4 seams are the most exploited throughout the Witbank Coalfields.

The Karoo Supergroup mainly consists of sedimentary successions of sandstone, shale, and coal. The Ecca group is underlain by the Dwyka Formation which consists of tillites and diamictites. Geological features such as dykes (dolerite intrusions) and faults are commonly found in the coalfield. The dolerite intrusions typically act as groundwater flow barriers due to its low permeability, while the contact zone of the intrusions acts as flow pathways due to cracks and faults leading to higher flow rates along these contact zones.

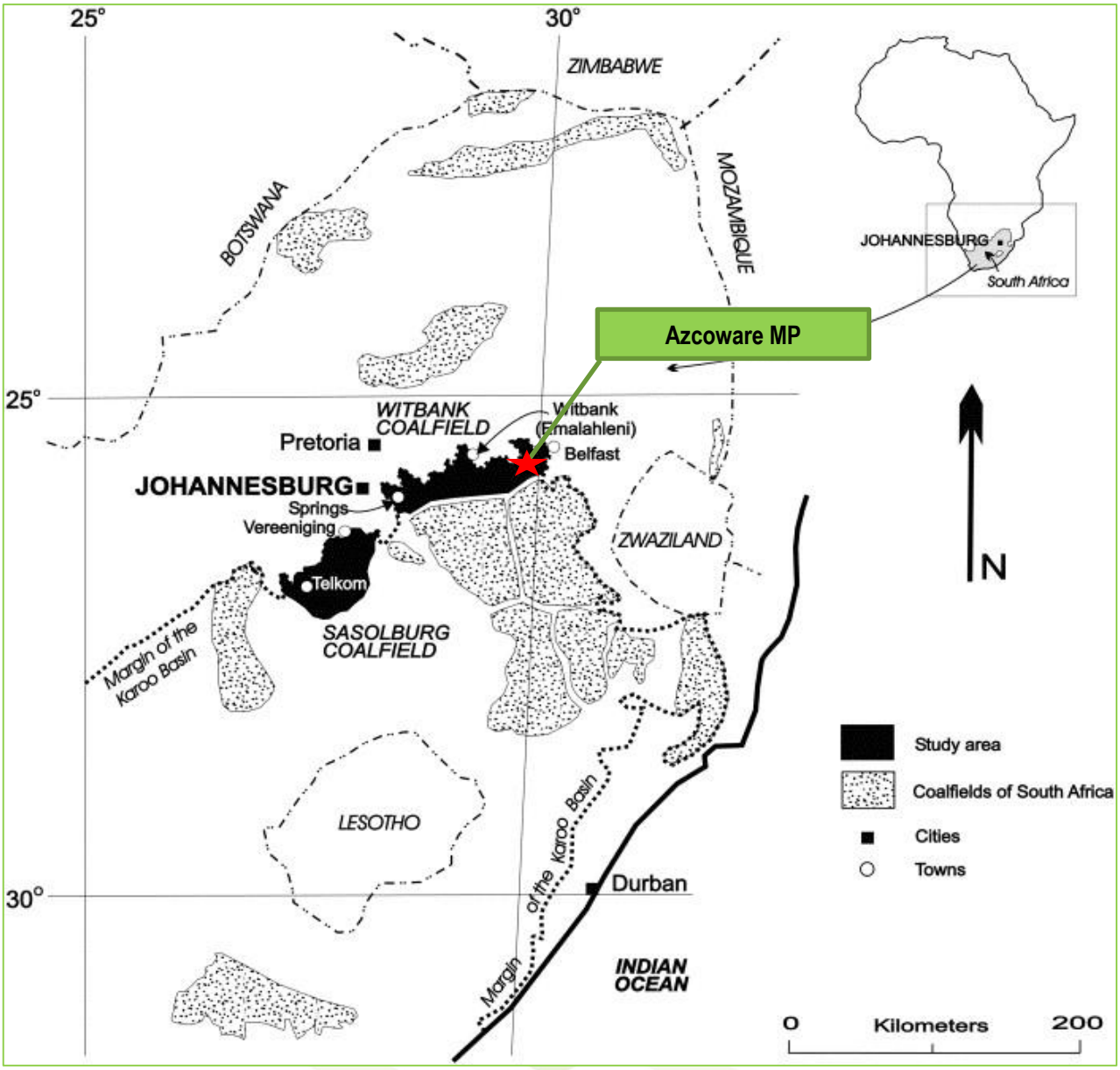


Figure 3.14: Witbank Coalfields and position of the study area in relation to it (Denis et.al., 2007).

Local Geology

Geological information from site-specific core drilling boreholes indicated that sandstone, mudstone, siltstone, gritstone and coal from the Vryheid Formation make up the geology of the site. The majority of the boreholes intersected the 4 seam (upper and lower) and the 5 seam. The average thickness of the 5 seam is 1.93 m while the average thickness of the 4 seam (upper and lower) is 6.9 m. The 2 seam was only intersected in two boreholes while the 1 seam was intersected in one borehole. For this reason, the proposed mining operation will target the 5 seam down to the 4 lower seam. The maximum depth of the boreholes was over 70 m and the Dwyka formation was not intersected in any of the boreholes. The weathering depth varied between 14 and 29 m.

HYDROGEOLOGY

Unsaturated Zone

The unsaturated zone is the zone between the ground surface and the static water table. In the unsaturated zone the pores between the ground particles are filled with air and water- thus below saturation. Static water levels in the region of the proposed Azcoware MP area as obtained from the hydrocensus boreholes, EVRAZ Highveld Steel Monitoring boreholes and the Highveld Collieries monitoring boreholes varied from 2 to 13 mbs. Some deeper levels were observed in the Elandsfontein mining area and one of the user boreholes in Clewer. These levels varied from 18 to 40 mbs. The deeper levels in these boreholes are in all probability caused by dewatering in the mining areas and pumping in the user borehole. The unsaturated zone thickness under natural conditions without impacts from pumping or dewatering ranges between 2 and 13 mbs. The unsaturated zone may consist of soil, weathered bedrock and even solid bedrock of the Ecca Group.

Saturated Zone

The saturated zone is that part of the aquifer below the regional static water level where all pores and fractures are filled with water at a pressure greater than atmospheric pressure. The depth of the saturated zone in the Azcoware MP area is therefore more than 2 to 13 mbs. From studies compiled in the larger region of Azcoware MP area the saturated zone mainly consists of two aquifer systems.

- Firstly, the weathered, unconfined aquifer that typically occurs on the transition between soil and weathered bedrock (typically sandstone and shale). The groundwater flow closely mimics the surface topography. Groundwater levels are usually shallow in the low-lying topographical regions and may even daylight on surface which is referred to as springs. The weathered aquifer is more prominent in the wet season because it is located on top of solid bedrock or clayey layers. This aquifer normally has a low yield.
- The second aquifer is known as the deeper, confined aquifer. Flow in this aquifer mainly occurs along fractures, bedding planes and other groundwater flow paths. The presence of fractures generally decreases with depth in this aquifer. The secondary aquifer, due to its heterogeneous nature, may be higher yielding than the weathered aquifer. Due to longer residence time of the groundwater in this aquifer, the salt load may be higher than that of the weather aquifer.

A third aquifer at great depth may occur within the pre-Karoo geology (Transvaal Group), underlying the Dwyka-tillites. Very little information of this aquifer in the area is available since very few boreholes have been drilled to this great depth. The water quality in quantity in this aquifer may be inferior to that of the overlying Karoo aquifers. Where dolomite underlays the Karoo geology, the yields of this aquifer may be significantly higher.

Groundwater Levels

Groundwater level information is available for the model area from several sources including the study by Shangoni (2019), EVRAZ Highveld Steel & Vanadium monitoring boreholes as well as the Azcoware MP area hydrocensus and monitoring information. Groundwater levels in the shallow aquifer generally varied between 2 and 13 mbs. Deeper levels were observed in the boreholes located within the mining region just south of Azcoware MP area and in one user borehole in Clewer. The deeper levels are therefore expected to be the result of dewatering for mining purposes and domestic purposes. The water levels in the deep, secondary aquifer boreholes varied between 0.4 and 14 mbs.

Table 3-7: Summary of water levels in boreholes in vicinity of proposed Azcoware MP area.

	Borehole	X-coordinate	Y-coordinate	Surface Elevation (mamsl)	Water Level (mbs)	Water Level Elevation (mamsl)
Shallow aquifer boreholes	EFNBH11	8876	-2865215	1532	5	1527
	EFNBH5	9854	-2866230	1540	39	1501
	EFNBH10	10673	-2866905	1557	20	1537
	HS12SD	10724	-2865634	1540	2,5	1537,5
	ZanTrHC1	11510	-2865634	1538	6	1532
	Clewer03	11525	-2866503	1542	18	1524
	Clewer04	11132	-2866511	1547	5	1542
	PMPS	9757	-2864808	1549	8	1541
	HS10S	9485	-2865037	1540	6	1534
	HS9S	9456	-2865287	1540	6	1534
	HS8S	9161	-2865136	1538	5	1533
	PDS	9144	-2864900	1540	4	1536
	H18S	8438	-2865097	1535	3	1532
	H17S	7349	-2864857	1531	7,5	1523,5
	H2S	8503	-2863314	1540	4	1536
	H4S	9550	-2862968	1540	5,5	1534,5
	HS14S	11722	-2864159	1501	2	1499
	H/BH02	7241	-2865575	1519	11	1508
	H/BH03	6903	-2865671	1504	10	1494
	H/BH04	6907	-2865739	1503	11	1492
	H/BH05	6149	-2866261	1480	11	1469
	H/BH07	6748	-2865375	1502	5	1497
	H/BH08	6107	-2865582	1500	13	1487
Deep, secondary aquifer monitoring boreholes	H2D	8503	-2863314	1540	6	1534
	H7D	11984	-2863039	1520	7	1513
	H11D	6847	-2864560	1520	5,5	1514,5
	H12D	7112	-2863636	1538	10	1528
	H13D	6468	-2863826	1520	7,5	1512,5
	H15D	10598	-2864524	1540	12	1528
	H16D	9341	-2864894	1540	7	1533
	H17D	7349	-2864857	1531	13,5	1517,5
	H18D	8438	-2865097	1536	5	1531
	PDD	9144	-2864900	1540	6	1534
	HGM16D	11854	-2863924	1501	0,4	1500,6
	HS1D	6446	-2863279	1531	10	1521

	HS2D	8139	-2865146	1536	9	1527
	HS3D	6944	-2864931	1520	8	1512
	HS8D	9361	-2865136	1540	6	1534
	HS10D	9485	-2865037	1540	10	1530
	HS12D	10765	-2865613	1540	9	1531
	HS13D	11062	-2865115	1538	7	1531
	HS14D	11722	-2865115	1527	4	1523
	HS15D	7039	-2863333	1540	12	1528

Groundwater Potential Contaminants

Acid generation is a common response to the coal mining environment. Coal and carbonaceous material contain a mineral known as pyrite, an iron-sulphide mineral, which is the main contributor to acid rock drainage (ARD). After being exposed to oxygen and water the sulphide minerals react to form an acid. Bacteria, which increases with the exposure to water and oxygen often accelerates the acidification process. The reaction can however also occur abiotically.

The general equation of pyrite oxidation is as follows:

$$2FeS_2 + 7O_2 + 2H_2O \rightarrow 2Fe^{2+} + 4SO_4^{2-} + 4H^+$$

Ferrous iron is oxidised to ferric iron:

$$4Fe^{2+} + O_2 + 4H^+ \rightarrow 4Fe^{3+} + 2H_2O$$

As mentioned previously these two reactions can occur abiotically or with the catalisation by micro-organisms. These organisms arise from the oxidation reactions. The ferric cations reduce to ferrous ions:

$$FeS_2 + 14Fe^{3+} + 8H_2O \rightarrow 15Fe^{2+} + 2SO_4^{2-} + 16H^+$$

The release of H+ lowers the pH. At the lower pH the solubility of the ferric ion continuous which increases the acid generation.

Two composite samples were collected by Eco Elementum and submitted to Waterlab to represent:

- ZAN-ROM – ROM material collected from the ROM pad,
- ZAN-OB– overburden material.

The collection points for the composite samples are indicated in Figure 3-15.

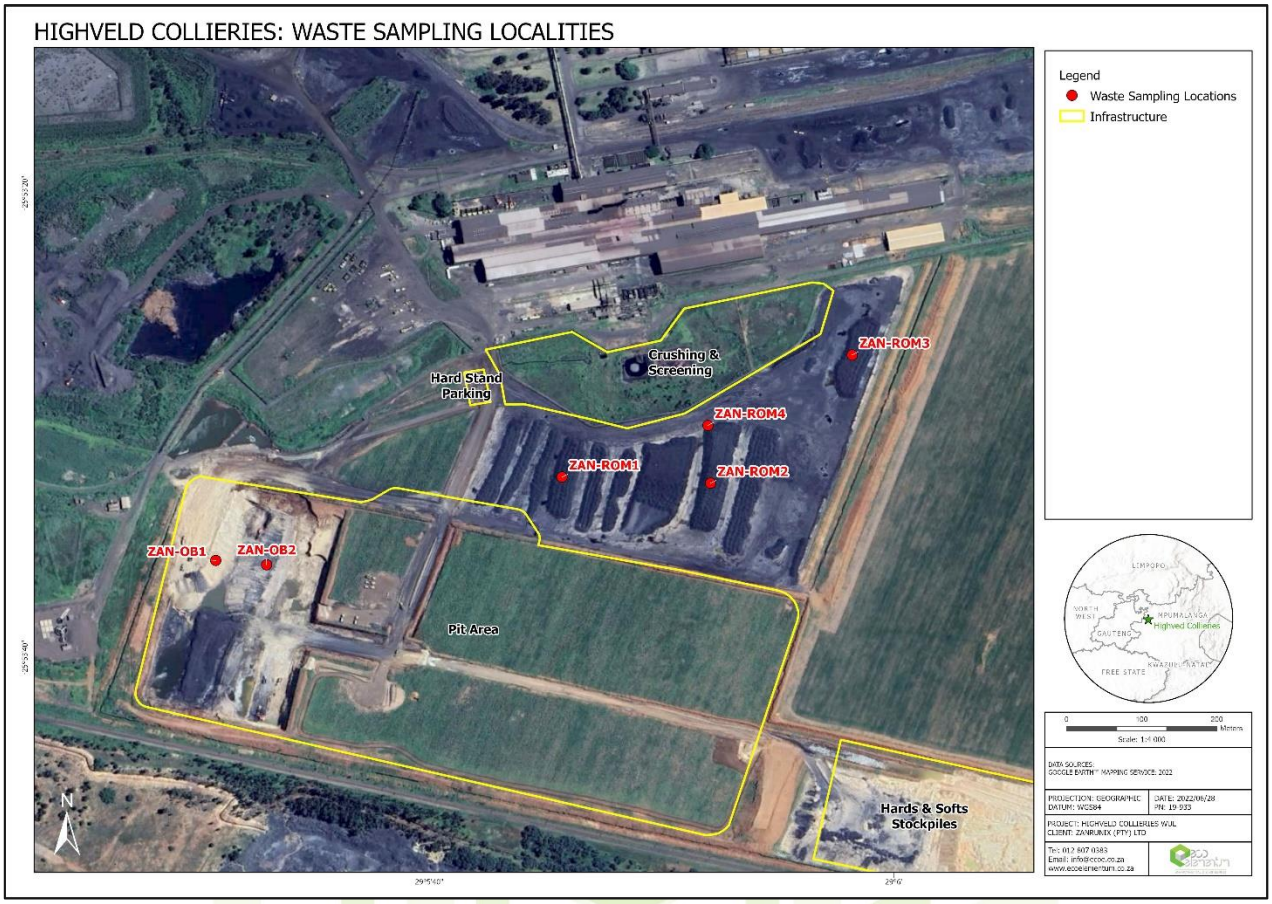


Figure 3-15: Position of sampling points at Highveld Collieries.

Waste Classification

A waste classification should be conducted in accordance with the National Environmental Management: Waste Act (NEM: WA) Regulations (2013). The assessment is undertaken by comparing the samples' leachate concentration (LC) to the leachable concentration threshold (LCT), and the total concentration (TC) to the total concentration thresholds (TCT). The results will indicate the type of waste and the type of liner, if any, required for the potential source.

Generally, the results below are expected for the coal mining environment (Figure 3-16). Please note that these are only indicative and may differ from site to site.

- Coal material:
    - The coal samples are generally classed as Type 3 waste (hazardous) and according to the NEM: WA guidelines should be disposed of at a Class C landfill site (Table 3-8) or a site designed with the prescribed liner requirements; and
    - The short-term storage of the coal material on stockpiles and good storm water management should ensure that environmental impacts are kept to a minimum and contained to the stockpile sites. Based on these management protocols the liner prescribed in the attached Hydrogeology report should be sufficient, however the decision lies with the Department of Environmental Affairs.
- Waste rock material:
    - Waste rock are generally also classed as Type 3 waste and should be disposed of at Class C landfill sites or sites designed with prescribed liner requirements.

Table 3-8: Waste Classification Criteria

Waste Type	Disposal
0	Not allowed
1	Class A or Hh:HH landfill
2	Class B or GLB+ landfill
3	Class C or GLB- landfill
4	Class D or GLB- landfill

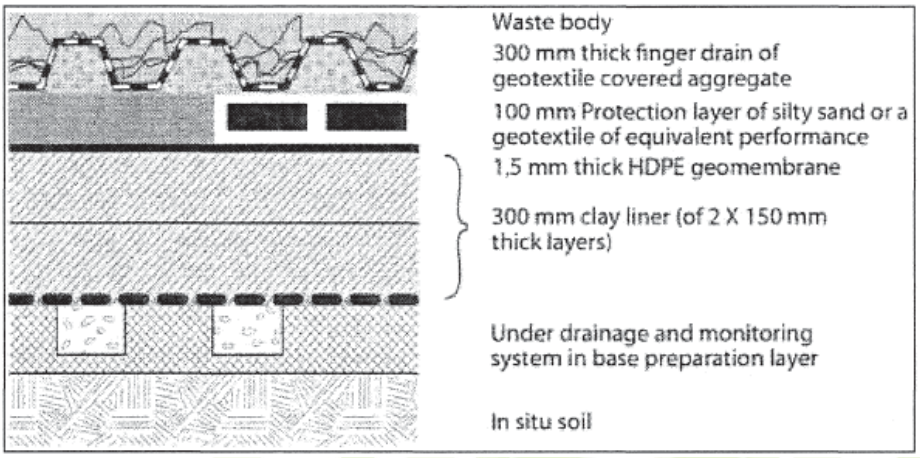


Figure 3-16: Class C landfill site liner requirements.

Groundwater Vulnerability

Groundwater vulnerability refers to the likelihood of contamination to reach a certain area/receptor after it has been introduced to the surface. For the Azcoware MP area, the vulnerability was estimated from the Aquifer Vulnerability map of South Africa (DWA, 2013) and by the Groundwater Vulnerability Classification System. According to the Aquifer Vulnerability map, the Azcoware MP area are located in a moderate vulnerability rating area. Therefore, an area that if continuously exposed to contamination may be vulnerable to some pollutants.

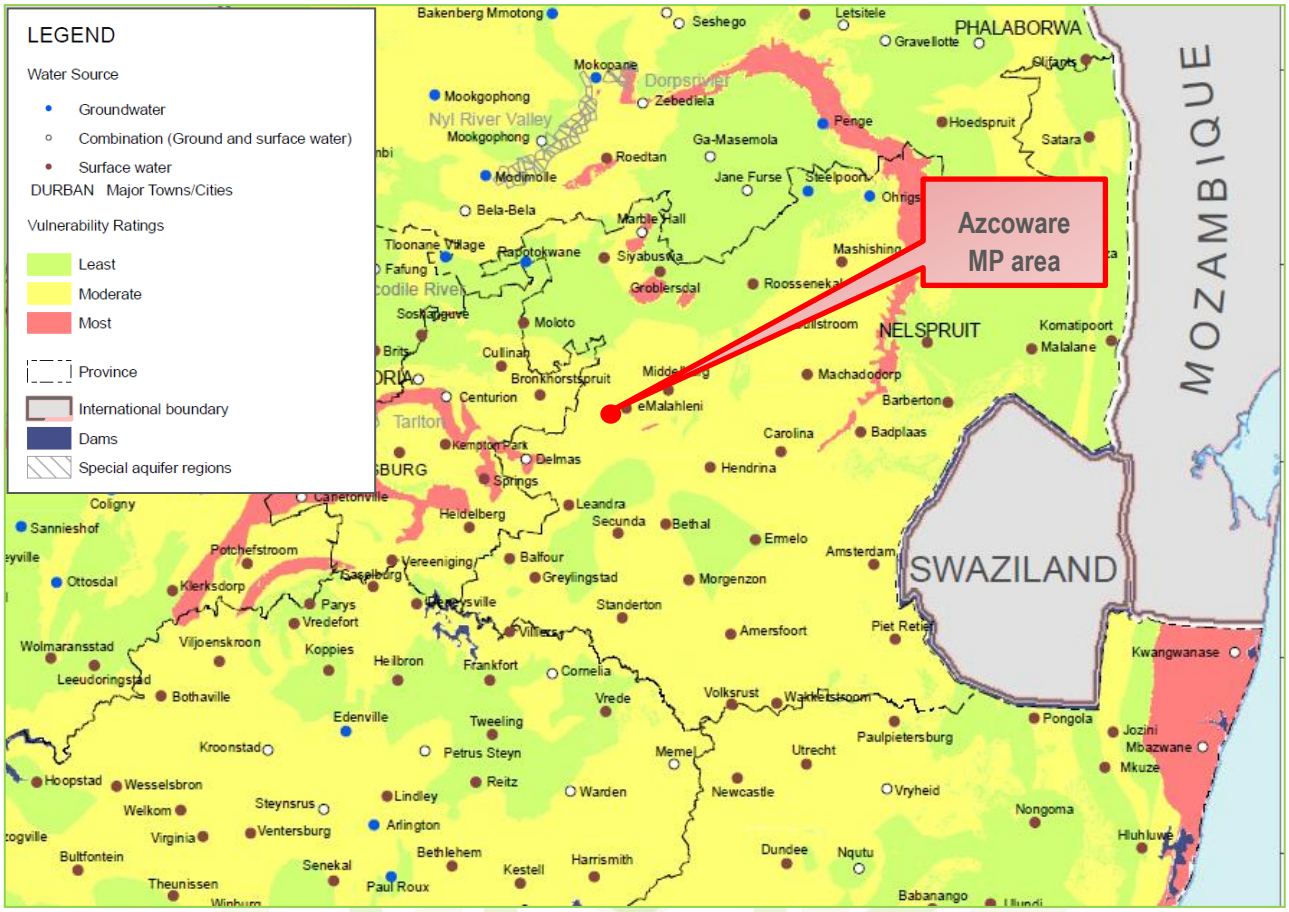


Figure 3-17: Aquifer vulnerability rating of the propsosed mining permit area (DWA, 2013)

The Groundwater Vulnerability Classification System incorporates the Parsons Aquifer Classification System and the drinking water guidelines from the Department of Water Affairs and Forestry.

Table 3-9: Groundwater Vulnerability Classification System

Rating	Depth to Water Level	Groundwater Quality	Aquifer Type- Parsons
1	> 10 m	Poor (TDS > 2 400 mg/l).	Non-Aquifer System.
2	6 – 10 m	Marginal (TDS > 1 000 < 2 400 mg/l).	Minor Aquifer System.
3	3 – 6 m	Good (TDS > 450 < 1 000 mg/l).	Major Aquifer System.
4	0 – 3 m	Excellent (TDS < 450 mg/l).	Sole Aquifer System.

Table 3-10: Groundwater Vulnerability Rating

Rating	Vulnerability
≤ 4	Low
> 4 ≤ 8	Medium
≥ 9	High

According to the Groundwater Vulnerability Classification System, the proposed mining permit area aquifer is expected to fall within a medium vulnerability rating. When groundwater qualities and levels are available, the rating will be completed.

Table 3-11: Groundwater Vulnerability Rating

Rating	
Depth to water level	2
Groundwater quality	3
Aquifer Type	2
Total Score	7

According to the Groundwater Vulnerability Classification System, the Azcoware MP area aquifer scored a rating of 7 which is indicative of a medium vulnerability. Due to the groundwater qualities in terms of TDS concentrations being very good in some boreholes, the aquifer in some areas may even be highly vulnerable.

Aquifer Classification

According to the Aquifer Classification map (DWA, 2012), the Azcoware MP area is situated in a minor aquifer classification area. Aquifer classification is based on the Parsons System (1995). Qualities in these aquifers can vary and are typically moderately yielding aquifers.

Table 3-12: Aquifer System Management Classes.

Sole Aquifer System	An aquifer that is used to supply 50% or more of domestic water for a given area, and for which there is no reasonably available alternative sources should the aquifer be impacted upon or depleted. Aquifer yields and natural water quality are immaterial.
Major Aquifer System	Highly permeable formation, usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public supply and other purposes. Water quality is generally very good (less than 150 mS/m).
Minor Aquifer System	These can be fractured or potentially fractured rocks that do not have a primary permeability, or other formations of variable permeability. Aquifer extent may be limited and water quality variable. Although these aquifers seldom produce large volumes of water, they are important both for local suppliers and in supplying base flow for rivers.
Non-Aquifer System	These are formations with negligible permeability that are generally regarded as not containing groundwater in exploitable quantities. Water quality may also be such that it renders the aquifer unusable. However, groundwater flow through such rocks, although impermeable, does take place, and needs to be considered when assessing the risk associated with persistent pollutants.
Special Aquifer System	An aquifer designated as such by the Minister of Water Affairs, after due process.

Two main aquifer systems are expected to exist in the proposed mining permit area. Firstly, is a swallow, weathered aquifer which is found in the transitional soil and weathered bedrock zone. Due to direct recharge and dynamic groundwater flow through the weathered sediments, the natural groundwater qualities are often good. The direct recharge and dynamic groundwater flow are also the reason why this aquifer is vulnerable to pollution. Water levels in this aquifer are often shallow (few meters below ground level) and follow the surface topography.

Secondly is a deeper semi-confined to confined fractured aquifer where groundwater flow is predominantly fracture flow. The fractured Karoo aquifer consists of sedimentary successions of siltstone, shale, sandstone and the coal seams. Groundwater flow is dominated by secondary porosities like faults, fractures, joints, bedding planes or other geological contacts. Yields can be higher in this aquifer along these geological structures. The rock matrix is characterised by a low permeability. Borehole yields in the in the Ecca aquifers are generally low and can be expected to be less than 2 l/s.

Aquifer Protection Classification

As part of policy and regulation development and implementation, the aquifer classification used in Table 3-12 alone is not sufficient. To minimise misinterpretation, the decision support tool in Table 3-13 also needs to be incorporated as part of aquifer classification (Parsons, 1995). The combination of the Aquifer System Management Classification and the Aquifer Vulnerability Classification rating is referred to as the Groundwater Quality Management (GQM) classification, which provide a level of aquifer protection.

GQM = Aquifer System Management x Aquifer Vulnerability

Table 3-13: GQM Classification for the proposed mining permit area.

Aquifer System Management Classification		Aquifer Vulnerability Classification		GQM		GQM
Class	Points	Class	Points	Index	Level of protection	Azcoware MP area
Sole Source Aquifer System	6	High	3	<1	Limited	
Major Aquifer System	4			1 - 3	Low	
Minor Aquifer System	2	Medium	2	3 - 6	Medium	4
Non-aquifer System	0			6 - 10	High	
Special Aquifer System	0-6	Low	1	>10	Strictly non-degradation	

The level of protection for the Azcoware MP area according to the GQM Index is 4. This indicates a medium level of protection. Based on the findings of the geohydrological study it is highly recommended that a proposed monitoring protocol should be in place for the proposed project area.

The DWA has also compiled a susceptibility map for South Africa (2013). This map indicates the qualitative measure of the relative ease with which an aquifer can potentially be contaminated. According to the aquifer susceptibility map, the Azcoware MP area are also classified as medium susceptible to contamination

WETLANDS

Examination of the National Freshwater Ecosystem Priority Areas (NFEPA) database were undertaken for the area. The NFEPA project aims to produce maps which provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. They were identified based on a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries (MacFarlane et al., 2009). Identification of FEPA Wetlands are based on a combination of special features and modelled wetland conditions that include expert knowledge on features of conservation importance as well as available spatial data on the occurrence of threatened frogs and wetland-dependent birds.

