CABANGA environmental

Telephone: +27 11 794 7534
Fax: +27 11 794 6946
E-mail: info@cabangaenvironmental.co.za

TUMELO COAL MINES (PTY) LTD

TUMELO COLLIERY

Proposed road diversion on Boschmanskop 154 IS, near the town of Pullens Hope, Mpumalanga Province

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT (EMPr)

FOR PUBLIC REVIEW & COMMENT

REFERENCE: MP30/5/1/2/2/10115MR

June 2024

Unit 5 & 6 Beyers Office Park, Bosbok Road, Randpark Ridge
Postnet Suite 470, Private Bag X3, Northriding, 2162 • www.cabangaenvironmental.co.za
Members: K.C. van Rooyen • J. Barrett •

Telephone: +27 11 794 7534
Fax: +27 11 794 6946
E-mail: info@cabangaenvironmental.co.za

PREPARED FOR:	
Company	Tumelo Coal Mines (Pty) Ltd)
Site	Tumelo Colliery
Contact Person	Elize Mostert
Telephone	066 221 3596
E-mail	elize@tumelomine.co.za

COMPLETED BY:	
Company	Cabanga Environmental
Author	Modibe Rachamose (Cand. EAP)
Reviewer	Lelani Claassen (Registered EAP)
Telephone	076-7353992
E-mail	info@cabangaenvironmental.co.za

Disclaimer

This report has been prepared by Cabanga with all reasonable skill, care and diligence within the terms of the contract with the client and taking into account of the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and any other in respect of any matters outside the scope of the project.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such parties rely on the report at their own risk.

Document Control

NAME:	**SIGNATURE:**	**DATE:**	**REASON FOR CHANGE:**
Modibe Rachamose Cand. EAP (EAPASA) (2023/6400)		30/05/2024 14/06/2024	Draft – internal review Draft – client internal review
Lelani Claassen Reg EAP (EAPASA) (2018/153) Pr. Sci. Nat.		31/05/2024	Review
Jane Barrett (Cert. Sci. Nat, SEA, GRI Certified Sustainability Professional)		14/06/2024 10/07/2024	Quality Control Client Comments
Ken van Rooyen Pr. Sci. Nat		01/07/2024	Quality Control

Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms

AEL	Atmospheric Emissions License in terms of NEMAQA
AIPs	Alien Invasive Plant species
AQMP	Air Quality Management Plan
BAR	Basic Assessment Report
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983) as amended
CBA	Critical Biodiversity Areas
DALRRD	The Department of Agriculture, Land Reform and Rural Development
dBA	Decibel (A weighted)
DEA	Department of Environmental Affairs
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation in terms of NEMA
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECA	Environmental Conservation Act, 1989 (Act No 73 of 1989)
EIA	Environmental Impact Assessment (process or report)
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GHG	Greenhouse Gas
GN	General Notice (issued under an Act, providing notice or instructions in terms of Regulations)
HGM	Hydrogeomorphic
HPA	Highveld Priority Area
IDPs	Integrated Development Plans
IWUL	Integrated Water Use License
LoM	Life of Mine
MBSP	Mpumalanga Biodiversity Sector Plan
MHSA	Mine Health and Safety Act (Act 29 of 1996) as amended
MAP	Mean annual precipitation
mm	Millimetres

MPRDA	Mineral and Petroleum Resources Development Act (Act 28 of 2002) as amended
MRA	Mining Right Area
MTPA	Mpumalanga Tourism and Parks Agency
NAAQS	National Ambient Air Quality Standards
NAEIS	National Atmospheric Emissions Inventory System
NEMA	National Environmental Management Act (Act 107 of 1998) as amended
NEMAQA	National Environmental Management: Air Quality Act (Act 59 of 2008) as amended
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004) as amended
NEMPAA	National Environmental Management: Protected Areas Act (Act 57 of 2003) as amended
NEMWA	National Environmental Management: Waste Act (Act 39 of 2004) as amended
NGERs	National Greenhouse Gas Emissions Reporting Regulations, 2017 (Notice 275 of 2017)
NHRA	National Heritage Resources Act (Act No. 25 of 1999) as amended
NPAES	National Protected Areas Expansion Strategy
NSR	Noise-sensitive Receptors
NWA	National Water Act (Act 36 of 1998) as amended
OHSA	Occupational Health and Safety Act (Act 85 of 1993)
PAOI	Project Area of Influence
PPP	Public Participation Process
SAGERS	South African Greenhouse Gas Emissions Reporting System
S&LP	Social and Labour Plan
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resource Agency
SANS	South African National Standard (followed by standard number)
SAPAD	South African Protected Areas Database
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SPLUMA	Spatial Planning and Land Use Management Act (Act No.16 of 2013)
WMA	Water Management Area
WML	Waste Management Licence in terms of NEMWA

1 INTRODUCTION

Tumelo Coal Mine is an existing, operational mine with an approved Mining Right (MP30/5/1/2/2/10115MR) and associated Environmental Management Programme report (EMPr) in terms of the Mineral and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA). The Tumelo underground mining operation is situated on the farm Boschmanskop 154 IS, near the town of Pullens Hope, under the jurisdiction of Nkangala District Municipality, Mpumalanga.

Mining of the #2 Seam at Tumelo is undertaken by means of underground bord-and-pillar methods, using continuous miners. The current coal reserves in #2 Seam will be depleted towards the end of 2025, at which time it is proposed that the pillars remaining under the existing access road will be partially extracted to optimise the reserve, extending the Life of Mine (LoM) by an additional one (1) year.

To undertake partial pillar extraction under the existing access road, it is necessary to divert the access road to an area where pillar extraction is not proposed.

The construction of the new access road triggers Listed Activities identified in the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) and as such requires Environmental Authorisation (EA) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

This report constitutes the Environmental Management Programme Report (EMPr) for the proposed access road.

1.1 Purpose of this Report

The purpose of the EMPr is to specify the proposed management, mitigation, protection or remedial measures that must be implemented to address the environmental impacts that have been identified for the construction and operation of the proposed access road. The EMPr also contains the criteria against which environmental performance and compliance must be measured.

The EMPr is considered a working document to enable effective environmental management. Tumelo Coal Mines (Pty) Ltd (the Applicant), their contractors and subcontractors will be subject to the provision of the EMPr.

1.2 Structure of this Report

The required content of an EMPr is provided in Appendix 4 of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), and shown in Table 1 with cross-references to the relevant section(s) of this report.

Table 1: Structure of the EMPr

No	Requirement	Section of report
1	An EMPr must comply with section 24N of the Act and include—	
(a)	details of–	Section 2.2

No	Requirement	Section of report
	(i) the Environmental Assessment Practitioner (EAP) who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 5
(c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Figure 6: Overall Environmental Sensitivity and Figure 7
(d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including — (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Section 9
(e)	- (repealed)	n/a
(f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Table 9
(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Table 10
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Table 10
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Table 9 and Table 10
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Table 10
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Table 10

No	Requirement	Section of report
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 10.1
(m)	an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 11
(n)	any specific information that may be required by the competent authority.	None

2 CONTACT DETAILS

2.1 Details of the Applicant

Details of the Project Applicant are provided in Table 2.

Table 2: Applicant details

Project applicant:	Tumelo Coal Mines (Pty) Ltd		
Registration no	2003/003924/07		
Contact person:	Rowan Karstel		
Alternative contact	Elize Mostert		
Postal address:	P.O.Box 158, Krugersdorp		
Postal code:	1740	Cell:	
Telephone:	066 221 3596	E-mail:	rowan@tumelomine.co.za elize@tumelomine.co.za

2.2 Details of the EAP

Cabanga Environmental has been appointed as the independent Environmental Assessment Practitioner (EAP) for the proposed Project. The details of the persons who prepared this report are provided in Table 3.

Table 3: Details of the EAP

Report Author	Modibe Rachamose (Candidate EAP)		
EAP	Lelani Claassen (Registered EAP)		
Company:	Cabanga Concepts cc (trading as Cabanga Environmental)		
Physical address:	Unit 5 & 6 Beyers Office Park, Bosbok Roar, Randpark Ridge		
Postal address:	Postnet Suite 470, Private Bag X3, Northriding, 2162		
Telephone:	011 794 7534	Fax	011 794 6946
E-mail:	info@cabangaenvironmental.co.za		

2.2.1 Summary of Past Experience

Modibe Rachamose is a registered candidate EAP (registration Number: 2023/6400) with a demonstrated history of research and report writing. He holds a BSc degree in Environmental Sciences, BSc Hons in Environmental Management and MSc in Environmental Management.

He is currently under the mentorship of Lelani Claassen, covering a wide range of skills training including but not limited to the understanding of Environmental Legislation and its application to factual scenarios; Environmental Impact Assessments; Environmental Management Plans; Monitoring and Compliance Reporting; Environmental Auditing; Water Use Licensing; Mineral Right Applications; Pre-feasibility and Feasibility Studies.

Modibe is also registered with IAIAsa (Membership No. 1553531), IAP2 (IAP2SA156) and currently in the process of registering with the South African Council for Natural Scientific Professions (SACNASP).

Lelani Claassen started her career as an environmental consultant in 2008. She holds an Honours degree in Environmental Management from UNISA, which she completed whilst working as an environmental consultant following the successful completion of a BSc Degree in Landscape Architecture from the University of Pretoria. She has also successfully completed the SABS Short-course: Environmental Legal Requirements for ISO 14001 compliance.

Her project experience is extensive in scope and covers various aspects of development including residential developments, filling stations and depots, infrastructure, and mining projects. Lelani's experience includes environmental authorisation processes, concept (Fatal Flaw), Pre-Feasibility and Feasibility Studies, environmental compliance audits and environmental-legal compliance assessments. She also has experience as an Environmental Control Officer on construction projects.

Lelani is a Registered EAP (Registration Number 2018/153) with the EAPASA, the only Registration Authority for EAPs in South Africa in terms of Section 24H of the National Environmental Management Act (NEMA). Lelani is also a Registered Scientist with SACNASP (Environmental Science (Pr. Sci. Nat 121645).

3 POLICY & LEGISLATIVE CONTEXT

A comprehensive discussion on the laws, regulations and policies is contained in Section 5 of the Basic Assessment Report (BAR) (Cabanga Environmental, 2024). This section of the EMPr aims to summarise the most pertinent legal requirements, guidelines and standards relevant to the proposed project.

Table 4: Summary of Applicable National Legislation

Title	Summary	Relevance to the Project
Constitution of the Republic of South Africa, Act 108 of 1996.	The constitution is the supreme law of the country. Law or conduct that is inconsistent with the provisions of the Constitution are invalid (Section 2). Chapter 2 details the Bill of Rights. Section 24 guarantees everybody's right to an environment that is not harmful to their health or wellbeing, and to have the environment protected for the benefit of present and future generations. Section 24 (b) promotes legislative and other measures that prevent pollution and ecological degradation, promotes conservation, and secures ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.	The National Legislative Context in terms of NEMA and other laws was developed in line with the constitutional obligations. The Applicant/Holder takes cognisance of the relevant legislative framework. Activities regarding the new access road at Tumelo Coal Mine must be undertaken with due cognisance of the constitutional obligations of the Holder of the Mining Right (Tumelo Coal Mines Pty Ltd), not to threaten the rights of people to an environment that is safe and healthy.
Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (Act No. 28 of 2002) and its Regulations.	The MPRDA is the predominant piece of legislation dealing with the acquisition of rights to search for, extract and process mineral resources in South Africa. The MPRDA came into effect on 1 May 2004. The MPRDA holds that mineral resources in South Africa belong to the Nation and that the State is the custodian thereof. Any person may apply for a mineral right by following the application procedure set out in the MPRDA and administrated by the DMRE. Applications for rights must be accepted if the application requirements are met, and if no other person holds a prospecting right, mining right, mining permit or retention permit for the same mineral on the same land. The MPRDA further states that nobody may prospect or mine without environmental authorisation (Section 5A) in terms of the NEMA.	Tumelo holds a valid Mining Right and EMP for its operations, Reference: MP 30/5/1/2/2/10115MR, comprising of 462.2117 Ha over various portions of the farm Boschmanskop 154 IS.
Mineral and Petroleum Resources Development	The MPRDAA of 2008 amended certain sections of the MPRDA to make the Minister of Mineral Resources the responsible authority for implementing environmental matters in terms of the NEMA as it relates to mining and	As the application relates to infrastructure associated with a mining operation, the Department of Mineral Resources and Energy

Title	Summary	Relevance to the Project
Amendment Act, 2008 (Act No. 49 of 2008) (MPRDAA).	prospecting operations and incidental activities, and to align the MPRDA with NEMA.	(DMRE) has been identified as the Competent Authority.
Mining Charter, 2018	Section 100(2)(a) of the MPRDA empowers the Minister to develop a Broad-Based Black Economic Empowerment (BBBEE) Charter for the South African Mining and Minerals Industry ("Mining Charter") as a regulatory instrument. One of the objectives of the MPRDA and Mining Charter is to ensure the attainment of Government's objectives to redress historical socio-economic inequalities, to ensure broad-based economic empowerment and the meaningful participation of Historically Disadvantaged Persons in the mining and minerals industry.	Tumelo Coal Mines (Pty) Ltd is jointly owned by is owned by Mmakau Mining (Pty) Ltd (51%), and Katlego Coal (Pty) Ltd (previously known as Exxaro Coal Central Limited) (49%). Procurement and employment will be undertaken in accordance with the Mine's approved Social and Labour Plan (S&LP).
Mine Health and Safety Act, 1996, (MHSA) and its Regulations.	Regulation 17(8) of the MHSA Regulations state that "no person may erect, establish or construct… any structures whatsoever within a horizontal distance of 100 (one hundred) metres from workings, unless a lesser distance has been determined safe by a professional geotechnical specialist and all restrictions and conditions determined by him or her or by the Chief Inspector of Mines are complied with."	Route B traverses an area that has been undermined in the past however, no pillar extraction has been undertaken in this area. Tumelo must submit the necessary application for exemption to the DMRE: Chief Inspector of Mines in this regard.
National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) and its Regulations	The NEMA, as amended was set in place in accordance with Section 24 of the Constitution. Section 24 (1)(a) and (b) of NEMA state that the potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorising, permitting, or otherwise allowing the implementation of an activity NEMA Regulations pertaining to the financial provision for prospecting, exploration, mining or production activities (GNR1147 –20 November 2015) (as amended).	The EIA Regulations identifies activities that require assessment due to their potential environmental impacts, and sets out the procedure for the EIA process. The application for environmental authorisation has been undertaken in terms of the provisions of NEMA.

Title	Summary	Relevance to the Project
National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) (NEMWA) and its Regulations.	Regulations to the NEMWA identifies a number of activities (Category A and B) which require a Waste Management License (WML) prior to being undertaken. Activities identified in Category C of the NEMWA Regulations (GN R 921) do not require a WML, but must comply with the relevant requirements or standards determined by the Minister. The Norms and Standards for Storage of Waste, published under Government Notice R.926 in Government Gazette 37088 of 29 November 2013 are relevant to the operations at Forzando North Coal Mine.	The construction of the proposed access road may involve the generation of construction-related waste, but does not trigger the need for a Waste Management License (WML). All wastes will feed into the existing waste streams at Tumelo Colliery, where waste must be temporarily stored and eventually disposed in accordance with the Norms and Standards and the approved EMPr.
National Water Act, 1998 (Act 36 of 1998) (NWA) and its Regulations.	The NWA is the principal Act regulating water use in South Africa, and places an obligation on the owner, occupier or person in control of land to mitigate against potential pollution of water resources, including the remediation of polluted water after closure. The Regulations on use of water for mining and related activities aimed at the protection of water resources promulgated in terms of the NWA (GN704) contains specific regulations for rehabilitation of coal residue deposits, which state that any person who establishes a coal residue deposit must rehabilitate the residue deposit to ensure compaction thereof (to prevent spontaneous combustion and minimise the infiltration of water) and to ensure that rehabilitation is implemented concurrently with the mining operation. There are two mine residue facilities remaining at Forzando North.	Tumelo has a valid Integrated Water Use License (IWUL), Licence No. 24090831, for its existing operations. However, the new access road will require an additional water use authorisation in terms of Section 21(c) and (i) of the NWA. According to the wetland baseline and risk assessment report, the preferred route (Route B) will have a Low impact on the freshwater resources and thus a General Authorisation in terms of GN 509 is applicable, as opposed to a full water use license (The Biodiversity Company, 2024a).
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) and its Regulations.	Provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA. The Act relates to the protection of species and ecosystems that warrant national protection, among others.	Certain Fauna and Flora Species of Conservation Concern (SCC) are known to occur in the general vicinity of the site however, none were encountered during the vegetation surveys. No permits for destruction or relocation of SCC are expected to be required.
National Environmental Management Protected Areas Act,	The Act provides for the protection and conservation of ecologically viable areas of South Africa's biological diversity, natural landscapes and	There are no formally protected areas in the immediate vicinity of the proposed project, the closest being the Heyns Private Nature Reserve

Title	Summary	Relevance to the Project
2003 (Act No 57 of 2003) (NEMPAA)	seascapes. It further provides for the establishment of a register of South African Protected Areas Database (SAPAD).	situated approximately 23km north-west of Tumelo Colliery.
National Protected Areas Expansion Strategy (NPAES), 2008	The goal of the NPAES is to achieve cost effective protected area expansion, thus enabling better ecosystem representation, ecological sustainability, and resilience to climate change. A comprehensive set of priority areas was compiled based on the priorities identified by provincial and other agencies in their respective protected area expansion strategies. These focus areas are generally large, intact and unfragmented and are, therefore, of high importance for biodiversity, climate resilience and freshwater protection.	The project area overlaps with priority focus areas (The Biodiversity Company, 2024b) which corresponds to a Critical Biodiversity Area (CBA) – Optimal, CBA 2.
National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004) (NEMAQA) and its Regulations.	Activities that are identified in GN 983 require an Atmospheric Emissions License (AEL). The NEMAQA further establishes National Ambient Air Quality Standards (NAAQS) (GN R 1210 of 2009) which provide the goals for air quality management plans and also provide the benchmarks by which the effectiveness of these management plans are measured. GN1123 declared the Highveld Priority Area (HPA) in terms of the NEMAQA. The HPA Air Quality Management Plan (AQMP) was published in GN144. Regulation 3 of the National Dust Regulations set out a dust fall standard for residential and non-residential areas, which may not be exceeded more than twice per year or in two consecutive months. Mines are identified in Annexure 1 of the National Atmospheric Emission Reporting Regulations, 2015 and must report annually via the National Atmospheric Emissions Inventory System (NAEIS). Furthermore, coal mines are identified as a Category A Data Provider in terms of the National Greenhouse Gas Emissions Reporting Regulations, 2017 (Notice 275 of 2017), and identified in Annexure 1 as an activity for which greenhouse gas (GHG) Emissions must be reported annually via the South African Greenhouse Gas Emissions Reporting System (SAGERS).	No listed activities are associated with the construction of the new access road at Tumelo and an AEL is not required for the operations. Specific requirements for prevention and management of dust and emissions potentially arising from the construction of the access road, and monitoring and reporting requirements are incorporated into this EMPr.