Flat NFEPA wetlands were identified within 500 m of the mining area during the desktop assessment (Figure 3-18). However, ground-truthing the existence and condition of NFEPA wetlands is important to understand local conditions which have an impact on the wetland system, their functional integrity and health. During the site visit these wetlands were found to be the Scrubber Dam present onsite.

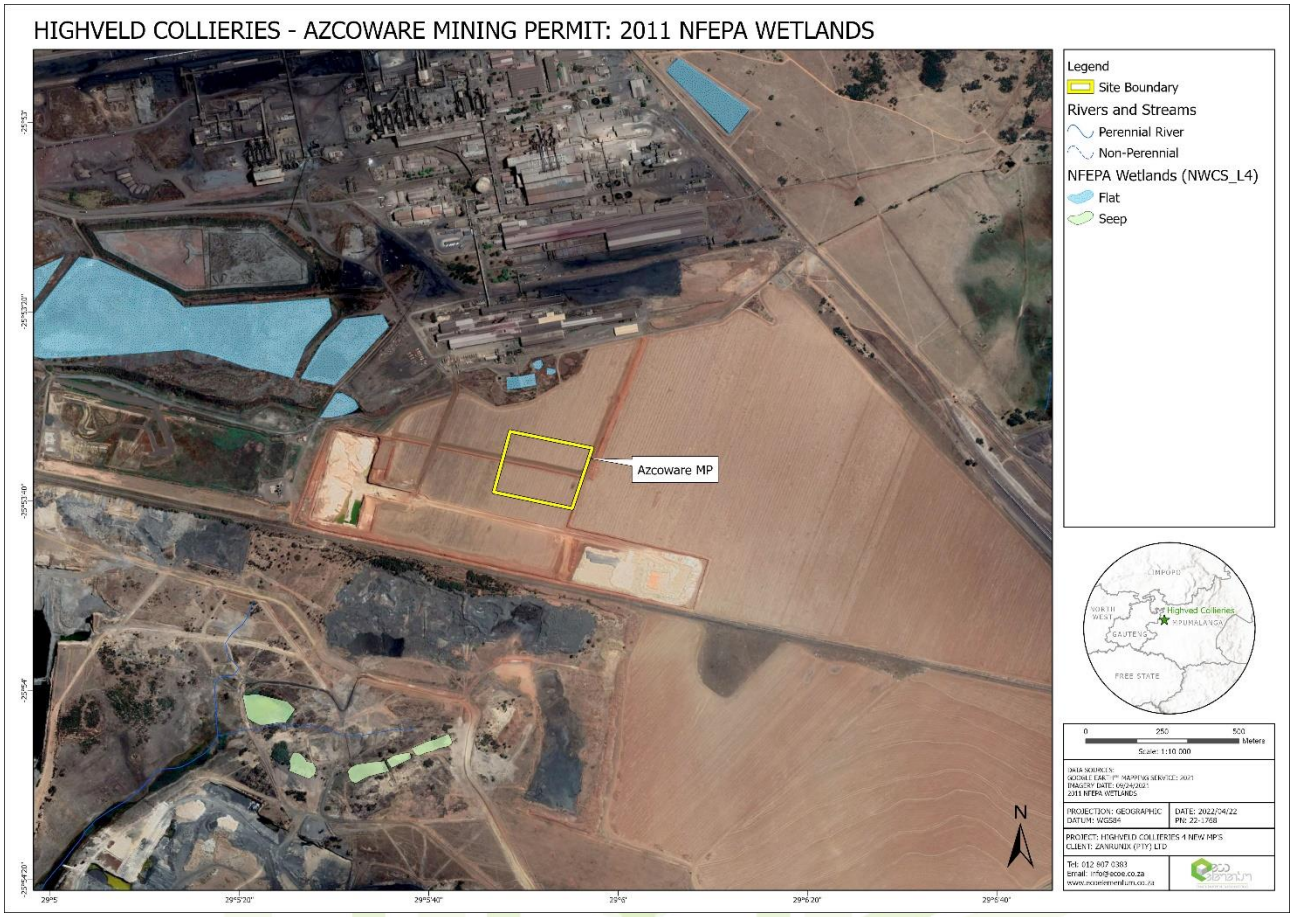


Figure 3-18: NFEPA wetlands

Wetland terrain indicator

The topography of an area is generally a good practical indicator for identifying those parts in the landscape where wetlands are likely to occur. Generally, wetlands occur as a valley bottom unit however wetlands can also occur on steep to mid slopes where groundwater discharge is taking place through seeps (DWAF, 2005). In order to classify a wetland system, the localised landscape setting must be taken into consideration through ground-truthing of the study site after initial desktop investigations (Ollis *et al*., 2014).

The study site can be characterised as having a relatively flat topography. The area ranges in altitude from 1499 m to 1581 m above sea level. A Digital Elevation Model (DEM) of the aerial photography of the site revealed slight depression in landscape south of the mining boundary (Figure 3-19). These areas identified during the desktop assessment where then assessed in more detail during the field investigation and confirmed to be **an artificial wetland system** as a result from seepage from the Scrubber Dam.

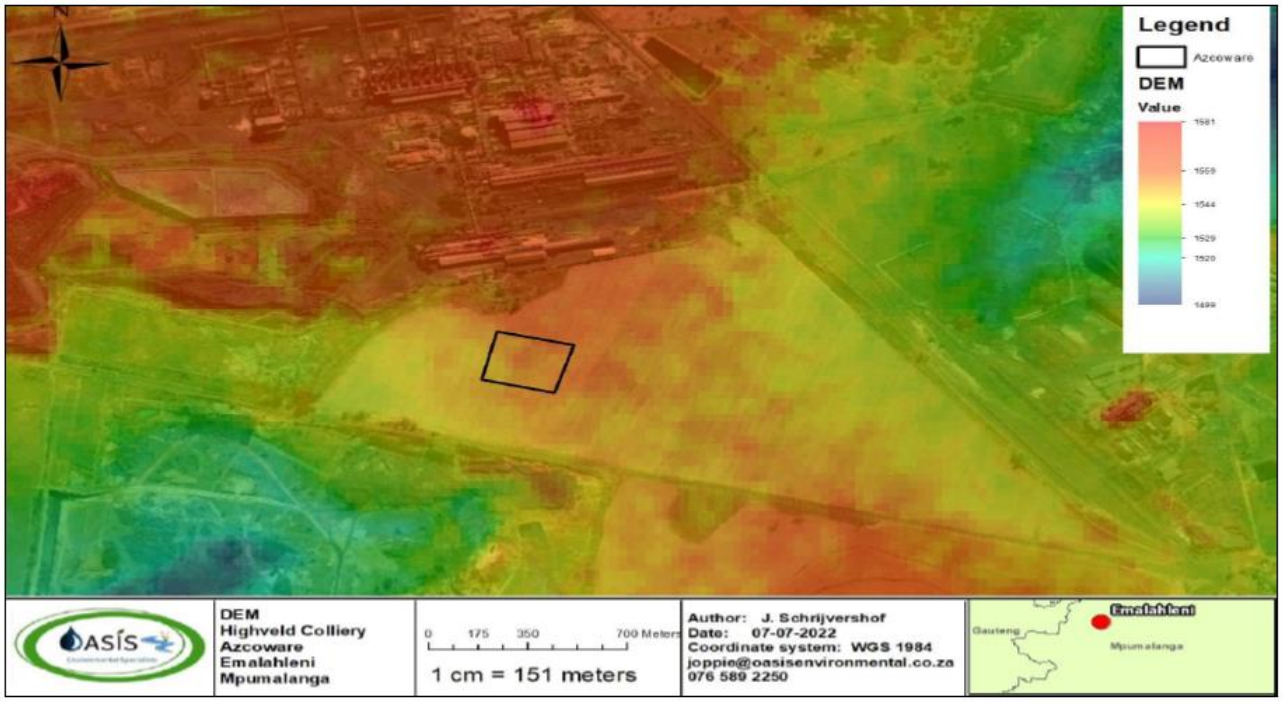


Figure 3-19: DEM map

Wetland soil wetness and soil form indicator

Pockets of artificial wetlands were delineated within the survey area. Wetland areas were identified and mainly delineated according to the presence of hydric (wetland) soil types. Hydric soils are defined as those which show characteristics (redoximorphic features) resulting from prolonged and repeated saturation. Characteristics include the presence of mottling (i.e. bright insoluble manganese and iron compounds) a gleyed matrix and/or Mn/Fe concretions.

The presence of redoximorphic features are the most important indicator of wetland occurrence, as these soil wetness indicators remain in wetland soils, even if they are degraded or desiccated (DWAF, 2005). Redoximorphic features are soil characteristics which develop as a result of prolonged and repeated saturation. It is important to note that the presence or absence of redoximorphic features within the upper 500 mm of the soil profile alone is sufficient to identify the soil as being hydric, or non-hydric (Collins, 2005).

No hydric soils were identified within the artificial wetland zones. The terrestrial soils sampled were dominated by Hutton Soils on site. Mispah soils dominated the rocky areas.

Wetland vegetation indicator

According to DWAF (2005), vegetation is regarded as a key component to be used in the delineation procedure for wetlands. Vegetation also forms a central part of the wetland definition in the National Water Act, Act 36 of 1998. However, using vegetation as a primary wetland indicator requires an undisturbed condition (DWAF, 2005). Minor disturbances were however noted in the wetland systems making it difficult to rely solely on vegetation as a wetland indicator. Disturbances included the presence of alien invasive species, damming, mining and erosion within the area. Hydrophytic wetland vegetation *Cyperus spp.* and *Australis phragmites* were dominant. *Juncus spp*. were also noted.

Wetland delineation

Any wetlands identified on the site were categorised according to the National Wetland Classification System for South Africa (Ollis et al., 2013). **The wetland areas were classified as artificial wetlands** based on that it possesses the

vegetation properties of a wetland is as a result from the seepage from the Scrubber Dam on site (seeFigure 3-20 andFigure 3-21).

Artificial wetlands, marshes or swamps, are generally created from human activities such as wastewater, storm water runoff or sewerage treatment facilities, which serves as habitat for wildlife. Natural wetlands act as bio-filters, removing sediments and pollutants such as heavy metals from the water, and artificial wetlands can be designed in a manner to emulate these features during a suitable rehabilitation phase.

Figure 3-20: Dam seepage from the Scrubber dam creating artificial wetland conditions

Figure 3-21: Riparian plants identified in a disturbed artificial wetland system

ECOLOGICAL

Critical Biodiversity Areas

According to the Critical Biodiversity Areas (CBA) datasets provided by SANBI (2022), the majority of the application area falls overlaps with heavily transformed landscape and a small section of other natural areas. These sections were confirmed to be transformed landscape during the site visit with extensive alterations from agricultural land and industrial activities.

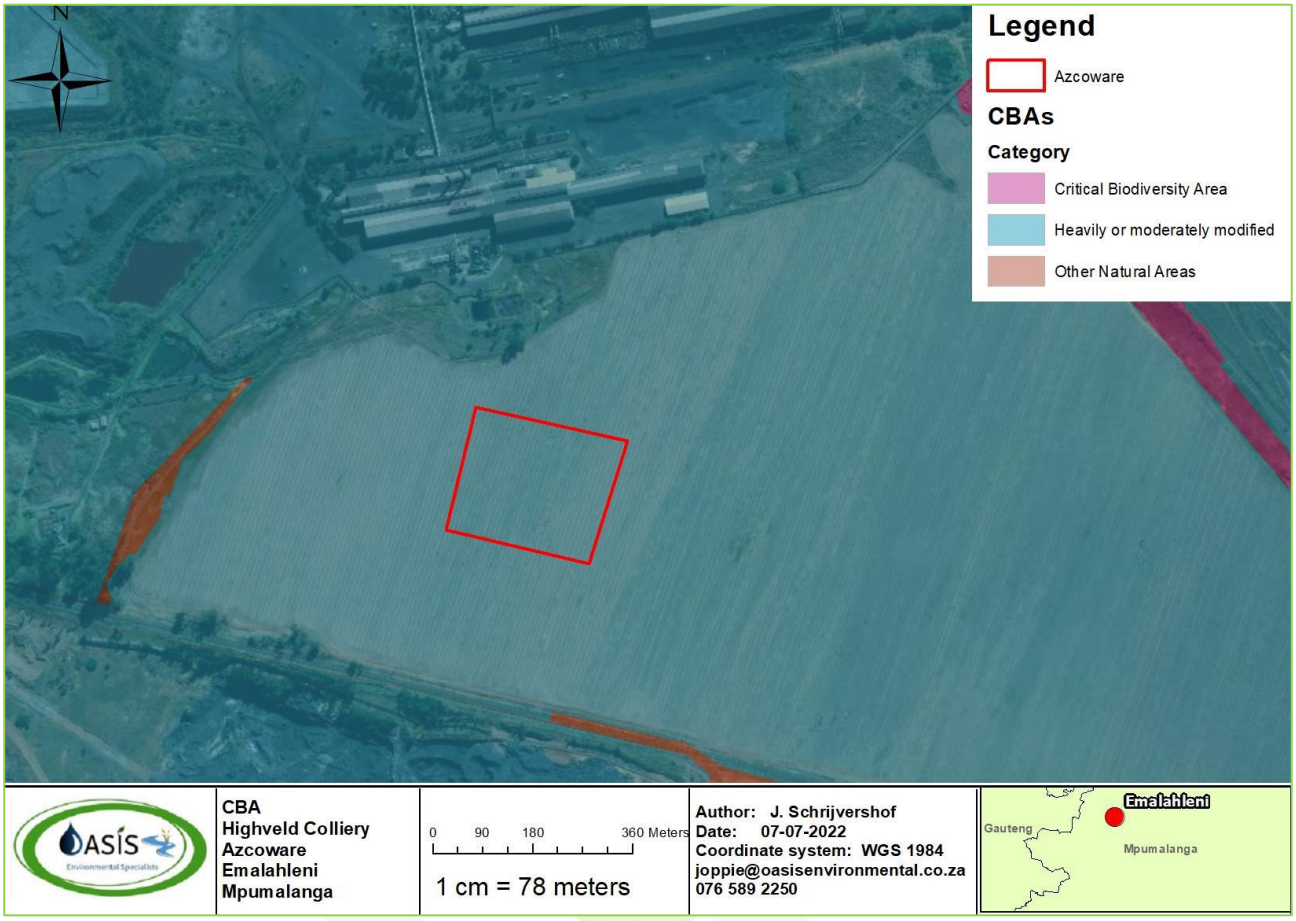


Figure 3-22: CBA map

Threatened Ecosystems and Protected areas

The mining area does overlap with the Eastern Highveld Grassland vegetation type which is considered as endangered ecosystems.

Important Bird Areas

The mining area does not occur within close proximity to any Important Bird Areas.

Vegetation

The majority of the study site consisted of alien invasive vegetation and very little indigenous vegetation, however vegetation normally associated with that area is listed in Appendix B of the Wetland and Ecological Assesment Report attached in Appendix D – Specialist Studies of this BAR. The vegetation associated with that area is depicted from Mucina and Rutherford (2006) for the Eastern Highveld Grassland which cover almost the entire area. No red listed floral species were

observed during the site visit. Observed grasses within the area of investigation comprised of *Hyparrhenia hirta* (Thatching grass), *Setaria spp.* and *Pennisetum clandestinum* (Kikuyu grass).

Alien Invasive Vegetation

National Environmental Management: Biodiversity Act (No. 10 of 2004) categorises four invasive species according to Section 21 and are as follows:

- Category 1a: Species requiring compulsory control;
- Category 1b: Invasive species controlled by an invasive species management programme;
- Category 2: Invasive species controlled by area, and;
- Category 3: Invasive species controlled by activity.

Certain species have different alien invasive categories for different provinces in South Africa. Table 3-14 lists the alien species identified on site as well as their respective alien categories. A large number of extensive alien invasive plants were observed onsite. Dominant alien invasive plants included *Acacia mearnsii* (Black Wattle); *Populas spp.* (Grey and White poplar); *Eucalyptus tereticornis* (Forest red gum) *and Verbena bonariensis* (Tall verbena).

Table 3-14: Alien Invasive Plants identified surrounding the mining areas.

Species Name	Common Name	Category
Acacia dealbata	Silver Wattle	2
Acacia elata	Pepper tree wattle	1b
Acacia mearnsii	Black Wattle	2
Arundo donax	Spanish/Giant Reed	1b
Bidens pilosa	Black Jack	Not Listed
Cirsium vulgare	Spear thistle, Scotch thistle	1b
Convolvulus arvensis	Field bindweed, Wild morning glory	1b
Cortaderia jubata	Pampas Grass	1b
Datura ferox	Large thornapple	1b
Datura stramonium	Common thornapple	1b
Eucalyptus tereticornis	Forest red gum	1b
Ipomoea purpurea	Morning Glory	1b
Populus alba	White popular	2
Populus canescens	Grey Poplar	2
Ricinus communis	Castor Oil Plant	2
Robinia pseudoacacia	Black Locust tree	1b
Solanum mauritianum	Bugweed	1b
Tagetes minuta	Khaki Weed	Not Listed
Verbena bonariensis	Tall Verbena	1b

Fauna

Mammal species that were identified onsite included the yellow mongoose (*Cynictis penicillata*) and ground squirrel (*Xerus spp.*). No red listed faunal species were observed during the site visit.

Bird species included Helmeted guineafowl (*Numida meleagris*), Swainson's spurfowl (*Pternistis swainsonii*), Laughing dove (*Spilopelia senegalensis*), Indian myna (*Acridotheres tristis*), Fan-tailed widowbird (*Euplectes axillaris*), Southern red bishop (*Euplectes orix*) and Southern masked weaver (*Ploceus velatus*).

No amphibian and reptile species were recorded during the field survey. No invertebrate animals of significance of the insect, spider and scorpion groups were found during the field survey.

HERITAGE / ARCHAEOLOGICAL

Historical topographical maps & aerial images

The historical aerial images dating to 1943, 1962, 1965, 1971 and 1979 indicate the demarcated study area to be open veldt, while the 1991, 1997 and 2003 aerial images indicate the area to be cultivated. When the 1960 topographical map is inspected a hut is shown in the north-western corner, while the remaining area consists of open veldt. Huts and footpaths are shown in the general region, as well as a railway line along the southern boundary of the study area. The 1962 aerial image shows the presence of buildings on the southern half of the demarcated area, as well as the presence of Site B01. The buildings at site B02, however, are not shown on any of the topographical maps and are also not visible on the 1979 aerial image. The 1974 topographical map shows the absence of huts, while the study area still appears to be associated with open veldt. The 1996, 2003 and 2010 topographical maps indicate the area to be cultivated.

Based on the historical aerial images and topographical maps, the area appears to have been cultivated between 1974 and 1991, thereby disturbing the archaeological context. Based on field observations and recent satellite imagery, the cultivated fields fell into disuse after September 2021. It is also after this date that the northern section of the study area became associated with mining activities. To view all the images, refer to the Figures in Appendix A of the Phase 1 Archaeological Impact Assessment Report attached in Appendix D – Specialist Studies of this BAR.

Figure 3-23: Proposed mining permit area superimposed on a 1943 aerial map

Figure 3-24: Proposed mining permit area superimposed on a 1962 aerial map

Figure 3-25: Proposed mining permit area superimposed on a 2003 aerial map

Archaeological and Historical Remains

Stone Age Remains

No Stone Age archaeological remains were located within the demarcated study area. Although no Stone Age archaeological remains were located, such artefacts may occur in the area. These artefacts are often associated with rocky outcrops or water sources.

Iron Age Farmer Remains

No Iron Age Farmer remains were located within the demarcated study area.

Historical

No sites dating to the Historic Period were located within the demarcated study area.

Contemporary Remains/Natural

No contemporary sites were located within the demarcated study area.

Graves

No burial sites were observed during the pedestrian survey.

Figure 3-26: Pedestrian survey track of the proposed mining permit area

PALAEONTOLOGICAL

Geological context

The site lies in the north-central part of the Karoo basin where the early Karoo Supergroup strata unconformably overlie the much older quartzites of the Transvaal Supergroup, in the Transvaal Basin. Intruding through the Pretoria Group rocks are sills and dykes composed of diabase, a volcanic and non-fossiliferous rock. Along the rivers and streams much young reworked sands and alluvium overly the older strata.

The Karoo Supergroup rocks cover a very large proportion of South Africa and extend from the northeast (east of Pretoria) to the southwest and across to almost the KwaZulu Natal south coast. It is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. Representing some 120 million years (300 – 183Ma), the Karoo Supergroup rocks have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

During the Carboniferous Period, South Africa was part of the huge continental landmass known as Gondwanaland and it was positioned over the South Pole. As a result, there were several ice sheets that formed and melted, and covered most of South Africa (Visser, 1986, 1989; Isbell et al., 2012). Gradual melting of the ice as the continental mass moved northwards and the earth warmed, formed fine-grained sediments in the large inland sea. These are the oldest rocks in the system and are exposed around the outer part of the ancient Karoo Basin and are known as the Dwyka Group (Johnson et al., 2006).

Overlying the Dwyka Group rocks are rocks of the Ecca Group that are Early Permian in age. There are eleven formations recognised in this group but they do not all extend throughout the Karoo Basin. In the Free State, Mpumalanga and KwaZulu Natal, from the base upwards are the Pietermaritzburg Formation, Vryheid Formation and the Volksrust Formation. All of these sediments have varying proportions of sandstones, mudstones, shales and siltstones and represent shallow to deep water settings, deltas, rivers, streams and overbank depositional environments.

Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 4. The site for development is in the very highly sensitive Vryheid Formation (red) with a central section of moderately sensitive Quaternary sands and alluvium (green).

The Vryheid Formation contains the main coal reserves of South Africa. Coals are the product of the alteration of buried peats by heat and pressure to form amorphous organic matter. No fossil plants are visible in the coal itself but can sometimes be found in the carbonaceous lenses between and adjacent to the coal seams. Here the original plants can be seen, the Glossopteris flora. This flora is dominated by the extinct seed fern, Glossopteris, but other plants were also present such as lycopods, sphenophytes, ferns, cordaitaleans and early gymnosperms (Plumstead, 1969; Anderson and Anderson, 1985; Bamford, 2004). Vertebrate fossils are seldom found with plant fossils because they require different environments for preservation. Plants require a more reducing environment while bones need a more oxidizing environment (Cowan, 1995).

Although the Glossopteris flora is widespread in Gondwana (Adendorff, 2005), the occurrence is sporadic and difficult to predict. In this area, the Witbank Coalfield, there are usually five coal seams, from bottom to top called 1-5 (Snyman, 1988). The uppermost seam is overlain by sandstone in most areas and is 20 or meters below the lands surface (Snyman, 1998; fig 16)

Figure 3-27: SAHRIS palaeosensitivity map for the site for the proposed Azcoware MP shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low;

Site observations

The area was walked through by palaeontologists Rick Tolchard and Chandelé Montgomery on 13 July 2022. They searched for rocky outcrops because soils do not preserve fossils. The area has been partially mined and carbonaceous shales and coal are exposed. There were no outcrops or fossils visible on the surface and no fossils in the discard.

FAUNA AND FLORA

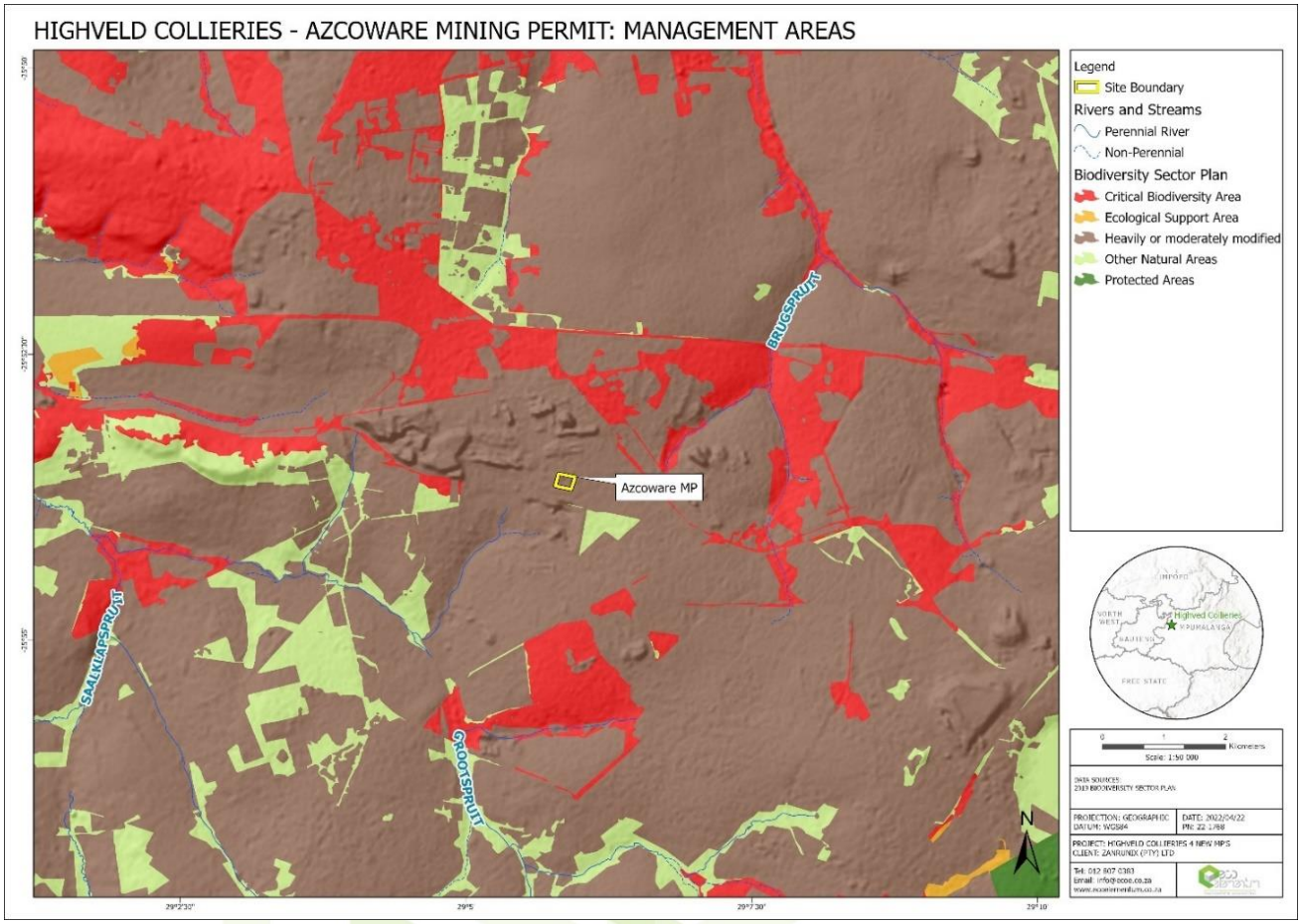


Figure 3.28: Critical Biodiversity Areas

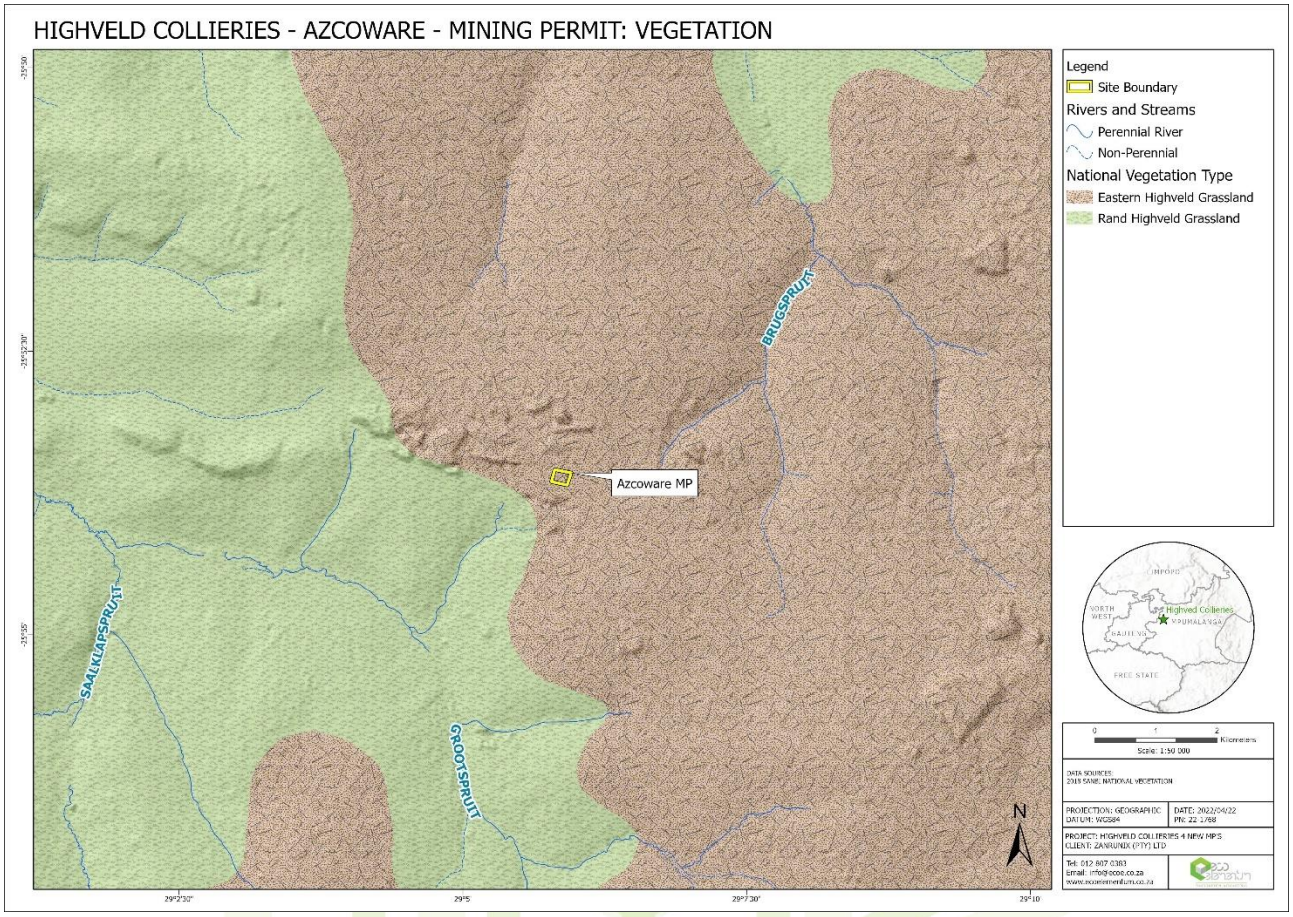


Figure 3.29: Azcoware MP area vegetation

Eastern Highveld Grassland

Stretches over the Mpumalanga and Gauteng Provinces, with plains between Belfast to the east and the eastern side of Johannesburg and extending southwards to Bethal, Ermelo and Piet Retief. Altitude ranges between 1520 to 1780 m, but also as low as 1300 m (Mucina & Rutherford, 2006). Strongly seasonal summer rainfall, with very dry winters. Mean annual precipitation ranges between 650 mm to 900 mm (overall average: 726 mm) and is relatively uniform, but increases significantly in the southeast areas (Mucina & Rutherford, 2006). Incidence of frost from lasts from 13 to 42 days, but is higher at higher elevations (Mucina & Rutherford, 2006).

Slightly too moderately undulating plains, including some low hills and pan depressions (Mucina & Rutherford, 2006). The vegetation is short dense grassland dominated by the usual Highveld grass composition (Aristida, Digitaria, Eragrostis, Themeda, Tristachya etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Senegalia caffra, Celtis africana, Diospyros lycioides* subsp *lycioides, Parinari capensis, Protea caffra, P. welwitschii* and *Rhus magalismontanum*) (Mucina & Rutherford, 2006).

Some 44% transformed primarily by cultivation, plantations, mines, urbanisation and dams. Cultivation may have had a more extensive impact, indicated by land-cover data (Mucina & Rutherford, 2006). No serious alien invasions are reported, but Acacia mearnsii can become dominant in disturbed sites, with very low erosion (Mucina & Rutherford, 2006).

Red to yellow sandy soils of the Ba and Bb land types found on shales and sandstones of the Madzaringwe Formation (Karoo Supergroup). Land types are Bb (65%) and Ba (30%) (Mucina & Rutherford, 2006). Found on younger Pleistocene to recent sediments overlying fine-grained sedimentary rocks of the Karoo Supergroup (on sediments of both Ecca and Beaufort Groups due to the large extent of the area of occurrence) as well as of the much older dolomites of the Malmani

Subgroup of the Transvaal Supergroup in the northwest (Mucina & Rutherford, 2006). In the areas built by Karoo Supergroup sediments are associated with the occurrence of Jurassic Karoo dolerite dykes having a profound influence on run-off (Mucina & Rutherford, 2006).

Soils are peaty (Champagne soil form) to vertic (Rensberg soil form) (Mucina & Rutherford, 2006). The pans and wetlands forms where flow of water is impeded by impermeable soils and/or by erosion resistant features, such as dolerite intrusions (Mucina & Rutherford, 2006). Many pans of this type of freshwater wetlands are inundated and/or saturated only during the summer rainfall season, and for some months after this into the middle of the dry winter season, but they may remain saturated all year round (Mucina & Rutherford, 2006). Surface water inundation may be present at any point while the wetland is saturated and some plant species will be present only under inundated conditions, or under permanently saturated conditions (Mucina & Rutherford, 2006). The presence of standing water should not be taken as a sign of permanent wet conditions (Mucina & Rutherford, 2006).

AIR QUALITY

South Africa is located in the sub-tropics where high pressures and subsidence dominate. However, the southern part of the continent can serve as a source of hot air that intrudes sub-tropics, and that sometimes lead to convective movement of air masses. On average, a low pressure will develop over the southern part of the continent, while the normal high pressures will remain over the surrounding oceans. These high pressures are known as Indian High-Pressure Cells and Atlantic High pressure Cells. The intrusion of continents will allow for the development of circulation patterns that draw moisture (rain) from either tropics (hot air masses over equator) or from the mid-latitude and temperate latitudes.

Southern Africa is influenced by two major high pressure cells, in addition to various circulation systems prevailing in the adjacent tropical and temperate latitudes. The mean circulation of the atmosphere over Southern Africa is anticyclonic throughout the year (except near the surface) due to the dominance of the three high pressure cells, namely South Atlantic High Pressure, off the west coast, the South Indian High Pressure off the east coast and the Continental High Pressure over the interior.

It is these climatic conditions and circulation movements that are responsible for the distribution and dispersion of air pollutants within the proposed Highveld Collieries - Azcoware Project area and between neighbouring provinces and countries bordering South Africa.

Site-Specific Dispersion Potential

A period wind rose for the site is presented in Figure 3.31 below. Wind roses comprise of 16 spokes which represents the direction from which winds blew during the period. The colours reflect the different categories of wind speeds. The dotted circles provide information regarding the frequency of occurrence of wind speed and direction categories.

Based on an evaluation of the meteorological data simulations run from a WRF weather model at ~10 km resolution from 2019 to 2021 of the project area. The following deductions regarding the prevailing wind direction and wind frequency can be assessed. Looking at Figure 3.29 below, the predominant wind direction is predicted to occur mainly from the NNW 957 hours per year respectively. A secondary direction is predicted from NW 873 hours per year, respectively, with wind speeds higher than 5 km/h.

From Figure 3.30 at the site, calm conditions with wind speeds of 12 km/h or less, are predicted 21 days per month throughout the year. 12-19 km/h winds are predicted 6 days per month through the year. Wind speeds of more than 19 km/h are predicted to occur 4 days per year on average.

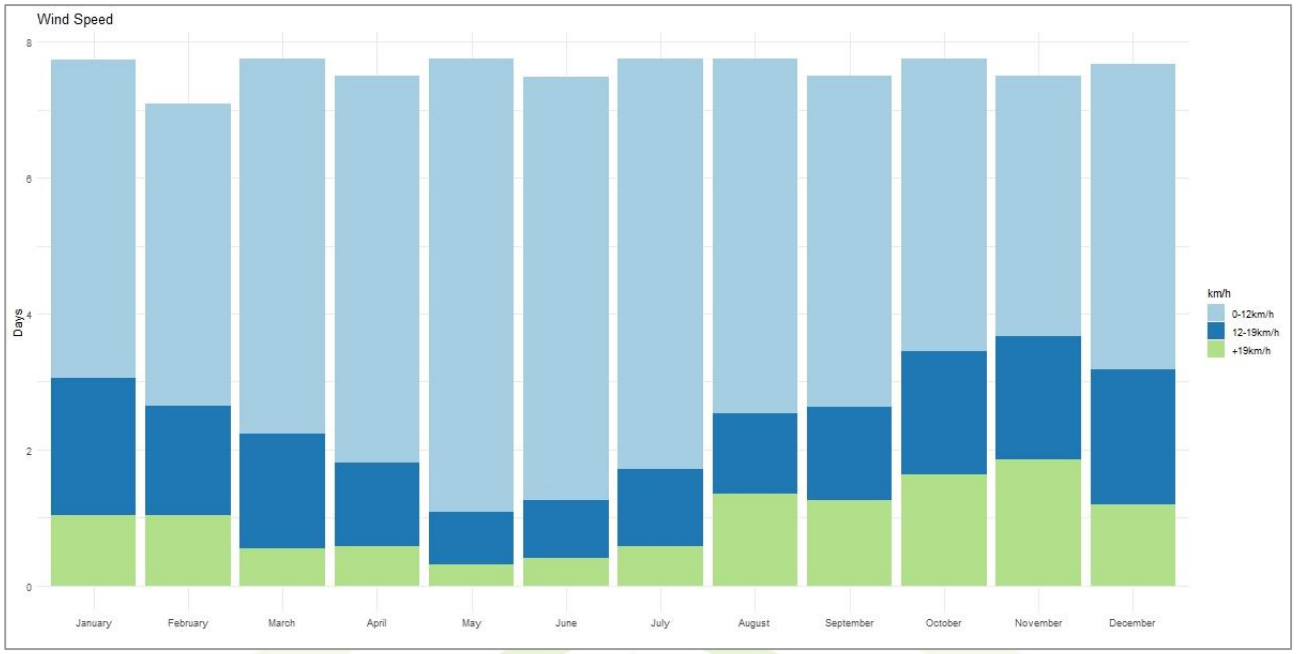


Figure 3.30: Wind Class Frequency Distribution per month.

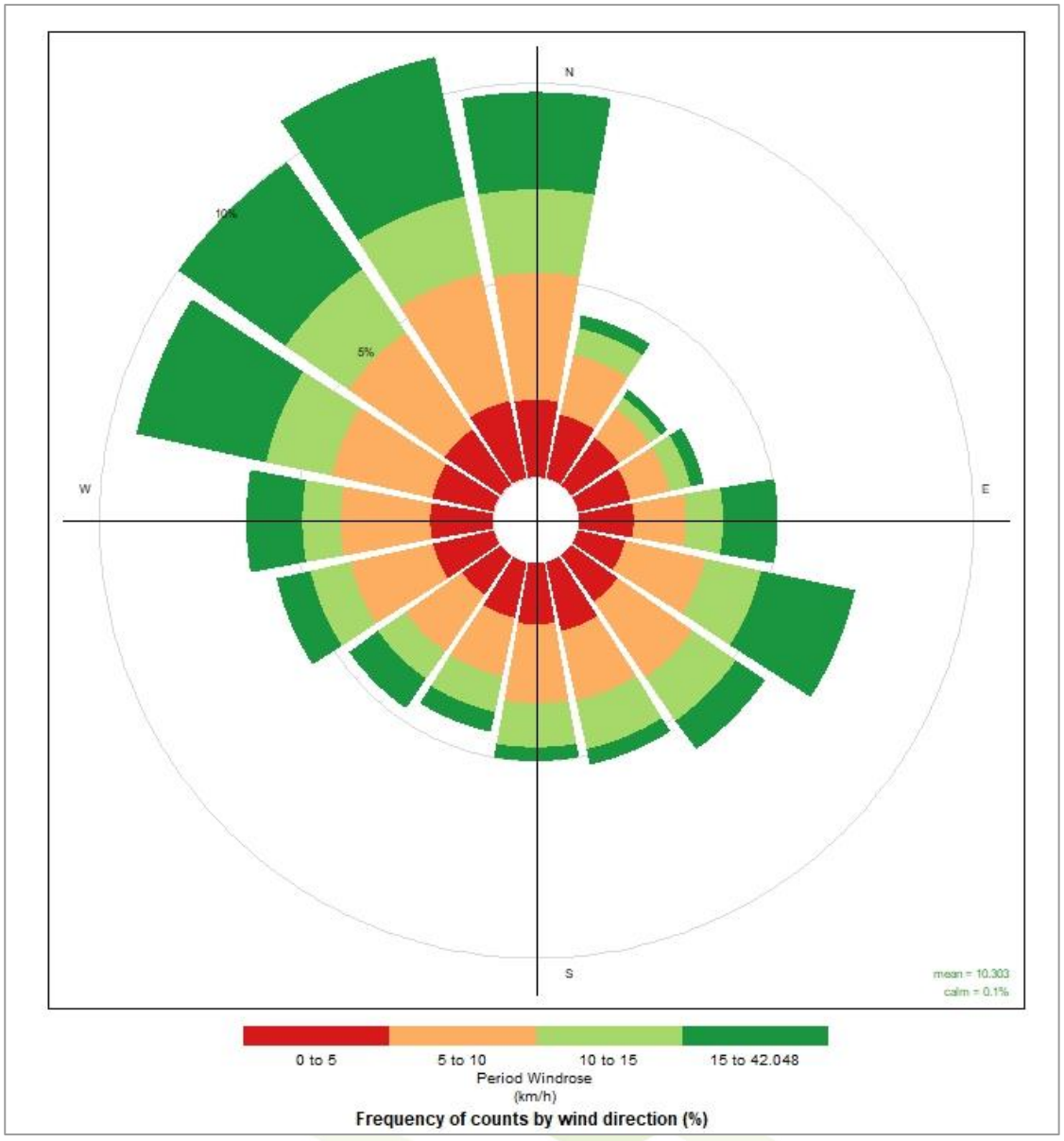


Figure 3.31: WRF 10 km simulation model wind rose for the proposed Highveld Collieries - Azcoware project area for the period 2019-2021.

BLASTING & NOISE ASSESSMENT

The need for blasting has not been determined yet, and the below is included should blasting be required.

Blasting operations have effect to its surroundings. These effects can manifest in the form of ground vibration, air blast, fumes, fly rock etc. The application of explosives breaking rock will always have a positive and negative manifestation of different energies. It is the effects that have negative outcome that we concentrate on and that will need to be managed.

Ground Vibration

Explosives are used to break rock through the shock waves and gasses yielded from the explosion. Ground vibration is a natural result from blasting activities. The far field vibrations are inevitable, but un-desirable by products of blasting operations. The shock wave energy that travels beyond the zone of rock breakage is wasted and could cause damage and annoyance. The level or intensity of these far field vibration is however dependant on various factors. Some of these factors can be controlled to yield desired levels of ground vibration and still produce enough rock breakage energy.

Factors influencing ground vibration are the charge mass per delay, distance from the blast, the delay period and the geometry of the blast. These factors are controlled by planned design and proper blast preparation.

- The larger the charge mass per delay - not the total mass of the blast, the greater the vibration energy yielded. Blasts are timed to produce effective relief and rock movement for successful breakage of the rock. A certain quantity of holes will detonate within the same time frame or delay and it is the maximum total explosive mass per such delay that will have the greatest influence. All calculations are based on the maximum charge detonating on a specific delay.
- Secondly is the distance between the blast and the point of interest / concern. Ground vibrations attenuate over distance at a rate determined by the mass per delay, timing and geology. Each geological interface a shock wave encounters will reduce the vibration energy due to reflections of the shock wave. Closer to the blast will yield high levels and further from the blast will yield lower levels.
- Thirdly the geology of the blast medium and surroundings has influences as well. High density materials have high shock wave transferability where low density materials have low transferability of the shock waves. Solid rock i.e. norite will yield higher levels of ground vibration than sand for the same distance and charge mass. The precise geology in the path of a shock wave cannot be observed easily, but can be tested for if necessary in typical signature trace studies - which are discussed shortly below.

Normally, in order to determine effective control measures, it will be required to do signature hole trace study. This process consists of charging and blasting test holes that are measured for ground vibration and air blast at various distances. Signature trace data can then be used to determine site specific constants for prediction of ground vibration and assist in determining timing of blasts in order to minimize the effect of vibration.

Air blast

Air blast or air-overpressure is pressure acting and should not be confused with sound that is within audible range (detected by the human ear). Sound is also a build up from pressure but is at a completely different frequency to air blast. Air blast is normally associated with frequency levels less than 20 Hz, which is the threshold for hearing. Air blast is the direct result from the blast process although influenced by meteorological conditions the final blast layout, timing, stemming, accessories used, covered or not covered etc. all has an influence on the outcome of the result.

The three main causes of air blasts can be observed as:

- Direct rock displacement at the blast; the air pressure pulse (APP).
- Vibrating ground some distance away from the blast; rock pressure pulse (RPP).

- Venting of blast holes or blowouts; the gas release pulse (GRP).

Fly Rock

Blasting practices require some movement of rock to facilitate the excavation process. The extent of movement is dependent on the scale and type of operation. For example, blasting activities within large coal mines are designed to cast the blasted material much greater distances than practices in a quarrying or hard rock operation. This movement should be in the direction of the free face, and therefore the orientation of the blasting is important. Material or elements travelling outside of this expected range may be considered to be fly rock.

Fly rock from blasting can result from three mechanisms due to the lack of confinement of the energy in the explosive column. The main mechanisms are:

- Face burst - burden conditions usually control fly rock distances in front of the face.
- Cratering - If the stemming height to hole diameter ratio is too small or the collar rock is weak.
- Rifling - If the stemming material is ejected with insufficient stemming height or inappropriate stemming material is used.

In short the following list is typical causes of fly rock:

- Burden to small.
- Burden to large.
- Stemming length to short.
- Out of sequence initiation of blast holes.
- Drilling inaccuracies.
- Incorrect blast hole angles.
- Over charged blast holes.

It is possible to blast without any fly rock with proper confinement of the explosive charges within blast holes using proper stemming procedures and materials. Stemming is further required to ensure that explosive energy is efficiently used to its maximum. Free blasting with no control on stemming cannot be allowed as this will result in poor blast results and possible damage to any nearby structures.

Noxious Fumes

Explosives currently used are required to be oxygen balanced. Oxygen balance refers to the stoichiometry of the chemical reaction and the nature of gases produced from the detonation of the explosives. The creation of poisonous fumes such as nitrous oxides and carbon monoxide are particular undesirable. These fumes present themselves as red brown cloud after the blast detonated. It has been reported that 10 to 20 ppm has been mildly irritating. Exposure to 150 ppm or more (no time period given) has been reported to cause death from pulmonary edema. It has been predicted that 50% lethality would occur following exposure to 174 ppm for 1 hour. Anybody exposed must be taken to hospital for proper treatment.

Factors contributing to undesirable fumes are typically: poor quality control on explosive manufacture, damage to explosive, lack of confinement, insufficient charge diameter, excessive sleep time, and specific types of ground can also contribute to fumes.

Poor quality control on explosives will yield improper balance of the explosive product. This is typically in the form of too little or too much fuel oil or incorrect quantities of additives to the mixture. Improper quality will cause break down on the explosives product that may result in poor performance. A “burning” may occur that increases the probability of fumes in the form of NO and NO_2.

Damage to explosives occur when deep blast hole is charged from the top of the hole and literally fall into the hole and get damage at the bottom. The bottom is normally the point of initiation and damaged explosives will not initiate properly. A slow reaction to detonation is forced and again contributes negatively to the explosives performance and fume creating capability.

Studies showed that inadvertent emulsion admixture with drill cuttings can also be a significant contributing factor to NOx production. The NO production from the detonation of emulsion equally mixed (by mass) with drill cuttings increased by a factor of 2.7 over that of emulsion alone. The corresponding NO_2 production increased by a factor of 9 while propagating at a steady Velocity of Detonation.

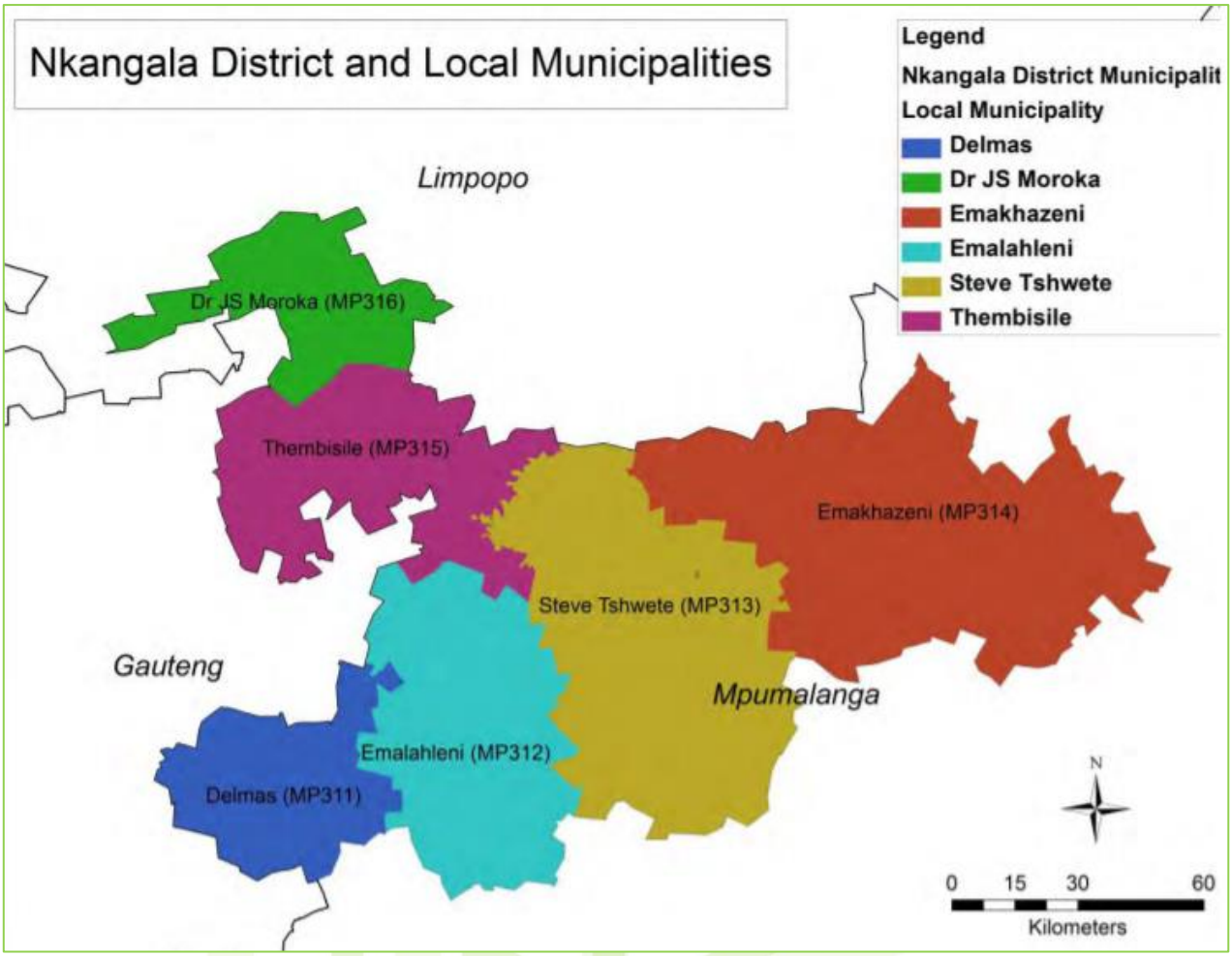
Water also has visible effect on the generation of fumes from emulsion explosives. Tests have shown that the detonation velocity may not be influenced as much but the volumes of fumes generated were significantly higher.

Further is also known that for certain ground types, especially the oxidized type materials could have an advert effect on explosives as well. These ground materials types tend to react with the explosives and causes more than expected fumes.

Drill diameter is also contributing factor to explosive performance and the subsequent generation of fumes. Explosives are diameter dependant for optimal performance. If diameter is too small for a specific product improper detonation will occur and may result in a burning of the product rather than detonation. This will have an adverse effect of more fumes created. Each explosive product has a critical diameter. It is the smallest diameter where failure to detonate properly occurs. ANFO blends are normally not good for small diameter blast holes and emulsion explosives can be sued in the smaller diameter blast holes.

SOCIAL

The proposed Project is located in eMalahleni Local Municipality (ELM), within the Nkangala District Municipality (NDM) in Mpumalanga Province. The socio-economic characteristics of the population within each of the aforementioned areas are listed below.



Population and Demographics

According to the ELM 2013-2014 IDP, this municipality is the largest economic contributor to the NDM of the six local municipalities, contributing 45% to the district's economy. Dominant economic contributors include utilities (74.1%), mining (52.8%) and construction (52.5%). The eMalahleni population size, as recorded by Stats SA 2011, was 395 466 people which makes up 30% of Nkangala District's population. The population lives in 119 874 households with an average household size of 3.3 people. This is a relatively low family size, which may reflect the young age of the urban centres in the district, in which large family structures have not had time to develop. More established towns generally have average family sizes in excess of 4.5 people, while rural areas often average 5.5 people or more per household. The ELM's population grew by 43.1% between 2001 and 2011 while annualised population growth rate was measured at 3.6%.

Educational Status

Educational achievement is a key development indicator of a population. The majority of the population (ages over twenty) in the local study area as well as district municipality have not completed matric, however, there is a large percentage of learners who complete primary level education.

Employment and Labour

According to Statistics South Africa, (2011) the employment rate for Mpumalanga Province and Nkangala District Municipality was 24% and 27% respectively (Stats SA, 2011). There has been a drop in unemployment rate in the ELM

from 38.4% to 27% between 2001 and 2011. A large portion of those employed are absorbed into the mining, construction, power generation and agricultural sectors.

Annual Household Income

Over 40% of people in Mpumalanga Province have no annual income at all. Average income figures for the local study area, the ELM and the NDM are all very much in line with the provincial average; however, the income earning figures are slightly higher for the local study area, with more people earning between R3 201 and R12 800 (Stats SA, 2011). It can be gathered that the ELM has a higher income production than the provincial figures. This is attributed to the concentration of mining and power generation activities, and construction industry in this area (Stats SA, 2011).

Social Infrastructure and Services

All the urban areas within ELM (with the exception of informal settlements and townships) are fully reticulated in terms of potable water supply. A large percentage of households in the local study area have access to piped water either inside their house or within a communal yard, with an average of 77% having access to municipal water, whilst 8% have access to water through a borehole. In terms of sanitation, data from the 2011 census, show that an estimated 57% of households in the local study area have access to waterborne sewer services (flush toilets, with or without septic tanks); the majority (33%) of the remaining households use pit latrines (Stats SA, 2011). An estimated 69% of waste generated within the ELM is collected weekly by the local municipality. In contrast to the ELM, the most common means of waste disposal for populations in Ward 30 is through utilisation of their own refuse dumps (39%), 36% make use of municipal services and a significant amount of the population has no means of waste disposal at all. Of the households in local study area, 53% use electricity for cooking, heating and lighting. In contrast 69% of the households in the ELM use electricity. The bulk electricity provider throughout the municipality is Eskom (ELM IDP, 2012 - 2013). The ELM is strategically located in terms of the provincial context and transport network. It is situated in close proximity to the City of Johannesburg, City of Tshwane and Ekurhuleni Metropolitan Municipalities in Gauteng, and is connected to these areas by the N4 and N12 freeways. Although roads in the ELM are sufficiently connected with district, provincial and national roads, many secondary road systems are in a state of disrepair, being insufficient to handle the increased traffic created by mining and other industrial developments. Crime and community safety is generally a cause of concern for communities in the local study area. There has been a history of substance abuse and widespread criminal activity in the area, with several instances of community conflict, industrial action and opposition towards the local municipality and surrounding mining companies.