Title	Summary	Relevance to the Project
Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983) (CARA)	Provides for control over the utilisation of the natural agricultural resources of the Republic to promote the conservation of soil, water sources and vegetation and the combating of weeds and invader plants.	Relevant mitigation measures have been incorporated into this EMPr.
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)	The Act aims to promote good management and preservation of the country's Heritage Resources.	Heritage resources have been identified in the vicinity of the project, including the ruins of an old farmstead ruins and one farm cemetery. The Archaeological Impact Assessment concluded that the Phase 1 Report is considered sufficient recording of the farmstead ruins, and Tumelo may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subject to the granting of the EA (Archaetnos, 2024) The farm cemetery will not be directly impacted on by the proposed access road. Mitigation measures have been incorporated into this EMPr to prevent inadvertent damage to the graves. Furthermore, a Chance Find Protocol has been included as Appendix G - 1.
NEMA Guidelines	Various Guidelines on different aspects of integrated environmental management have been published by the Department of Environmental Affairs (currently the Department of Forestry, Fisheries and Environment, DFFE). These include (but are not limited to):	Relevant guidelines have been considered throughout the application process and the compilation of the associated reports.

Title	Summary	Relevance to the Project
	The Integrated Environmental Management (IEM) Information Series; Public Participation Guideline (2017); Guideline on Need and Desirability (2017); and Procedures for the Assessment and Minimum Criteria (National Gazettes, No. 43110 of 20 March, 2020).	
	Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013.	No changes proposed to existing, approved mining activities. This application relates to a new access road.
Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013) (SPLUMA)	SPLUMA aims to develop a framework to govern planning permissions and the lawful use of land.	In terms of SPLUMA Tumelo should ensure that the surface right areas where construction activities are undertaken is approved as such.
Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970)	The Act controls the subdivision and use of agricultural land. Land with high-value agricultural potential should be protected and not sub-divided or fragmented into smaller portions that would threaten the viability of agricultural activities.	No subdivisions are proposed.
Restitution of Land Rights Act, 1994, the Land Reform (Labour Tenants) Act, 1996 and the Extension of Security of Tenure Act, 1997	These Acts are aimed at land restitution and addressing injustices of the past by allowing for land claims and land reform.	Land on which the project infrastructure is proposed is privately owned and the Project should not directly affect labour tenants. The Department of Agriculture, Land Reform and Rural Development (DALRRD) have been included as an I&AP and will be consulted as part of the public participation process (PPP).
Local Government Municipal Systems Act, 2000 (Act No. 32 of 2000) as amended	The Act requires local government to compile an SDF, including guidelines for land use management. Additionally, Municipalities are required to develop Integrated Development Plans (IDPs).	The relevant Municipal SDFs and IDPs have been considered where relevant.

Title	Summary	Relevance to the Project
Development Facilitation Act, 1995 (Act No. 67 of 1995)	The Act promotes the integration of the social, economic, institutional and physical aspects of land development and also promotes integrated land development in rural and urban areas in support of each other. The Act encourages the availability of residential and employment opportunities in close proximity to or integrated with each other, while optimising the use of existing resources including such resources relating to agriculture, land, minerals, bulk infrastructure, roads, transportation and social facilities.	Currently one seventy-two (172) people are permanently employed at Tumelo Coal Mine. The proposed Project is not expected to contribute to permanent job creation, but rather focus on the retention of jobs by prolonging the remaining LoM. Additionally, revenue is expected to accrue to the local community through the renting of construction equipment, diesel costs, and construction material.
National Road Traffic Act, Act No. 93 of 1996 (NRTA) and National Land Transport Act, Act No. 5 of 2008 (NLTA).	These Acts relate specifically to the planning and development of transport systems and the safe use of roads.	Additional trips will be generated during construction phase however, no abnormal loads are anticipated. The impact on general traffic on the surrounding network is deemed nominal as approximately 47 trips will be distributed across a nine (9) hour work day. The majority of the trips will occur outside of peak hours.
Provincial and Local Legislation and guidelines	Mpumalanga Tourism and Parks Agency Act (Act 5 of 2005), the Mpumalanga Nature Conservation Act (Act No. 10 of 1998), Mpumalanga Spatial Development Framework (SDF) (MPSDF, 2018).	The Mpumalanga Tourism and Parks Agency (MTPA) were consulted as part of the Public Participation Process (PPP) for the proposed project. Management measures to protect natural fauna and flora in line with the Act have been included in the EMPr where relevant.
National Forests Act, 1998 (Act 84 of 1998)	Allows for the protection of certain tree species.	No Listed Tree species were identified on site.
Noise Control Regulations in terms of the Environmental	National and Local legislation governing the generation of noise or the undertaking of noisy activities, and the setting of acceptable noise limits in certain districts or types of areas.	Noise impacts from the construction operations have been assessed and relevant measures are incorporated into this EMPr where relevant.

Title	Summary	Relevance to the Project
Conservation Act, 1989 (Act No 73 of 1989) (ECA) Nkangala District Municipality: Air Quality Management By-law (Provincial Gazette No. 2701 of 10 June 2016)		
Hazardous Substances Act, 1973 (Act No 15 of 1973)	The Act provides for the control of hazardous substances (sub-divided into four groups) defined as any substance that by their nature are toxic, corrosive, irritant, flammable, sensitising or pressure generating, which may cause ill-health, injury or death in humans.	All hazardous goods and machinery will be stored at the Tumelo Colliery and managed in accordance with the approved EMPr (Digby Wells and Associates, 2006) and the Hazardous Substances Act.
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) (OHSA)	The OHSA provides for the health and safety of persons at work and other persons who may be exposed to hazards associated with a workplace, including the use of plant and machinery.	Tumelo Coal Mines (Pty) Ltd must ensure compliance to the OHSA for the construction of the access road and operation during LoM.

4 PROJECT LOCATION

4.1 Regional and Local Setting

The project area is located approximately 13 kilometres North-west of Hendrina town within the Steve Tshwete Local Municipality (MP313) of the Nkangala District Municipality (DC31), Mpumalanga province (Figure 1).

Pullens Hope is the nearest urban residential area to Tumelo Colliery and is located approximately 6km North-west of the mining right area (MRA). The area is classified as rural in nature, with a few informal residential areas located near the site.

4.2 Property Description

The approved MRA includes Portions 6, 10 (RE), 14 (RE), 21 (of Portion 6), Portion 23 (of Portion 14) and Portion 26 (of Portion 14) of the farm Boschmanskop 154 IS and extends over an area of 462.2117 Ha (Figure 2).

The boxcut decline and infrastructure area is located on Portion 6, whilst the existing and proposed new access road traverse Portions 1, 14 and 6 of the farm Boschmanskop 154 IS (see Table 5 and Figure 3 for details).

Table 5: Details of the Affected Properties

Farm	Portion Number	Title Deed No.	Registered Owner	SG Code
Boschmanskop 154 IS	Portion 1	T7397/2020	Willem Marthinus Davel	T0IS00000000015400001
Boschmanskop 154 IS	Portion 6	T334586/2007	Tumelo Coal Mines (Pty) Ltd	T0IS00000000015400006
Boschmanskop 154 IS	Portion 14 (RE)	T334586/2007	Tumelo Coal Mines (Pty) Ltd	T0IS00000000015400014

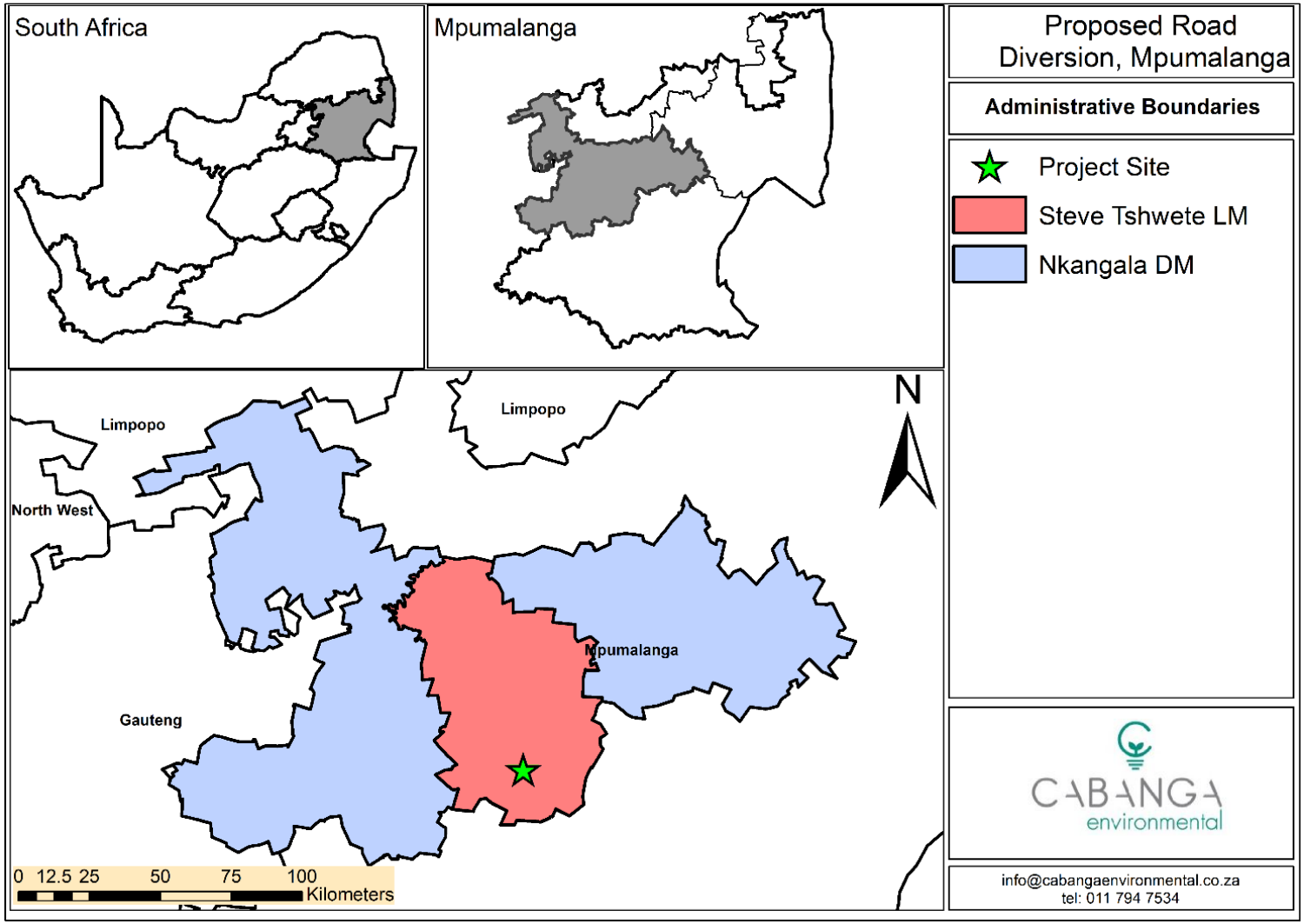


Figure 1: Tumelo Colliery relative to Administrative Boundaries

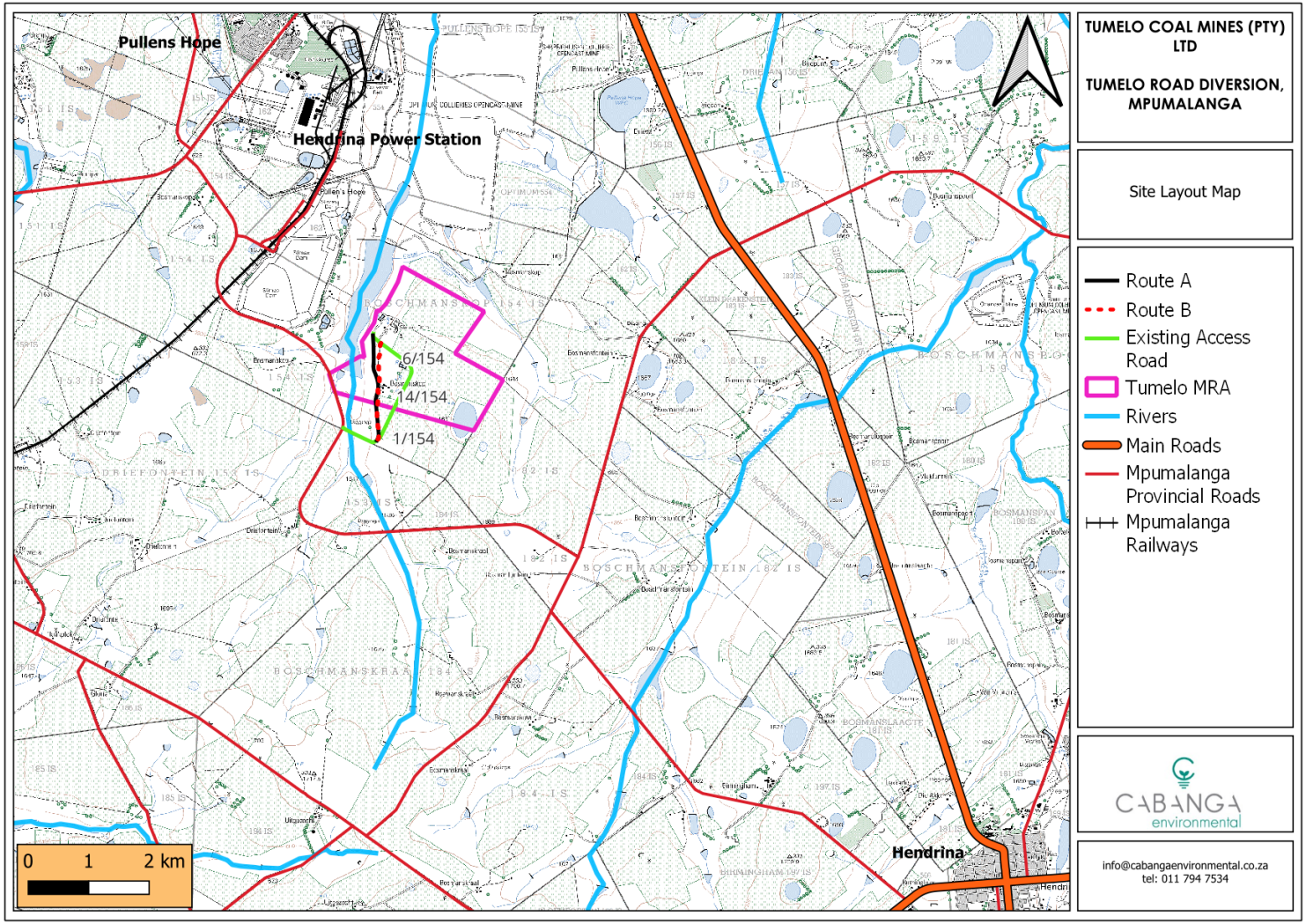
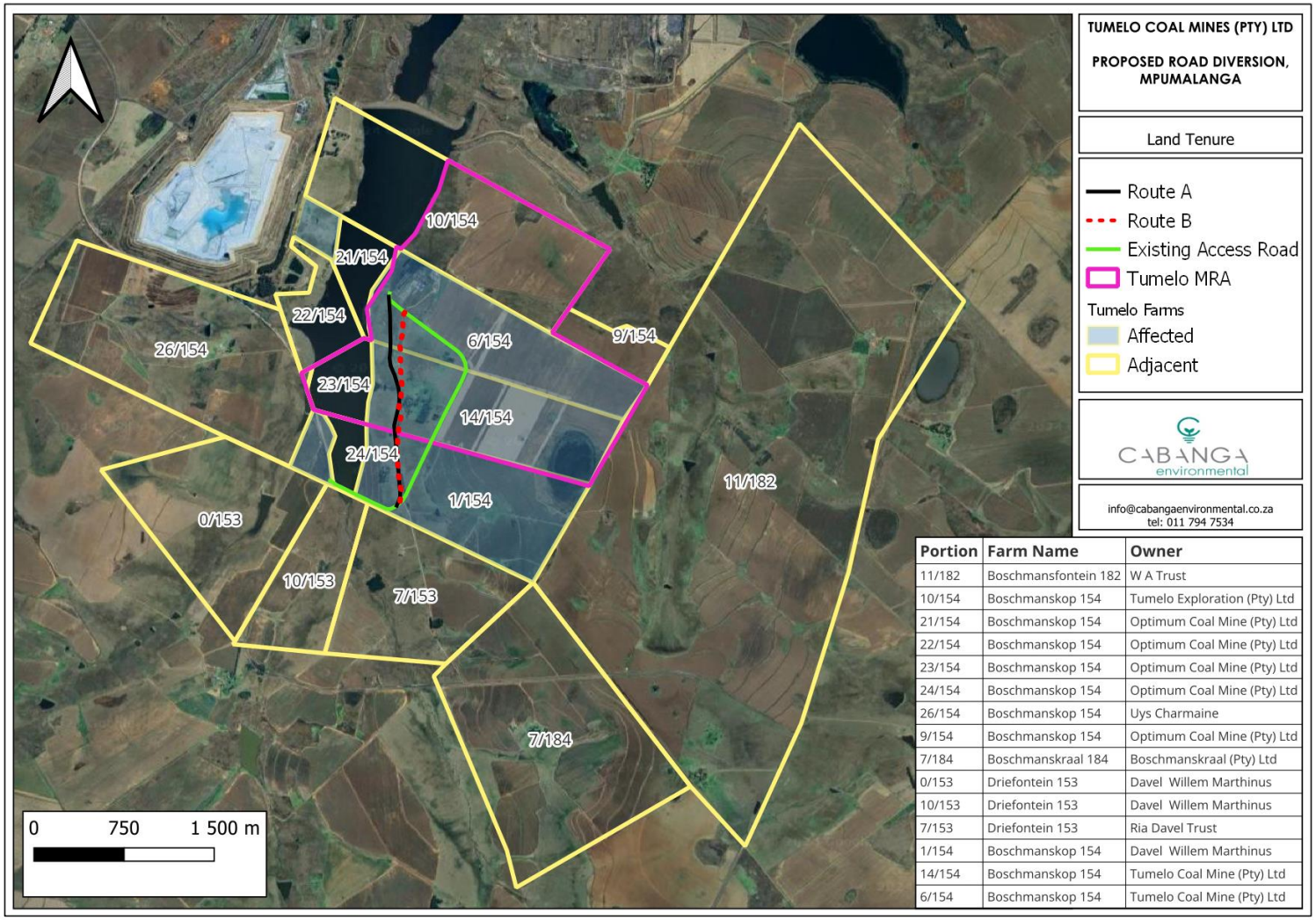