Health Services

It was found in an interview with the head nurses at the Phola Community Health Centre and the Ogies Clinic that prostitution has become an increased problem within the region as a result of the mining operations; this then in turn leads to an increase in HIV/AIDS rates. The mining operations also have resulted in an influx of inhabitants into the area which has put tremendous strain on health facilities.

3.8.4.2 Description of the current land uses.

When the surrounding environment is considered, the region is associated with crop cultivation and mining activity. Access to the study area is via a local road / haul road turning from a tertiary road. On a local scale, the area is associated with cultivated land and a wetland system on the eastern side. The area comprises of agricultural land, natural veld and a neighbouring coal mine.

3.8.4.3 Description of specific environmental features and infrastructure on the site.

The study area was previously cultivated, and vegetation has since re-established. The area comprises of agricultural land, natural veld and a neighbouring coal mine.

3.8.4.4 Environmental and current land use map.

(Show all environmental and current land use features)

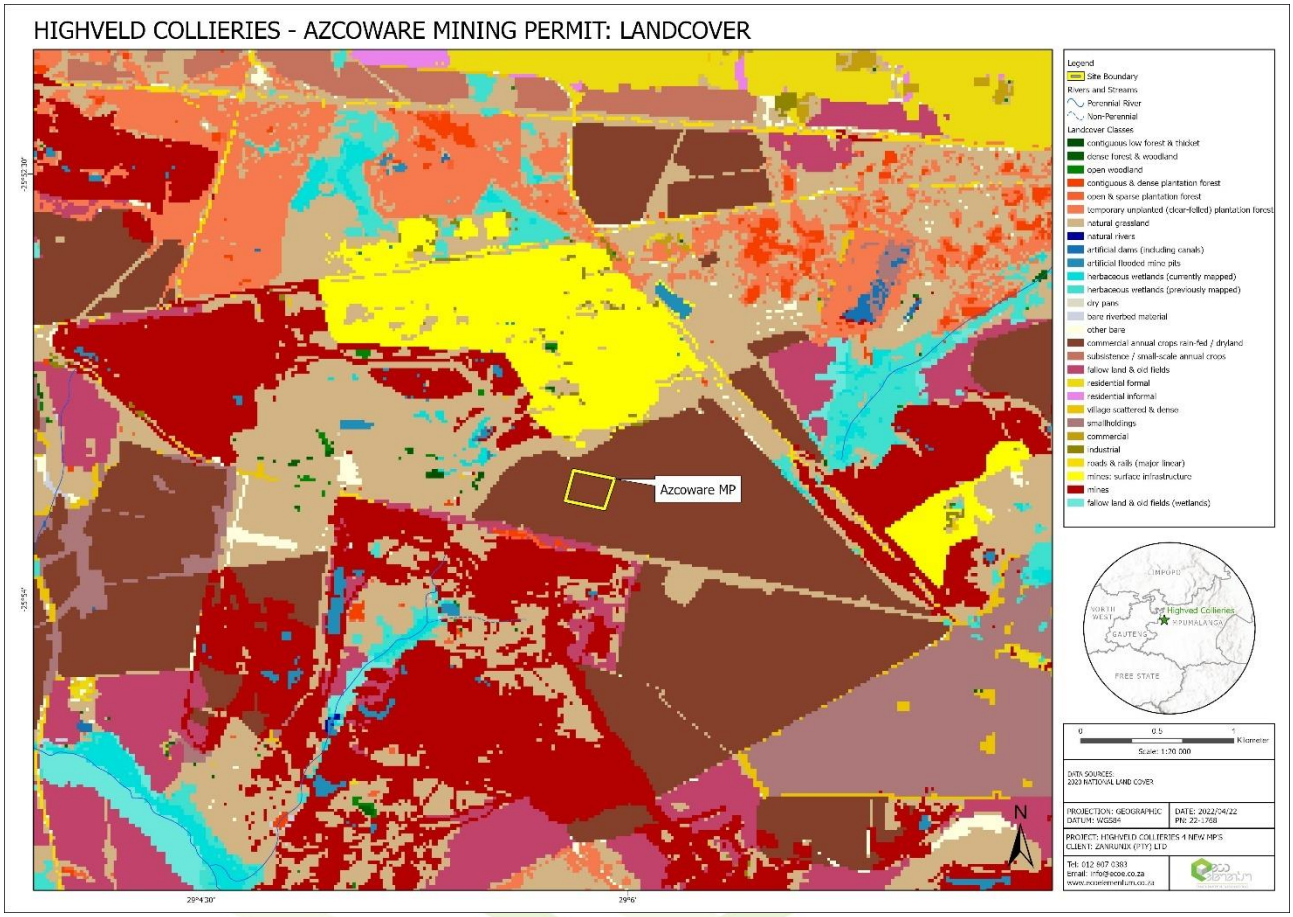


Figure 3.32: Land cover of the study area

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

WETLANDS AND ECOLOGY IMPACT ASSESSMENT

Impact on Wetland

No impacts on the delineated artificial wetland were identified by the specialist. Historically this area was not a wetland area, but due to prolonged seepage from the Scrubber dam, it created conditions for the emergence of an artificial wetland with characteristic hydrophytic wetland vegetation.

Impact on Ecology / Biodiversity

Any development activity in a natural system will have an impact on the surrounding environment, usually in a negative way. The purpose of this phase of the study was to identify and assess the significance of the potential impacts caused by the current mining operations.

A number of potential impacts relating to the loss of indigenous vegetation, floral habitat and ecological structure, loss of floral diversity and ecological integrity, proliferation of alien invasive species, loss of plant species of conservation concern, loss of faunal habitat, direct faunal impacts and disturbance to fauna are predicted to occur as a result of the mine operation.

Loss of Species of Conservation Concern

No red listed faunal or floral species were identified in the study area, but some of the species numbers may deplete over time. All endemic species and species of concern have specific habitat requirements and the impacts of the mine operation might have effects on these species.

Loss of indigenous vegetation, floral and faunal habitat and ecological structure of water resources and soil

The mine operation might impact on foraging, breeding and roosting ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. Cumulative impacts might include a decrease in floral habitat and ecological structure will lead to the proliferation of alien invasive species.

Alien Invasive Species

Alien invasive plant species will quickly encroach into disturbed areas. Alien plant species generally out-compete indigenous plant species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches (Bromilow, 2010). Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and “quality” of species), change nutrient cycling and productivity, and modify food webs (Zedler, 2004). This negatively affects the ability of the disturbed area to maintain indigenous floral biodiversity.

HYDROGEOLOGY IMPACT ASSESSMENT

Construction Phase

Impacts on Groundwater Quantity

No significant impacts are expected during the construction phase in terms of groundwater quantity. The removal of vegetation in preparation of the mining area and haul road construction may cause an increase in surface runoff and therefore a small decrease in aquifer recharge.

The box-cut may cause a decrease in the water level due to dewatering if the base of the box-cut is lower than the groundwater level at that position.

Impacts on Groundwater Quality

The proposed Azcoware MP area mining activities are not expected to impact on the groundwater quality during the construction phase. The only possible impacts may be from example fuel spillages from the construction vehicles.

Operational Phase

Impacts on Groundwater Quantity

The operational phase impacts on the groundwater quantity will mainly be as a result of the dewatering of the surrounding aquifer during the opencast mining. The groundwater level in close proximity to the pit is expected to decrease since groundwater seepage to the void will be abstracted.

As simulated with the numerical model the extent of the dewatering cone is not expected to extend more than 330 m from the pit area in the shallow aquifer. No groundwater users are present in the area of impact.

Impacts on Groundwater Quality

During the operational phase and for the period after mining when the groundwater level has not yet recovered, the mine void will act as a groundwater sink area. Groundwater gradients and therefore groundwater flow will be towards the pit area. For this reason, groundwater contamination as a result of the mining pit itself will not be able to flow down gradient from the pit area during the operational phase.

Sulphate contamination from the EVRAZ Highveld Steel & Vanadium activities is observed in the groundwater towards the south-west, west, north-west and north of the proposed mining pit. Poor quality water will therefore accumulate in the pit as a result of the dewatering. Groundwater inflow to the pit will be pumped to the PCD.

Additional impacts from the proposed Azcoware MP mining activities on the groundwater quality during the operational phase have been discussed in section 7.8.2 of this document.

Impacts on Surface Water

Based on Figure 3-33, the closest NFEPA wetland is situated north-west and north of the Azcoware MP mining area. These wetlands can however be ascribed to the activities of EVRAZ Highveld Steel & Vanadium and are not seen as a natural wetland. The north-west wetland is associated with the Scrubber dam activities. The drawdown cone as a result of dewatering from the mining pit will extent to these wetland areas. Due to poor quality water already associated with the unlined Scrubber dam, the dewatering cone may to an extent limit the existing plume migration from this area.

Groundwater can contribute to surface drainage, and base flow to streams and wetlands only if the static water level is higher or at the same elevation as the base of the surface water feature.

The dewatering cone at maximum impact from the mining activities will not reach the closest stream to the south of the proposed mining pit. The simulated 100 years post closure sulphate plume is expected to reach the stream south of the mining area. This stream is however situated in an existing opencast area and has been altered by mining activities.

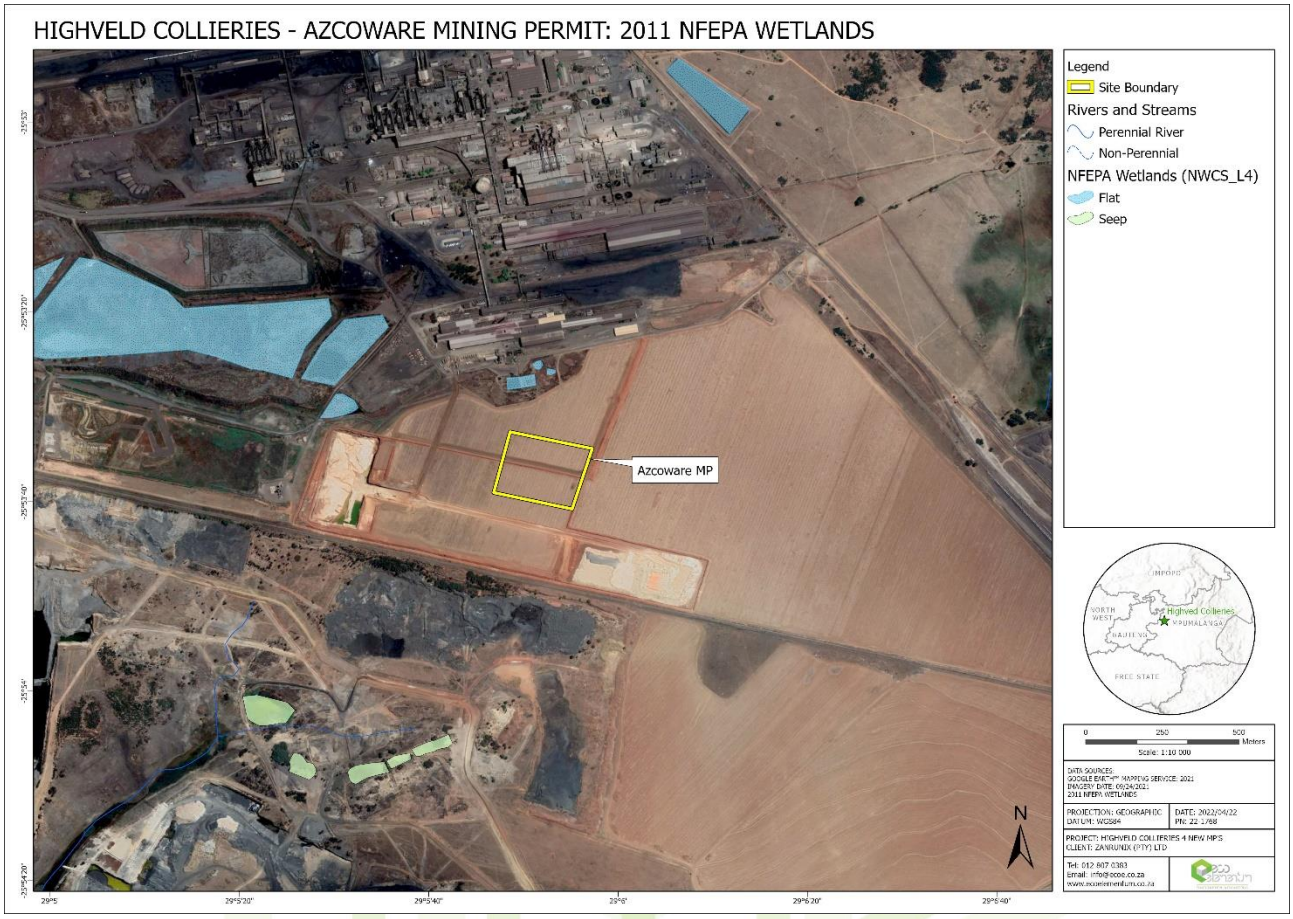


Figure 3-33: NFEPA Wetlands in the region of the Azcoware MP area.

Decommissioning Phase

During the decommissioning phase all the potential surface contamination sources including the PCDs, ROM stockpiles and other infrastructure, will be removed. These include all carbonaceous or contaminated material. This will decrease the surface sources for further groundwater contamination.

The opencast pit area will be rehabilitated which will have a positive impact on the groundwater regime in some areas since the poor-quality seepage to the groundwater will decrease. Rehabilitation should occur in such a manner as to divert as much as possible water away from the opencast areas.

Post Closure

Groundwater Quantity

Since dewatering has ceased at the end of the operational phase, the groundwater level will start to recover to a state of equilibrium. Decant from the lowest elevation on the pit boundary may occur once the groundwater levels have recovered.

With sufficient and adequate rehabilitation, the recharge to the opencast pits will decrease to approximately 12,5%. Decant elevations and estimated rates were discussed in Section 7.8.3 of the Geohydrological Report attached in Appendix D – Specialist of this BAR.

Groundwater Quality

Acid base analysis at Highveld Collieries indicated that the mining activities at Azcoware MP area will have a probability of acid generating. Therefore, the groundwater quality in the pit region will decrease as a result of the acidification. It is highly

recommended that all carbonaceous material be placed on the pit floor and covered with overburden material. This will result in coverage of the carbonaceous material with water first, which will eliminate oxygen from the system to decrease the process of acid generation. A groundwater pollution plume will start to migrate down gradient once the groundwater level has reached a point of equilibrium.

Cumulative Impact

The Azcoware MP mining area is situated in an area with numerous mining, industrial and agricultural activities at or near its boundaries. These include:

iv. EVRAZ Highveld Steel & Vanadium (integrated with some activities of Highveld Collieries 3 MP areas),
v. Submerged Elandsfontein mining just south of the proposed Azcoware MP area,
   a. Anglo Umlalazi Colliery to the south east;
   b. TransAlloys 1.7 km to the east; and
   c. Agricultural activities to the southeast and east.

Dewatering of the local aquifers is not limited to the Azcoware MP mining area. The mining operations as mentioned above and especially the Elandsfontein operations will have a cumulative impact on the aquifers in terms of quality and quantity. Acid mine drainage as well as the dewatering of the aquifers as a result of all these mining activities may decrease the groundwater quality and have a net loss on the water supply to the groundwater users and the springs in the area.

Heritage Impact Assessment

The proposed **Azcoware** Coal Mining Development consists of an opencast pit impacting approximately 4.95 ha. The entire study area was disturbed by mining activities and the cultivation of crops in the past. Also, no potential heritage sites were observed on historical aerial imagery, topographical maps or during the site visit. The area is therefore not considered to be sensitive from a heritage perspective and no impact to heritage resources is anticipated.

The demarcated study area has completely been disturbed by a combination of mining activities and the past cultivation of crops. The area is therefore not considered to be sensitive from a heritage perspective. Should uncertainty regarding the presence of heritage remains exist, or if heritage resources are discovered by chance, it is advised that the potential site not be impacted and that a qualified archaeologist 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 construction/development phase, 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 contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).

Palaeontology Impact Assessment

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were **no fossils on surface of the project footprint**. Since there is a chance that fossils from the Vryheid Formation may occur below ground and be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low to moderate.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and do contain fossil plant, insect, invertebrate and vertebrate material. The site visit and walk through on 13 July 2022 by palaeontologists Rick Tolchard and Chandelé Montgomery confirmed that there are no fossils on the surface. The sands of the Quaternary period would not preserve fossils. It is not known if there are fossils below the surface associated with the deeper coal seams.

AIR QUALITY IMPACT ASSESSMENT

The air quality impact assessment undertaken for the project includes a meteorological overview of the area. An emissions inventory was undertaken with the aim of quantifying emissions associated with the activities involved in the mining of coal. The emissions for specific activities such as bulldozing, blasting, tipping, wind erosion and materials handling activities were calculated, and the cumulative impacts were compared to the relevant ambient air quality standards to determine legal compliance.

The findings reported here is a combination of historical, observed and previously modelled data and provided the background and predicted scenario of various pollutants in the proposed Azcoware MP Project area. The construction and operational phases were assessed. Based on the dispersion modelling simulations, the below conclusions can be summarised for each project phase.

Construction Phase

It is forecasted that the Construction Phase of the Azcoware Project will entail site clearing, removal of topsoil and vegetation, construction of infrastructure, and general transportation and hauling of material. These will have a moderately significant impact on ambient air quality of the sensitive receptors identified for the area, both before and after mitigation.

Operational Phase

Two possible fugitive emission sources are anticipated in the proposed Azcoware area during the Operational Phase. These may impact on the air quality at the relevant environmental sensitive receivers:

1. Dust from material handling inside the pit area.
2. Haul roads; for transporting the ROM to the offsite Processing plant.

These sources were uses as inputs in the AERMOD model as unmitigated and mitigated.

For the unmitigated and mitigated Daily PM10 concentrations it was predicted not to be higher than the 75 µg/m³ limit for any of the sensitive receptors as can be seen in Figure 3-15. This is the highest levels predicted for a 24 hour period within the period. Due to site specific atmospheric conditions these exceedances may still occur within the limit of 4 per year. The annual average PM10 limit of 40 µg/m³ are predicted not to exceed at any of the identified sensitive receptors for the unmitigated or mitigated scenarios.

Table 3-15: PM Concentrations at sensitive receptors

Receptor	PM10 2nd Highest Daily (µg/m³)		PM10 Annual Average (µg/m³)	
	Unmitigated	Mitigated	Unmitigated	Mitigated
1	2.9	1.3	0.1	0.0
2	3.4	1.4	0.1	0.0

Receptor	PM10 2nd Highest Daily (µg/m³)		PM10 Annual Average (µg/m³)	
	Unmitigated	Mitigated	Unmitigated	Mitigated
3	5.5	2.3	0.2	0.1
4	5.1	2.2	0.2	0.1
5	6.6	2.8	0.2	0.1
6	6.6	2.9	0.3	0.1
7	6.3	2.5	0.2	0.1
8	5.2	2.3	0.2	0.1
9	3.6	1.6	0.1	0.1
10	1.9	0.8	0.1	0.0
11	1.7	0.7	0.1	0.0
12	3.5	1.5	0.2	0.1
13	9.5	4.3	0.3	0.1
14	6.3	2.7	0.3	0.1
15	11.8	5.3	0.5	0.2
16	9.6	4.3	0.5	0.2
17	2.5	1.1	0.1	0.0
18	2.3	1.0	0.1	0.0
19	1.9	0.8	0.1	0.0
20	1.5	0.7	0.1	0.0
21	1.7	0.8	0.1	0.0

For Total Dust Fallout (TDF), in the unmitigated and mitigated scenarios, no sensitive receptors are predicted to exceed the monthly dust fallout for the highest month residential limit of 600 mg/m²/day. The predicted annual dust fall out for the unmitigated and mitigated scenarios are not predicted to exceed the annual limit of 300 mg/m²/day at any of the sensitive receptors.

Decommissioning Phase

The Decommissioning Phase will involve the demolition, removal and transportation of any infrastructure which was placed on the site area. This will also include the rehabilitation of the site to pre-mining conditions. During decommissioning, there will be a moderately significant impact on the receptors ambient air quality.

Cumulative Impact

The proposed Azcoware MP Project area is surrounded by other mining areas. These mining operations will also generate fugitive dust and particulate matter emissions. The Azcoware MP Project will contribute to the cumulative air quality impacts of the region.

The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or

region, it is appropriate to consider the cumulative effects of development. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system. Cumulative impacts refer to the incremental effect of several projects that may have an individually minor, but collectively significant, impact on air quality.

There are three separate levels of cumulative impacts considered for the project site: localised cumulative impacts; regional cumulative impacts; and global cumulative impacts.

- **Project site localised cumulative impacts**

These are the cumulative impacts that result from mining operations in the immediate vicinity of the project site. Project site localised cumulative impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers. These include mainly dust deposition. From this air impact assessment conducted for the proposed project the modelling indicates the cumulative pollution plume emanating from this site as a combination of activities and shows that the impacts will be mainly localised around and in the vicinity of the operations.

- **Regional cumulative impacts**

Regional cumulative impacts include the project's contribution to impacts that are caused by mining operations throughout the region. Each mining operation in itself may not represent a substantial impact, however the cumulative effect on air quality in the region may warrant consideration. The coal mining sector in South Africa is growing steadily as the requirement for electricity also grows and therefore this project will also contribute to the larger regional impact that will be experienced.

- **Global cumulative impacts**

The only impact from the project that is potentially global is the generation of potential greenhouse gas emissions. However, the level of emissions from the project represents a very minor and insignificant contribution at this scale.

NOISE IMPACT ASSESSMENT

The potential environmental noise impact on average will be moderate and short term and after the implementation of noise mitigatory measures it will change to low. The impact will be low during the decommissioning phase. The impact will be moderate and short term during the operational phase. The following mining related activities will create a noise increase in the immediate vicinity of the mining activities:

- Pit activities.

IMPACT ASSESSMENT TABLE

Table 3-16: Impact Assessment

Activity	Aspect	Impact	Phase	+/-	SU[1]		+/-	SM[2]		Mitigation measures	Action Plan
Heritage											
Subsurface activity.	Subsurface culturally significant material.	Destruction of subsurface culturally significant material.	Operational	Negative	4	Low	Negative	1,6	Low	Monitor material unearthed.	Monitor subsurface material during development and construction phases and contact a qualified archaeologist should culturally significant material be observed.
Site establishment.	Clearance of the site	Destruction of culturally significant material.	Construction and development.	Negative	48	Med	Negative	38,4	Low-Med	Avoid heritage sites when encountered.	Monitor subsurface material during development and construction phases and contact a qualified archaeologist should culturally significant material be observed. Apply for permits to demolish or move sites of cultural significance.
Palaeontological											
Subsurface activity.	Subsurface palaeontological significant material.	Destruction of palaeontological significant material.	Construction and Operational	Negative	4	Low	Negative	1,6	Low	Monitor unearthed material & adhere to the Fossil Chance Find Protocol when material of palaeontological significance is found.	Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were NO FOSSILS on surface of the project footprint. Since there is a chance that fossils from the Vryheid Formation may occur below ground and be disturbed a Fossil Chance Find Protocol has been added to the EMPr.
Noise											
Construction and clearing activities.	Offloading of construction materials; Excavations and backfilling where required; Concrete mixing and batching; Use and maintenance of roads; Machinery noise from construction	Increased Noise levels	Construction	Negative	10	Low	Negative	6	Low	Construct a Noise Barrier between the main noise source noise sensitive receivers Equipment Maintenance Implement Road rules.	• A noise barrier in the form of a berm, tree break or similar noise fence should be constructed on the mine boundary • Construction and mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. • Fixed noise producing sources such as generators, pump stations and crushers to be to be either housed in enclosures or barriers put up around the noise source void the use of engine compression brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to

[1] Significance unmitigated
[2] Significance mitigated

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
	related activities.										noisier equipment. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads.
Operational Activities.	Use and maintenance of haul roads (incl. transportation of material to site and offsite), Removal of material (mining process) and stockpiling, Machinery and excavation noise, Trucks clearing their load bins before loading, Vehicle travelling to and from site on a daily basis.	Increased Noise levels.	Operation	Negative	48	Med	Negative	28,8	Low-Med	Construct a Noise Barrier between the main noise source noise sensitive receivers. Equipment Maintenance Implement Road rules.	• A noise barrier in the form of a berm, tree break or similar noise fence should be constructed on the mine boundary • Construction and mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. • Fixed noise producing sources such as generators, pump stations and crushers to be to be either housed in enclosures or barriers put up around the noise source void the use of engine compression brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads.
Decommissioning activities	Demolition & Removal of all infrastructure (incl. transportation off site), Reshaping of the area that was mined, Rehabilitation - spreading of soil, re-vegetation & profiling/contouring with heavy machinery, Aftercare and maintenance of rehabilitated areas.	Increased Noise levels.	Closure and Decommissioning.	Negative	20	Low-Med	Negative	12	Low	Equipment Maintenance Implement Road rules.	• mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. Avoid the use of engine compression brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment.
Ecological Impacts											
Construction and operational activities.	Work Revetments New access	Flow alterations due to erosion	Construction and Operation.	Negative	48	Med	Negative	9,6	Low	• Rehabilitation of the disturbed areas; • Limiting instream sedimentation; • Minimising pollutants entering the	• Design and implementation of a suitable stormwater system; • Implement a programme for the clearing/eradication of alien species including long term control of such species;

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
	routes Site clearing for opencast area Placement of cleared topsoil into allocated stockpiles Use of heavy machinery Increased traffic Bank erosion.	and sedimentation .								watercourse. Erosion control measures must be employed where required.	• Water quality monitoring must take place every month during operational phases; and • A topsoil stripping and stockpiling guideline must be completed to ensure rehabilitation success. • Attenuation measures must include, but are not limited to - the use of sand bags, erosion control blankets, and silt fences. • Long term attenuation measures, such as attenuation/infiltration trenches, swales must be established to control stormwater from hardened surfaces • Vegetation clearing must be undertaken as and when necessary in phases. • Install sediment barriers (silt catchers and Reno mattresses) along any drainage areas to prevent the migration of silt. • Exposed soils must be rehabilitated as soon as practically possible to limit the risk of erosion. • All roads need to be maintained and any erosion ditches forming along the road filled and compacted. • Demarcate wetland areas to avoid unauthorised access. • No washing of any equipment in close proximity to a watercourse is permitted. • No releases of any substances that could be toxic to fauna or faunal habitats within the channels or any watercourses is permitted. • Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities • Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. The general consensus is that they should be within 30 m to 50 m of a work face • Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas.
Construction and operational activities.	Increased traffic leading to potential accidental spills of hydrocarbon materials Hazardous materials entering the watercourses Acid Mine Drainage Increased road runoff during rainfall events.	Pollution of watercourses.	Construction, Operation	Negative	56	Med	Negative	22,4	Low-Med		
Construction and operational activities.	Increased runoff from hardened surfaces Further spread of plants and seedlings Increased traffic.	Spread of alien vegetation.	Operational, Closure and Decommissioning.	Negative	56	Med	Negative	11,2	Low		
Construction and operational activities.	Construction and operational activities	Loss of Species of Conservation Concern	Operational, Closure and Decommissioning.	Negative	16	Low	Negative	6	Low	• Search and rescue for reptiles and other vulnerable species, before areas are cleared; • Environmental induction for all staff and contractors on-site. • Any disturbed areas should be rehabilitated in line with the rehabilitation	• Implement an Alien Invasive Management Plan

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
Construction and operational activities.	Construction and operational activities	Loss of indigenous vegetation, floral and faunal habitat and ecological structure of water resources and soil	Operational, Closure and Decommissioning.	Negative	16	Low	Negative	6	Low	guidelines, this includes the clearing of alien vegetation, following the guidelines of a suitable alien invasive plant management plan. • The site must be regularly monitored for re-growth of alien invasive species, and any new seedlings etc. eradicated using methods appropriate for the particular species, whether mechanical, chemical or biological. • Protect as much indigenous vegetation as possible. • An alien invasive management programme must be incorporated into an Environmental Management Programme. • Ongoing alien plant control must be undertaken in the disturbed areas as these areas will quickly be colonised by invasive alien species, especially in the riparian zone, which is particularly sensitive to AIP infestation. • Herbicides must be carefully applied, in order to prevent any chemicals from entering the river. Spraying of herbicides within or near to the wetland areas is strictly forbidden. • Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas directly after mining ceases so as to stabilise against erosion and sedimentation.	
Groundwater											
Surface clearing and preparation.	Removal of vegetation.	Increase in surface run-off and therefore decrease in aquifer recharge.	Construction.	Negative	7	Low	Negative	1,4	Low	Re-vegetate.	Rehabilitation plan.
Box cut opening.	Dewatering.	Decrease in water level should the pit floor be lower than the water level.	Construction	Negative	68	Med-High	Negative	68	Med-High	No management can be incorporated to limit the impacts of dewatering should the box-cut floor be lower than the groundwater level.	Quarterly monitoring of monitoring boreholes.