Figure 2: Locality Map (Topographic map)



Portion	Farm Name	Owner
11/182	Boschmansfontein 182	W A Trust
10/154	Boschmanskop 154	Tumelo Exploration (Pty) Ltd
21/154	Boschmanskop 154	Optimum Coal Mine (Pty) Ltd
22/154	Boschmanskop 154	Optimum Coal Mine (Pty) Ltd
23/154	Boschmanskop 154	Optimum Coal Mine (Pty) Ltd
24/154	Boschmanskop 154	Optimum Coal Mine (Pty) Ltd
26/154	Boschmanskop 154	Uys Charmaine
9/154	Boschmanskop 154	Optimum Coal Mine (Pty) Ltd
7/184	Boschmanskraal 184	Boschmanskraal (Pty) Ltd
0/153	Driefontein 153	Davel Willem Marthinus
10/153	Driefontein 153	Davel Willem Marthinus
7/153	Driefontein 153	Ria Davel Trust
1/154	Boschmanskop 154	Davel Willem Marthinus
14/154	Boschmanskop 154	Tumelo Coal Mine (Pty) Ltd
6/154	Boschmanskop 154	Tumelo Coal Mine (Pty) Ltd

Figure 3: Land Tenure

5 PROJECT DESCRIPTION

The mine holds an approved Mining Right (MP30/5/1/2/2/10115MR) and associated Environmental Management Programme report (EMPr) in terms of the Mineral and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA). It is understood that construction of the operations commenced in 2008 prior to commencement of production in 2010.

Further to this, Tumelo has Environmental Authorisation (EA) issued in terms of Section 24G of the NEMA, Reference: 17/2/10/24G NK03/2014, for auxiliary activities associated with the mining operation.

Underground mining of the No.2 Seam is currently being undertaken using mechanised bord-and-pillar methods, with partial pillar extraction (checker-boarding) on retreat. The underground reserves are accessed via a box-cut decline positioned slightly upslope of the Boschmanskop Dam. Coal is conveyed to surface where it is crushed and screened on site before being trucked to market.

The current reserves are anticipated to be depleted by the conclusion of 2026. To facilitate an extension of the Life of Mine (LoM) at Tumelo Colliery, the Mine proposes to carry out partial pillar extraction beneath the existing access road. To enable this, it becomes essential to reroute the access road to an area where pillar extraction is not intended.

5.1 Existing and Proposed Infrastructure

Existing infrastructure at Tumelo Colliery, includes:

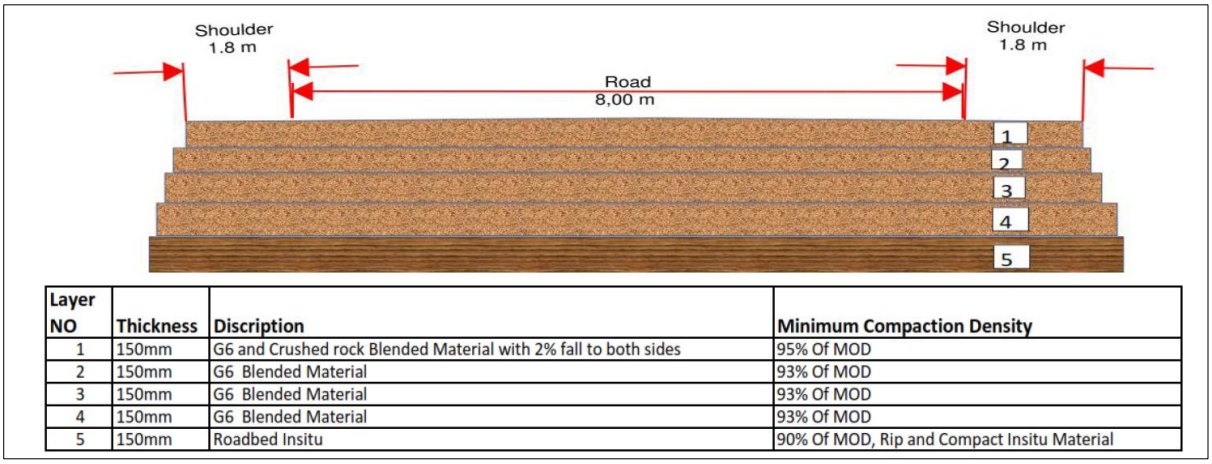
- Access and haul roads;
- Workshop area incl. stores, fuel storage, wash bay and waste management areas;
- Administrative complex incl. offices, change house, laundry and lamp room;
- Sewage treatment plant (modular package plant);
- Boxcut Adit;
- Crushing and screening plant;
- Coal stockpile area;
- Weighbridge;
- Clean and dirty water diversion drains;
- Pollution control dam (PCD);
- Overburden stockpile;
- Erikson dam;
- Pump station;
- Substation; and associated power lines.

Additional infrastructure associated with the Project and to which this EMPr relates is limited to the construction of a new access road.

5.2 Scope of the Activity

The proposed access road will be a gravel road, <2 km in length and 8 m wide with a 1.8 m gravel shoulder on either side (Figure 4). Thus, affecting a total footprint area of ~2.3 hectares (ha) (see Table 6). With the addition of 10 m on both sides of the road to allow for construction activities, the disturbed footprint increases to 6.004 ha.

Two route alternatives are currently under consideration (Figure 5). Route B is the Preferred Route for which authorisation has been sought.



Layer NO	Thickness	Discription	Minimum Compaction Density
1	150mm	G6 and Crushed rock Blended Material with 2% fall to both sides	95% Of MOD
2	150mm	G6 Blended Material	93% Of MOD
3	150mm	G6 Blended Material	93% Of MOD
4	150mm	G6 Blended Material	93% Of MOD
5	150mm	Roadbed Insitu	90% Of MOD, Rip and Compact Insitu Material

Figure 4: Layer Work Details (IWC Projects and NEP Civils, 2024)

Table 6: Summary of Project Details

	Route A: Alternative Route		Route B: Preferred Alternative	
Road Length	1.95 km		1,8 km	
Road Width	8 m, with 1.8 m shoulder either side (total of 11.6 m)		8 m, with 1.8 m shoulder either side (total of 11.6 m)	
Route Coordinates	**Latitude**	**Longitude**	**Latitude**	**Longitude**
	26° 5'9.80"S	29°36'44.61"E	26° 5'9.80"S	29°36'44.61"E
	26° 5'1.30"S	29°36'44.75"E	26° 5'1.30"S	29°36'44.75"E
	26° 4'50.68"S	29°36'44.36"E	26° 4'50.63"S	29°36'43.80"E
	26° 4'43.49"S	29°36'45.42"E	26° 4'40.27"S	29°36'44.72"E
	26° 4'40.57"S	29°36'44.75"E	26° 4'36.97"S	29°36'44.91"E
	26° 4'38.07"S	29°36'45.31"E	26° 4'31.80"S	29°36'43.75"E
	26° 4'33.36"S	29°36'45.67"E	26° 4'28.22"S	29°36'42.32"E
	26° 4'21.72"S	29°36'45.08"E	26° 4'25.91"S	29°36'42.01"E
	26° 4'18.85"S	29°36'45.92"E	26° 4'21.41"S	29°36'42.27"E
	26° 4'12.26"S	29°36'46.54"E	26° 4'8.32"S	29°36'41.83"E

5.2.1 Construction Method

The geotechnical examination highlighted several crucial findings along the intended route of the road (IWC Projects and NEP Civils, 2024):

i) No seepage was identified in any of the conducted tests.

ii) The majority of test pits revealed medium to dense consistencies, with shallow bedrock (less than 1 meter) present along most sections of the proposed route.
iii) The excavation is anticipated to be generally soft, reaching depths explored during the investigation.
iv) No problematic soils hindering future development were observed.

Based on the above, the following construction activities have been identified:

- Clearing and grubbing:
    - An excavator will be used for vegetation clearing and topsoil stripping/scraping.
    - The stripped topsoil will be stockpiled and preserved for later use during mine rehabilitation or overlaid in the same area should the road be decommissioned.
- Profiling and levelling of the road surface.
- Laying of Culverts:
    - Catchment areas and slopes in the project area will be determined for the placement of culverts.
    - The precast pipe and box culverts will be installed as per the requirements of the project (i.e. excavation, bedding, and backfilling). This includes the construction of wing walls.
- Import and placement of Non-Carbonaceous Material/Crushed Rock as Base:
    - The non-carbonaceous material will be sourced from the Tumelo overburden stockpile or blended G6 material from crushed rock exported from the adjacent Optimum Mine.
    - The placement of material, including compaction methods and layer thickness will be according to the engineering specification/requirements.
- Compaction:
    - Compaction will occur in five layers to meet the desired thickness requirements of 150 millimetres (mm) for each layer (Figure 4).
    - The compaction procedure will include specific material such as moisture, compaction layers and compaction density to ensure compliance with engineering standards as demonstrated in Figure 4.

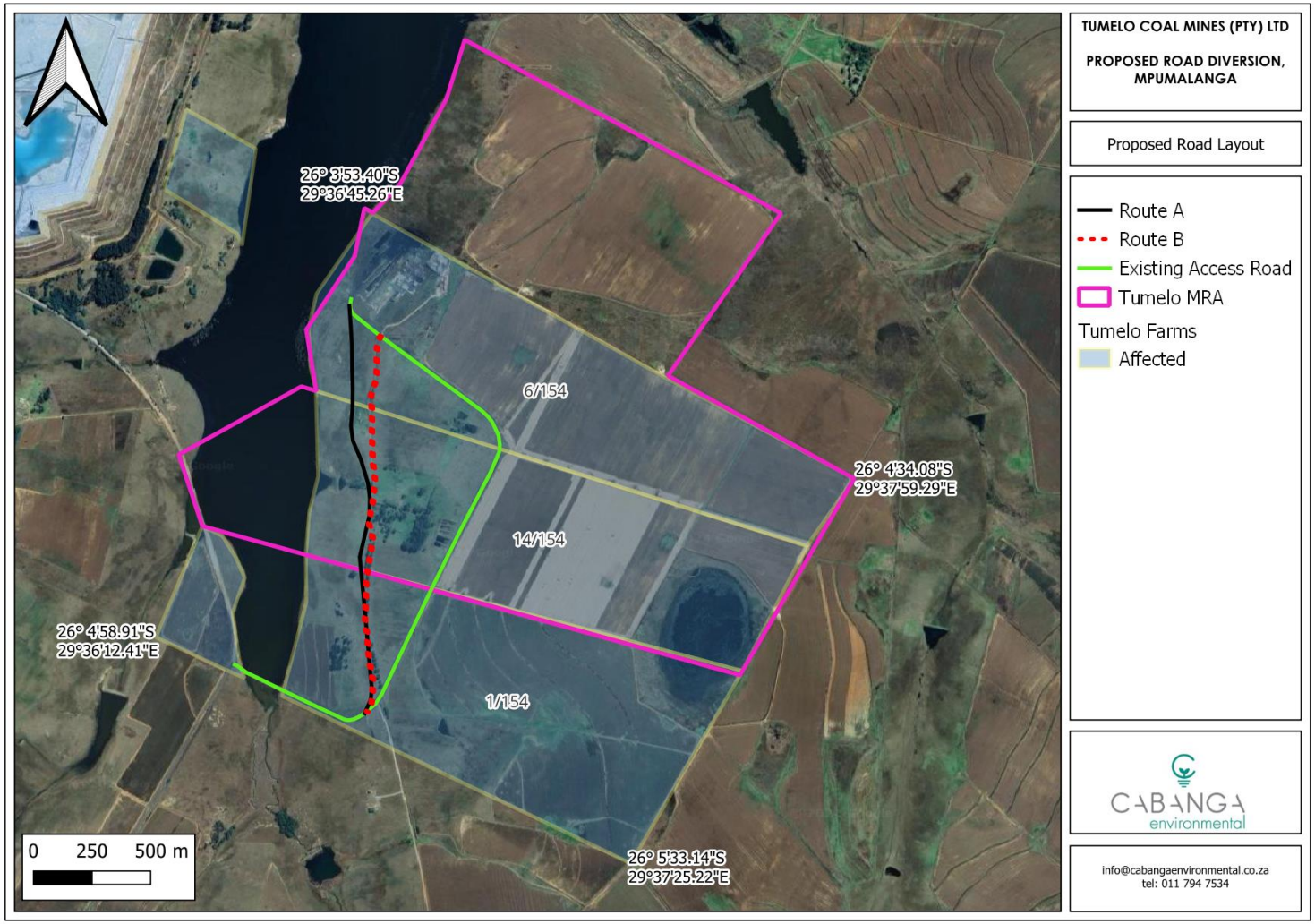


Figure 5: Proposed Layout

5.2.2 Associated Activities, Infrastructure and Services

Existing infrastructure at Tumelo Colliery will continue to be utilised. Equipment/machinery will be stored at Tumelo Colliery overnight (no construction during night-time).

5.2.2.1 Electricity Requirements

There is no electricity requirement for the project as only diesel-run equipment will be used for construction of the road.

5.2.2.2 *Water Requirements*

Drinking water for the construction personnel will be sourced from the Mine.

Process water requirements will be limited to that of dust suppression. The access road is considered to be a clean footprint area, and thus only clean water may be utilised for dust suppression purposes.

The Mine has approved IWUL, Licence No. 24090831, which authorises the abstraction of 44,400m^3/annum from the Boschmanskop Dam for mining related purposes. This should be sufficient to meet the dust suppression requirements.

5.2.2.3 *Waste Management*

During construction of the road various waste streams will be generated, including potentially hazardous and general waste. Sufficient bins will be provided to ensure separation of general and hazardous waste at source. Bins will be emptied into skips at the existing Tumelo Colliery (still separated as either general or hazardous waste). Skips are removed from Tumelo by contractors for disposal to relevant recyclers/landfill (as the case may be). No landfill sites have/will be constructed on site or at the Tumelo Colliery.

A portable chemical toilet will be provided for construction personnel. These will be serviced by a reputable contractor, the Environmental Manager will be required to retain proof of safe and lawful disposal of sewage.

5.2.3 Employment

Currently one hundred and seventy-two (172) people are permanently employed at Tumelo Colliery. The proposed Project is not expected to contribute to permanent job creation, but rather focus on the retention of jobs by prolonging the remaining LoM by an additional year.

5.2.4 Emissions

No scheduled gaseous emissions will take place on site and the proposed project does not require a License in terms of the National Environmental Management: Air Quality Act, 2004 (Act No 39 of 2004) (NEMAQA).

Vehicles and machinery will emit fumes but will be serviced and maintained regularly in accordance with a service schedule to keep these emissions within the relevant vehicle/machine's specifications.

Dust is and will continue to be monitored and managed on site to ensure these are within the standards set by the Department of Environmental Affairs (DEA) as well as that of the Mine Health and Safety Act.

5.3 Timeframes and Implementation of the Project

The construction phase of the road is anticipated for the first quarter of 2025, and should take no longer than 6 months to complete. This will extend the LoM by an additional one (1) year, on top of the remaining eighteen (18) months. Decommissioning and Closure activities associated with the Mine are expected to take a further five (5) years.

The Environmental Authorisation has been sought for a period of eight (8) years.

6 EXISTING SITE ATTRIBUTES

Just as a project is associated with certain impacts on the environment in which it is undertaken, the existing environment can also influence a proposed development in terms of design, location, technology and layout. It is therefore important to define the environmental baseline conditions (*status quo*) or context of a proposed development project.

The Baseline Environment is defined in detail in the BAR which was compiled for the application for Environmental Authorisation. Table 7 provides a summary of environmental aspects of the Mine and proposed project site.

Table 7: Summary of Baseline Environment

Aspect	Description
Climate	The proposed project site is located in the Eastern Plateau Highveld climate zone of the Mpumalanga Province. The region generally experiences a sub-tropical climate with warm, rainy summers and cold winters. The mean annual precipitation (MAP) for the project area is +700 millimetres (mm) and annual evaporation is 1,552 mm/a. Average monthly temperatures range from 3 – 25 ºC, with the highest temperatures observed over summer (October - March). Minimum temperatures are observed during winter (July). Relative humidity is lowest during the spring and summer months. The predominant wind directions at the project site, as observed from January 2016 to December 2018, are from the east (~12% of the time), east-northeast (~11% of the time) and north-west (~10.3% of the time). Wind speeds for the three-year period were generally moderate to fast with calm conditions, defined as wind speeds less than 1 m/s, observed for 10.25% of the time(Rayten Environmental and Engineering Consultants, 2020).
Geology	The geological composition of the region south and southeast of Middelburg primarily consists of sediments from the Ecca Formation of the Karoo Supergroup. The Ecca Formation comprises shale, shaly sandstone, grit, sandstone, conglomerate, and coal in certain locations near the base and top. This area falls within the Springs-Emalahleni Coalfield, extending approximately 180 km from Brakpan and Springs in the west to Belfast in the east, with an irregular northern margin defined by the Vryheid Formation. The southern margin is delineated by pre-Karoo granite and felsite hills, separating it from the Highveld Coalfield. Notable mines in the region include Woestalleen Colliery, Optimum Colliery, Arnot Colliery, Black Wattle Colliery, and Graspan Colliery. The Selons River Formation of the Rooiberg Group is present to the south and

Aspect	Description
	southeast, while the geology towards Loskop Dam features the Loskop and Wilge River Formations of the Waterberg Group. The project area lies in the central part of the main Karoo Basin where the dominant rocks are the older Karoo Supergroup shales and sandstones. Ancient lavas of the Rooiberg Group are present. The much younger sands and alluvium of Quaternary age unconformably overlie the Karoo rocks especially along rivers and streams (Bamford, 2024).
Topography	The topography in the project area is typical of the Highveld grassland and is characterised by slight to moderately undulating plains, including some low hills and pan depressions (The Biodiversity Company, 2024a). The project area ranges from 1 604 to 1 656 metres about mean sea level (mamsl). Surface drainage will follow the contours towards the Boschmanskop Dam, located downslope of the proposed access road.
Land Use, Soils and Land Capability	The surrounding land uses include natural veld, grazing (livestock), waterbodies, mining and power generation (The Biodiverity Company, 2024c). According to the South African National Land Cover dataset (2018) much of the Project Area is classified as "Grassland" interspersed with "Cultivated Land" and "Wetlands/Water Courses". The soil and agricultural assessment identified six (6) soil forms within a 50 m buffer of the project road, and its alternative. Soil forms identified included Carolina, Glenrosa, Katspruit, Kroonstad, Mispah and Oakleaf. The land capability of the above-mentioned soils has been determined to be class "IV" and "VI". Given the low MAP and high evaporation, a climate capability level 7 has been assigned to the project area. By using the determined land capability and the determined climate capability, a land potential of "L5" and "L6" has been calculated – these areas are considered non-arable. Moreover, no historical nor actively cultivated crop fields were found within the proposed project area (The Biodiverity Company, 2024c).
Water Resources	The site falls within the quaternary catchment B12B of the Olifants Water Management Area 2 (WMA2). Several river systems drain this catchment, the most prominent being the Klein-Olifants River, Woes-Alleenspruit and Rietkuilspruit. In the immediate vicinity of the study area, two smaller drainage systems, the East Woes-Alleenspruit and an unnamed tributary, are located to the east and west. Both these features flow north for 15 km until it drains into the Woes-Alleenspruit. Another prominent water feature in the area is the Boschmanskop Dam. This dam, located to the immediate west of the project area, was constructed to divert clean water from a neighbouring opencast operation, Optimum Colliery (Mucina & Rutherford, 2006). As per the MBSP (MTPA, 2014) freshwater Ecological Support Areas (ESAs) have been identified in the project area of interest (PAOI). The ESAs relate to the Boschmanskop Dam and unnamed perennial stream and are required to maintain landscape connectivity to downstream Critical Biodiversity Areas (CBA's). Five (5) hydrogeomorphic (HGM) units were delineated within the PAOI. The wetland units represent two (2) wetland types namely, seep wetlands (HGM 1

Aspect	Description
	to HGM4) and channelled valley bottom wetlands (HGM 5) (The Biodiversity Company, 2024a). The ecosystem service scores of the delineated wetland ranged from Intermediate to High and the EIS scores was determined to be Moderate and High. The wetlands presented PES scores of C Moderately Modified due to the modification of the substrate and mostly vegetation of the wetland through anthropogenic activities, with the main activities being vegetation clearance, alien invasives and agricultural activities (grazing) (The Biodiversity Company, 2024a).
Biodiversity	The project area is located within the Eastern Highveld Grassland national vegetation type of the Mesic Highveld Grassland Bioregion. The Eastern Highveld Grassland is listed as Endangered on the revised national list of threatened ecosystems for South Africa and is characterised by slight to moderately undulating plains consisting of low hills and pan depressions with scattered rocky outcrops (Mucina & Rutherford, 2006). According to the National Protected Areas Expansion Strategy, 2018 (NPAES) a small portion of the proposed access road (aligned to the existing farm road) overlaps with priority focus areas for expansion. The priority focus area largely correlates with Critical Biodiversity Areas (CBAs) as identified in the Mpumalanga Biodiversity Sector Plan (MBSP). It is however noted that the majority of the project area overlaps with Other Natural Areas, with some Heavily Modified (The Biodiversity Company, 2024b). Four (4) habitat types were identified within the POAI namely: water resources (associated with HGM2 and HGM3); rocky grasslands; disturbed grasslands; and modified areas. These were categorised as having Very Low to Medium site ecological importance (The Biodiversity Company, 2024b).
Heritage and Archaeology	Two heritage resources have been identified within the vicinity of the project area: • Ruins of an old farmstead; and • A farm cemetery. Due to the close proximity of the farmstead to the existing farm road, construction activities (and decommissioning, if applicable) could pose a direct threat to the ruins – specifically the old animal kraal located <10 m from the proposed road. The cultural significance of the farm yard is considered to be Low, and was assigned a field rating of IIIC by the Specialist. The Archaeological Impact Assessment concluded that the Phase 1 Report is considered sufficient recording of the farmstead ruins, and Tumelo may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subject to the granting of the EA (Archaetnos, 2024). Graves are always assigned a High Cultural Significance and should be managed in-situ if possible. As the farm cemetery is located >200 m from the proposed access route, no direct impacts are anticipated however, they should be managed accordingly.

Aspect	Description
Paleontological Setting	The Project area falls within the Vryheid Formation of the Ecca Group. The Vryheid Formation contains the unique Glossopteris flora, which thrived as the continent shifted towards the poles and the climate became warmer. The formation is characterised by coal seams that formed over time from peat deposits, which were buried and altered by heat and pressure. Of the coal seams in this part of the Highveld Coalfield, the uppermost coal seam is about 15 m below the land surface and overlain by more than 10 m of recent sediments and a narrow band of shale. The Alfred and Gus seams are more than 50 m below the surface. The coal seams do not preserve any recognisable fossils as the peats have been altered considerably by heat and pressure. However, the surrounding shales and shale lenses might hold preserved plant fossils. Given the presence of roughly 10m of modern soil above the uppermost shale layer, and the proposed dirt road with a maximum depth of around one meter, construction is unlikely to disturb any potential fossils (Bamford, 2024).
Air Quality	The site is within the Highveld Priority Area. Existing land use activities that could have significant impacts on air quality in the region, include power generation, coal mining, coal transport and coal processing, vehicle movement on unpaved roads and dust from agricultural activities. The proposed project is not expected to violate the HPA due to its small footprint and the type of construction planned.
Noise	HECS Occupational Hygiene Services cc undertakes annual ambient noise monitoring at four (4) sites located within the mining right area (MRA). Average daytime and nighttime readings were recorded on 29 January 2024 and compared against the SANS 10103: 2008 Standards. All recorded measurements were within the allowable limits, <35 dBA for nighttime and <45 dBA for daytime (HECS Occupational Hygiene Services cc, 2024). A Noise Compliance Statement and Screening Noise Report was carried out by Enviro-Acoustic Research cc for the proposed access road project. Only one noise sensitive receptor (NSR) was identified in the vicinity of the project area. The proposed access road will be constructed approximately 376 m from the identified NSR (EARES, 2024).
Socio-Economic	The Nkangala District Municipality's overall Gross Domestic Product (GDP) amounted to R121 billion, and it held the top position among all regional economies in contributing to the total GDP of Mpumalanga Province. This comparative size ranking within Nkangala has remained consistent since 2006. Despite a slightly reduced share in 2016 (36.8%) compared to 2006 (37.1%), the municipality's position in relation to other regions has remained unchanged. Over the period from 2006 to 2016, Nkangala demonstrated the second-highest average annual growth rate of 1.0% among its counterparts when considering constant 2010 prices (Nkangala District Municipality, 2020/21). Locally, during the period from 2006 to 2016, Steve Tshwete exhibited the highest average annual economic growth among the regions within the Nkangala District Municipality, recording an average of 4.16%. Following closely, the Thembisile Hani local municipality secured the second-highest average annual growth rate at 2.75%. In contrast, the Emalahleni local municipality had the least favourable performance, experiencing the lowest

Aspect	Description
	average annual growth rate at -1.35% over the same period (Nkangala District Municipality, 2020/21). The construction of the access road will increase the LoM by an additional year and thereby prolonging the employment of the current employees (180 employees) by 1 year. Additional employment opportunities are expected to accrue to the local communities during construction phase.

7 ENVIRONMENTAL SENSITIVITY IN RELATION TO THE PROJECT

The sensitive environmental features associated with the Project area are as follows:

- Watercourses;
- Delineated wetlands;
- Heritage Sites and Graves;
- Terrestrial CBAs;
- Freshwater ESAs; and
- NPAES Focus Areas.

Figure 6 depicts the environmentally sensitive areas, in relation to the proposed access road.

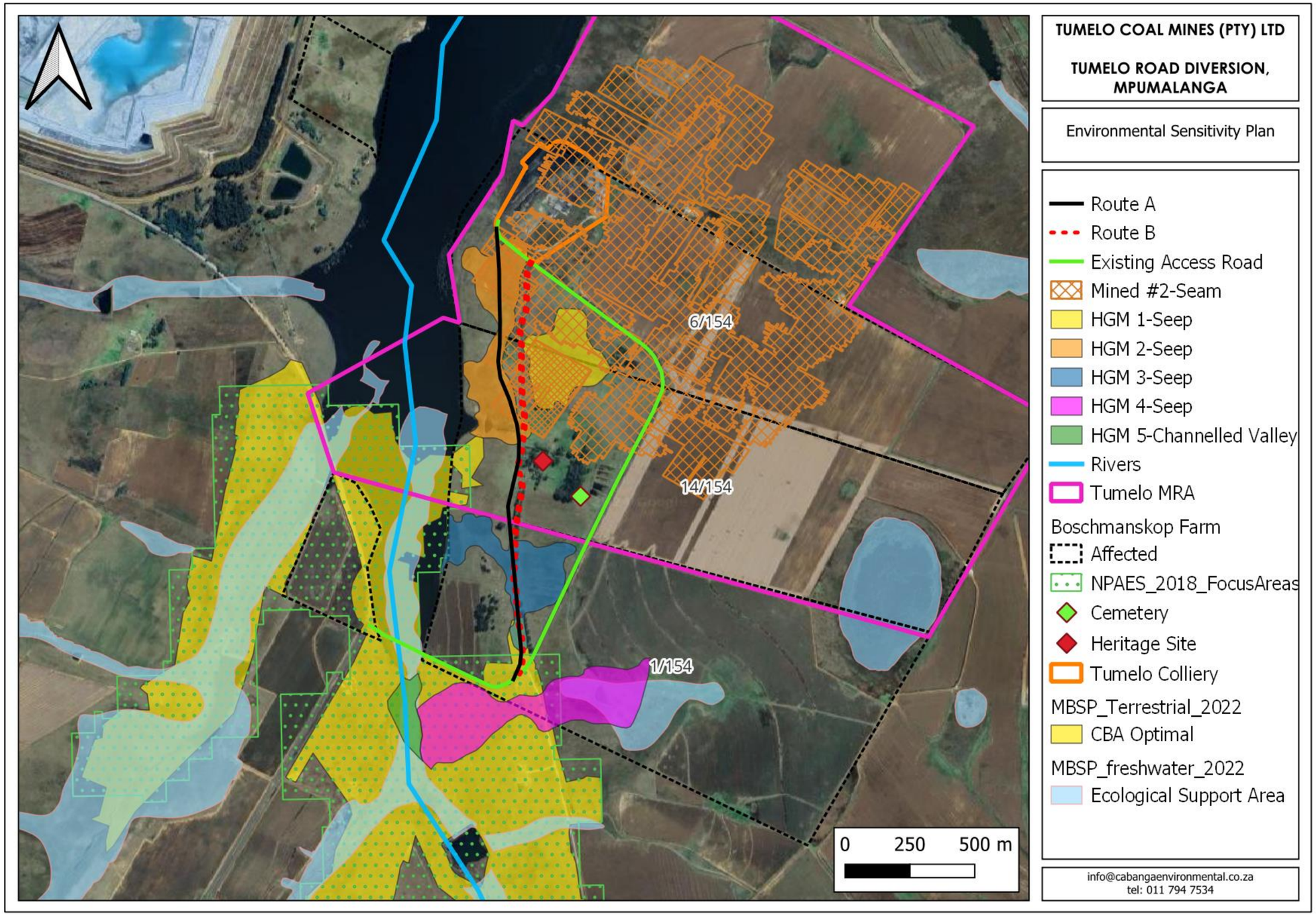


Figure 6: Overall Environmental Sensitivity

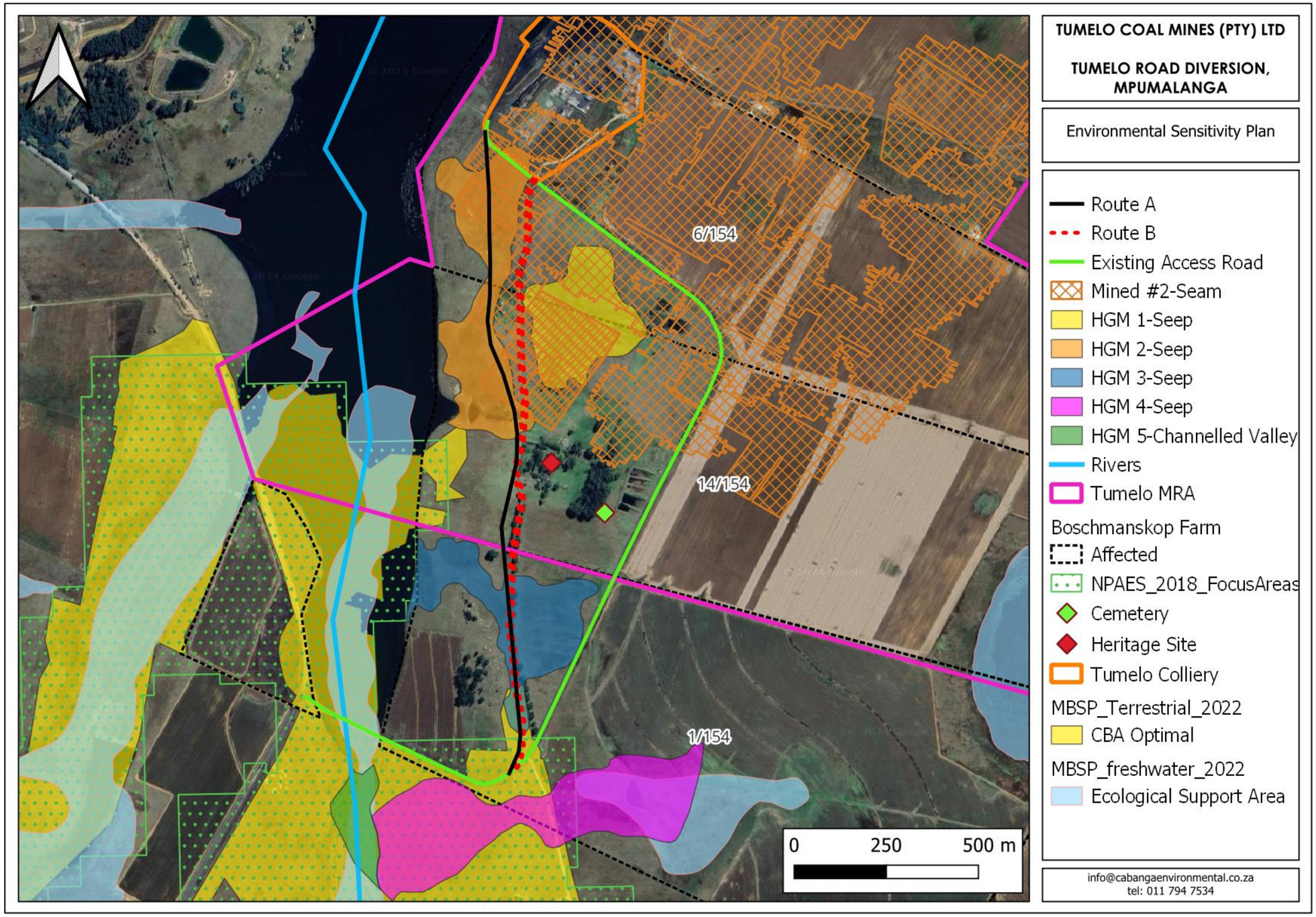


Figure 7: Environmental Sensitivity – Zoomed In

8 FINDINGS OF THE IMPACT ASSESSMENT

A detailed impact assessment was completed for the BAR as part of the Application for EA for the proposed new access road. The findings of the Impact Assessment are summarised in Table 8 overleaf, where the following potential negative impacts were rated as *Moderate*, before the implementation of mitigation measures:

- Direct disturbance / degradation / loss to wetland soils or vegetation due to the clearing and construction activities (Both Alternatives).
- Proliferation of alien invasive species due to surrounding disturbances (Both Alternatives).
- Deterioration in surface water quality due to increased erosion and sedimentation (Route A).
- Potential contamination of wetlands and water resources with machine oils construction materials (Route A).
- Altered hydrology due to hardened surfaces and stormwater channelling (Both Alternatives).
- Increased dust and emissions from earthworks and construction machinery/vehicles (Both Alternatives).
- Increased dust and emissions from the transportation, handling and transfer of crushed rock material (Both Alternatives).
- Pollution and littering through inappropriate management of domestic and Industrial waste (Route A).
- Contamination and siltation of the wetland systems from coal dust and dust carried by trucks (Route A).
- Vehicle-entrained dust emissions from the unpaved road (Both Alternatives).