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Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
Topsoil and overburden stockpiling.	Leaching from stockpiles.	Acid generation in the case of carbonaceous material placement.	Operation	Negative	24	Low-Med	Negative	9,6	Low	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes.
ROM stockpiling.	Leaching from stockpiles.	Acid generation as a result of carbonaceous material.	Operation	Negative	24	Low-Med	Negative	9,6	Low	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes.
Pollution Control Dams	Seepage should lining fail or dam overflow.	Contaminated water in the dams can seep to the aquifer.	Operation	Negative	24	Low-Med	Negative	9,6	Low	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes.
Hydrocarbon spills.	Plume migration.	Spills from mining vehicles can infiltrate to the aquifer and cause a down gradient plume migration.	Operation	Negative	14	Low	Negative	2,8	Low	Clean any hydrocarbon spills in the appropriate manner.	Report any hydrocarbon spillage.
Pit dewatering	Dewatering.	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level.	Operation	Negative	85	High	Negative	85	High	No management can be incorporated to limit the impacts of dewatering.	Quarterly Monitoring. Compensate users for losses. Monitor pit inflow rates, Annual Monitoring report, Update Numerical Model.
Topsoil and overburden removal.	Placement of topsoil and overburden into pit.	Carbonaceous material, if any in the overburden, will be placed at the bottom of the pit as to prevent or minimise the exposure to oxygen and potential acid generation.	Closure and decommissioning.	Negative	12	Low	Negative	2,4	Low	Remove the top soil and overburden dumps during rehabilitation. Placement of carbonaceous material at bottom of pit.	Rehabilitation Plan- placement of topsoil and overburden in pit.

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
Backfilling	Reshaping of area.	Adequate backfilling and rehabilitation will decrease aquifer recharge. The period to decant will therefore be prolonged.	Decommissioning	Negative	27	Low-Med	Negative	10,8	Low	Carbonaceous material at deeper base of pit. Rehabilitation to direct surface runoff away from pit and recharge to pit minimized. Flow paths including fracture zones sealed.	Refer to rehabilitation plan.
Revegetation.	Reshaping of area and revegetating the area.	Increase surface runoff over the rehabilitated opencast, therefore decreasing aquifer recharge.	Rehabilitation	Negative	5	Low	Negative	1	Low	Remove the ROM stockpile and PCD's. This will eliminate the ROM stockpile and PCD's as potential sources.	Rehabilitation Plan.
Backfilling of pit.	Backfilling of the pit and no more dewatering.	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	Residual.	Negative.	80	High	Negative	80	High	Keep water level in pit lower than level in nearby streams. Maintain water level below decant level (e.g. abstraction). Investigate implementation of cut-off trench.	Abstracted/decant water to be treated or handled in appropriate manner and within legislation. Continue quarterly monitoring post-closure.
Surface Water & Watercourse											
Construction activities	Infrastructure Work revetments New access road	Flow alteration due to erosion and sedimentation	Construction Phase.	Negative.	48	Med	Negative	48	Med	Do not allow surface water or stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection measures being in place.	Long term attenuation measures, such as attenuation/infiltration trenches, swales must be established to control stormwater from hardened surfaces so as to Sustainable Urban Drainage Systems (SUDS): All storm water runoff from the site must be supplemented by an appropriate road drainage system that must include open, grass-lined channels/swales rather than simply relying on

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
	Site clearance for infrastructure and opencast area Topsoil stockpile placement Use of heavy machinery									Exposed soils must be rehabilitated as soon as practically possible to limit the risk of erosion. Erosion control measures must be employed where required.	underground piped systems or concrete V-drains. SUDS will encourage infiltration across the site, provide for the filtration and removal of pollutants and provide for some degree of flow attenuation by reducing the energy and velocity of storm water flows through increased roughness when compared with pipes and concrete V-drains. A topsoil stripping and stockpiling guideline must be completed to ensure rehabilitation success.
Operational activities	Increased traffic Use of heavy machinery Bank erosion	Flow alteration due to erosion and sedimentation	Operational phase	Negative	80	High	Negative	68	Med-high		
Construction activities	Use of heavy machinery using oils and fuels during site clearing Accidental spillages of chemicals, cements, oils, etc.	Pollution of watercourse	Construction Phase.	Negative	70	Med-High	Negative	42	Med	Design and implementation of a suitable stormwater system Rehabilitation of the disturbed areas. Limiting instream sedimentation. Minimising pollutants entering the watercourse; Implement a programme for the clearing/eradication of alien species including long term control of such species; Water quality monitoring must take place every month during operational phases; and	Construct and implement SWMP Wetland monitoring and biomonitoring must take place bi-annually.
Operational activities	Increased traffic leading to potential accidental spills of hydrocarbon materials Increased road runoff during rainfall events	Pollution of watercourse	Operational phase	Negative	80	High	Negative	68	Med-high		
Construction activities	Hazardous materials entering the watercourse Use of heavy machinery Topsoil stockpile Bank trampling leading to erosion	Spread of alien vegetation	Construction Phase.	Negative	55	Med	Negative	44	Med	Ongoing alien plant control must be undertaken, particularly in the disturbed areas as these areas will quickly be colonised by invasive alien species, especially in the riparian zone, which is particularly sensitive to AIP infestation. Herbicides must be carefully applied, in order to prevent any chemicals from entering the river. Spraying of herbicides within or near to the wetland areas is strictly forbidden.	Implement an alien invasive management plan throughout the phases of the development.
Operational activities	Increased runoff from hardened surfaces	Spread of alien vegetation	Operational phase	Negative	70	Med-High	Negative	42	Med		

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
	Increased traffic									Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas.	
Construction activities.	Vegetation clearance and site establishment.	Sedimentation and pollution of the wetland.	Construction Phase.	Negative	33	Low-Med	Negative	13,2	Low	Separate clean and Dirty Water System.	Construct and implement SWMP.
Open pit Mining.	Pit dewatering and drawdown.	Reduction in Baseflow.	Operational Phase	Negative	68	Med-High	Negative	68	Med-High	No mitigation available.	N/A
Pit dewatering.	Reduction to baseflow in the stream.	Reduced Poor Quality Water input.	Operational Phase.	Positive	39	Low-Med	Positive	39	Low-Med	No mitigation required.	N/A
Operational Activities.	Hydrocarbon spills Dirty Water release Sediment runoff.	Water quality deterioration.	Operational Phase.	Negative	60	Med-High	Positive	36	Low-Med	Separate clean and Dirty Water System.	Construct and implement SWMP.
Closure of the mine.	Groundwater rebound.	Decant of poor quality water.	Closure and Decommissioning.	Negative	32	Low-Med	Positive	12,8	Low	Treat decant water before release to the environment.	Establish a Passive treatment system in the form of a constructed wetland or similar.
Air Quality											
Site establishment	Removal of topsoil and vegetation.	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts.	Construction and Operational Phase.	Negative	40	Med	Negative	32	Low-Med	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur Reduce exposure areas Avoid Dust Creation.	Demarcate areas of movement, and avoid areas where movement is not permitted. Topsoil should be re-vegetated. During the loading of topsoil onto trucks or stockpiles, the dropping heights should be minimised. Water or binding agents such as (petroleum emulsions, polymers and adhesives) can be used for dust suppression on earth roads. When using bulldozers and graders, minimise travel speed and distance and volume of traffic on the roads. All stockpiles to be damped down, especially during dry weather or re-vegetated (hydro seeding is a good option for slope revegetation).
Site establishment.	Construction of surface infrastructure.	Fugitive dust (containing TSP (total	Construction and	Negative	40	Med	Negative	32	Low-Med	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur.	Demarcate areas of movement, and avoid areas where movement is not permitted. Dust emitted during bulldozing activity can be reduced by increasing soil

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
		suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts.	Operational Phase.							Reduce exposure areas. Avoid Dust Creation.	dampness by watering the material being removed. Time the blasting with wind to ensure the dust will not be blown to the sensitive receptors. Material need to be removed to dedicated stockpiles to be used during rehabilitation. Apply dust suppressant to roads. Cover Haul trucks with Tarpaulin.
General transportation.	Hauling and vehicle movement on site.	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts.	Construction and Operational Phase.	Negative	40	Med	Negative	32	Low-Med	Avoid Dust Creation Enforce a low Speed limit.	Apply dust suppressant to roads. Cover Haul trucks with Tarpaulin Fit roads with Speed bumps.
Site closure.	Demolition & Removal of all infrastructure.	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as	Decommissioning Phase.	Negative	44	Med	Negative	35,2	Low-Med	The area of disturbance must be kept to a minimum Avoid Dust Creation.	Demolition should not be performed during windy periods (August, September and October). Demarcate areas of movement. Speed restrictions should be imposed and enforced. Exhaust pipes of vehicles should be directed so that they do not raise dust. Hard surfaced haul roads or standing areas should be washed down and swept to remove accumulated dust. Dust suppression of roads being used during rehabilitation should be enforced.

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
		fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts.									
Rehabilitation.	Spreading of soil, revegetation & profiling/contouring.	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts.	Decommissioning Phase.	Negative	56	Med	Negative	44,8	Med	Minimise exposed surface duration The area of disturbance must be kept to a minimum. Avoid Dust Creation.	Revegetation of exposed areas Demarcate areas of movement Spreading of soil must be performed on less windy days. Keep soil moist using sprays or water tanks, using wind breaks. Speed restrictions should be imposed and enforced Exhaust pipes of vehicles should be directed so that they do not raise dust.
Visual											
Construction related activities.	Site Establishment.	Potential visual impact on the viewpoints.	Construction Phase.	Negative	40	Med	Negative	24	Low-Med	The visual impact can be minimized creating a visual barrier.	Creating a Berm between the opencast pits and the road and Planting Indigenous vegetation.
Mining related activities.	Open Pit Mining.	Potential visual impact on Road and Land users.	Operation, Decommissioning and Closure.	Negative	64	Med-High	Negative	38,4	Low-Med	The visual impact can be minimized creating a visual barrier. Minimise areas of operation.	Creating a Berm between the opencast pits and the road and Planting Indigenous vegetation. Perform concurrent rehabilitation as mining progresses.
Social Economic											
Mine establishment.	Mining operations.	Employment and income opportunity.	Construction and Operation Phase	Positive	55	Med	Negative	55	Med	Maximise Employment Opportunities, Skills and Enterprise Development.	Prioritise local labour in the recruitment process as part of the company's own recruitment policy or as part of contractor management plan during operations Put a procurement strategy as well as a contractor management plan (if

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
											relevant) in place to ensure that 100% local employment target in terms of unskilled labour is met. Up-skill the local labour force. Develop a database of goods and services that could potentially be outsourced to the local community. Establish a supplier development programme as part of the Local Economic Development component . Where local contractors are used, put a contractor management plan in place to ensure that the local employment and procurement targets of the operations are met.
Mining operations.	Employee training.	Upskilling of Labour force.	Construction and Operation Phase.	Positive	30	Low-Med	Negative	30	Low-Med	Promote Socio-Economic Development in the Local Area.	Develop an updated Local Economic Plan for the project in consultation with the local community. Some strategic recommendations: Determine whether the current allocation as per the mines MWP is in line with the targets of the Mining Charter of 2018. Monitor and manage the social contribution of multinational suppliers (in-house as well as suppliers to contractor and direct service providers).
Mining operations.	Coal production and sales.	Increased Public revenue.	Construction and Operation Phase.	Positive	36	Low-Med	Negative	36	Low-Med		
Mining operations.	Social Development Plan.	Increase in Local Economic Development Funds.	Construction and Operation Phase.	Positive	36	Low-Med	Negative	36	Low-Med		
Mining operations.	Employment creation.	Project Induced In-Migration.	Construction and Operation Phase.	Negative	32	Low-Med	Negative	25,6	Low-Med	Minimise Impacts of Project- Induced In-Migration.	The local labour procurement strategy as well as proof of residence required should be clearly communicated in the local community and broader regional media well in advance of the construction phase. The communication strategy should ensure that unrealistic employment expectations are not created. Ensure that foreign (outside) workers reside in suitable facilities and do not establish informal houses. Information distributed as part of the existing HIV/Aids awareness campaigns undertaken in the area should again be focused on and communicated to the local workforce. The general health of workers should be monitored on an on-going basis Establish a forum, with representatives of the mine and local stakeholders for discussing potential issues of community conflict. The area should be fenced off and security measures should ensure that no squatters are allowed on the mining right area. The relevant actions related to this objective should form of the a contractor management plan.
Mining operations.	Increased traffic Mining related hazards Increased dust Water quality deterioration Historical subsidence Blasting.	Safety and Health Risks.	Construction and Operation Phase.	Negative	44	Med	Negative	26,4	Low-Med	Minimise Safety and Health Risks.	Permanent security personnel should be on site. The mining area must be fenced with electrical fencing and access to the area should be controlled to avoid animals or people entering the area without authorisation. Speed limits on the local roads surrounding the mining sites should be enforced The mining area should be equipped with surveillance around its perimeter. A Health and Safety Plan should be implemented and it must be ensured that all managers are qualified in First Aid and other relevant safety courses. Ensure that a proper emergency plan that fits with the Municipal Disaster Management Plan is in place.

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
											Implement a HIV/AIDS awareness programme with specific focus on communities in and nearby the mining areas, as well as on the mine employees. Fire-fighting equipment should be on site and should be in a good working condition. All mining vehicles should be in a good condition and adhere to the road worthy standards. Access from haul roads and internal mine roads to local main roads should be in line with the road standard and requirements to accommodate the traffic load and traffic patterns. The mine to provide workers without transport with mine transport to and from work, with a safe off-loading site inside the mine premises. Adhere to air pollution management plan to minimize health hazards related to coal dust particles and noxious gases. Adhere to groundwater and surface water management measures to prevent any negative impacts on health due to ground or surface water pollution Suitable safety measures should be implemented to avoid subsidence.
Mining operations	Open pit establishment	Change in sense of place	Construction and Operation Phase	Negative	36	Low-Med	Negative	36	Low-Med	Minimise Negative Impacts of Nuisance Factors (Noise and Dust). Minimise Negative Impacts from Blasting Activities.	The mitigation measures of the Noise and Air Quality Impact Assessments are relevant. Dust suppression measures should be applied if and when necessary. Limit the number of haul roads to limit dust creation. Operational mining activities with potential noise impacts should be mitigated and should not be undertaken during night time. Noise generating activities should thus be kept to normal working hours (e.g. 7 am until 5 pm) where possible. Heavy machinery and heavy vehicles should be kept in a good working order. Also, ensure that all vehicles and equipment comply with generally accepted noise levels and noise abatement regulations. Personnel should be equipped with the necessary noise protection equipment I&AP forum needs to be established to discuss and address issues of concern. Quarterly meetings are advised. The Mine to maintain a complaints register for regular update as well as keep minutes of community forum meetings. Feedback should be provided on issues registered and resolved. The mitigation measures of the Blasting Report are relevant. These include but is not limited to: • Use a qualified blasting expert. • Close the provincial road during blasting in consultation with the relevant authority. • Monitor noise levels from blasting to ensure it is not exceeded. • Establish a baseline of the structural condition of relevant structures (houses and public infrastructure) within a 1km radius of the operation. Inspect the structures on a 6 monthly basis or at public request. • Notify all I&APs an hour before blasting takes place. • Conduct blasting in working hours (e.g. between 6:00 and 18:00).
Mining operations.	Mine closure.	Job losses.	Decommissioning and Closure.	Negative	75	Med-High	Negative	45	Med	Minimise the negative economic impacts related to mine closure.	Develop mechanisms to assist employees, prior to retrenchment date in the transition phase after closure of the operations including portable skilled development programmes during the operational phase of the mine, providing

Activity	Aspect	Impact	Phase		SU[1]			SM[2]		Mitigation measures	Action Plan
Mining operations.	Mine Closure.	Decrease/termination of community investment funds and support to local communities.	Decommissioning and Closure.	Negative	70	Med-High	Negative	42	Med		assistance in accessing available and suitable jobs with other local mines or companies etc. Focus on non-core related local supply links during the operational phases of the mine to facilitate easier transitioning of local suppliers to other costumers Plan community projects with an exit strategy of which beneficiaries are aware of. The risk of ADM should be mitigated as per the ground water management plan. Rehabilitate mining area as soon as possible to prevent to prevent high losses in agricultural potential. Investigate the potential for a housing development as a high value post-closure land-use as well as a community priority as part of a final rehabilitation plan.
Mine Closure.	Water quality deterioration Historical subsidence.	Safety and Health Risks.	Decommissioning and Closure.	Negative	48	Med	Negative	28,8	Low-Med		

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

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

Table 3-17: Impact Criteria and Assigned Rating

Intensity (Magnitude)		ASSIGNED QUANTITATIVE SCORE
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it has a significant, moderate or insignificant		
(L)OW	The impact alters the affected environment in such a way that the natural processes or functions are not affected.	**1**
(M)EDIUM	The affected environment is altered, but functions and processes continue, albeit in a modified way.	**3**
(H)IGH	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.	**5**
Duration		
The lifetime of the impact, that is measure in relation to the lifetime of the proposed development.		
(S)HORT TERM	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.	**1**
(SM) SHORT - MEDIUM TERM	The impact will be relevant through to the end of a construction phase.	**2**
(M)MEDIUM	The impact will last up to the end of the development phases, where after it will be entirely negated.	**3**
(L)ONG TERM	The impact will continue or last for the entire operational lifetime (i.e. exceed 20 years) of the development, but will be mitigated by direct human action or by natural processes thereafter.	**4**
(P)ERMANENT	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact is transient.	**2**
Spatial Scale/Extent		
Classification of the physical and spatial aspect of the impact		
(F)OOTPRINT	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.	**1**
(S)ITE	The impact could affect the whole, or a significant portion of the site.	**2**

(R)EGIONAL	The impact could affect the area including the neighbouring Farms, the transport routes and the adjoining towns.	**3**
(N)ATIONAL	The impact could have an effect that expands throughout the country (South Africa).	**4**
(I)NTERNATIONAL	Where the impact has international ramifications that extend beyond the boundaries of South Africa.	**5**
Probability		
This describes the likelihood of the impact actually occurring. The impact may occur for any length of time during the life cycle of the activity. The classes are rated as follows:		
(I)MPROBABLE	The possibility of the Impact occurring is none, due to the circumstances or design. The chance of this Impact occurring is zero (0%)	**1**
(P)OSSIBLE	The possibility of the Impact occurring is very low, due either to the circumstances or design. The chance of this Impact occurring is defined as 25% or less	**2**
(L)IKELY	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of Impact occurring is defined as 50%	**3**
(H)IGHLY LIKELY	It is most likely that the Impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.	**4**
(D)EFINITE	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.	**5**
Weighting Factor		
Subjective score assigned by Impact Assessor to give the relative importance of a particular environmental component based on project knowledge and previous experience. Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance		
(L)OW		**1**
LOW- MEDIUM		**2**
MEDIUM (M)		**3**
MEDIUM-HIGH		4
HIGH (H)		5
Mitigation Measures and Mitigation Efficiency		
Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures		

Mitigation measures were recommended to enhance benefits and minimise negative impacts and address the following:

Mitigation objectives: what level of mitigation must be aimed at: For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make "educated guesses" based on professional experience;

Recommended mitigation measures: For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided;

Effectiveness of mitigation measures: The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible; and

Recommended monitoring and evaluation programme: The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented.

The management objectives, design standards, etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits. National standards or criteria are examples, which can be stated as mitigation objectives.

HIGH	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.	**0.2**
MEDIUM-HIGH	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.	**0.4**
MEDIUM	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.	**0.6**
LOW -MEDIUM	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.	**0.8**
LOW	The impact will be mitigated to the point where it is of limited importance.	**1.0**

Table 3-18: Description of bio-physical assessment parameters with its respective weighting

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2		Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4		Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

Table 3-19: Significant Rating Scale Without Mitigation

Potential Impacts Without Mitigation Measures (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

SIGNIFICANT RATING EQUATION

Significant Rating (SR) = (Extent + Intensity + Duration) x Probability

S=0	**INSIGNIFICANT**	The impact will be mitigated to the point where it is regarded as insubstantial.
SR < 30	**LOW (L)**	The impact will be mitigated to the point where it is of limited importance.
20<SR<39	**LOW- MEDIUM**	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels;
40> SR < 59	**MEDIUM (M)**	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
60<SR>79	**MEDIUM-HIGH**	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
80<SR > 100	**HIGH (H)**	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

Table 3-20: Significant Rating Scale with Mitigation

Potential Impacts with Mitigation Measures (WM) –

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it will be necessary to re-evaluate the impact.

SIGNIFICANT RATING WITH MITIGATION EQUATION

Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency.

Or WM = WOM x ME

S=0	**INSIGNIFICANT**	The impact will be mitigated to the point where it is regarded as insubstantial.
SR < 30	**LOW (L)**	The impact will be mitigated to the point where it is of limited importance.
20<SR<39	**LOW- MEDIUM**	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels;
40> SR < 59	**MEDIUM (M)**	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
60<SR>79	**MEDIUM-HIGH**	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
80<SR > 100	**HIGH (H)**	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

3.8.7 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.

Refer to Section 3.8.5 and Impact Assessment Table

Table 3-16.

3.8.8 Possible Mitigation Measure that could be applied and the level of risk

Refer to Section 3.8.5 and Impact Assessment Table

Table 3-16.

3.8.9 Motivation where no alternative sites were considered.

The area is located within the Witbank Coal Field. The site is preferred due to the shallow coal reserve and the site's already modified state (cultivated land). No Alternative mining site locations were considered during the study. The project location was however bound to the current location due to the underlying geology and acceptance of the application for the specific Mining Permit. The Mining Permit is dependent on the area chosen being susceptible to possible coal deposits and therefore no alternative site could be considered. Azcoware Colliery will use the infrastructure of the adjacent Highveld Colliery. The stormwater management infrastructure of the proposed site will be based on the most effective way to handle clean and dirty water separation.

3.8.10 Statement motivating the alternative development location within the overall site.

The Mining Permit is dependent on the area chosen being susceptible to possible coal deposits and therefore no alternative site could be considered. Additionally, Azcoware is planning on using the mining infrastructure of the adjacent Highveld Collieries Mine.

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

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

The same impact ranking criteria and methodology was employed as discussed in Section 3.8.6 of this report.

3.10 ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

Refer to Section 3.8.5 and Impact Assessment Table

Table 3-16..

3.11 SUMMARY OF SPECIALIST REPORTS.

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

List of Studies Undertaken	Recommendations of Specialist Reports	Recommendations that Have Been Included in the EIA Report	Reference to Applicable Section of Report
Archaeological Impact Assessment.	The area demarcated for the mining of coal (Azcoware MP) is located on previously cultivated land that is currently exclusively associated with mining activities. Also, no sites of heritage significance were observed during the site inspection, on historical aerial images or on toparchical maps. The 500 m river buffer, a zone generally associated with a higher heritage site probability, does not intersect the demarcated study area. The study area is therefore not considered to be sensitive from a heritage perspective. The following recommendations are made in terms with the National Heritage Resources Act (25 of 1999) in order to avoid the destruction of heritage remains associated with the area demarcated for development: • The demarcated study area has completely been disturbed by a combination of mining activities and the past cultivation of crops. The area is therefore not considered to be sensitive from a heritage perspective. • Should uncertainty regarding the presence of heritage remains exist, or if heritage resources are discovered by chance, it is advised that the potential site not be impacted and that a qualified archaeologist 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 construction/development phase, 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 contacted (See National Heritage Resources Act, 25 of 1999 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 the South African Heritage Resources Agency.	**X**	This table, Section 3.8.4
Geohydrological Assessment	The proposed mitigation measures for the proposed mining operation are summarised below: • Should fuel spillages occur during the construction phase immediate action is required to minimise the impact on the groundwater regime. No management can be incorporated to limit the impacts of dewatering should the box-cut floor be lower than the groundwater level. • Groundwater levels in the monitoring boreholes should be measured on at least a quarterly interval. Should the water levels of surrounding users be influenced in terms of groundwater level or quality decline, the users should be compensated. Monitor groundwater inflow rates on a monthly basis throughout the mining operation. The groundwater quality in the monitoring boreholes should be analysed on a quarterly basis. Annual reporting on the groundwater qualities and levels should be conducted and submitted to the DWA. The numerical model should be updated once	**X**	This table, Section 3.8.4

List of Studies Undertaken	Recommendations of Specialist Reports	Recommendations that Have Been Included in the EIA Report	Reference to Applicable Section of Report
	more time-series monitoring data (water levels and qualities) are available. Cut-off trenches and passive treatment of contaminated water collected in the trenches downgradient of potential sources should be implemented. • Carbonaceous material should be placed at the deeper base of the opencast pits to allow flooding with groundwater as soon as possible. This will reduce the redox reaction potential as oxygen is excluded from the system. Rehabilitation should occur in such a manner that surface runoff is directed away from the rehabilitated pit and recharge to the pit minimized. Flow paths which include fracture zones should be sealed to reduce inflow of fresh groundwater and outflow of contaminated groundwater. Methods of handling the potential decant should be investigated and may include treatment of polluted water. Passive treatment options should be investigated. The groundwater quality in the monitoring boreholes should continue to be analysed on a quarterly interval basis.		
Wetland and Ecological Impact Assessment. Ecological Impact Assessment	• From the NFEPA database, flat wetlands were identified within the project boundary. During the field survey these wetland areas was confirmed to be a part of the Scrubber Dam. • The Scrubber Dam hasn't been lined and have been seeping water through the walls. This created several pockets of several small artificial wetlands within the area.	**X**	This table, Section 3.8.4
	• The application area falls within the Eastern Highveld Grassland vegetation type. No plant species of conservation concern were identified during the site visit. Riparian plant species were dominated by *Phragmites australis, Cyperus spp.* and *Juncus spp*. • According to the Critical Biodiversity Areas datasets provided by SANBI (2022), the majority of the mining area falls within heavily degraded land. The mining operations does not fall within close proximity to any Important Bird Areas (IBAs). • Although no protected (vulnerable, endangered and critically endangered) species are thought to occur within the area, it is most likely that they would occur within protected areas within close proximity of the study area, but have been fenced off from the transformed areas. • Observed grasses within the area of investigation comprised of *Hyparrhenia hirta* (Thatching grass), *Setaria spp.* and *Pennisetum clandestinum* (Kikuyu grass). • A large number of extensive alien invasive plants were observed onsite, but the dominant alien invasive plants included *Acacia mearnsii* (Black Wattle); *Populas spp.* (Grey and White poplar); *Eucalyptus tereticornis* (Forest red gum) *and Verbena bonariensis* (Tall verbena). • Mammal species that were identified onsite included the yellow mongoose (*Cynictis penicillata*) and ground squirrel (*Xerus spp.*). Bird species included the Helmeted guineafowl (*Numida meleagris*), Swainson's spurfowl (*Pternistis swainsonii*), Laughing dove (*Spilopelia senegalensis*), Indian myna (*Acridotheres tristis*), Fan-tailed widowbird (*Euplectes axillaris*), Southern red bishop (*Euplectes orix*) and Southern masked weaver (*Ploceus velatus*). • No red listed faunal or floral species were observed during the site visit. All expected faunal species are listed in Appendix A for QDS 2529CC. Though very unlikely, according to this QDS data by SANBI the Black-footed Cat (Felis nigripes) and the Leopard (Panthera pardus) listed as	**X**	This table, Section 3.8.4