After the application of mitigation measures most of these impacts can be reduced to a *Low* significance, with only the following Negative impacts remaining as *Moderate*:

- Direct disturbance / degradation / loss to wetland soils or vegetation due to the clearing and construction activities (Both Alternatives).
- Altered hydrology due to hardened surfaces and stormwater channelling (Route A).

Note: The pre-construction/planning and design phase were not assessed in the BAR as the impacts associated with these activities will not occur during this phase, but rather during subsequent on-site activities.

Table 8: Impact Assessment

No.	Activity	Impact / Risk Description	Aspect	Phase	Nature of Impact	Significance (without Mitigation)		Mitigation Possible?	Significance (with Mitigation)	
1A	Clearing of vegetation; stripping and stockpiling of topsoil	Loss of agricultural potential by soil degradation. Erosion due to disturbance can lead to loss of topsoil and agricultural land capability (Both Alternatives).	Land Use, Soils & Agricultural Potential	All Phases	Negative	36	Low	**Yes**	18	Insignificant
1B		Direct disturbance / degradation / loss to wetland soils or vegetation due to the clearing and construction activities (Route A).	Water Resources, Aquatic Biodiversity	Construction	Negative	55	Moderate	**Yes**	50	Moderate
1C		Direct disturbance / degradation / loss to wetland soils or vegetation due to the clearing and construction activities (Route B).			Negative	50	Moderate	**Yes**	36	Low
1D		Proliferation of alien invasive species due to surrounding disturbances (Route A).	Water Resources, Aquatic Biodiversity, Terrestrial Biodiversity	All Phases	Negative	42	Moderate	**Yes**	26	Low
1E		Proliferation of alien invasive species due to surrounding disturbances (Route B).			Negative	39	Low	**Yes**	24	Low
1F		Deterioration in surface water quality due to increased erosion and sedimentation (Route A).	Water Resources	All Phases	Negative	42	Moderate	**Yes**	28	Low
1G		Deterioration in surface water quality due to increased erosion and sedimentation (Route B).			Negative	33	Low	**Yes**	26	Low
1H		Loss of natural vegetation (Both Alternatives).	Terrestrial Biodiversity	Construction & Decommissioning	Negative	35	Low	**Yes**	30	Low
1I		Loss of functional habitat (Both Alternatives).		Construction & Decommissioning	Negative	14	Insignificant	**Not Required**	14	Insignificant
1J		Destruction of SCC (Both Alternatives).		Construction & Decommissioning	Negative	22	Low	**Yes**	10	Insignificant

No.	Activity	Impact / Risk Description	Aspect	Phase	Nature of Impact	Significance (without Mitigation)		Mitigation Possible?	Significance (with Mitigation)	
1K		Clearing and stripping activities could destroy unidentified heritage resources (Both Alternatives).	Heritage, Archaeology & Palaeontology	Construction	Negative	32	Low	**Yes**	28	Low
1L		Increased noise levels associate with the use of construction vehicles and machinery (Both Alternatives).	Noise	Construction & Decommissioning	Negative	24	Low	**Yes**	18	Insignificant
2A	Construction Earthworks (excavation, grading, profiling and laying of crushed rock), including the installation of culverts	Potential for spills and/or leaks from heavy machinery and vehicles onsite. Loss of agricultural potential by soil degradation (Both Alternatives)	Land Use, Soils & Agricultural Potential	All phases	Negative	18	Insignificant	**Not Required**	18	Insignificant
2B		Displacement of faunal community due to habitat loss and disturbance (noise, dust and vibration) (Both Alternatives).	Terrestrial Biodiversity	All Phases	Negative	32	Low	**Yes**	27	Low
2C		Potential contamination of wetlands and water resources with machine oils construction materials (Route A).	Water Resources, Aquatic Biodiversity	Construction & Decommissioning	Negative	42	Moderate	**Yes**	28	Low
2D		Potential contamination of wetlands and water resources with machine oils construction materials (Route B).			Negative	39	Low	**Yes**	26	Low
2E		Altered hydrology due to hardened surfaces and stormwater channelling (Route A).	Water Resources	All phases	Negative	55	Moderate	**Yes**	45	Moderate
2F		Altered hydrology due to hardened surfaces and stormwater channelling (Route B).			Negative	50	Moderate	**Yes**	32	Low
2G		Direct mortality of fauna through traffic, illegal collecting and/or poaching (Both Alternatives).	Terrestrial Biodiversity	Construction & Decommissioning	Negative	30	Low	**Yes**	20	Low

No.	Activity	Impact / Risk Description	Aspect	Phase	Nature of Impact	Significance (without Mitigation)		Mitigation Possible?	Significance (with Mitigation)	
2H		Potential damage to the old farmstead ruins, particularly the old animal kraal (Both Alternatives).	Heritage, Archaeology & Palaeontology	Construction & Decommissioning	Negative	32	Low	**Yes**	16	Insignificant
2I		Disturbance of fossils (Both Alternatives).	Heritage, Archaeology & Palaeontology	Construction & Decommissioning	Negative	12	Insignificant	**Not Required**	12	Insignificant
2J		Increased dust and emissions from earthworks and construction machinery /vehicles (Both Alternatives).	Air Quality	Construction & Decommissioning	Negative	44	Moderate	**Yes**	20	Low
2K		Potential damage to the farm cemetery (Both Alternatives).	Heritage, Archaeology & Palaeontology	Construction & Decommissioning	Negative	32	Low	**Yes**	14	Insignificant
2L		Increased noise levels associate with the use of construction vehicles and machinery (Both Alternatives).	Noise	Construction & Decommissioning	Negative	24	Low	**Yes**	18	Insignificant
3A	Transportation of construction personnel, construction equipment and material (incl. crushed rock) to site	Increased dust and emissions from the transportation, handling and transfer of crushed rock material (Both Alternatives).	Air Quality	Construction	Negative	44	Moderate	**Yes**	20	Low
3B		Increased noise levels associated with the hauling of material to site.	Noise	Construction	Negative	32	Low	**Yes**	21	Low
3C		Increase in traffic on the direct road network (i.e. D2539, D622) and further network (R38, R542 and N11) which could result in delays and congestion (Both Alternatives).	Traffic	Construction & Decommissioning	Negative	32	Low	**Yes**	21	Low
4A	Presence of construction personnel on site	Pollution and littering through inappropriate management of domestic and Industrial waste (Route A).	Water Resources, Aquatic Biodiversity, Terrestrial Biodiversity	Construction & Decommissioning	Negative	40	Moderate	**Yes**	20	Low
4B		Pollution and littering through inappropriate management of domestic and Industrial waste (Route B).			Negative	36	Low	**Yes**	18	Insignificant

No.	Activity	Impact / Risk Description	Aspect	Phase	Nature of Impact	Significance (without Mitigation)		Mitigation Possible?	Significance (with Mitigation)	
4C		Nuisance noise from employees onsite (Both Alternatives).	Noise	Construction & Decommissioning	Negative	15	Insignificant	**Not Required**	15	Insignificant
4D		Increased risk of unfamiliar people may result in a risk of safety to the landowner/user. Increased risk of stock theft/loss (Both Alternatives).	Social / Socio-economic	Construction & Decommissioning	Negative	24	Low	**Yes**	12	Insignificant
4E		Increased risk for veldt fires (Both Alternatives).	Social / Socio-economic	Construction & Decommissioning	Negative	36	Low	**Yes**	20	Low
5A	Utilisation of the access road, hauling of coal, employees, services etc.	Potential contamination of wetlands and watercourses with truck fuel and oil spills (Route A).	Water Resources, Aquatic Biodiversity	Operational	Negative	39	Low	**Yes**	24	Low
5B		Potential contamination of wetlands and watercourses with truck fuel and oil spills (Route A).			Negative	36	Low	**Yes**	22	Low
5C		Contamination and siltation of the wetland systems from coal dust and dust carried by trucks (Route A).	Water Resources, Aquatic Biodiversity	Operational	Negative	42	Moderate	**Yes**	28	Low
5D		Contamination and siltation of the wetland systems from coal dust and dust carried by trucks (Route B).			Negative	39	Low	**Yes**	26	Low
5E		Vehicle-entrained dust emissions from the unpaved road (Both Alternatives).	Air Quality	Operational	Negative	48	Moderate	**Yes**	22	Low
5F		Although the project is not expected to result in any new job opportunities, the extended LoM will result in the continued employment of Mine personnel.	Social / Socio-economic	Operational	Positive	55	Moderate	**Not Required**	55	Moderate
5G	Decommissioning and rehabilitation of the road (if not required by the end land user)	Soil replacement, amelioration and seeding. Vegetative cover and plant community succession. Influx of animals to the area once vegetation re-establishes.	Land Use, Soils & Agricultural Potential, Terrestrial Biodiversity	Decommissioning and Closure	Positive	55	Moderate	**Not Required**	55	Moderate

9 ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS AND OUTCOMES

Impact Management should be proportionate to the significance of an impact prior to the implementation of mitigation measures and aim to reduce either the probability of an impact occurring, or the consequence of an impact (in terms of its duration, scale or intensity).

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 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.

Table 9 indicates management actions and outcomes required for each of the identified impacts during the relevant phases.

Table 9: Impact Management Actions and Outcomes

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
1A	Loss of agricultural potential by soil degradation. Erosion due to disturbance can lead to loss of topsoil and agricultural land capability (Both Alternatives).	Land Use, Soils & Agricultural Potential	Vegetation clearance must be restricted to areas authorised for development. Land clearing and preparation may only be undertaken immediately prior to construction activities and within authorised areas. A detailed stormwater management plan must be developed and implemented for the project. If soil erosion is detected, the area must be stabilised using geo-textiles and facilitated re-vegetation.	Protect the soil physical and chemical properties as far as possible. Prevent erosion from occurring, thereby preventing loss of soil, vegetation communities and siltation of downstream water bodies.	CARA and NEMA Regulations regarding the remediation of soil. General duty of care in terms of NEMA.	All Phases	Visual inspections. EMPr Compliance Audit	Weekly Annually	Environmental Manager External Auditor
1B	Direct disturbance / degradation / loss to wetland soils or vegetation due to the clearing and construction activities (Route A).	Water Resources, Aquatic Biodiversity	The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Silt traps and fences must be placed in the preferential flow paths along the proposed road to prevent sedimentation of the watercourse. A suitable storm water plan must be compiled for the project. This plan must attempt to displace and divert storm water from the road and discharge the water into adjacent areas without eroding the receiving areas. It is preferable that run-off velocities be reduced with energy dissipaters and flows discharged into the local watercourses. The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly. It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces. Prevent uncontrolled access of vehicles through the water resources system that can cause a significant adverse impact on the hydrology and alluvial soil structure of these areas. All chemicals and toxicants to be used for the construction must be stored outside the wetland system and in a bunded area (preferably at the existing purpose-built facilities at Tumelo Coal Mine). All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site (preferably at	To prevent, wherever possible, the loss of fertile soil and impacts to intact terrestrial ecosystems. To ensure continued functioning of the aquatic ecosystems.	Compliance with NEMBA, NEMA and NWA.	Construction Phase	Visual inspections. EMPr Compliance Audit	Weekly Annually	Environmental Manager External Auditor
1C	Direct disturbance / degradation / loss to wetland soils or vegetation due to the clearing and construction activities (Route B).								

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
			the existing purpose-built facilities at Tumelo Coal Mine). All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks, avoidance of heritage resources, keeping to the approved site footprint and general good "housekeeping". Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems. All removed soil and material must not be stockpiled within the system. Stockpiling should take place outside of the watercourse. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds. Erosion and sedimentation must be minimised through the effective stabilisation (Reno mattresses) and the re-vegetation of any disturbed slopes. Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil;						
1D	Proliferation of alien invasive species due to surrounding disturbances (Route A).	Water Resources, Aquatic Biodiversity, Terrestrial Biodiversity	The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Implement the alien management plan as outlined in Appendix G - 2. Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil. Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species.	To prevent, wherever possible, impacts to intact terrestrial ecosystems and protected species.	Compliance with NEMBA and CARA.	All Phases	Visual inspections. EMPr Compliance Audit	Weekly Annually	Environmental Manager External Auditor
1E	Proliferation of alien invasive species due to surrounding disturbances (Route B).								
1F	Deterioration in surface water quality due to increased erosion and sedimentation (Route A).	Water Resources	Silt traps and fences must be placed in the preferential flow paths along the proposed road to prevent sedimentation of the watercourse.	Protect the soil physical and chemical properties as far as possible.	Compliance with NEMBA, NEMA and NWA.	All Phases	Visual inspections. EMPr	Weekly Annually	Environmental Manager

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
1G	Deterioration in surface water quality due to increased erosion and sedimentation (Route B).		Temporary storm water channels should be filled with aggregate and/or logs (branches included) to dissipate flows. A suitable storm water plan must be compiled for the project. This plan must attempt to displace and divert storm water from the road and discharge the water into adjacent areas without eroding the receiving areas. It is preferable that run-off velocities be reduced with energy dissipaters and flows discharged into the local watercourses. It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces. Prevent uncontrolled access of vehicles through the water resources system that can cause a significant adverse impact on the hydrology and alluvial soil structure of these areas. All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks, avoidance of heritage resources, keeping to the approved site footprint and general good "housekeeping". All removed soil and material must not be stockpiled within the system. Stockpiling should take place outside of the watercourse. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds. Erosion and sedimentation must be minimised through the effective stabilisation (Reno mattresses) and the re-vegetation of any disturbed slopes. Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil.	To ensure continued functioning of the aquatic ecosystems.			Compliance Audit		External Auditor
1H	Loss of natural vegetation (Both Alternatives).	Terrestrial Biodiversity	Prevent the further loss and fragmentation of indigenous vegetation communities within the ecosystem in the vicinity of the PAOI, by limiting project activities to the approved, minimum necessary footprints. Activities must be restricted to the demarcated low and medium sensitivity habitats. Make use of existing roads as far possible.	To prevent, wherever possible, the loss of fertile soil and impacts to intact terrestrial ecosystems.	Compliance with NEMBA and NEMA.	Construction & Decommissioning Phase	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
			Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type. Prevent the direct and indirect loss and disturbance of flora and fauna species and communities. It should be made an offence for any staff to /take bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants. All contractors and employees should undergo induction which is to include a component of environmental awareness.						
11	Loss of functional habitat (Both Alternatives).		Prevent the further loss and fragmentation of indigenous vegetation communities within the ecosystem in the vicinity of the PAOI, by limiting project activities to the approved, minimum necessary footprints. Activities must be restricted to the demarcated low and medium sensitivity habitats. Make use of existing roads as far possible. Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type. Reduce the negative fragmentation effects of the development and enable the safe movement of fauna species (Culverts can act as passageways for wildlife, allowing them to cross under roads safely and maintain connectivity	To prevent loss of functional habitat.	Compliance with NEMBA and NEMA.	Construction & Decommissioning Phase	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
			between habitats. Regular maintenance ensures that these passages remain clear of debris and accessible for wildlife use). It should be made an offence for any staff to /take bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants. All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.						
1J	Destruction of SCC (Both Alternatives).		Prevent the further loss and fragmentation of indigenous vegetation communities within the ecosystem in the vicinity of the PAOI, by limiting project activities to the approved, minimum necessary footprints. Activities must be restricted to the demarcated low and medium sensitivity habitats. Make use of existing roads as far possible. All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	To prevent the destruction of threatened and endangered species.	Compliance with NEMBA and NEMA.	Construction & Decommissioning Phase	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
1K	Clearing and stripping activities could destroy unidentified heritage resources (Both Alternatives).	Heritage, Archaeology & Palaeontology	Should any graves/fossils/archaeological artefacts be unearthed, all work must stop, and the chance find procedure (Appendix G - 1) implemented. All employees and contractors should receive Health and Safety induction which must include an environmental awareness component, including information on the chance find protocol.	To prevent where possible the destruction of heritage resources.	Compliance with the NHRA. General Duty of Care in terms of NEMA.	Construction Phase	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
1L	Increased noise levels associate with the use of construction vehicles and machinery (Both Alternatives).	Noise	Ensure regular vehicle maintenance is undertaken, as per supplier specification, to prevent the noise that can be generated by vehicles and machinery in disrepair. Machinery will be switched off when not in use. Limit construction activities to daytime hours.	To minimise the generation of nuisance noises and address complaints where possible.	General duty of Care in terms of NEMA. Compliance with ECA and the Noise Control Regulations (GN R154).	Construction & Decommissioning Phase	Inspect Complaints register	Weekly	Environmental Manager

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
			All employees and contractors should receive Health and Safety induction which must include an environmental awareness component, including noise.						
2A	Potential for spills and/or leaks from heavy machinery and vehicles onsite. Loss of agricultural potential by soil degradation (Both Alternatives)	Land Use, Soils & Agricultural Potential	The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly. All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site (preferably at the existing purpose-built facilities at Tumelo Coal Mine). All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks, avoidance of heritage resources, keeping to the approved site footprint and general good "housekeeping".	Protect the soil physical and chemical properties as far as possible.	Compliance with NEMBA and NEMA.	All Phases	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
2B	Displacement of faunal community due to habitat loss and disturbance (noise, dust and vibration) (Both Alternatives).	Terrestrial Biodiversity	Make use of existing roads as far possible. Reduce the negative fragmentation effects of the development and enable the safe movement of fauna species (Culverts can act as passageways for wildlife, allowing them to cross under roads safely and maintain connectivity between habitats. Regular maintenance ensures that these passages remain clear of debris and accessible for wildlife use). All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	To prevent, wherever possible, the loss of fertile soil and impacts to intact terrestrial ecosystems.	Compliance with NEMBA and NEMA.	All Phases	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
2C	Potential contamination of wetlands and water resources with machine oils and construction materials (Route A).	Water Resources, Aquatic Biodiversity	All construction activities and access must make use of the existing road. The footprint area of the construction should be kept to a minimum. The footprint area must be	To ensure continued functioning of the aquatic ecosystems.	Compliance with NEMBA and NEMA.	Construction & Decommissioning Phase	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
2D	Potential contamination of wetlands and water resources with machine oils construction materials (Route B).	Water Resources	clearly demarcated to avoid unnecessary disturbances to adjacent areas. The water resources outside of the specific project site area must be avoided. Laydown yards, camps and storage areas must be beyond the aquatic areas. The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly. Prevent uncontrolled access of vehicles through the water resources system that can cause a significant adverse impact on the hydrology and alluvial soil structure of these areas. All chemicals and toxicants to be used for the construction must be stored outside the wetland system and in a bunded area (preferably at the existing purpose-built facilities at Tumelo Coal Mine). All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site (preferably at the existing purpose-built facilities at Tumelo Coal Mine). All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks, avoidance of heritage resources, keeping to the approved site footprint and general good "housekeeping". Treat all hydrocarbon spills as hazardous waste and dispose of accordingly.						External Auditor
2E	Altered hydrology due to hardened surfaces and stormwater channelling (Route A).		Temporary storm water channels should be filled with aggregate and/or logs (branches included) to dissipate flows. The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. The water resources outside of the specific project site area must be avoided. A suitable storm water plan must be compiled for the project. This plan must attempt to displace and divert storm water from the road and discharge the water into adjacent areas without	Protect the soil physical and chemical properties as far as possible. To ensure continued functioning of the aquatic ecosystems.	Compliance with NEMBA, NWA and NEMA.	All Phases	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
2F	Altered hydrology due to hardened surfaces and stormwater channelling (Route B).								