List of Studies Undertaken	Recommendations of Specialist Reports	Recommendations that Have Been Included in the EIA Report	Reference to Applicable Section of Report
	Vulnerable (2016) and Swamp Musk Shrew (Crocidura mariquensis) and Serval (Leptailurus serval) listed as Near Threatened (2016), are thought to occur within this area. • The whole area survey could be considered as a low sensitive area as a result of the extensive transformed landscape from industrial development, mining and agricultural activities within the area. • It is highly recommended that the following is implemented: Proper design and construction of a suitable stormwater systems; Rehabilitation of the disturbed areas; Limiting instream sedimentation; Minimising pollutants entering any watercourses; Fixing any leakages from pipelines and dams; and Implement a programme for the clearing/eradication of alien species including long term control of such species of such species		
Paleontological Impact Assessment	Based on the fossil record but confirmed by the site visit and walk through there are NO FOSSILS of the Glossopteris flora on the surface even though fossils have been collected and recorded from rocks of a similar age and type in South Africa. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a chance that fossils may occur in below the ground surface in the shales of the Vryheid Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once mining, excavations or drilling have commenced, then they should be rescued and a palaeontologist called to assess and collect a representative sample.	**X**	This table, Section 3.8.4
Air Quality Impact Assessment	• It is recommended that ambient air quality monitoring be established to get a baseline condition prior to the onset of the operations and in order to establish the level at which the proposed operations are noted to impact on the ambient air quality. • Fallout monitoring should be continued for the life of mine to better assess the level of nuisance dust associated with both mining and process related operations. Sampling of fallout should be undertaken within the neighbouring areas as well as on-site. Dust fallout monitoring is recommended at the locations as shown in **Error! Reference source not found.** Figure 21 of the AQ Assessment Report in the attached annexures. • If it is found that dust levels are measured to be exceeding limits, it is highly recommended to establish a Real-Time indicative monitoring network to quantitatively help identify the sources and to assist in the management of the mitigation of these sources.	**X**	This table, Section 3.8.4

3.12 ENVIRONMENTAL IMPACT STATEMENT

3.12.1 Summary of the key findings of the environmental impact assessment;

The most significant impacts after mitigation and with a cumulative medium to high significance are:

Table 3-21: Summary of key findings

Activity	Aspect	Impact	Phase	÷	SU	÷	SM
Groundwater							
Box cut opening.	Dewatering.	Decrease in water level should the pit floor be lower than the water level.	Construction	Negative	Med - High	Negative	Med - High
Pit dewatering	Dewatering	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level.	Operation	Negative	High	Negative	High
Backfilling of pit	Backfilling of the pit and no more dewatering.	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	Residual	Negative	High	Negative	High
Surface Water and Wetlands							
Open pit Mining	Pit dewatering and drawdown	Reduction in Baseflow.	Operation	Negative	Med - High	Negative	Med - High
Operational activities	Operational activities	Flow alteration due to erosion and sedimentation	Operation	Negative	High	Negative	Med - high
Operational activities	Operational activities	Pollution of watercourse	Operation	Negative	High	Negative	Med - high
Social Economic							
Mine establishment	Mining operations	Employment and income opportunity.	Construction and Operation Phase	Positive	Med	Negative	Med
Mining operations	Mine closure	Job losses.	Decommissioning and Closure	Negative	Med - High	Negative	Med
Mining operations	Mine Closure	Decrease/termination of community investment funds and support to local communities.	Decommissioning and Closure	Negative	Med - High	Negative	Med

3.12.2 Final Site Map

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

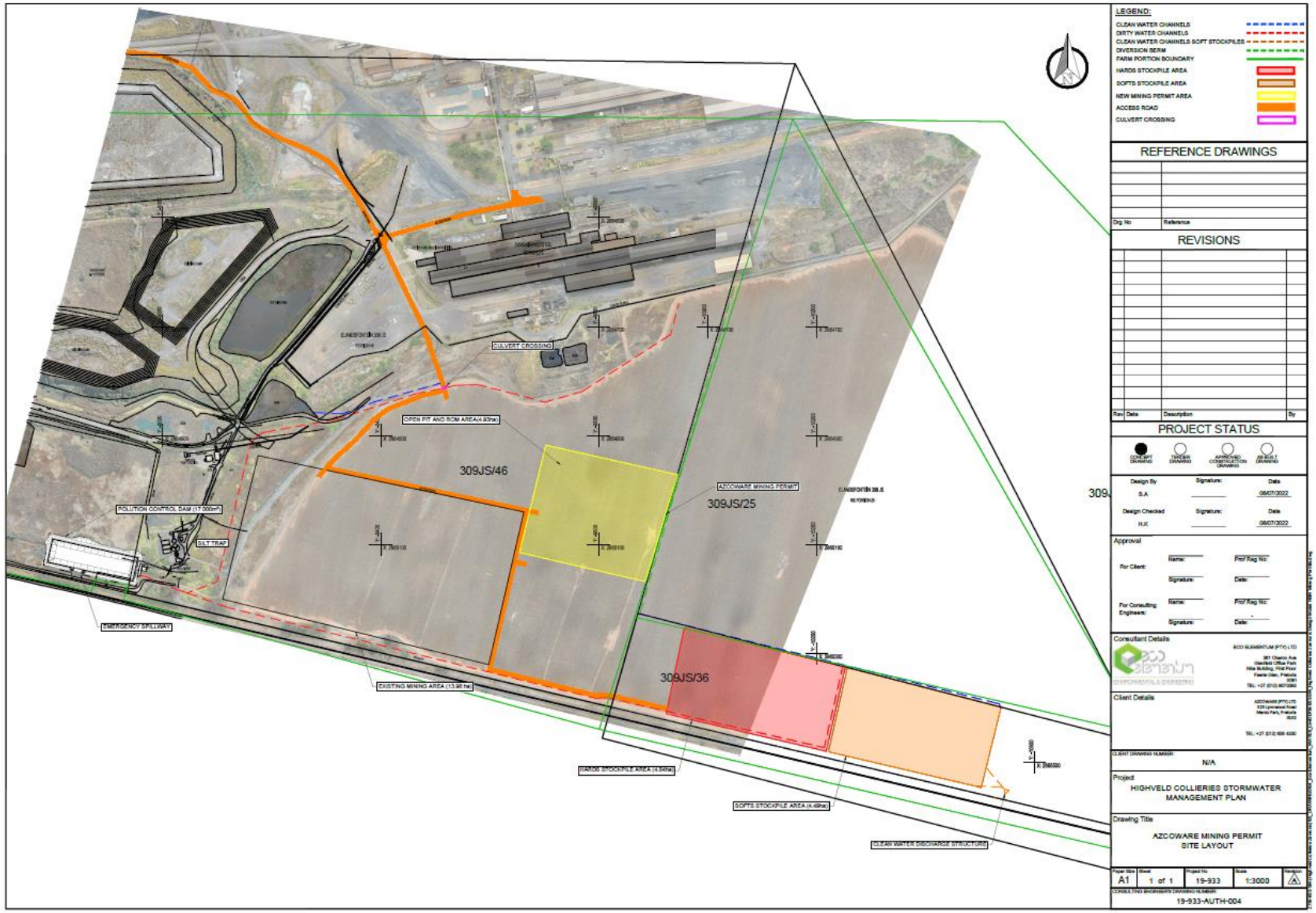

Figure 3.34: Proposed alternative mining layout

3.12.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

Description	Advantages	Disadvantages
Mining Alternatives		
Mining on cultivated area.	• Remaining coal resources can be optimally extracted and benefited from financially. • Additional job creation.	• Production from cultivate land will be compromised for the duration of the operation until rehabilitation has established the area to pre-mining conditions.
The no go option of not mining.	• Area remains a modified cultivated land to some degree and agricultural practises continue.	• Loss of remaining coal resources and the financial gain from mining it. • No additional jobs will be created.

3.13 PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR;

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

The objectives of impact mitigation and management are to:

- Primarily pre-empt impacts and prevent the realisation of these impacts - PREVENTION.
- To ensure activities that are expected to impact on the environment are undertaken and controlled in such a way so as to minimise their impacts – MODIFY and/or CONTROL.
- To ensure a system is in place for treating and/or rectifying any significant impacts that will occur due to the proposed activity – REMEDY.
- Implement an adequate monitoring programme to:
    - Ensure that mitigation and management measure are effective.
    - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
    - Reduce duration of any potential negative impacts.

Environmental impact management outcomes are:

- Efficient groundwater recharge.
- Record of Groundwater Levels.
- Limit of the extent of contamination plume.
- Prevention of groundwater pollution.
- Fair compensation for loss of groundwater.
- Prolong period before decanting and allow for decant to be of an acceptable quality.
- Minimised impact on aquifer recharge.
- Maintenance and improvement of water quality in the watercourse.
- Limited noise disturbance.
- No soil erosion on site.
- No soil compaction in areas outside of the construction / operation area.
- Preservation of topsoil and seed bank.
- No soils pollution occurrence.
- Offset of agricultural areas for sustainable co-existence.

- Minimal dust nuisance.
- Minimise the cumulative impact on sense of place.
- Maintenance and conservation of heritage resources.
- Increased employment in the local community.
- Improved economic status locally.
- health and safety issues within the community remain the same or improve.
- Social uplifting of neighbouring communities.

3.14 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION.

- Adhere to all recommendation and management measures contained in the EMP.
- All relevant permits and authorisation must be obtained prior to construction commencing.
- Adhere to all monitoring requirements.
- A water use license must be obtained prior to any water uses undertaken on site.
- Because 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 contacted.
- From a palaeontological perspective – the possibility exists that fossiliferous significant material (plants, insects, bone, coal) may be exposed during the development (construction & operational phase). These materials generally occur below the surface and is of palaeontologic significance. In cases where such material is found, all activities must be suspended pending further palaeontological investigations by a qualified palaeontological scientist.
- Methods of handling the potential decant should be investigated, approved, and set in place prior to mine closure.
- All acoustic screening measures must be in place before commissioning the mining activities.
- No off-road driving, hunting, poaching, or fires should be permitted on the property.
- An incident and complaints register must be present on site and submitted to the Municipality on quarterly basis.
- The applicant must have dust fallout monitoring points around the proposed mining area and have the monitoring reports submitted to the Municipality on quarterly basis.
- The mining layout proposed in this report should be considered with the diversion of clean surface water from the top of the wetland catchment to the depression in the south through berms or cut-off trenches.

3.15 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE.

Groundwater

The following knowledge gaps, limitations and assumptions apply to the study area in terms of the groundwater study:

- No information on the status of the neighbouring mining activities were available. The impacts and inter-mine interactions can therefore not be determined.
- No site-specific information regarding groundwater users, aquifer hydraulics, groundwater quality is available for the project site.
- No acid-base analysis were performed and the mining activities were regarded as acid generating.

3.16 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

3.16.1 Reasons why the activity should be authorized or not.

The EAP believes that the authorisation for the activity on the portion of Portion 46 of the Farm Elandsfontein 309 should be granted. The site area is located in a modified area and is in close proximity of other mining operations. The risks of the proposed mining activity are minimal and can be mitigated by following the mitigation measures stipulated in the EMP, which will reduce impacts significantly to acceptable levels.

3.16.2 Conditions that must be included in the authorisation

- Adhere to all recommendation and management measures contained in the EMP.
- All relevant permits and authorisation must be obtained prior to construction commencing.
- Adhere to all monitoring requirements.
- A water use license must be obtained prior to any water uses undertaken on site.
- Because 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 contacted.
- From a palaeontological perspective – the possibility exists that fossiliferous significant material (plants, insects, bone, coal) may be exposed during the development (construction & operational phase). These materials generally occur below the surface and is of palaeontologic significance. In cases where such material is found, all activities must be suspended pending further palaeontological investigations by a qualified palaeontological scientist.
- Methods of handling the potential decant should be investigated, approved, and set in place prior to mine closure.
- All acoustic screening measures must be in place before commissioning the mining activities.
- No off-road driving, hunting, poaching, or fires should be permitted on the property.
- An incident and complaints register must be present on site and submitted to the Municipality on quarterly basis.
- The mining layout proposed in this report should be considered with the diversion of clean surface water from the top of the wetland catchment to the depression in the south through berms or cut-off trenches.

3.17 THE APPLICANT MUST HAVE DUST FALLOUT MONITORING POINTS AROUND THE PROPOSED MINING AREA AND HAVE THE MONITORING REPORTS SUBMITTED TO THE MUNICIPALITY ON QUARTERLY BASIS.PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED.

3 Years.

3.18 UNDERTAKING

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

For the undertaking refer to Part B: EMP.

3.19 Financial Provision

CALCULATION OF THE MINE CLOSURE QUANTUM - OPENCAST								Version 1.0: Annual Mine Closure Quantum Update for 2022
Mine: Azcoware (Pty) Ltd – Mining Permit MP 30/5/1/1/3/13324 MP				Province: Mpumlanga				
Evaluators: Eco Elementum (Pty) Ltd				Date: July 2022				
General Information	Risk Class	High (A)	PROPOSED OPENCAST MINING PERMIT AREA					
	Environmental Sensitivity	Medium						
	WF 1: Nature of Terrain Weighting Factor	Flat 1.00						
	WF 2: Proximity to Urban Area Weighting Factor	1.05						
Component No	Main Activities Itemized Descriptions	[B] CPI Adjusted STEP 4.3	[A] Quantity STEP 4.5	Units	[C] Multiplication STEP 4.3	[D] Weighting Factor 1: STEP 4.4	Sub Totals [E = A*B*C*D]	NOTES & SUPPORTING EXPLANATIONS
1	Dismantling of processing plant and structures	R 16,33	0,00	m3	1,00	1,00	R 0,00	Mobile Crushing and Screening Plant
2(A)	Demolition of steel buildings and structures	R 227,49	0,00	m2	1,00	1,00	R 0,00	Mobile container type structres only
2(B)	Demolition of reinforced concrete buildings and structures	R 335,25	44,00	m2	1,00	1,00	R 14 751,11	The proposed operation will make use of the neighboring mine's mobile offices, weighbridge and silt trap, but will share in the closure cost as well.
3	Rehabilitation of access roads	R 40,71	262,47	m2	1,00	1,00	R 10 684,95	Gravel roads L:87.49m x W:6m = 524.94m2 (Share access road with neighboring mine) = 524.94m2 / 2 = 262,47m2
4(A)	Demolition and rehabilitation of electrified railway lines	R 395,12	0,00	m	1,00	1,00	R 0,00	n/a
4(B)	Demolition and rehabilitation of non-electrified railway lines	R 215,52	0,00	m	1,00	1,00	R 0,00	n/a
5	Demolition of housing and facilities	R 454,99	0,00	m2	1,00	1,00	R 0,00	Mobile offices mainly, minimal permanent structures on site
6	Opencast rehabilitation including final voids and ramps	R 231563,75	3,20	ha	0,52	1,00	R 385 322,08	
7	Sealing of shafts, adits and inclines	R 122,13	0,00	m3	1,00	1,00	R 0,00	n/a
8(A)	Rehabilitation of overburden and spoils	R 159 005,51	0,700	ha	1,00	1,00	R 111 303,86	All overburden and spoils to be shaped, grassed and seeded
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	R 198 038,49	0,00	ha	1,00	1,00	R 0,00	n/a
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	R 575 197,64	0,150	ha	0,80	1,00	R 69 023,72	Carbenaceous material footprints to be rehabilitated for e.g. stockpiling areas. RoM area shared with the adjacent mine. RoM situated in the pit
9	Rehabilitation of subsided areas	R 133 143,17	0,00	ha	1,00	1,00	R 0,00	n/a
10	General surface rehabilitation, including grassing of denuded areas	R 38 824,10	3,66	ha	1,00	1,00	R 142 096,21	Entire disturbed footprint
11	River diversions	R 125 959,18	0,00	ha	1,00	1,00	R 0,00	n/a
12	Fencing	R 143,68	100,00	m	1,00	1,00	R 14 367,97	Main farm fences to remain – mining complex fencing to be removed
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater, including treatment, when required)	R 47 893,23	0,85	ha	0,67	1,00	R 27 275,19	All carbenaecous areas to be accounted for: Item 8A + 8C
14	2 to 3 years of maintenance and after care	R 16 762,63	3,66	ha	1,00	1,00	R 61 351,22	Entire disturbed footprint
15	Specialist study	R 45 000,00	1,00	report	1,00	1,00	R 45 000,00	GNR 1147 Specialist Study
						Subtotal (1 to 15 above)	R 881 176,31	
	Subtotal 1			Weighting Factor 2		1,05	R 925 235,12	
1	Preliminary and General				12% of Subtotal 1 if less than R100mil 6% of Sub Total 1 if more than R100mil		R 111 028,21	
2	Contingency				10% of Sub Total 1		R 92 523,51	
					Subtotal 2 (Subtotal 1 plus sum of management and contingency)		R 203 551,73	
					Subtotal 3		R 1 128 786,85	
					GRAND TOTAL (Subtotal 3 plus 15% VAT)		R 1 298 104,87	

3.19.1 Explain how the aforesaid amount was derived.

Rates were provided by the DMR for calculation of the financial provision.

A bill of quantity was determined for each of the units and applied to the rates to determine a closure cost per unit. The unit costs determined the category costs and the category costs resulted in a preliminary closure cost also called Sub-Total 1. A contingency of 10% was included on Subtotal 2 to obtain a Financial Liability Cost in Subtotal 3. Finally, a 15% VAT was added to Subtotal 3 to obtain a subtotal 4. Subtotal 3 is regarded as the Final closure liability of the mine.

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

The applicant confirms that this amount will be provided for.

3.20 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

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

3.20.1.1 Impact on the socio-economic conditions of any directly affected person.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an **Appendix D**.

Mining operations.	Employment and income opportunity.	Med -	Med -
Employee training.	Upskilling of Labour force.	Low-Med +	Low-Med +
Coal production and sales.	Increased Public revenue.	Low-Med +	Low-Med +
Social Development Plan.	Increase in Local Economic Development Funds.	Low-Med +	Low-Med +
Employment creation.	Project Induced In-Migration.	Low-Med +	Low-Med +
Increased traffic Mining related hazards Increased dust Water quality deterioration Historical subsidence Blasting.	Safety and Health Risks.	Med -	Low-Med +
Open pit establishment.	Change in sense of place.	Low-Med +	Low-Med +
Mine closure.	Job losses.	Med-High -	Med -
Mine Closure.	Decrease/termination of community investment funds and support to local communities.	Med-High -	Med -
Water quality deterioration Historical subsidence.	Safety and Health Risks.	Med -	Low-Med +

3.20.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act. (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The phase 1 archaeological impact assessment for the proposed mining permit area examined the area and determined that previous agricultural activity disturbed the area. The proposed MP area appears to be located in open veldt that used to be cultivated. Also, no structures or features are visible on any of the historical aerial images, topographical maps or satellite imagery. The demarcated study areas, therefore, appear to be of low significance in terms of heritage remains. However, this can only be verified once a pedestrian survey has been conducted, especially since smaller features, such as burial sites, are not always visible on aerial data source.

3.21 OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT.

Section 24(4) (b) (i) of the Act specifies "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".

The alternatives assessed and the impacts associated with the alternatives assessed have been fully presented in Section 3.8 and Section 3.12.3.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

4. ENVIRONMENTAL MANAGEMENT PROGRAMME

4.1 DETAILS OF THE EAP

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

Name of The Practitioner: Marungwane Ramashapa

Tel No.: 012 807 0383

e-mail address: Maru@ecoe.co.oza

4.2 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Azcoware intends to mine coal resources on a 5ha portion of portion 46 of the farm Elandsfontein 309 JS. The resource will be mined via opencast roll over mining. The following activities will be undertaken on site:

- Box cut opencast mining with a roll over rehabilitation sequence;
- Mobile crushing and screening of the ROM coal in the pit.

The adjacent Highveld Colliery will provide Azcoware with their infrastructure needs, including:

- Hauling, access road, haul road;
- Mobile office;
- Mobile sanitation and change house;
- Mobile fuel storage;
- Pollution control facility/dam(s);
- Clean and dirty water separation system;
- Topsoil, subsoil, overburden, ROM stockpiles;
- Weighbridge;
- Waste management;

Site Preparation

Site preparation mainly deals with the stripping and stockpiling of topsoil prior to the mining activities commencing as this might affect the quality and quantity of available valuable topsoil resources. The main objectives of soil management are to:

- Minimal removing and stockpiling of topsoil due to historical mining activities;
- Optimise the preservation and recovery of topsoil for rehabilitation;
- Identify soil resources and stripping guidelines;
- Identify surface areas requiring stripping (to minimise over clearing);
- Manage topsoil reserves to not degrade the resource;
- Identify stockpile locations and dimensions; and
- Identify soil movements for rehabilitation use.

In accordance with the objective of providing sufficient stable soil material for rehabilitation and to optimise soil recovery, the following strategies have been adopted:

- Stockpiles to be located outside proposed mine disturbance areas;
- Construction of stockpiles by dozers rather than scrapers to minimise structural degradation;
- Construction of stockpiles with a “rough” surface condition to reduce erosion hazard, improve drainage and promote revegetation; and

- Revegetation of stockpiles with appropriate fertiliser and seed to minimise weed infestation, maintain soil organic matter levels, soil structure and microbial activity and maximise the vegetative cover of the stockpile depending on the exposure timeframes.

Disturbance areas will be stripped progressively (i.e. only as required) to reduce erosion and sediment generation, to reduce the extent of topsoil stockpiles and to utilise stripped topsoil as soon as possible for rehabilitation. Rehabilitation of disturbed areas (i.e. roads, embankments and stripped mining footprint) will be undertaken as practicable after these structures are completed or as areas are no longer required. Soil surveys over the open cut area, beneath proposed mine waste emplacements and other infrastructure areas will determine the depth of topsoil. It should be noted that it is important that for topsoil recovered from the areas it is required that underlying material is not inadvertently collected since it is unsuitable for reuse in rehabilitation.

A general protocol for soil handling is presented below and includes soil handling measures which optimise the retention of soil characteristics (in terms of nutrients and micro-organisms) favourable to plant growth:

- The surface of the completed stockpiles will be left in a “rough” condition to help promote water infiltration and minimise erosion prior to vegetation establishment;
- Topsoil stockpiles to have a maximum height of 3 m to limit the potential for anaerobic conditions to develop within the soil pile;
- Topsoil stockpiles to have an embankment grade of approximately 1V:4H (to limit the potential for erosion of the outer pile face);
- Topsoil stockpiles will be seeded and fertilised; and
- Soil rejuvenation practices will be undertaken if required prior to re-spreading as part of rehabilitation works.

Box Cut Opencast Mining with a Roll-over Rehabilitation Sequence

Opencast mining using the truck and shovel lateral sequential rollover mining method will be undertaken. Mining will commence from the initial box cut. A haul road that will be extended from the nearby existing road will be used as access to the mining area.

The soft overburden will be removed by mechanical methods. The hard overburden will be drilled and blasted and then removed by mechanical methods. The coal will be drilled and blasted prior to removal.

Replacement of overburden materials into the mining pit will be according to the following sequence:

1. Placement of hard overburden at base of pit;
2. Placement of soft overburden; and
3. Final cover of topsoil (minimum 500 mm).

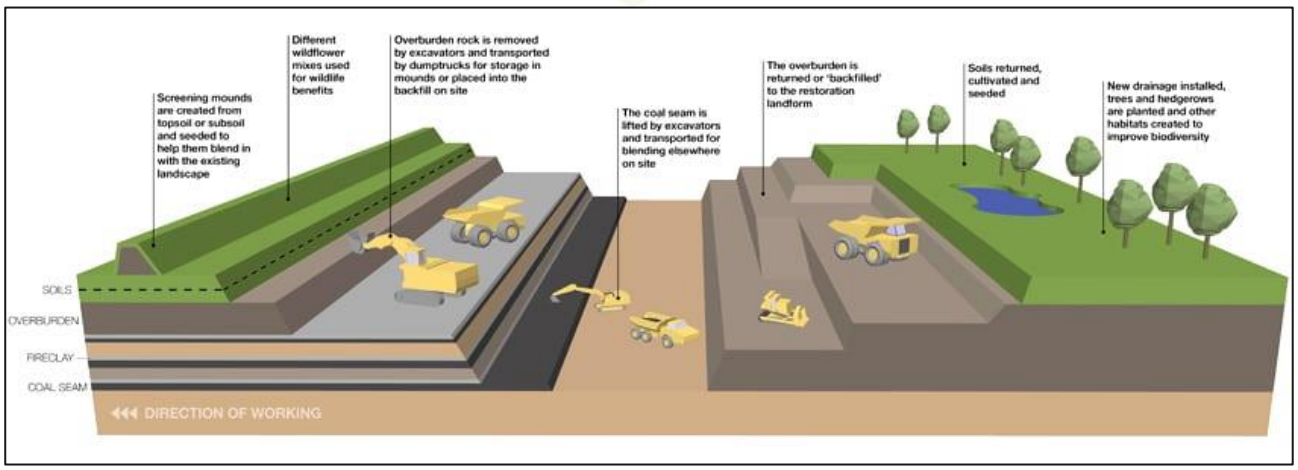

Figure 4.1: Typical Opencast Concurrent Roll Over Rehabilitation Mining Technique

ROM Coal

The Run of Mine (RoM) will be loaded and hauled to the designated off-site beneficiation plant.

Access and Haul Roads Construction

The mine access road will lead off one of the Highveld Industrial Complex roads. The dirt road will be upgraded to the applicable standards which includes a gravel road leading into the mine. The road will be used to access the mine offices, ablution facilities, workshop complex, and mining area. Coal transportation trucks will also use this road to enter and exit the mine premises, including travelling to the weighbridge.

Semi Temporary Site and Security Offices

The site offices for the project, including a small security hut at the entrance of the mining area next to the main entrance road will consist of container-type offices that is commercially available as off the shelve products, as illustrated in the image below. This ensures minimal construction requirements on site and also minimal footprint. Keeping the disturbance area minimal and ensuring ease of mine closure and rehabilitation after life of mine make the temporary offices ideal, especially considering the short duration of the proposed activities and requirement of these offices.

Figure 4.2: Typical semi temporary site offices and security office

Semi Temporary Sanitation and Change House

Similar to the structure indicated in the section above, will the semi temporary sanitation and change house also be container type facilities which can easily be brought to site and also removed after life of mine. For the change house and ablution facility a septic tank system will be implemented which is temporary of nature and can also be decommissioned easily. The septic tank system will ensure a 'honey-sucker' type sewage removal vehicle can remove and dispose of sewage at an appropriate facility off site. This ensures no major construction and approval is required for a full-scale sewage treatment facility. Mobile chemical toilets will also be used where necessary and supplied by an approved contractor who will be responsible for the management of these toilets. Water requirements relating to ablutions and drinking water are expected to be minimal and if water cannot be sourced on site from a borehole it will be brought in by a tanker. The current expectation is that 50 employees will require 45 litre per person per day (litre pp/day) amounting to 2 460 litres per day.

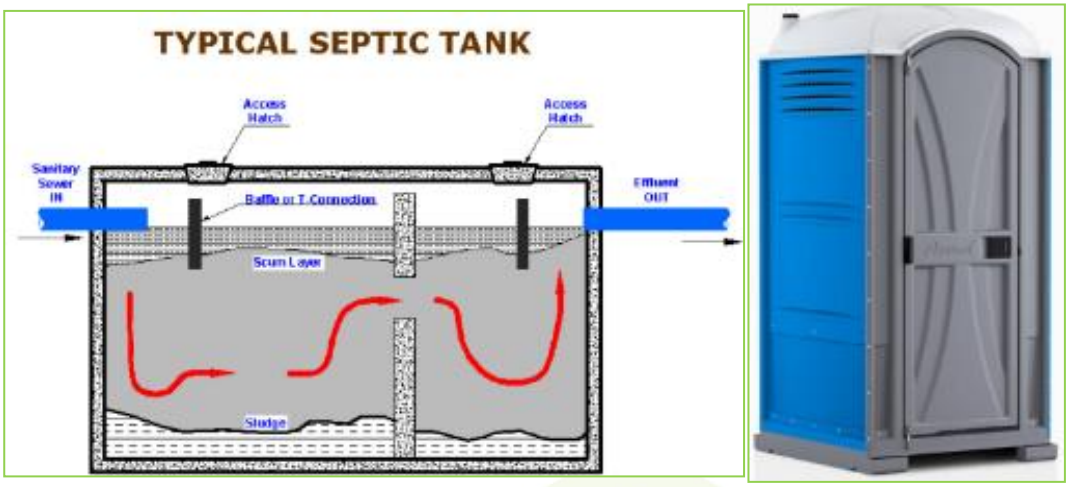

Figure 4.3: Typical septic tank cross section and chemical toilet illustration

Mobile Fuel Storage

The main fuel storage will be diesel in a mobile fuel storage tank with a drip tray designed to hold 110% the capacity of the tanks. The fuel bowser will be stored off site.