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
			eroding the receiving areas. It is preferable that run-off velocities be reduced with energy dissipaters and flows discharged into the local watercourses.						
2G	Direct mortality of fauna through traffic, illegal collecting and/or poaching (Both Alternatives).	Terrestrial Biodiversity	Make use of existing roads as far possible. Reduce the negative fragmentation effects of the development and enable the safe movement of fauna species (Culverts can act as passageways for wildlife, allowing them to cross under roads safely and maintain connectivity between habitats. Regular maintenance ensures that these passages remain clear of debris and accessible for wildlife use). All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	To prevent, wherever possible, the loss and illegal capture of faunal species.	Compliance with NEMBA and NEMA.	Construction & Decommissioning Phases	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
2H	Potential damage to the old farmstead ruins, particularly the old animal kraal (Both Alternatives).	Heritage, Archaeology & Palaeontology	All vehicles and personnel must make use of existing routes/roads as far as possible. Demarcate the construction footprint and laydown area. Limit construction and vegetation clearance activities to this area. The Archaeological Impact Assessment concluded that the Phase 1 Report is considered sufficient recording of the farmstead ruins, and Tumelo may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subject to the granting of the EA (Archaetnos, 2024) All employees and contractors should receive Health and Safety induction which must include an environmental awareness component, including information on the chance find protocol (Appendix G - 1).	To prevent where possible the destruction of heritage resources.	Compliance with the NHRA. General Duty of Care in terms of NEMA.	Construction & Decommissioning Phases	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
2I	Disturbance of fossils (Both Alternatives).	Heritage, Archaeology & Palaeontology	All vehicles and personnel must make use of existing routes/roads as far as possible. Demarcate the construction footprint and laydown area. Limit construction and vegetation clearance activities to this area.	To prevent where possible the destruction of heritage resources.	Compliance with the NHRA. General Duty of Care in terms of NEMA.	Construction & Decommissioning Phases	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
			Should any graves/fossils/archaeological artefacts be unearthed, all work must stop and the chance find procedure implemented (Appendix G - 1). All employees and contractors should receive Health and Safety induction which must include an environmental awareness component, including information on the chance find protocol.						
2J	Increased dust and emissions from earthworks and construction machinery /vehicles (Both Alternatives).	Air Quality	Demarcate the construction footprint and laydown area. Limit construction and vegetation clearance activities to this area. Do not leave areas bare for extended periods, only clear vegetation as construction progresses. Areas that have been disturbed but will not undergo development must be revegetated with indigenous vegetation. A water cart will be used to spray gravel roads and relevant areas when dust levels are high. Restrict speed limits on unpaved areas and roads. Ensure trucks are covered with tarpaulins. Vehicles and machinery will be regularly serviced as per the manufacturer's guidelines. Optimise the loading of haul trucks and adjust construction truck engines to ensure optimal energy efficiency. Where possible, use cleaner fuels.	Minimise emissions from vehicles and machinery on site.	General duty of care in terms of NEMA. Compliance with NEMAQA and National Greenhouse Gas Emissions Reporting Regulations, 2017 (Notice 275 of 2017) (NGERs)	Construction Phase	Dust Fallout Monitoring EMPr Compliance Audit.	Monthly Annually	Environmental Manager External Auditor
2K	Potential damage to the farm cemetery (Both Alternatives).	Heritage, Archaeology & Palaeontology	The farm cemetery should be cordoned off and no surface activities allowed within 100 m of the site. All vehicles and personnel must make use of existing routes/roads as far as possible. Demarcate the construction footprint and laydown area. Limit construction and vegetation clearance activities to this area. Should any graves/fossils/archaeological artefacts be unearthed, all work must stop and the chance find procedure implemented (Appendix G - 1). All employees and contractors should receive Health and Safety induction which must include an environmental awareness component, including information on the chance find protocol.	To prevent where possible the destruction of heritage resources.	Compliance with the NHRA. General Duty of Care in terms of NEMA.	Construction & Decommissioning Phases	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
2L	Increased noise levels associate with the use of construction vehicles and machinery (Both Alternatives).	Noise	Ensure regular vehicle maintenance is undertaken, as per supplier specification, to prevent the noise that can be generated by vehicles and machinery in disrepair. Machinery will be switched off when not in use. Limit construction activities to daytime hours. All employees and contractors should receive Health and Safety induction which must include an environmental awareness component, including noise.	To minimise the generation of nuisance noises and address complaints where possible.	General duty of Care in terms of NEMA. Compliance with ECA and the Noise Control Regulations (GN R154).	Construction & Decommissioning Phases	Inspect Complaints register.	Weekly	Environmental Manager
3A	Increased dust and emissions from the transportation, handling and transfer of crushed rock material (Both Alternatives).	Air Quality	A water cart will be used to spray gravel roads and relevant areas when dust levels are high. Restrict speed limits on unpaved areas and roads. Ensure trucks are covered with tarpaulins. Vehicles and machinery will be regularly serviced as per the manufacturer's guidelines. Optimise the loading of haul trucks and adjust construction truck engines to ensure optimal energy efficiency. Where possible, use cleaner fuels.	Minimise emissions from vehicles and machinery on site.	General duty of care in terms of NEMA. Compliance with NEMAQA and National Greenhouse Gas Emissions Reporting Regulations, 2017 (Notice 275 of 2017) (NGERs)	Construction Phase	Dust Fallout Monitoring EMPr Compliance Audit.	Monthly Annually	Environmental Manager External Auditor
3B	Increased noise levels associated with the hauling of material to site.	Noise	Ensure regular vehicle maintenance is undertaken, as per supplier specification, to prevent the noise that can be generated by vehicles and machinery in disrepair. Machinery will be switched off when not in use. Limit construction activities to daytime hours. All employees and contractors should receive Health and Safety induction which must include an environmental awareness component, including noise.	To minimise the generation of nuisance noises and address complaints where possible.	General duty of Care in terms of NEMA. Compliance with ECA and the Noise Control Regulations (GN R154).	Construction Phase	Inspect Complaints register.	Weekly	Environmental Manager
3C	Increase in traffic on the direct road network (i.e. D2539, D622) and further network (R38, R542 and N11) which could result in delays and congestion (Both Alternatives).	Traffic	The delivery of material machinery to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods as much as feasible. Regular maintenance of gravel roads located within the site boundary, including the access roads to the site, by the Contractor during the construction phase (including dust suppression).	To minimise disruption to existing road network and traffic. To prevent road safety incidents.	Compliance with National Road Traffic Act, Act No. 93 of 1996 (NRTA).	Construction & Decommissioning Phases	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
			The use of existing licensed quarries near the site would decrease the traffic impact on the surrounding road network, if available. Staff and general trips should occur outside of peak traffic periods as far as possible. Vehicular movements within the site boundary are the responsibility of the respective Contractor and the Contractor must ensure that all construction road traffic signs and road markings (where applicable) are in place. The Contractor needs to ensure that the gravel sections of the routes (i.e., the access routes to site (D2539, D622)) remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed. Construction vehicles to adhere to road safety principles and laws when traveling on roads in the vicinity of the project site.						
4A	Pollution and littering through inappropriate management of domestic and Industrial waste (Route A).	Water Resources, Aquatic Biodiversity, Terrestrial Biodiversity	The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly. All chemicals and toxicants to be used for the construction must be stored outside the wetland system and in a bunded area (preferably at the existing purpose-built facilities at Tumelo Coal Mine). All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site (preferably at the existing purpose-built facilities at Tumelo Coal Mine). All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks, avoidance of heritage resources, keeping to the approved site footprint and general good "housekeeping". Siltation from coal dust during transportation must be reduced by ensuring that truck have sails on,	To prevent, wherever possible, the loss of fertile soil and impacts to intact terrestrial ecosystems. To ensure continued functioning of the aquatic ecosystems.	Compliance with NEMBA, CARA. NWA and NEMA.	Construction & Decommissioning Phase	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
4B	Pollution and littering through inappropriate management of domestic and Industrial waste (Route B).								

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
			covering the coal before departing from the yards. No dumping of construction material on-site may take place; and All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials must be undertaken, using the existing facilities at Tumelo Coal Mine. Effluent from chemical toilets is to be removed by a registered company and disposed of at the nearest sewage facility in accordance with the relevant national legislation. The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly. All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site (preferably at the existing purpose-built facilities at Tumelo Coal Mine). All contaminated soil / yard stone shall be treated in situ or removed and treated as hazardous waste.						
4C	Nuisance noise from employees onsite (Both Alternatives).	Noise	Ensure regular vehicle maintenance is undertaken, as per supplier specification, to prevent the noise that can be generated by vehicles and machinery in disrepair. Machinery will be switched off when not in use. Limit construction activities to daytime hours. All employees and contractors should receive Health and Safety induction which must include an environmental awareness component, including noise.	To minimise the generation of nuisance noises and address complaints where possible.	General duty of Care in terms of NEMA. Compliance with ECA and the Noise Control Regulations (GN R154).	Construction & Decommissioning Phase	Inspect Complaints register.	Weekly	Environmental Manager.
4D	Increased risk of unfamiliar people may result in a risk of safety to the landowner/user. Increased risk of stock theft/loss (Both Alternatives).	Social / Socio-economic	Contractors and site personnel must carry company identification. Any employee or contractor found guilty of stock theft and/or misconduct will be dealt with according to Tumelo's disciplinary procedures. All contractors and site personnel must undergo induction and environmental awareness training to this affect.	To prevent theft and promote safety of persons.	General duty of Care in terms of NEMA.	Construction & Decommissioning Phase	Visual inspections, keeping track of administration documents, EMPr Compliance Audit.	Weekly Annually	SHE Manager. External Auditor.

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
4E	Increased risk for veldt fires (Both Alternatives).	Social / Socio-economic	No open fires will be permitted on site. Fire extinguishers will be provided. Tumelo will join the local fire protection association. In the event that there is no fire protection association Tumelo will join local community groups to stay in contact with local landowners and users. All contractors and site personnel must undergo induction and environmental awareness training to this affect.	To prevent veld fires and promote safety of persons.	Compliance with National Veld and Forest Fire Act, Act 101 of 1998 and CARA.	Construction & Decommissioning Phase	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
5A	Potential contamination of wetlands and watercourses with truck fuel and oil spills (Route A).	Water Resources, Aquatic Biodiversity	The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Laydown yards, camps and storage areas must be beyond the aquatic areas. The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly. All chemicals and toxicants to be used for the construction must be stored outside the wetland system and in a bunded area (preferably at the existing purpose-built facilities at Tumelo Coal Mine). All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site (preferably at the existing purpose-built facilities at Tumelo Coal Mine). All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks, avoidance of heritage resources, keeping to the approved site footprint and general good "housekeeping". Treat all hydrocarbon spills as hazardous waste and dispose of accordingly.	Protect the soil physical and chemical properties as far as possible. To ensure continued functioning of the aquatic ecosystems.	Compliance with NEMBA and NEMA.	Operational Phase	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor
5B	Potential contamination of wetlands and watercourses with truck fuel and oil spills (Route B).								
5C	Contamination and siltation of the wetland systems from coal dust and dust carried by trucks (Route A).	Water Resources, Aquatic Biodiversity	Siltation from coal dust during transportation must be reduced by ensuring that truck have sails on, covering the coal before departing from the yards.	Protect the soil physical and chemical properties as far as possible.	Compliance with NEMBA, NEMA and NWA.	Operational Phase	Visual inspections. EMPr	Weekly Annually	Environmental Manager

No.	Impact / Risk Description	Aspect	Mitigation measures	Impact Management Outcome	Compliance with standard	Time Period for Implementation of Mitigation Measure	Monitoring Specification	Monitoring Frequency	Person responsible
5D	Contamination and siltation of the wetland systems from coal dust and dust carried by trucks (Route B).		Appropriate dust control and dust suppression measures should be implemented.	To ensure continued functioning of the aquatic ecosystems.			Compliance Audit.		External Auditor
5E	Vehicle-entrained dust emissions from the unpaved road (Both Alternatives).	Air Quality	A water cart will be used to spray gravel roads and relevant areas when dust levels are high. Restrict speed limits on unpaved areas and roads.	Minimise emissions from vehicles and machinery on site.	General duty of care in terms of NEMA. Compliance with NEMAQA and	Operational Phase	Dust Fallout Monitoring. EMPr Compliance Audit.	Monthly Annually	Environmental Manager. External Auditor.
5F	Although the project is not expected to result in any new job opportunities, the extended LoM will result in the continued employment of mine personnel.	Social / Socio-economic	Employment and procurement to be undertaken in accordance with the approved Social and Labour Plan. Prioritise the use of local contractors/suppliers as far as possible. Manage job-seeker expectations and ensure clear communication.	Ensure positive socio-economic impacts are maximised.	Compliance with the S&LP and Mining Charter.	Construction Phase	Review SLP requirements	As and when required	Social Manager.
5G	Soil replacement, amelioration and seeding. Vegetative cover and plant community succession. Influx of animals to the area once vegetation re-establishes.	Land Use, Soils & Agricultural Potential, Terrestrial Biodiversity	A detailed stormwater management plan must be developed and implemented for the project. If soil erosion is detected, the area must be stabilised using geo-textiles and facilitated re-vegetation.	Prevent erosion from occurring, thereby preventing loss of soil, vegetation communities and siltation of downstream water bodies.	CARA, MPRDA and NEMA Regulations regarding the remediation of soil. General duty of care in terms of NEMA.	Decommissioning Phase	Visual inspections. EMPr Compliance Audit.	Weekly Annually	Environmental Manager External Auditor

10 MONITORING AND REPORTING REQUIREMENTS

This section of the report contains the monitoring, auditing and reporting requirements relevant to the mine regarding the proposed access road.

Table 10 contains a summary of the monitoring plans that must be implemented and identifies the person responsible for undertaking the audit / monitoring and the frequency of each monitoring /auditing and reporting exercise.

Table 10: Monitoring, Auditing and Reporting Summary

Aspect	Monitoring description	Person responsible for monitoring	Frequency of monitoring	Reporting requirements
General compliance – all EMPr commitments	Visual inspections	Environmental Manager	Weekly	Internal
	Internal audits	Environmental Manager	Monthly	Internal – maintain register
	External Regulation 34 Audits	Independent External Auditor	Annually	DMRE (note: PPP to be undertaken if audit findings result in the need for EMPr Amendment)
Rehabilitation	Assessment of Quantum for Financial Provision	Independent Specialist	Annually	Report to DMRE
Biodiversity	Aquatic Biomonitoring	Independent Specialist	Bi-Annually	Annual Report to DWS
	Monitoring the establishment and spread of Alien Invasive Plant Species.	Environmental Manager	Quarterly	Internal – maintain records
		Independent Specialist	Annually	Report to DMRE (Financial Provision & EMPr Compliance)
Water Resources	Continue with Surface Water Monitoring. No additional monitoring points required for the proposed access road.	Samples: Environmental Manager and/or Specialist Analysis: SANAS accredited laboratory; Reporting: suitably qualified independent specialist	Monthly	Quarterly Report to DWS
	Continue with Groundwater Monitoring. No additional monitoring points required for the proposed access road.		Quarterly	
Air Quality	Monthly Dust Fallout Monitoring must continue at the existing 4 buckets.	Environmental Manager and/or Specialist	Monthly	Annual Reporting to the National Atmospheric

Aspect	Monitoring description	Person responsible for monitoring	Frequency of monitoring	Reporting requirements
	Additional monitoring points to be established along the access road.			Emissions Inventory System (NAEIS)
	Greenhouse Gas (GHG)[1] Reporting	Environmental Manager and/or Specialist	Annually	Annual Reporting to the National Atmospheric Emissions Inventory System (NAEIS).
Noise	Continue with occupational noise monitoring at the mine. No additional points required for the proposed access road.	SHE Manager	Monthly	Internal
	Continue with ambient noise monitoring at the mine infrastructure area. No additional noise monitoring points required for the proposed access road.	Environmental Manager and/or Specialist	Annually	Internal

10.1 Specific Monitoring Programmes

10.1.1 Water Monitoring

Tumelo Colliery currently undertakes water monitoring at its operations. The surface water monitoring network comprises five (5) in-stream monitoring points, and two (2) process water points (PCD and Ericksen Dam). Whilst the groundwater monitoring network includes eight (8) boreholes (Table 11). Figure 8 indicates the proposed access road in relation to these monitoring points.

The existing monitoring network is considered sufficient and no additional monitoring points are proposed for the project.

Table 11: Surface and Groundwater Monitoring Network

	ID	Description	Coordinates	
Monthly	**Surface water Localities**			
	BMKSW01	Woes-Alleenspruit upstream of Boschmanskop dam	26° 6'4.39"S	29°36'50.40"E

[1] GHG Emissions Reporting is also required to also comply with the Carbon Tax Act.

	ID	Description	Coordinates	
	BMKSW02	Woes-Alleenspruit tributary upstream of Boschmanskop dam	26° 6'0.40"S	29°36'5.00"E
	BMKSW03	Pan	26° 5'1.54"S	29°37'29.46"E
	BMKSW04	Boschmanskop dam	26° 3'13.54"S	29°36'35.24"E
	BMKSW05	Downstream from Boschmanskop Dam	26° 3'3.96"S	29°36'46.51"E
	BMKSW06	Pollution Control Dam (PCD)	26° 3'57.70"S	29°36'47.27"E
	BMKSW07	Ericksen Dam	26° 4'0.70"S	29°36'50.92"E
Quarterly	**Groundwater Localities**			
	BMKGW03	Borehole replaced BMKGW03 in July 2012	26° 4'33.74"S	29°37'58.84"E
	BMKGW04	Borehole adjacent to pan	26° 4'58.61"S	29°37'25.43"E
	TC01	Adjacent to Boschmanskop dam and plant area	26° 3'57.38"S	29°36'45.18"E
	DS1	New monitoring borehole (Jan 2016)	26° 3'55.40"S	29°36'42.26"E
	DS3	New monitoring borehole (Jan 2016)	26° 3'58.21"S	29°36'42.80"E
	DS4	New monitoring borehole (Jan 2016)	26° 3'53.17"S	29°36'44.14"E
	DS5	New monitoring borehole (Jan 2016)	26° 3'58.21"S	29°36'40.68"E
	DS6	New monitoring borehole (Jan 2016)	26° 3'54.29"S	29°36'47.12"E

A third-party, SANAS accredited laboratory is used for the analysis of the water samples. The following constituents are analysed:

Chemical Constituents:

- Total Alkalinity;
- Chloride (Cl);
- Sulphate (SO_4);
- Orthophosphate (PO_4) as P;
- Ammonium (NH_4) as N;
- Nitrate (NO_3) as N;
- Fluoride (F);
- pH;
- Electrical conductivity (EC);
- Suspended Solids (SS);
- Ca Mg Na K;
- Al Fe Mn Cr;
- Total Hardness;
- Calcium Hardness;
- Magnesium Hardness;
- Total Dissolved Solids (TDS);
- Sodium Adsorption Ratio (SAR);
- Bicarbonate alkalinity;
- Carbonate alkalinity; and

- Langelier saturation index (LSI).

10.1.2 Aquatic Biomonitoring

Toxicity testing is undertaken bi-annually at two sites within the East Woes-Alleenspruit, with one site being upstream (TM-1) and the other downstream (TM-2) of Tumelo Colliery. To ensure the prompt identification and mitigation of negative impacts, it is imperative to continue biomonitoring in the future. This should involve an analysis of seasonal variations and temporal trends, particularly if any spatial degradation is observed downstream from the mine and associated access road.

Biomonitoring locations are listed in Table 12 and depicted in Figure 8. Biomonitoring of these sites should continue bi-annually (every 6 months), once during the rainy season and once during the dry season. Although some sites may be dry over winter, the sites must still be visited and assessed where possible.

Table 12: Biomonitoring Sites

ID:	COORDINATES:		DESCRIPTION:
TM-1	26° 5'3.63"S	29°36'27.99"E	Toxicity testing only
TM-2	26° 3'4.54"S	29°36'47.32"E	Toxicity testing only

10.1.3 Dust Fallout Monitoring

Dust fallout monitoring is undertaken at Tumelo Colliery, at four (4) monitoring locations on a monthly basis (Table 13). It is proposed that the monitoring network be expanded to include the additional monitoring points along the access road, the location of these additional monitoring points are to be determined with consideration to the prominent wind direction.

Monitoring and reporting must be undertaken in accordance with NEMAQA and the National Dust Control Regulations, 2013.

Table 13: Existing Dust Monitoring Network

ID:	COORDINATES:	
BMK1	26° 4'7.85"S	29°36'43.58"E
BMK2	26° 3'59.50"S	29°36'45.60"E
BMK3	26° 3'59.80"S	29°36'57.50"E
BMK4	26° 4'9.60"S	29°36'51.80"E

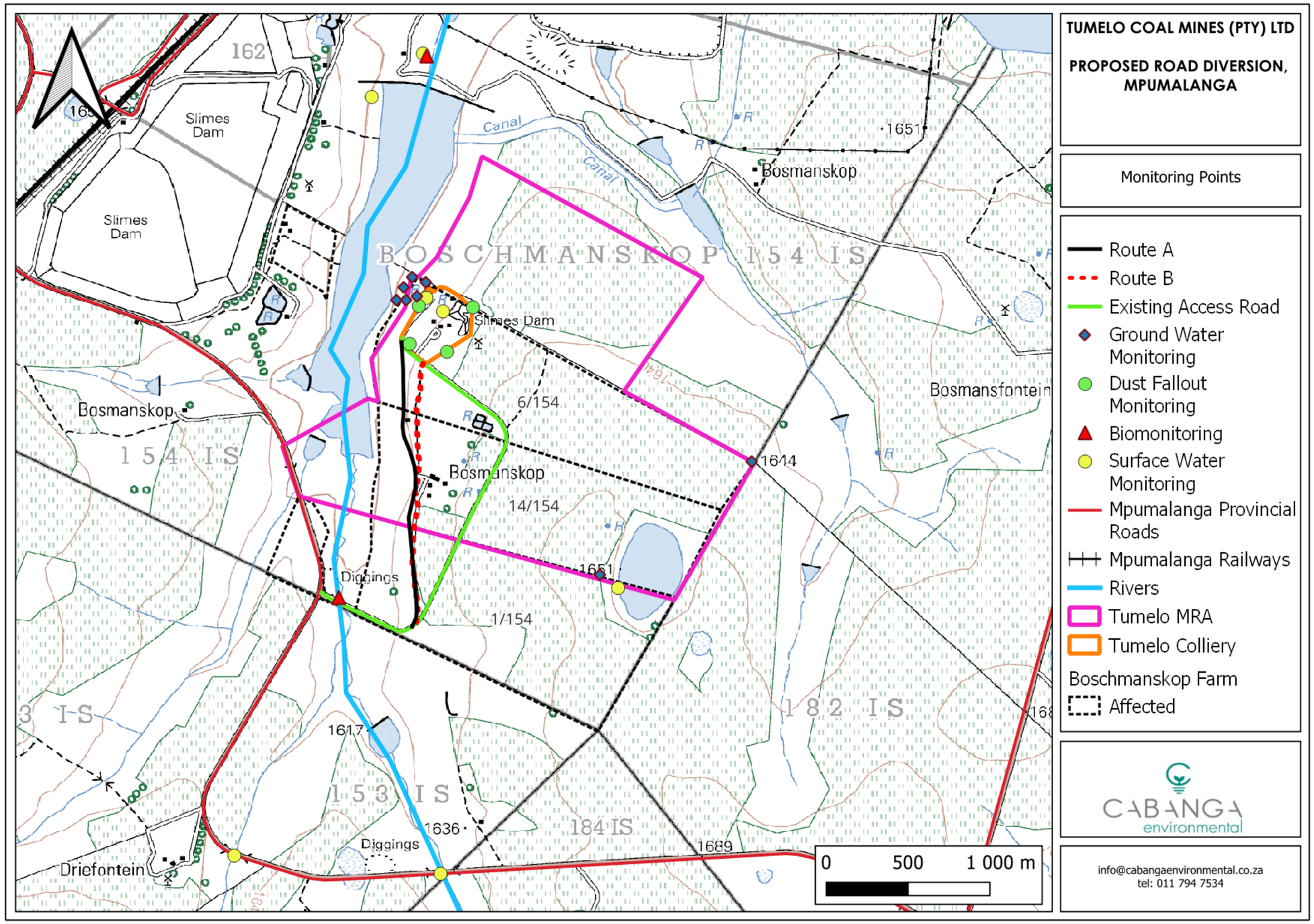


Figure 8: Monitoring Plan

10.2 Compliance Assessment & Reporting

The NEMA EIA Regulations (2014) (as amended) states that the Holder of an Environmental Authorisation must, for the period during which the Authorisation, EMPr and Closure Plan remain valid, ensure that compliance with the conditions of the approvals is audited and submit such audit report to the competent authority (in this case the DMRE).

The frequency of auditing will be provided in the Environmental Authorisation. However, it is recommended that Internal compliance inspection reports be compiled by the on-site Environmental Manager monthly and that external compliance audits against the conditions of the Environmental Authorisation and commitments in the EMPr be undertaken annually. External audits must be undertaken in accordance with Regulation 34 of the act.

11 ENVIRONMENTAL AWARENESS TRAINING

Environmental awareness training is critical for two primary reasons:

1. The workforce must understand how they can play a role in achieving the objectives specified in the EMPr, and
2. The workforce must understand their obligations in terms of the implementation of the EMPr and adherence to environmental-legislative requirements.

Environmental awareness training should be provided to all individuals involved in the project to ensure that everyone understands their roles, responsibilities, and the importance of adhering to environmental management plans and regulations.

The Training Department in conjunction with the SHE Officer and Environmental Manager are responsible for ensuring job specific training for personnel performing tasks related to environmental and social impacts (e.g. handling of hazardous chemicals/fuel, responding to emergency situations etc.).

The Environmental Manager responsible for environmental awareness training will keep records of the persons who attended the training sessions, and these sessions must incorporate methods to test the training attendee's understanding of the subject matter presented. The Environmental Manager must, based on evidence, determine that the employees are competent in the training material and learning outcomes.

Effectiveness of the environmental awareness training will be evaluated by the management through task observations and during internal and external audits.

12 EMERGENCY RESPONSE

Though every effort has been made to identify the potential impacts and risks associated with the operations and to prescribe management and mitigation measures associated with each impact, emergency situations can arise for which site personnel have to prepare.

Procedures that the Applicant must implement in response to certain emergency events are detailed in the table overleaf.

Table 14: Emergency Response

No.	Situation	Response Procedure
1	Spillage/leakage of chemicals, hydrocarbons or waste	In the event of a spill/leak occurring on site: • Contain the spill using appropriate materials (e.g., absorbent pads, sand). • Prevent the spill from reaching water bodies/wetlands or seeping into the ground.
		All spill incidents must be reported to the Environmental Manager immediately, who will assess the incidents and set up an investigation team if deemed necessary.
		Reportable incidents must be reported to the DMRE, Department of Water and Sanitation (DWS) and all other relevant authorities within 24 hours.
2	Veld fires	Report the fire to the Environmental Manager and Fire Marshal.
		Evacuate employees (as well as contractors, visitors etc.) from areas at risk.
		Notify downwind residents and industries of the danger.
		Assist those in imminent danger/less able individuals to evacuate until danger has passed.
		Provide emergency firefighting assistance with available trained mine personnel and equipment.
3	Road traffic accidents (on site)	The individual discovering the accident (be it bystander or able casualty) must raise the alarm giving the location of the incident. Able personnel at the scene should shut down vehicles where it is safe to do so.
		A doctor (or appropriate medical practitioner)/ambulance should arrive at the scene to provide first aid and transport individual to hospital.
		Access to the area should be restricted and access roads cleared for the emergency response team.
		Vehicles must be made safe first by trained professionals (e.g. crushed or overturned vehicles).
		Medical centres in the vicinity with appropriate medical capabilities will be notified if multiple seriously injured casualties are expected.
		A nearby vet should be consulted in the case of animal injury.
4	Uncovering of graves, fossils, archaeological or historical artefacts	Upon finding any fossil, archaeological or historical material all work at the affected area must cease.
		Personnel discovering the site must inform the Environmental Manager immediately and implement the Chance Find Procedure (Appendix G - 1).
		Notify the SAHRA Development Applications Unit (Natasha Higgitt 021 202 8660/ nhiggitt@sahra.org.za)

No.	Situation	Response Procedure
		The area should be demarcated in order to prevent any further work there until an investigation has been completed.

13 CLOSURE, REHABILITATION AND FINANCIAL PROVISION

Tumelo assesses the financial provision for closure and rehabilitation of their mining operations on an annual basis in accordance with GN R 1147 published under NEMA.

It is anticipated that the proposed access road will be of beneficial use to the end land user and will remain after decommissioning and closure of the Mine. Written agreement from the end land user/owner should be obtained in this regard. Alternatively, the cost to rehabilitate the proposed access road should be included in the next review and update of the Mine's Financial Provision for Rehabilitation.

14 CONCLUSION

This report constitutes the EMPr for the proposed new access road at Tumelo Colliery.

The purpose of the report is to specify the proposed management, mitigation, protection or remedial measures that must be implemented through the construction and operation of the proposed road. The EMPr also contains the criteria against which environmental performance and compliance must be measured.

Tumelo Coal Mines (Pty) Ltd (the Applicant), their contractors and subcontractors are subject to the provision of the EMPr, the contents of which are made legally binding once approved by the Competent Authority – the DMRE.

The EMPr is a considered a working document to enable effective environmental management at Tumelo Coal Mine and may require review and amendment through the phases of the proposed access road. It is noted that any Amendment must be undertaken in accordance with the NEMA and its EIA Regulations, 2014 (as amended).

15 REFERENCES

Archaetnos. (2024). *A Report on an Archaeological Impact Assessment for the Proposed Tumelo Road Diversion Project, near Pullens Hope, Mpumalanga Province.* Archaetnos Culture & Cultural Resouces Consultants.

Bamford, M. (2024). *Palaeontological Impact Assessment for the proposed new access road for Tumelo Coal, northwest of Hendrina, .*

Cabanga Environmental. (2024). *Basic Assessment Report: Application for Environmental Authorisation for the proposed road diversion on Boschmanskop 154 IS, near the town of Pullens Hope, Mpumalanga Province.* Cabanga Concepts cc t/a Cabanga Environmental.

Digby Wells and Associates. (2006). *Environmental Impact Assessment Report and Environmental Management Programme, Boschmanskop Coal Mine, Pullenshope, Mpumalanga.*

EARES. (2024). *Noise Compliance Statement and Screening Noise Report for the Proposed Re-alignment of the Tumelo Access Road, Mpumalanga.* Enviro Acoustic Research .

HECS Occupational Hygiene Services cc. (2024). *Tumelo Coal Mine Environmental Noise.*

IWC Projects and NEP Civils. (2024). *New Access Road to Tumelo Mine.*

iWink . (2024). *Tumelo Coal Mine Proposed Access Road Re-alignment* . iWink Consulting Traffic & Transport Engineering Road Safety.

MPSDF. (2018). Mpumalanga Spatial Development Framework. https://cer.org.za/wp-content/uploads/2019/01/Phase1.pdf.

MTPA. (2014). *Mpumalanga Biodiversity Sector Plan Handbook. Compiled by Lötter M.C., Cadman, M.J. and Lechmere-Oertel R.G.* Mbombela: Mpumalanga Tourism and Parks Agency.

Mucina, L., & Rutherford, M. C. (2006). *Reprint 2011. The Vegetation of South Africa, Lesotho and Swaziland.* Pretoria: Strelitzia 19. South African National Biodiversity Institute.

Nkangala District Municipality. (2020/21). *Final Integrated Development Plan.*

Rayten Environmental and Engineering Consultants. (2020). *Tumelo Colliery Air Quality Impact Assessment.*

Steve Tswete Local Municipality. (2010). *Spatial Development Framework Draft Report.*

The Biodiverity Company. (2024c). *Soil and Agricultural Compliance Statement for the proposed Tumelo Road Project.* The Biodiverity Company.

The Biodiversity Company. (2024a). *Wetland Baseline and Risk Assessment for the proposed Tumelo Road Diversion Project.* Johannesburg,: The Biodiversity Company.

The Biodiversity Company. (2024b). *Terrestrial Biodiversity Compliance Statement for the Tumelo Road Project.* The Biodiversity Company.

Appendix G - 1: Chance Find Protocol

CABANGA environmental

Telephone: +27 11 794 7534
Fax: +27 11 794 6946
E-mail: info@cabangaenvironmental.co.za

CHANCE FIND PROCEDURE

1. Introduction

Cultural heritage can represent irreplaceable sources of life and inspiration and should be safeguarded. Although there are always cultural heritage studies conducted in the Project and its area of influence, there is always potential for new discoveries to be made, especially during excavation activities. Finds can include fossils, archaeological, paleontological or sacred sites as well as more modern graves.

Heritage resources are protected in terms of the Heritage Resources Act (Act No 25 OF 1999). The Act sets out the overarching administrative processes for protecting and preserving cultural heritage and management by project developers. Successful implementation requires everyone being alert to the possibility of finds, applying the specified measures and notifying immediate Site Supervisor and Environmental Manager that should in turn inform relevant Authorities as appropriate.