Figure 4.4: Typical mobile fuel storage trailer with bunded tray

Pollution Control Facility/Dam (Evaporation and Dust Suppression Usages)

Pollution control dams (PCDs) form an integral and important part of the water management systems on a mine. Different types of PCDs may exist on a mine site, such as process water dams, storm water dams, evaporation dams and other dams, possibly including excess mine water dams and natural pans.

The purpose of PCDs for the mine and in the water management circuits are to:

- Minimise the impact of polluted water on the water resource;
- Minimise the area that is polluted as far as possible, by separating out clean and dirty catchments; and
- Capture and retain the dirty water contribution to the PCDs that cannot be discharged to the water resource, due to water quality constraints, and manage this dirty water through recycling, reuse, evaporation and/or treatment and authorised discharge.

The image below is an illustration of the typical PCD that will be constructed.

Figure 4.5: Lined PCD illustration

Clean and Dirty Water Separation

A detailed surface water management plan will be drawn up as part of the WULA including the determination of flood lines, identification of sensitive receptors and existing surface water systems and flow paths, and civil engineering design reports for the required trenches and water management facilities. The Geohydrological investigation will also feed into these designs as the anticipated pollution will be modelled. Trenching around the mining area forms part of the clean and dirty water separation and is to a large extent based on the water balance as calculated by the civil engineering team. The image below is a typical illustration of aspects to consider during the calculation of the opencast mining area water balance.

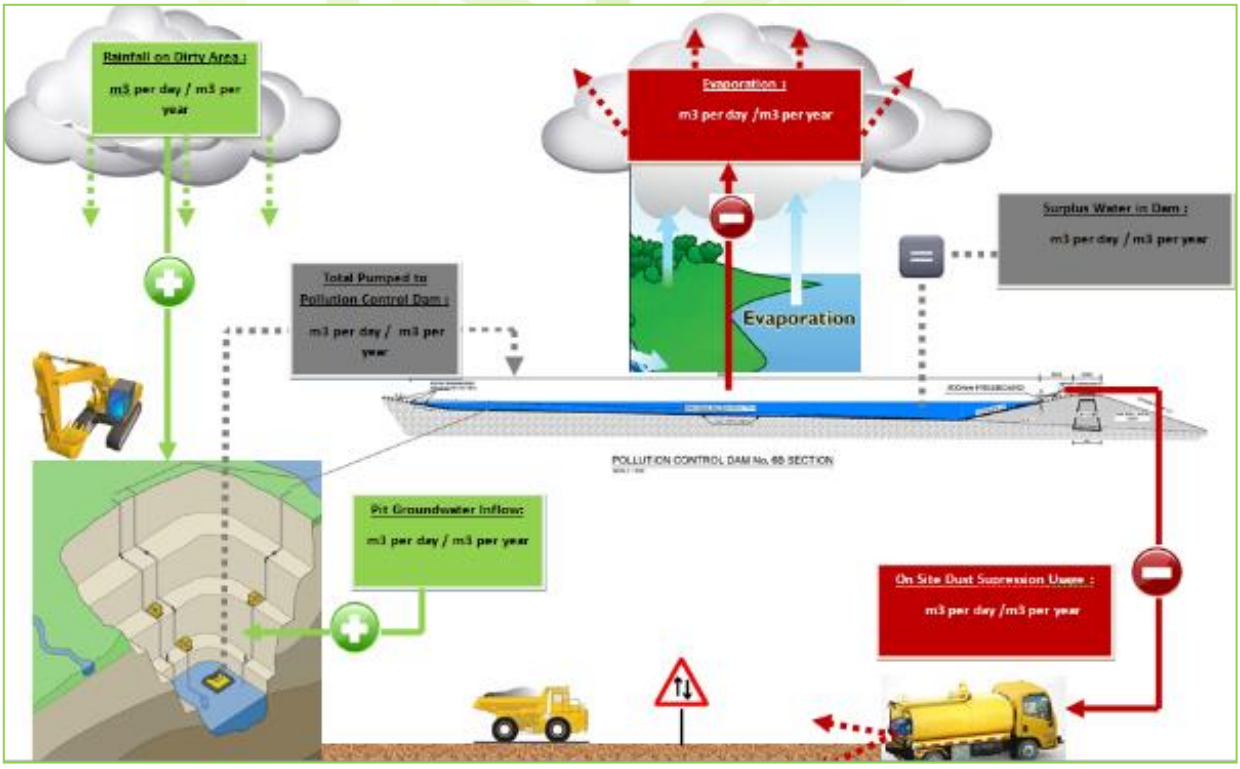

Figure 4.6: Typical water balance considerations during the design of a clean and dirty water separation system

Further images for clarification purposes have been provided below to indicating cross sections of both the dirty water and clean water diversion trenches which will be constructed around the mining area. These designs will also form part of the final master plan to be implemented during the Water Use License Application.

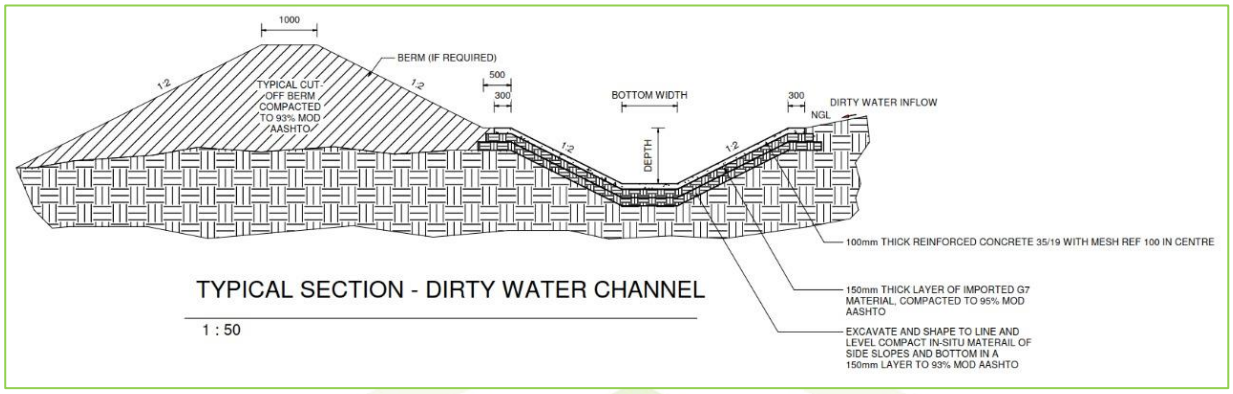

Figure 4.7: Typical Channel / Berm Cross Section For Polluted Water Diversion

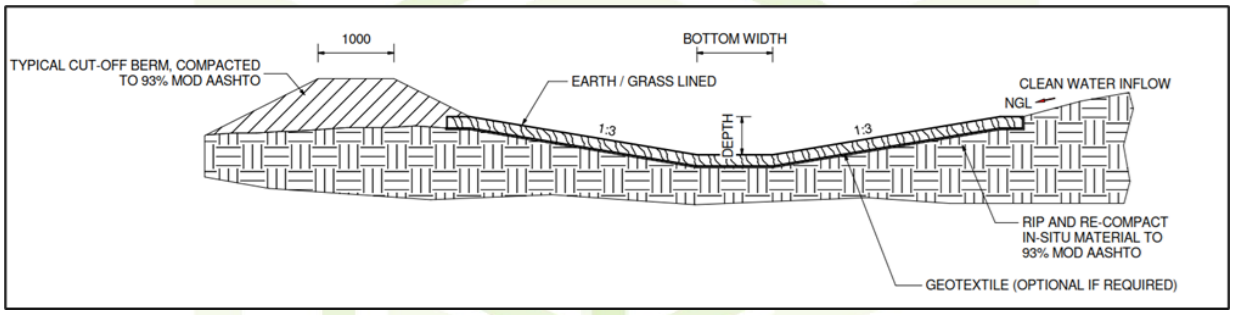

Figure 4.8: Typical channel/berm cross section for clean water diversion

Fencing

Fencing of the entire mining area will be required as a means of ensuring safety and also keeping trespassers at bay. Fences will be clearly demarcated, and appropriate signage will be displayed, similar to the signs in the images below. Fencing of the sensitive receptors such as wetlands will also take place ensuring no mining personnel will enter these areas and that it will remain protected for the duration of the project. Sites of archaeological and heritage importance will also need to be fenced off while safe access to these sites will be provided. The necessary signage will also be erected at sites of archaeological and/or heritage importance to ensure visitors can easily and safely access the premises.

Figure 4.9: Typical mine fence signage

Staff and Visitors Parking

Designated parking areas will be constructed by compaction of the subsoil after removal, storage and preservation of the valuable layer of topsoil. Storm water management control around these areas will be implemented while the necessary signage will be erected to ensure optimal safety while reverse parking will be implemented at all parking bays. The necessary waste receptacles as well as oil spill kits will be provided at these sites in case of accidental spillage or leakage of hydrocarbon fuel/oil/greases from the vehicles.

Drilling and Blasting

Blasting of mine overburden to allow efficient recovery of the underlying coal can have impacts on the surrounding community. These impacts mainly include vibration through the air (overpressure) and earth (ground vibration) along with the generation of dust and fume. Overpressure and ground vibration limits in place for private residences and heritage structures are prescribed by government based on standards. Blasts are designed and managed to minimise the risk of exceeding these limits, and to minimise impacts they have on the community, surrounding structures and environment.

Due to the nature of the activities associated with open cast activities, blasting will mainly occur during the construction phase of the initial box cut, however, subsequent blasting to remove overburden and gain access to the mineral reserve will also take place during the life of mine. A suitably qualified blasting contractor will be appointed to construct a blasting design and conduct blasting activities. There will be no explosives magazine on site and the blasting contractor will be required to supply the explosives and consumables required to blast.

Topsoil, Subsoil, Overburden Stockpiles

All topsoil, subsoil and overburden material will be removed during the mining operation and stockpiled separately for the purpose of backfill rehabilitation. The topsoil stockpiles will not exceed a height of six meters which is high enough to reduce leaching impacts of stockpiled topsoil. The subsoil and overburden stockpiles will however exceed this height.

Waste Management

Waste will be generated from the start to the decommissioning of the project. It is proposed that the waste that would be generated on site would be managed by reducing, reusing and recycling as far as possible. A certified and approved external contractor will be responsible for the removal and disposal of the waste at a registered landfill.

4.3 Composite Map

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

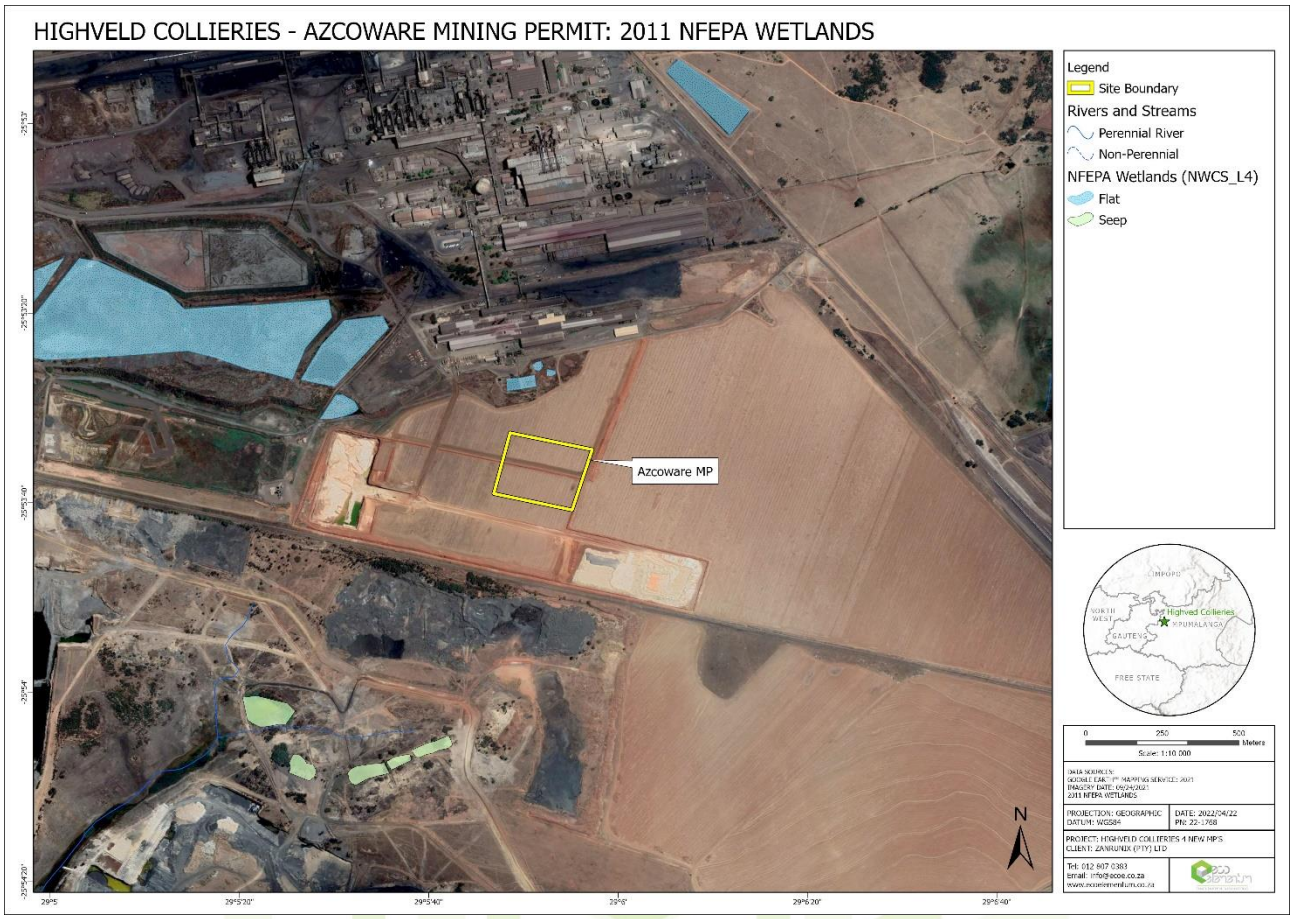

Figure 4.10: Mining Permit area in relation to delineated wetlands

4.4 DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

4.4.1 Determination of closure objectives.

The closure vision is supported by the objectives as listed below;

- Create a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;
- Sustain the long term catchment water yield and ensure suitable water quality;
- Rehabilitation of the surface infrastructure where necessary to minimize infiltration into the underground water regime (the philosophy of concentration and containment);
- Rehabilitation to minimise contamination of surface water resources (the philosophy of dilution and dispersion);
- Focus on establishing a functional post-mining landscape that would ensure self-sustaining agricultural practices post mine closure where possible;
- Ensure interconnectivity between the rehabilitated landscapes with surrounding regionally biologically diverse areas;
- Encourage, if and where required, the re-instatement of terrestrial and aquatic wetland biodiversity over time; and
- Create opportunities for alternative post-mining livelihoods by aligning to the regional planning;
- Meet with prevailing environmental legal requirements outlined in this report; and
- Prevent / Minimise negative impacts and risks as identified in this report.

4.4.2 Volumes and rate of water use required for the operation.

Only a small volume of water will be required for the mining activities. Approximately 500 m^3 of water will be used per day for mining activities. Water will also be brought onto site for potable use, this is estimated at 5 litres per person/day.

4.4.3 Has a water use licence has been applied for?

A WUL will be applied for, for activities that trigger Section 21 Water Uses.

4.4.4 Impacts to be mitigated in their respective phases.

Table 4-1: Impacts to be mitigated in their respective phases, Impact Management outcomes, Impact Management Action

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
Heritage										
Subsurface activity.	Subsurface culturally significant material.	Destruction of subsurface culturally significant material.	Operational.	Monitor material unearthed.	Monitor subsurface material during development and construction phases and contact a qualified archaeologist should culturally significant material be observed.	Prevent impact on subsurface culturally significant material.	Limit impact on subsurface culturally significant material.	National Heritage Resources Act 25 of 1999.	Control through management and monitoring.	During Operation
Palaeontological										
Excavations / drilling / mining activities begin	Clearance of site and excavations	Destruction of subsurface palaeontological significant material.	Construction and development	Apply the Fossil Chance Find Protocol described as part of the action plan.	Fossil Chance Find Protocol The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the	Prevent impact on subsurface palaeontological significant material.	Limit impact on subsurface palaeontological significant material.	National Heritage Resources Act 25 of 2000.	Control through management and monitoring.	During site clearance and more specifically whenever subsurface material removal occurs.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
					selected material and check the dumps where feasible. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. If no fossils are found and the excavations have finished then no further monitoring is required.					
Noise										
Construction and clearing activities.	Offloading of construction materials; Excavations and backfilling where required; Concrete mixing and batching; Use and maintenance of roads; Machinery noise from construction related activities.	Increased Noise levels	Construction	Construct a Noise Barrier between the main noise source noise sensitive receivers Equipment Maintenance Implement Road rules.	• A noise barrier in the form of a berm, tree break or similar noise fence should be constructed on the mine boundary • Construction and mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. • Fixed noise producing sources such as generators, pump stations and crushers to be to be either housed in enclosures or barriers put up around the noise source void the use of engine compression brakes when approaching the site entrance or driving through or in	Minimise noise disturbance.	Zero noise disturbance complaints.	SANS 10103	Control through management and monitoring.	Prior to construction. Ongoing maintenance throughout LoM.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
					the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads.					
Operational Activities	Use and maintenance of haul roads (incl. transportation of material to site and offsite), Removal of material (mining process) and stockpiling, Machinery and excavation noise, Trucks clearing their load bins before loading, Vehicle travelling to and from site on a daily basis.	Increased Noise levels.	Operation	Construct a Noise Barrier between the main noise source noise sensitive receivers Equipment Maintenance Implement Road rules.	• A noise barrier in the form of a berm, tree break or similar noise fence should be constructed on the mine boundary • Construction and mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. • Fixed noise producing sources such as generators, pump stations and crushers to be to be either housed in enclosures or barriers put up around the noise source void the use of engine compression brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads.	Minimise noise disturbance.	Zero noise disturbance complaints	SANS 10103	Control through management and monitoring.	Prior to construction. Ongoing maintenance throughout LoM.
Decommissioning activities	Demolition & Removal of all infrastructure (incl. transportation off site), Reshaping of the area that was mined,	Increased Noise levels	Closure and Decommissioning	Equipment Maintenance Implement Road rules.	• mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. Avoid the use of engine compression	Minimise noise disturbance.	Zero noise disturbance complaints.	SANS 10103	Control through management and monitoring.	Ongoing maintenance throughout LoM.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
	Rehabilitation - spreading of soil, re-vegetation & profiling/contouring with heavy machinery, Aftercare and maintenance of rehabilitated areas.				brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment.					
Ecological Impacts										
Construction and operational activities	Stream Diversion Work Revetments New access routes Site clearing for opencast area Placement of cleared topsoil into allocated stockpiles Use of heavy machinery Increased traffic Bank erosion.	Flow alterations due to erosion and sedimentation.	Construction and Operation	• Rehabilitation of the disturbed areas; • Limiting instream sedimentation; • Minimising pollutants entering the watercourse Erosion control measures must be employed where required.	• Design and implementation of a suitable stormwater system; • Implement a programme for the clearing/eradication of alien species including long term control of such species; • A 32 m buffer implemented for the wetland system; • Water quality monitoring must take place every month during operational phases; and • Wetland monitoring and biomonitoring must take place bi-annually.	prevent undesirable change in surface water flow.	improve and maintain natural flow where possible.	0	Modify through design measures.	Ongoing concurrent rehabilitation.
Construction and operational activities.	Increased traffic leading to potential accidental spills of hydrocarbon materials Hazardous materials entering the watercourses Acid Mine Drainage Increased road runoff during rainfall events	Pollution of watercourse.	Construction, Operation.		• A topsoil stripping and stockpiling guideline must be completed to ensure rehabilitation success. • Attenuation measures must include, but are not limited to - the use of sand bags, erosion control blankets, and silt fences. • Long term attenuation measures, such as attenuation/infiltration trenches, swales must be established to control stormwater from hardened surfaces • Vegetation clearing must be undertaken as and when necessary in phases. • Install sediment barriers (silt catchers and Reno mattresses) along any drainage areas to prevent the migration of silt. • Exposed soils must be rehabilitated as soon as practically possible to limit the risk of erosion. • All roads need to be maintained and any erosion ditches forming along the road filled and compacted.	prevent pollution of the downstream watercourse.	Effective pollution and dirty water management of the mining site, and no pollution of the downstream watercourse.		Control through management and monitoring.	Ongoing concurrent rehabilitation.
Operational, decommissioning and rehabilitation activities.	Increased runoff from hardened surfaces Further spread of plants and seedlings Increased traffic.	Spread of alien vegetation.	Operational, Closure and Decommissioning.			prevent an increase in alien and invasive species.	effective management of alien and invasive species.		Control through management and monitoring.	Ongoing concurrent rehabilitation.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
					• Demarcate wetland areas to avoid unauthorised access. • No washing of any equipment in close proximity to a watercourse is permitted. • No releases of any substances that could be toxic to fauna or faunal habitats within the channels or any watercourses is permitted. • Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities • Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. The general consensus is that they should be within 30 m to 50 m of a work face • Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas.					
Groundwater										
Surface clearing and preparation.	Removal of vegetation.	Increase in surface run-off and therefore decrease in aquifer recharge.	Construction	Re-vegetate.	Rehabilitation plan.	Re-vegetate to pre-mining conditions.	Recharge to be close to -pre-mining conditions.	SANS241:2015.	Remedy through control measures.	Storm water Management to be constructed prior to other infrastructure establishment.
Box cut opening.	Dewatering.	Decrease in water level should the pit floor be lower than the water level.	Construction	No management can be incorporated to limit the impacts of dewatering should the box-cut floor be lower than the groundwater level.	Quarterly monitoring of monitoring boreholes.	N/A	N/A	N/A	Control through management and monitoring	N/A
Topsoil and overburden stockpiling.	Leaching from stockpiles.	Acid generation in the case of carbonaceous material placement.	Operation	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes.	Prevent leaching into the environment.	No spills of polluted water into the environment or contamination of the Groundwater Aquifer.	SANS241:2015	Control through management and monitoring.	Storm water Management to be constructed prior to other infrastructure establishment.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
ROM stockpiling.	Leaching from stockpiles.	Acid generation as a result of carbonaceous material.	Operation	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes.	Prevent leaching into the environment.	No spills of polluted water into the environment or contamination of the Groundwater Aquifer.	SANS241:2015	Control through management and monitoring.	Storm water Management to be constructed prior to other infrastructure establishment.
Pollution Control Dams	Seepage should lining fail or dam overflow.	Contaminated water in the dams can seep to the aquifer.	Operation	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes.	Prevent leaching into the environment.	No spills of polluted water into the environment or contamination of the Groundwater Aquifer.	SANS241:2015	Control through management and monitoring.	Storm water Management to be constructed prior to other infrastructure establishment.
Hydrocarbon spills.	Plume migration.	Spills from mining vehicles can infiltrate to the aquifer and cause a down gradient plume migration.	Operation	Clean any hydrocarbon spills in the appropriate manner.	Report any hydrocarbon spillage.	Prevent spills and pollution on site.	Effective prevention of the pollution of the groundwater resource.	SANS241:2015	Control through management and monitoring.	Storm water Management to be constructed prior to other infrastructure establishment. Ongoing monitoring.
Pit dewatering	Dewatering	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level.	Operation	No management can be incorporated to limit the impacts of dewatering.	Quarterly Monitoring. Compensate users for losses. Monitor pit inflow rates, Annual Monitoring report, Update Numerical Model.	N/A	N/A	N/A	Control through management and monitoring.	N/A
Topsoil and overburden removal.	Placement of topsoil and overburden into pit.	Carbonaceous material, if any in the overburden, will be placed at the bottom of the pit as to prevent or minimise the exposure to oxygen and potential acid generation.	Closure and decommissioning	Remove the top soil and overburden dumps during rehabilitation. Placement of carbonaceous material at bottom of pit.	Rehabilitation Plan- placement of topsoil and overburden in pit.	Prevent leaching into the environment.	No spills of polluted water into the environment or contamination of the Groundwater Aquifer.	SANS241:2015	Control through management and monitoring.	During Closure
Backfilling.	Reshaping of area	Adequate backfilling and rehabilitation will decrease aquifer recharge. The	Decommissioning	Carbonaceous material at deeper base of pit. Rehabilitation to direct surface runoff	Refer to rehabilitation plan.	Treatment of poor quality decant to an acceptable quality.	Release of acceptable quality water to the downstream environment.	SANS241:2015	Remedy through control measures.	Passive treatment establishment before mine closure.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
		period to decant will therefore be prolonged.		away from pit and recharge to pit minimized. Flow paths including fracture zones sealed.						
Revegetation	Reshaping of area and revegetating the area.	Increase surface runoff over the rehabilitated opencast, therefore decreasing aquifer recharge.	Rehabilitation	Remove the ROM stockpile and PCD's. This will eliminate the ROM stockpile and PCD's as potential sources.	Rehabilitation Plan.	Prevent leaching into the environment.	No spills of polluted water into the environment or contamination of the Groundwater Aquifer.	SANS241:2015	Control through management and monitoring.	During Closure
Backfilling of pit.	Backfilling of the pit and no more dewatering.	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	Residual	Keep water level in pit lower than level in nearby streams. Maintain water level below decant level (e.g. abstraction). Investigate implementation of cut-off trench.	Abstracted/decant water to be treated or handled in appropriate manner and within legislation. Continue quarterly monitoring post-closure.	Treatment of poor quality decant to an acceptable quality.	Release of acceptable quality water to the downstream environment.	SANS241:2015	Remedy through control measures.	Passive treatment establishment before mine closure.
Surface Water										
Construction activities.	Vegetation clearance and site establishment.	Sedimentation and pollution of the watercourse.	Construction Phase.	Separate clean and Dirty Water System.	Construct and implement SWMP.	To separate the clean water from entering the dirty water areas, and vice versa.	Effective onsite dirty water management and retention.	SWMP.	Modify through design measures.	Storm water Management to be constructed prior to other infrastructure establishment.
Open pit Mining.	Pit dewatering and drawdown.	Reduction in Baseflow.	Operational Phase.	No mitigation available.	N/A	N/A	N/A	N/A	Modify through design measures.	N/A
Pit dewatering.	Reduction to baseflow in the stream.	Reduced Poor Quality Water input.	Operational Phase.	No mitigation required.	N/A	N/A	N/A	N/A	N/A	N/A