2. Objectives

This Procedure aims to protect and preserve any cultural heritage discovery from potential adverse impacts associated with the construction and operation of the proposed access road.

3. Training

Awareness training should be conducted by the Environmental Manager, in conjunction with the SHE Manager, for all Employees. The training should include, as a minimum, the following:

- Identifying potential features of heritage significance;
- Procedures for dealing with heritage resources discovered on site;
- Applicable Legislation pertaining to the protection of heritage resources; and
- The importance of protecting heritage resources.

The training programme should include photographs of fossil examples to assist site personnel in recognizing potential fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Figure 9) .

4. Procedure

4.1. Archaeological Heritage and Palaeontological Discoveries during Works

Any archaeological or heritage site discoveries should be reported to immediate Supervisor, Environmental Manager and Sitee Manager and treated as an incident. The area should be demarcated until further instructions by relevant Specialist and /or relevant Authorities. The person discovering a potentially significant site or artefact should initiate the following actions:

Stop Work

- Inform the immediate Supervisor, Environmental Manager and Site Manager;
- Stop work in the immediate area and take digital photographs to record the find; and
- Install temporary site protection measures (e.g. delineate a 'no-go' area using warning tape, stakes and signage / deploy worker and give instructions to prevent access or further disturbance) and take all reasonable steps to avoid any further disturbance or damage from excavation, vibration, plant or machinery.

Reporting & Permitting

- Inform all relevant Employees of the chance find and whether access to work area or along the right-of-way is being restricted;
- The Environmental Manager is to consult with an Archaeologist / Palaeontologist Specialist, providing photographic records for a preliminary assessment.
- The specialist shall be responsible for evaluating whether the chance find needs to be classified as cultural heritage, significant fossil find, or deposition etc. and if so, whether it is isolated or part of a larger site or feature;
- The specialist will be required to highlight the way forward.
- The Environmental Manager will notify the relevant Authorities:
    - Section 38(4)c(i) of the National Heritage Resources Act – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Tel: 021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.
    - Section 38(4)c(ii) of the National Heritage Resources Act – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Tel: 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- Should any fossils or artefact need to be removed from the site a SAHRA permit must be obtained.
- Prior to the relocation of any graves, permission for the exhumation and relocation of graves must be obtained from the relevant descendants (if known), SAHRA, the National Department of Health, the Provincial Department of Health, the Premier of the Province and the local Police.
- The exhumation process must comply with the requirements of the relevant Ordinance on Exhumations, and the Human Tissues Act, 65 of 1983 (and the NHRA if relevant).
- Annual reports must be submitted to SAHRA as required by the relevant permits.

General Mitigation / Treatment Strategies

- Artefacts/fossils are to be left in place for recording by the specialist/archaeologist. It is important they are not disturbed or moved as there setting is as important as the artefact/fossil; if materials are to be collected they should be placed in bags and labelled

by the Specialist /Archaeologist and forwarded to the Authorities in a manner that ensures the integrity of the 'chain of custody';

- Site personnel are not permitted to take or keep artefacts as personal possessions as that is a criminal offence;
- Any damage, accidental or otherwise, should be investigated by the Environmental Manager detailing corrective actions, with digital images, maps and plans showing any locations that are no-go, limited access or present risks of further chance finds;
- Stakeholder engagement may be needed with affected communities to determine the correct mitigation actions or, if applicable, suitable compensation (e.g. reburial costs). Mitigation scenarios may include:
    - Preservation *in-situ* through avoidance, and/or
    - Rescue excavations to remove, record and relocate in advance of further earthworks, if avoidance is not possible.
- If the chance find is an isolated artefact/site or is not classed as cultural heritage, the Environmental Manager should approve the removal of site protection measures and activity can resume only with consultation and approval of the local Authorities.
- While required mitigation is ongoing, the Site Manager should coordinate with the relevant Employees keeping them informed as to status and schedule of investigations / actions, and informing them when activities may resume.

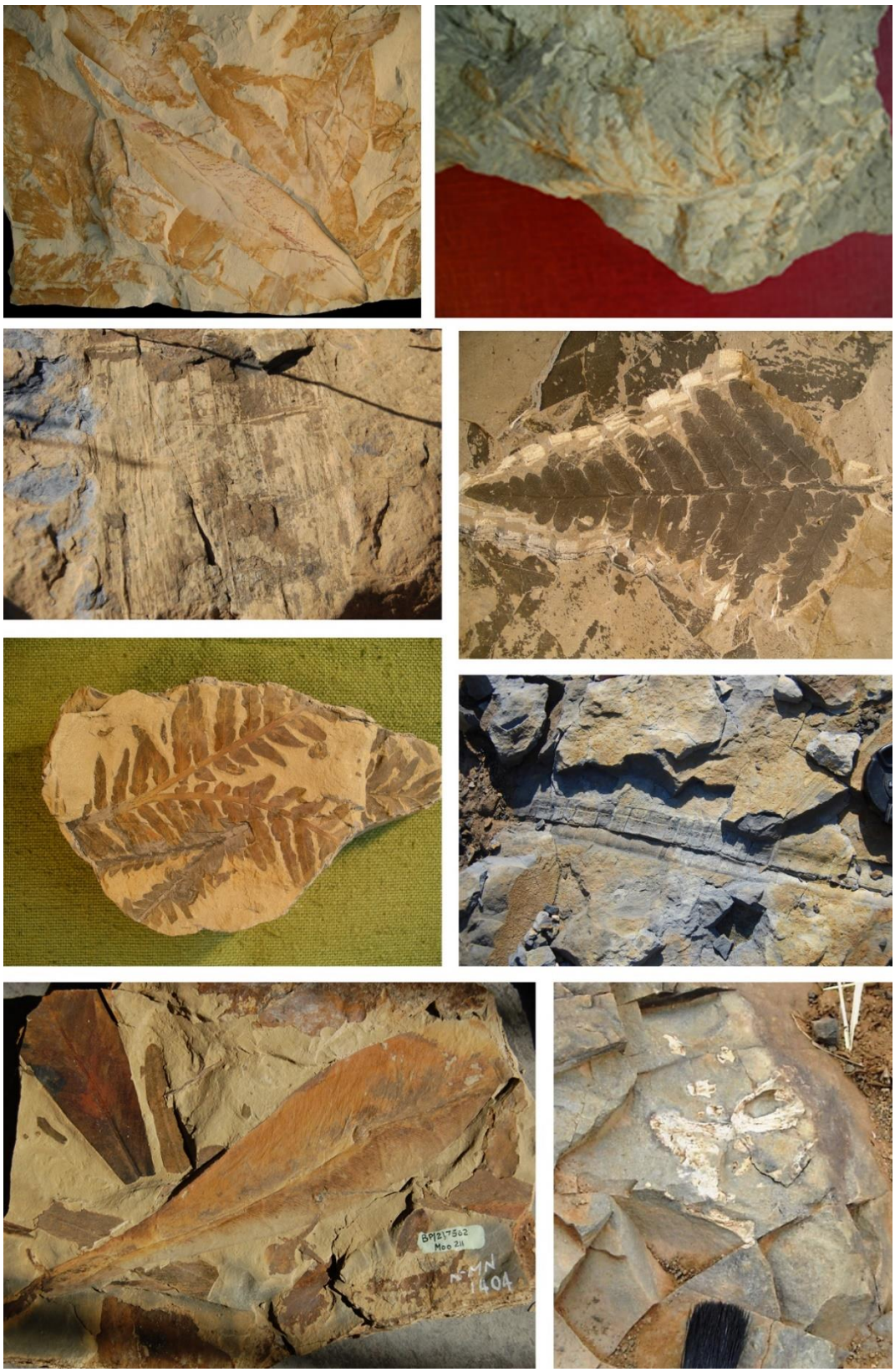


Figure 9: Photographs of fossil plants that would be expected to occur (Bamford, 2024)

Appendix G - 2: Alien Invasive Plant (AIP) Species Management Plan

HIGH LEVEL ALIEN INVASIVE PLANT SPECIES MANAGEMENT PLAN

1. Introduction & Legal Context

The National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) (NEMBA) provides for the management and conservation of South Africa's biodiversity. Chapter 5 of NEMBA deals specifically with species and organisms posing potential threats to Biodiversity.

The following definitions are pertinent to understanding the purpose and intention of the NEMBA, and the Regulations published thereunder:

alien species	(a) a species that is not an indigenous species; or (b) an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention;
control	in relation to an alien or invasive species, means- (a) to combat or eradicate an alien or invasive species; or (b) where such eradication is not possible, to prevent, as far as may be practicable, the recurrence, re-establishment, re-growth, multiplication, propagation, regeneration or spreading of an alien or invasive species
introduction	in relation to a species, means the introduction by humans, whether deliberately or accidentally, of a species to a place outside the natural range or natural dispersal potential of that species
invasive species	means any species whose establishment and spread outside of its natural distribution range- (a) threaten ecosystems, habitats or other species or have demonstrable potential to threaten ecosystems, habitats or other species; and may result in economic or environmental harm or harm to human health
listed invasive species	means any invasive species listed in terms of section 70(1). Section 70(1) compels the Minister to publish a national list of invasive species, and empowers the provincial authorities to publish similar lists relevant to a Province. Thus, "listed invasive species" include all species listed in the Alien and Invasive Species Lists, 2020 (GN1003), or in Schedule 13 to the Mpumalanga Nature Conservation Act (Act No 10 of 1998) (MNCA).
restricted activity	(b) in relation to a specimen of an alien species or listed invasive species, means- (i) importing into the Republic, including introducing from the sea, any specimen of an alien or listed invasive species;

	(ii) having in possession or exercising physical control over any specimen of an alien or listed invasive species; (iii) growing, breeding or in any other way propagating any specimen of an alien or listed invasive species, or causing it to multiply; (iv) conveying, moving or otherwise translocating any specimen of an alien or listed invasive species; (v) selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of an alien or listed invasive species; or any other prescribed activity which involves a specimen of an alien or listed invasive species;

Section 65(1) of NEMBA prohibits a person from carrying out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEMBA.

Section 73 (2) of NEMBA places an obligation on the owners of land where a listed invasive species occurs to:

a. notify any relevant competent authority, in writing, of the listed invasive species occurring on that land;
b. take steps to control and eradicate the listed invasive species and to prevent it from spreading; and
c. take all the required steps to prevent or minimise harm to biodiversity.

NEMBA distinguishes three categories of species, that must be controlled, as follows:

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

The Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983) (CARA) provides for the control over the use of the natural agricultural resources in South Africa, to promote the conservation of soil, water sources and vegetation, and the combating of weeds and invader plants.

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

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

2. Purpose of the Management Plan

While it is acknowledged that the Applicant or Contractor may not be the owner of the land, there remains a responsibility on parties in control of land to control the occurrence of alien invasive plants (whether listed or not) and weeds (AIPs).

The purpose of this Management Plan is therefore to specify general measures that must be undertaken at the Project, during all phases of development, to:

- ensure the identification of AIPs on the development site;
- prevent the spread of AIPs onto the development site, or from the development site onto adjacent land;
- facilitate the eradication of AIPs that may become established on the development site; and
- take all the reasonably required steps to prevent or minimise harm to biodiversity caused by AIPs on the development site.

3. AIPs likely to occur in the Project Area

The AIPs listed in the table below were recorded in Tumelo Colliery's Alien Invasive Management Plan as occurring the vicinity of the project area. 21 AIPs were recorded, of which most are listed as NEMBA Category 1b species. Nine alien species, not listed as invasive, were also noted.

Species	English Common Name	NEMBA Category	CARA Category	MNCA Category
NEMBA Category 1b (compulsory eradication)				
Argemone ochroleuca	White flowered Mexica poppy	1b	1	Not Listed (N/L)
Cestrum parqui	Chilean inkberry/ Green centrum	1b	1	N/L
Cirsium vulgare	Scotch Thistle	1b	1	Invader weeds and plants
Datura stramonium	Common thorn apple	1b	1	Invader weeds and plants

Species	English Common Name	NEMBA Category	CARA Category	MNCA Category
Eucalyptus camaldulensis	Red River Gum	1b (within a Listed Ecosystem)	2	Invader weeds and plants
Grevillea robusta	Australian silky oak	1b	3	N/L
Ligustrum lucidum	Chinese wax-leaved privet	1b	3	N/L
Melia azedararch	Syringa	1b	3	Invader weeds and plants
Nicotiana glauca	Wild tobacco	1b	1	N/L
Opuntia ficus-indica	Sweet prickly pear	1b	1	Invader weeds and plants
Solanum sisymbriifolium	Dense-thorned bitter apple	1b	1	N/L
Tamarix ramosissima	Pink tamarix	1b	3 in Mpumalanga Province	N/L
Verbena bonariensis	Purple top/ Tall verbena	1b	N/L	N/L
Xanthium spinosum	Spiny cocklebur	1b	1	Invader weeds and plants
Xanthium strumarium	Large cocklebur	1b	1	Invader weeds and plants
NEMBA Category 2				
Acacia mearnsii	Black wattle	2	2	Invader weeds and plants
Pinus pinaster	Cluster pine	2	2	Invader weeds and plants
Populus x canescens	Grey poplar	2	2	Invader weeds and Plants

Species	English Common Name	NEMBA Category	CARA Category	MNCA Category
NEMBA Category 3				
Fraxinus angustifolius	Algerian ash/ Narrow leaved ash	3	N/L	N/L
Morus alba	White mulberry	3	3	N/L
Phytolacca octandra	Forest inkberry	3	N/L	N/L
Not Listed (N/L)				
Amaranthus hybridus	N/L	N/L	N/L	N/L
Bidens bipinnata	Spanish blackjack/ Spanish needles	N/L	N/L	N/L
Chenopodium album	White goosefoot	N/L	N/L	N/L
Magnolia grandiflora	Magnolia	N/L	N/L	N/L
Platanus occidentalis	American sycamore	N/L	N/L	N/L
Quercus ruber	English oak	N/L	N/L	N/L
Schinus molle	Pepper tree	N/L	N/L	N/L
Senecio consanguineus	Starvation senecio	N/L	N/L	N/L
Tagetes minuta	Tall khaki weed	N/L	N/L	N/L
Indicator of Bush Encroachment				
Stoebe plumosa	Bankrupt bush	N/L	Indicator of Bush Encroachment	N/L

4. Control Strategy

The control of AIPs should use methods that are appropriate for the species concerned and for the area where the species occurs. Often, a combination of control methods is the most appropriate way to ensure effective control. In general, four control methods exist:

- physical control (uprooting, felling, cutting, ring barking), or
- chemical control (treatment with registered herbicides), or
- biological control (using biological control agents), or
- integrated control (combination of control methods).

Ongoing control is required to achieve long-term goals of eradication and prevent the recurrence of AIPs in areas where control was previously implemented. Repetitive follow-up actions will therefore be mandatory until the required control has been achieved.

As far as possible, AIPs must be removed prior to seed production (typically occurring in early summer). Chemical control through the application of herbicides should only take place during the growing season to ensure efficacy.

The following control strategy is proposed:

4.1. Control Strategy

Measures to prevent the introduction of new AIPs into the study area and from spreading from the property to neighbouring properties, potentially including:

- No new AIPs are to be planted or introduced into the development area.
- Construction areas must be rehabilitated immediately following construction, including re-vegetating disturbed areas, to ensure the establishment of viable indigenous plant populations, and preventing AIPs from colonising disturbed areas;
- NEMBA Category 1b species should be prioritised for control, due to the known invasive success of these species.

4.2. Early Detection & Rapid Response

- The Development Footprint areas must be surveyed by the Environmental Manager to detect any new or emerging AIPs (weekly in construction phase, and until rehabilitation of construction areas has proven successful, and quarterly in operational phase).
- Emerging or new AIPs detected must be addressed with urgency. These plants must be eradicated before they can produce seed (or off-spring, or start growing vegetatively, depending on the species), as it will be more challenging and costly to eradicate them later on.

4.3. Monitoring & Control

The following phases are required in the AIP control programme:

- Initial Control Phase: with the aim of eradicating, or drastically reducing the existing AIP population;
- Follow-up Control Phase: with the aim to deplete the seed bank (specific tactics for seed bank management can be employed, including control of coppice regrowth, root suckers and seedlings).

- Maintenance Phase: During this phase, AIP's are no longer considered a problem. It is important to monitor the situation of infestation during the growing season of the plants to avoid re-infestation and to keep the control cost at a minimum. Potential seed source for re- infestation and causative agent for reintroduction should also be identified and monitored.

4.4. Prioritisation

It is recommended that the Environmental Mnager compile a detailed plan of the development area at the onset of construction, and record the alien invasive species on the development area. From this plan, species with higher categorisation should be prioritised for control.

The areas where new AIPs are detected (expected to be the areas disturbed by construction) must be prioritised for prevention of AIPs, but where AIPs are detected, the higher-categorised (NEMBA Category 1) should be prioritised for control.

4.5. Rehabilitation & Restoration

Clearing of AIP infestations may leave the soil surface exposed and vulnerable to soil erosion, and re- colonisation of an area by AIPs. Soil stabilisation and revegetation and establishment of vegetation cover will be required, following mechanical control of AIPs.

It is recommended that bare areas remaining after AIP clearance, be seeded with an indigenous grass species mixture, comprising species of the Eastern Highveld Grassland vegetation type.

4.6. Disposal of Plant Material

- All plant material removed should be taken to an area isolated from surrounding natural areas with a bunded surface, from where it should be taken to a registered garden refuse centre or landfill site.
- All plant material should be covered with a tarpaulin during transportation by road to prevent any blow-off from the vehicle.
- It is not recommended that any species be chipped and used as mulch, as there may be seeds present within the mulch that will spread to areas beyond the present AIP communities (unless it can be confirmed that no seeds are present).
- Wood from large trees could be made available to the public or surrounding communities for firewood.