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
Operational Activities.	Hydrocarbon spills Dirty Water release Sediment runoff.	Water quality deterioration.	Operational Phase.	Separate clean and Dirty Water System.	Construct and implement SWMP.	To separate the clean water from entering the dirty water areas, and vice versa.	Effective onsite dirty water management and retention.	SWMP	Modify through design measures.	Storm water Management to be constructed prior to other infrastructure establishment. Ongoing monitoring.
Closure of the mine.	Groundwater rebound.	Decant of poor quality water.	Closure and Decommissioning.	Treat decant water before release to the environment.	Establish a Passive treatment system in the form of a constructed wetland or similar.	Treatment of poor quality decant to an acceptable quality.	Release of acceptable quality water to the downstream environment.	ISO 5667: Grab Samples Water parameters as approved in the IWULA.	Remedy through control measures.	Passive treatment establishment before mine closure.
Air Quality										
Site establishment.	Removal of topsoil and vegetation.	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts.	Construction and Operational Phase.	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur Reduce exposure areas Avoid Dust Creation.	Demarcate areas of movement, and avoid areas where movement is not permitted. Topsoil should be re-vegetated. During the loading of topsoil onto trucks or stockpiles, the dropping heights should be minimised. Water or binding agents such as (petroleum emulsions, polymers and adhesives) can be used for dust suppression on earth roads. When using bulldozers and graders, minimise travel speed and distance and volume of traffic on the roads. All stockpiles to be damped down, especially during dry weather or re-vegetated (hydro seeding is a good option for slope revegetation).	Only clear areas required for immediate operation.	minimal vegetation clearance and concurrent rehabilitation as mining progresses.	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No. R 827) SANS 1929:2011.	Control through management and monitoring.	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas.
Site establishment.	Construction of surface infrastructure.	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5	Construction and Operational Phase.	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur Reduce exposure areas Avoid Dust Creation.	Demarcate areas of movement, and avoid areas where movement is not permitted. Dust emitted during bulldozing activity can be reduced by increasing soil dampness by watering the material being removed Time the blasting with wind to ensure the dust will not be blown to the sensitive receptors Material need to be removed to dedicated stockpiles to be used during rehabilitation	Only clear areas required for immediate operation.	minimal vegetation clearance and concurrent rehabilitation as mining progresses.	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No.	Control through management and monitoring.	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
		microns) giving rise to health impacts.			Apply dust suppressant to roads. Cover Haul trucks with Tarpaulin.			R 827) SANS 1929:2011.		
General transportation.	Hauling and vehicle movement on site.	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts.	Construction and Operational Phase.	Avoid Dust Creation Enforce a low Speed limit.	Apply dust suppressant to roads. Cover Haul trucks with Tarpaulin Fit roads with Speed bumps.	prevent excessive dust creation on site.	Effective dust management on site.	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No. R 827) SANS 1929:2011.	Control through management and monitoring.	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas.
Site closure.	Demolition & Removal of all infrastructure.	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts.	Decommissioning Phase.	The area of disturbance must be kept to a minimum Avoid Dust Creation.	Demolition should not be performed during windy periods (August, September and October). Demarcate areas of movement Speed restrictions should be imposed and enforced. Exhaust pipes of vehicles should be directed so that they do not raise dust. Hard surfaced haul roads or standing areas should be washed down and swept to remove accumulated dust. Dust suppression of roads being used during rehabilitation should be enforced.	prevent excessive dust creation on site.	Effective dust management on site.	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No. R 827) SANS 1929:2011.	Control through management and monitoring.	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas.
Rehabilitation.	Spreading of soil, revegetation & profiling/contouring .	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and	Decommissioning Phase.	Minimise exposed surface duration The area of disturbance must be kept to a minimum Avoid Dust Creation.	Revegetation of exposed areas Demarcate areas of movement Spreading of soil must be performed on less windy days. Keep soil moist using sprays or water tanks, using wind breaks. Speed restrictions should be imposed and enforced. Exhaust pipes of vehicles should be directed so that they do not raise dust.	prevent excessive dust creation on site.	Rehabilitation of cleared areas.	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government	Control through management and monitoring.	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
		dust with a size less than 2.5 microns) giving rise to health impacts.						Gazette No. 36794 - No. R 827) SANS 1929:2011.		
Visual										
Construction related activities.	Site Establishment.	Potential visual impact on the viewpoints.	Construction Phase.	The visual impact can be minimized creating a visual barrier.	Creating a Berm between the opencast pits and the road and Planting Indigenous vegetation.	reduce the visual disturbance to the area.	Effective visual barriers surrounding the mining operation.	0	Modify through design measures.	Prior to construction.
Mining related activities.	Open Pit Mining.	Potential visual impact on Road and Land users.	Operation, Decommissioning and Closure.	The visual impact can be minimized creating a visual barrier. Minimise areas of operation.	Creating a Berm between the opencast pits and the road and Planting Indigenous vegetation Perform concurrent rehabilitation as mining progresses.	reduce the visual disturbance to the area.	Effective visual barriers surrounding the mining operation.	0	Modify through design measures.	Prior to construction.
Social Economic										
Mine establishment.	Mining operations.	Employment and income opportunity.	Construction and Operation Phase.	Maximise Employment Opportunities, Skills and Enterprise Development.	Prioritise local labour in the recruitment process as part of the company's own recruitment policy or as part of contractor management plan during operations Put a procurement strategy as well as a contractor management plan (if relevant) in place to ensure that 100% local employment target in terms of unskilled labour is met. Up-skill the local labour force. Develop a database of goods and services that could potentially be outsourced to the local community Establish a supplier development programme as part of the Local Economic Development component. Where local contractors are used, put a contractor management plan in place to ensure that the local employment and procurement targets of the operations are met.	Maximise local employment opportunities and develop skills during operations.	Maximise local employment opportunities and develop skills during operations.	-.	Remedy through Social and Labour Plan.	Prior to construction and throughout LoM.
Mining operations.	Employee training.	Upskilling of Labour force.	Construction and Operation Phase.	Promote Socio-Economic Development in the Local Area..	Develop an updated Local Economic Plan for the project in consultation with the local community. Some strategic recommendations: Determine whether the current allocation as per the mines MWP is in line with the	Promote socio-economic development in the local area.	Promote socio-economic development in the local area.	-.	Remedy through Social and Labour Plan.	Throughout LoM.
Mining operations.	Coal production and sales.	Increased Public revenue.	Construction and				Promote socio-economic	-	Remedy through	Throughout LoM.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
			Operation Phase.		targets of the Mining Charter of 2018 Monitor and manage the social contribution of multinational suppliers (in-house as well as suppliers to contractor and direct service providers).		development in the local area.		Social and Labour Plan.	
Mining operations.	Social Development Plan.	Increase in Local Economic Development Funds.	Construction and Operation Phase.				Promote socio-economic development in the local area.	-.	Remedy through Social and Labour Plan.	Throughout LoM.
Mining operations.	Employment creation.	Project Induced In-Migration.	Construction and Operation Phase.	Minimise Impacts of Project- Induced In-Migration.	The local labour procurement strategy as well as proof of residence required should be clearly communicated in the local community and broader regional media well in advance of the construction phase. The communication strategy should ensure that unrealistic employment expectations are not created. Ensure that foreign (outside) workers reside in suitable facilities and do not establish informal houses. Information distributed as part of the existing HIV/Aids awareness campaigns undertaken in the area should again be focused on and communicated to the local workforce. The general health of workers should be monitored on an on-going basis Establish a forum, with representatives of the mine and local stakeholders for discussing potential issues of community conflict. The area should be fenced off and security measures should ensure that no squatters are allowed on the mining right area. The relevant actions related to this objective should form of the a contractor management plan.	Minimise any potential negative impacts associated with the inflow of workers and jobseekers.	Minimise any potential negative impacts associated with the inflow of workers and jobseekers.	-.	Remedy through Social and Labour Plan.	Throughout LoM.
Mining operations.	Increased traffic Mining related hazards Increased dust Water quality deterioration Historical subsidence Blasting.	Safety and Health Risks.	Construction and Operation Phase.	Minimise Safety and Health Risks.	Permanent security personnel should be on site. The mining area must be fenced with electrical fencing and access to the area should be controlled to avoid animals or people entering the area without authorisation. Speed limits on the local roads surrounding the mining sites should be enforced.	Limit any safety and health risks during operations.	Limit any safety and health risks during operations.	-.	Remedy through Social and Labour Plan.	Throughout LoM.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
					The mining area should be equipped with surveillance around its perimeter. A Health and Safety Plan should be implemented and it must be ensured that all managers are qualified in First Aid and other relevant safety courses. Ensure that a proper emergency plan that fits with the Municipal Disaster Management Plan is in place. Implement a HIV/AIDS awareness programme with specific focus on communities in and nearby the mining areas, as well as on the mine employees. Fire-fighting equipment should be on site and should be in a good working condition. All mining vehicles should be in a good condition and adhere to the road worthy standards. Access from haul roads and internal mine roads to local main roads should be in line with the road standard and requirements to accommodate the traffic load and traffic patterns. The mine to provide workers without transport with mine transport to and from work, with a safe off-loading site inside the mine premises. Adhere to air pollution management plan to minimize health hazards related to coal dust particles and noxious gases . Adhere to groundwater and surface water management measures to prevent any negative impacts on health due to ground or surface water pollution. Suitable safety measures should be implemented to avoid subsidence.					
Mining operations.	Open pit establishment.	Change in sense of place.	Construction and Operation Phase.	Minimise Negative Impacts of Nuisance Factors (Noise and Dust) Minimise Negative Impacts from Blasting Activities.	The mitigation measures of the Noise and Air Quality Impact Assessments are relevant. Dust suppression measures should be applied if and when necessary Limit the number of haul roads to limit dust creation. Operational mining activities with	Limit nuisance factors relate to noise and dust Limit potential negative impacts on noise and infrastructure damage related	Limit nuisance factors relate to noise and dust Limit potential negative impacts on noise and infrastructure damage related	-.	Remedy through Social and Labour Plan.	Throughout LoM.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
					potential noise impacts should be mitigated and should not be undertaken during night time. Noise generating activities should thus be kept to normal working hours (e.g. 7 am until 5 pm) where possible. Heavy machinery and heavy vehicles should be kept in a good working order. Also, ensure that all vehicles and equipment comply with generally accepted noise levels and noise abatement regulations. Personnel should be equipped with the necessary noise protection equipment I&AP forum needs to be established to discuss and address issues of concern. Quarterly meetings are advised. The Mine to maintain a complaints register for regular update as well as keep minutes of community forum meetings. Feedback should be provided on issues registered and resolved. The mitigation measures of the Blasting Report are relevant. These include but is not limited to: • Use a qualified blasting expert; • Close the provincial road during blasting in consultation with the relevant authority; • Monitor noise levels from blasting to ensure it is not exceeded. • Establish a baseline of the structural condition of relevant structures (houses and public infrastructure) within a 1km radius of the operation. Inspect the structures on a 6 monthly basis or at public request. • Notify all I&APs an hour before blasting takes place. • Conduct blasting in working hours (e.g. between 6:00 and 18:00).	to blasting activities.	to blasting activities.			
Mining operations.	Mine closure.	Job losses.	Decommissioning and Closure.	Minimise the negative economic impacts related to mine closure.	Develop mechanisms to assist employees, prior to retrenchment date in the transition phase after closure of the operations including portable skilled development programmes during the	Minimise the negative economic impacts related to mine closure.	Minimise the negative economic impacts related to mine closure.	-.	Remedy through Social and Labour Plan.	Prior to Mine closure.

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
Mining operations.	Mine Closure.	Decrease/termination of community investment funds and support to local communities.	Decommissioning and Closure.		operational phase of the mine, providing assistance in accessing available and suitable jobs with other local mines or companies etc. Focus on non-core related local supply links during the operational phases of the mine to facilitate easier transitioning of local suppliers to other costumers. Plan community projects with an exit strategy of which beneficiaries are aware of. The risk of ADM should be mitigated as per the ground water management plan Rehabilitate mining area as soon as possible to prevent to prevent high losses in agricultural potential Investigate the potential for a housing development as a high value post-closure land-use as well as a community priority as part of a final rehabilitation plan.		Minimise the negative economic impacts related to mine closure.	-.	Remedy through Social and Labour Plan.	Prior to Mine closure.
Mine Closure.	Water quality deterioration Historical subsidence.	Safety and Health Risks.	Decommissioning and Closure.				Minimise the negative economic impacts related to mine closure.	-.	Remedy through Social and Labour Plan.	Prior to Mine closure.

4.4.5 Financial Provision

4.4.5.1 Determination of the amount of Financial Provision.

4.4.5.1.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

The closure vision is supported by the objectives as listed below;

- Create a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;
- Sustain the long term catchment water yield and ensure suitable water quality;
- Rehabilitation of the surface infrastructure where necessary to minimize infiltration into the underground water regime (the philosophy of concentration and containment);
- Rehabilitation to minimise contamination of surface water resources (the philosophy of dilution and dispersion);
- Focus on establishing a functional post-mining landscape that would ensure self-sustaining agricultural practices post mine closure where possible;
- Ensure interconnectivity between the rehabilitated landscapes with surrounding regionally biologically diverse areas;
- Encourage, if and where required, the re-instatement of terrestrial and aquatic wetland biodiversity over time; and
- Create opportunities for alternative post-mining livelihoods by aligning to the regional planning;
- Meet with prevailing environmental legal requirements outlined in this report; and
- Prevent / Minimise negative impacts and risks as identified in this report.

4.4.5.1.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

The BAR and EMP will be provided to I&APs for review and comment for 30 days. The objective is to be communicated to IAP's during the public consultation process.

4.4.5.1.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

The scheduling of actions for final rehabilitation, decommissioning and closure which will ensure avoidance, rehabilitation and management of impacts is presented in the table below. As the disturbance after construction occurs on surface, linking the rehabilitation plan to the mine works program is not meaningful. Rather, the schedule is linked to applicant's intention to undertake rehabilitation activities over a 1-year closure period at the end of the Life of Mine. The perceived schedule drivers of this plan are also indicated in the table. This schedule is based on implementing the actions described in this report and relates to the aspects considered in this section.

Aspect	Scheduling	
	Quarter 1	***Continuous***
Opencast workings	Concurrent backfilling sequence and removal of salvageable equipment.	Topsoil stripping, handling, stockpiling, preservation and replacement in line with the general surface rehabilitation and revegetation actions prescribed in
Surface Infrastructure related to mining operations (including plant)	Removal, decommissioning and demolition of infrastructure.	
Final void	Backfilling and sealing.	

Aspect	Scheduling	
Contaminated land remediation	Hydrocarbons – Removal of fuel storage and refuelling bays Chemical – contaminated equipment removal.	this report as land becomes available for rehabilitation.
Quarter 2		
Pollution Control Dams	Management of stormwater in closure period, but capacity requirements can be assessed to remove upon closure.	
Waste Management Facilities	Removal, decommissioning and demolition of infrastructure.	
Roads and parking areas	Only roads required after closure to remain in place.	
Fencing and walling	Only fences required to remain after closure to stay in place.	
Quarter 3 - 4		
Water Management	Monitoring, measurement and management where required.	
Maintenance and aftercare	All rehabilitated areas.	

Appendix 4 requires that a spatial map or schedule, showing planned spatial progression throughout operations be included in the plan. However, as the spatial progression is limited to the mining footprint and the mine haul route, the inclusion of a plan showing the spatial progression will not add any further information than that included in the table above.

4.4.5.1.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The rehabilitation plan aims to provide a project site that is similar to the pre-mining environment through the shaping of backfilled areas, capping of boreholes, closing of trenches and vegetating of disturbed areas (where not within cultivated lands).

4.4.5.1.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

CALCULATION OF THE MINE CLOSURE QUANTUM - OPENCAST								Version 1.0: Annual Mine Closure Quantum Update for 2022
Mine: Azcoware (Pty) Ltd – Mining Permit MP 30/5/1/1/3/13324 MP				Province: Mpumlanga				
Evaluators: Eco Elementum (Pty) Ltd				Date: July 2022				
General Information	Risk Class	High (A)	PROPOSED OPENCAST MINING PERMIT AREA					
	Environmental Sensitivity	Medium						
	WF 1: Nature of Terrain Weighting Factor	Flat 1.00						
	WF 2: Proximity to Urban Area Weighting Factor	1.05						
Component No	Main Activities Itemized Descriptions	[B] CPI Adjusted STEP 4.3	[A] Quantity STEP 4.5	Units	[C] Multipliction STEP 4.3	[D] Weighting Factor 1: STEP 4.4	Sub Totals [E = A*B*C*D]	NOTES & SUPPORTING EXPLANATIONS
1	Dismantling of processing plant and structures	R 16,33	0,00	m3	1,00	1,00	R 0,00	Mobile Crushing and Screening Plant
2(A)	Demolition of steel buildings and structures	R 227,49	0,00	m2	1,00	1,00	R 0,00	Mobile container type structres only
2(B)	Demolition of reinforced concrete buildings and structures	R 335,25	44,00	m2	1,00	1,00	R 14 751,11	The proposed operation will make use of the neighboring mine's mobile offices, weighbridge and silt trap, but will share in the closure cost as well.
3	Rehabilitation of access roads	R 40,71	262,47	m2	1,00	1,00	R 10 684,95	Gravel roads L:87.49m x W:6m = 524.94m2 (Share access road with neighboring mine) = 524.94m2 / 2 = 262,47m2
4(A)	Demolition and rehabilitation of electrified railway lines	R 395,12	0,00	m	1,00	1,00	R 0,00	n/a
4(B)	Demolition and rehabilitation of non-electrified railway lines	R 215,52	0,00	m	1,00	1,00	R 0,00	n/a
5	Demolition of housing and facilities	R 454,99	0,00	m2	1,00	1,00	R 0,00	Mobile offices mainly, minimal permanent structures on site
6	Opencast rehabilitation including final voids and ramps	R 231563,75	3,20	ha	0,52	1,00	R 385 322,08	
7	Sealing of shafts, adits and inclines	R 122,13	0,00	m3	1,00	1,00	R 0,00	n/a
8(A)	Rehabilitation of overburden and spoils	R 159 005,51	0,700	ha	1,00	1,00	R 111 303,86	All overburden and spoils to be shaped, grassed and seeded
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	R 198 038,49	0,00	ha	1,00	1,00	R 0,00	n/a
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	R 575 197,64	0,150	ha	0,80	1,00	R 69 023,72	Carbenaceous material footprints to be rehabilitated for e.g. stockpiling areas. RoM area shared with the adjacent mine. RoM situated in the pit
9	Rehabilitation of subsided areas	R 133 143,17	0,00	ha	1,00	1,00	R 0,00	n/a
10	General surface rehabilitation, including grassing of denuded areas	R 38 824,10	3,66	ha	1,00	1,00	R 142 096,21	Entire disturbed footprint
11	River diversions	R 125 959,18	0,00	ha	1,00	1,00	R 0,00	n/a
12	Fencing	R 143,68	100,00	m	1,00	1,00	R 14 367,97	Main farm fences to remain – mining complex fencing to be removed
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater, including treatment, when required)	R 47 893,23	0,85	ha	0,67	1,00	R 27 275,19	All carbenaecous areas to be accounted for: Item 8A + 8C
14	2 to 3 years of maintenance and after care	R 16 762,63	3,66	ha	1,00	1,00	R 61 351,22	Entire disturbed footprint
15	Specialist study	R 45 000,00	1,00	report	1,00	1,00	R 45 000,00	GNR 1147 Specialist Study
						Subtotal (1 to 15 above)	R 881 176,31	
	Subtotal 1			Weighting Factor 2		1,05	R 925 235,12	
1	Preliminary and General			12% of Subtotal 1 if less than R100mil			R 111 028,21	
				6% of Sub Total 1 if more than R100mil				
2	Contingency			10% of Sub Total 1			R 92 523,51	
						Subtotal 2 (Subtotal 1 plus sum of management and contingency)	R 203 551,73	
						Subtotal 3	R 1 128 786,85	
						GRAND TOTAL (Subtotal 3 plus 15% VAT)	R 1 298 104,87	

4.4.5.1.6 Confirm that the financial provision will be provided as determined.

The applicant hereby commits to undertaking to provide the calculated amount in the form of either method provided in section 53 of the MPRD Regulations and the financial provisioning regulations, 2015 Published under Government Notice R1147 (GN R. 39425 of 2015). It should however be noted that no new guideline for determining the quantum for closure and rehabilitation has been published and therefore the guideline published under the MPRDA regulation was used to assess the quantum for closure liability.

MECHANISMS FOR MONITORING COMPLIANCE WITH A PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON, INCLUDING –

4.4.5.1.7 Monitoring of Impact Management Actions (Table 4-2).

4.4.5.1.8 Monitoring and reporting frequency (Table 4-2).

4.4.5.1.9 Responsible persons (Table 4-2).

4.4.5.1.10 Time period for implementing impact management actions (Table 4-2).

4.4.5.1.11 Mechanism for monitoring compliance (Table 4-2).

Table 4-2: Monitoring compliance

Source activity	Impacts requiring monitoring programmes	Functional requirements for monitoring.	Roles and responsibilities (for the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions.
Construction, Operation and Decommissioning Activities	Water Quality	ISO 5667 Grab Samples.	Independent Specialist.	Monthly as per WUL.
Construction, Operation and Decommissioning Activities	Water Quantity	Water Balance to be Updated Annually Flow Meter Reading and Update of Datasheet.	SHEQ/ Engineering.	Daily
Construction, Operation and Decommissioning Activities	Bio-Monitoring	SASS 5 and IHAS Sampling Sites are to be established upstream and downstream of all Potential Impact.	Aquatic Ecologist	Bi-Annually
Construction, Operation and Decommissioning Activities	Storm Water Management	Visual Inspection Check the system for blockages and possible spillage areas.	SHEQ/ Engineering	After heavy rainfall.
Construction, Operation and Decommissioning Activities	Biodiversity Assessment	Align the Fauna & Flora Compare the annual findings with those of the Baseline Studies.	Ecologist	Annually

Source activity	Impacts requiring monitoring programmes	Functional requirements for monitoring.	Roles and responsibilities (for the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions.
Construction, Operation and Decommissioning Activities	Alien Invasive Control Program (AICP)	Implement an Alien Invasive Control Programme. During the Biodiversity Assessment a qualified ecologist must be contracted to ensure that the implementation of the AICP are adequately addressed.	Ecologist	Bi-Annually
Construction, Operation and Decommissioning Activities	Vegetation and Rehabilitation.	RSIP to be adhered to As specified in EMP.	Ecologist	Bi-Annually
Construction, Operation and Decommissioning Activities	Groundwater Quality.	SANAS Standards As specified in Geo-Hydro Report.	Independent Specialist.	Quarterly
Construction, Operation and Decommissioning Activities	Groundwater Levels.	Depth meters. Determine the groundwater fluctuation over a LOM.	Independent Specialist.	Determine the groundwater fluctuation over a LOM.
Construction, Operation and Decommissioning Activities	Dust Fallout.	Implement a Monitoring Programme Gravimetric Dust Fallout.	To be analysed by an Accredited Laboratory Independent Specialist.	Monthly.
Construction, Operation and Decommissioning Activities	Environmental Noise & Vibration.	Implement a Monitoring Programme SANAS Standards Noise monitoring are to be done to determine the effect of mining, and associated activities, on the receptors.	Independent Specialist (Noise Specialist).	Annually.
Construction, Operation and Decommissioning Activities	Visual Inspection of receptors.	Implement Monitoring Schedule in-house Physical Census Any incidents of cracking must be recorded and addressed.	SHEQ/ Engineering.	Before and After each blasting event.

4.4.5.1.12 Indicate the frequency of the submission of the performance assessment/ environmental audit report.

A performance assessment/ environmental audit will be undertaken as stipulated in Table 4-2 above. The performance assessment will be conducted internally twice a year and by an external consultant annually throughout the life of operation as required under NEMA. This is conducted to assess the adequacy and compliance to the EMP, EA and the relevant legislation. The reports should be submitted to the DMR.

4.4.5.1.13 Emergency Preparedness, Response and Environmental Awareness Plan

Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

An environmental awareness training manual will be developed for the project.

All employees must be provided with environmental awareness training to inform them of any environmental risks that may result from their work and of the manner in which the risks must be dealt with to avoid pollution or the degradation of the environment.

Employees should be provided with environmental awareness training before operations start. All new employees should be provided with environmental awareness training. Environmental awareness and training is an important aspect of the implementation of the EMP. The onus is on the different parties involved in the various stages of the life cycle of the project to be environmentally conscious. Hence, it is suggested that all members of the project team are familiar with the findings of the site-specific EA report and the EMP. For instance, the contractor is responsible for the lack of environmental knowledge of his/her crew members. The contractor could forward internal environmental awareness and training procedures to the project manager and environmental officer for comment prior to the commencement of the project. Likewise, the above is applicable to the programming, design, operations and maintenance, and decommissioning teams. Environmental awareness ensures that environmental accidents are minimized and environmental compliance maximized.

All staff and contractors will be submitted to an annual training / awareness course as to inform the staff of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment.

Section 39 (3) (c) requires that an applicant who prepares an Environmental Management Programme or Environmental Management Plan must "develop an environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risks which may result from the work and the manner in which the risks must be dealt with in order to avoid pollution and degradation of the environment". Environmental Awareness is required not only for management and employees (as described in Section 39 (3) (c) but also for visitors to the site. the following strategies and plans will be put into place for each of the parties.

Visitor Environmental Awareness

Visitor/sub-contractor environmental awareness will be generated through the provision of a signboard describing very briefly the environmental considerations applicable to them. The signboard should contain the following information:

- Statement of the applicant's commitment to environmental principles;
- List of the "rules" to which the visitor must abide. This will include:
  - No littering. Dispose of all waste in the bins provided;
  - No fires;
  - Stay on demarcated roadways and paths only;
  - Kindly report any environmental infringements they may notice;

- Check your vehicle/equipment for diesel/oil leaks.

Senior and Middle Management Environmental Awareness:

Achieving environmental awareness at upper levels of management is slightly different from the process at the operational level. There is often a fair level of the general value of environmental awareness but site-specific issues will most often need to be communicated. This will be achieved by:

- Management must make themselves fully familiar with the EMP.
- Ensuring that there is a spare copy of the approved EMP at his/her disposal; management is encouraged to make notes in the document regarding the difficulty / ease of implementing the environmental management measures. These notes should be sent to the consultants to assist in future revisions of the EMP;
- The manager must ensure that the operators perform regular monitoring of their workstations / areas.

During the management's execution of their activities/being at the site, the management must constantly be aware of and observant of especially the following:

- Dust levels - movement outside of demarcated areas;
- Litter management - general housekeeping;
- Erosion during rainy season.

Topsoil management - fuel/oil management/leaks/changes;

- Success of operational re-vegetation; and
- Alien vegetation.

Operator / Workforce Environmental Awareness:

Achieving environmental awareness amongst the operators and labour is probably the most important because they are usually present at the place where most environmental transgressions take place or in fact cause them. It is the aim of increased environmental awareness to reduce any such environmental transgressions.

Increasing environmental awareness at these levels can be achieved through the following strategies:

- Induction environmental training must take place prior to any contract period.
- Training: Each and every employee (contractor or not) must go through an environmental training process where at least the following items area covered:
  - The oil/fuel management policy must be explained to the employees. The reason for the policy must also be explained (i.e. to not impact on groundwater, surface water, soil quality etc.);
  - The domestic and industrial waste management policy & method must also form part of the training;
  - The topsoil handling method and the reasons for preserving topsoil (i.e. post prospecting re vegetation, erosion prevention etc.);
  - Alien vegetation management: How to recognize and remove such species;
  - Protection of the natural veld by not driving/manoeuvring or walking through the demarcated protection areas. Reporting that demarcation posts/tape is broken or removed;

Emergency management procedures such as dealing with oil spills or fires must also be drilled; and

- Such training will, in this case, be carried out by the site manager/resident engineer.

Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Training, as detailed above, will address the specific measures and actions as listed in the EMP and also conditions of the EA. In this way the team will be provided the knowledge required to conduct the mining activities without resulting in environmental non-compliance, the liability of which would lie with the applicant. Secondly, informing the team of the EMP

will also assist the team in identifying if an impact is likely to occur / has occurred and communicate this appropriately to the Environmental Manager.

In order for appropriate action to be taken, proper communications network and reporting protocol must be established, with the team and the site manager reporting all environmental issues to the Environmental Manager and then all social issues to the General Manager.

4.4.5.1.14 Specific information required by the Competent Authority

The following specific information will be required by the competent authority:

- The financial provision will be reviewed annually.

1) UNDERTAKING

The EAP herewith confirms

d. the correctness of the information provided in the reports ☒

e. the inclusion of comments and inputs from stakeholders and I&APs ; ☒

f. the inclusion of inputs and recommendations from the specialist reports where relevant; ☒and

g. that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein. ☒

Signature of the Environmental Assessment Practitioner:

Eco Elementum

Name of Company:

04/08/2022

Date:

-END-

APPENDIX A: EAP CV

APPENDIX B: PUBLIC PARTICIPATION REPORT

APPENDIX C: LAYOUT MAPS

APPENDIX D: SPECIALIST STUDIES