ELANDSFONTEIN COLLIERY EXTENSION AND CONSOLIDATION

DMR REF: MP 63MR, MP 314MR

PREPARED FOR ELANDSFONTEIN COLLIERY (PTY) LTD.

JULY 2020

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DOCUMENT CONTROL

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REVISION AND AMENDMENTS

Date	No.	Description of Revision or Amendment
2020/07/09	0	Scoping Report for Public Review

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Abbreviations and Definitions

aa	Desc
AMD	Acid Mine Drainage
CMA	Catchment Management Agency
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EIMS	Environmental Impact Management Services
ELWU	Existing Lawful Water Use
EMPr	Environmental Management Programme Report
ESA	Early Stone Age
GA	General Authorisation
GHG	Greenhouse Gas
GN	Government Notice
GSW	Geo Soil and Water
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
IBA	Important Bird Area
LOM	Life of Mine
MAR	Mean Annual Runoff

MCM	Million Cubic Metres
MPRDA	Minerals and Petroleum Resources Development Act
NEMWA	National Environmental Management Waste Act
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
NWA	National Water Act
PHRA	Provincial Heritage Resources Authority
RoM	Run of Mine
SAHRA	South African Heritage Resources Agency
WMA	Water Management Area
WUL	Water Use Licence

EXECUTIVE SUMMARY

Elandsfontein Colliery (Pty) Ltd (hereafter referred to as the applicant) has appointed Geo Soil and Water cc (GSW) as the Environmental Assessment Practitioner (EAP) to assist with undertaking the necessary Environmental Authorisation and amendment processes for Elandsfontein Colliery.

The Elandsfontein Colliery comprises of 2 distinct mining rights (MR314 and MR63). The applicant plans to consolidate the two mining right areas into a single mining right with associated consolidated EMPr. In addition, the applicant wishes to expand their existing mining operations to include additional mineral resource areas (i.e.: new open cast & underground areas within the consolidated mining right boundary).

The proposed project includes inter alia the following application processes with associated activities:

- New Integrated Environmental Authorisation and Waste Management Licence (Scoping and Environmental Impact Report (S&EIR));
- Renewal of Integrated Water Use Licence (IWUL) with new water uses applied for;
- Section 102 consolidation of mining rights as well as consolidation of EMPr's into one holistic EMPr.

The proposed new mining operations will necessitate additional infrastructure including new Pollution Control Dams (PCD), internal haul roads, stockpiles, etc.

An application for the amendment to the existing Mine Works Programme (MWP), Social and Labour Plan (SLP) and EMPr, through an MPRDA Section 102 Application, and a full Environmental Impact Assessment (EIA) for the proposed new mining area is therefore required to support an application for environmental authorisation (EA) / waste management licence (WML) as applicable. A new (or amendment to the existing) water use licence application (WULA) for the relevant new water use triggers associated with the proposed project will also be undertaken.

PURPOSE OF THE SCOPING REPORT

The purpose of the scoping process is to:

- Identify the policies and legislation that are relevant to the activity;
- To motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- To identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking;
- To provide preliminary identification and confirmation of the preferred site, through a detailed site selection process, which includes an impact and risk assessment process including cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment. This site selection process will be refined and finalised in the subsequent EIA phase;
- To identify the key issues to be addressed in the assessment phase;
- To agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required, as well as the extent of further consultation to be undertaken. This will assist in determining the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- To identify preliminary measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored. These mitigation measures will be further refined during the EIA phase.

PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) for the proposed project has been undertaken in accordance with the requirements of the MPRDA, and NEMA in line with the principles of Integrated Environmental Management (IEM). The PPP commenced on the 20th of July 2018 with an initial notification and call to register for a minimum period of 30 days. This scoping report has been made available for public review and comment for a period of 30 days in line with the legislative timeframes (13th July 2020 to the 14th August 2020). The comments received from I&AP's to date have been captured in a Public Participation summary table included in this report and appended in detail in the Public Participation Report. On acceptance of the scoping report from DMR, an EIA Report, including an EMPr, will be compiled and presented for public comment as part of this EIA process during which time further stakeholder engagement will take place.

A Public Participation Plan (PP Plan) was prepared in accordance with the requirements of the National Environmental Management Act (Act 107 of 1998-NEMA), and the Directions issued by the Department of Environment, Forestry and Fisheries (GN 650 of 5 June 2020) in terms of the Disaster Management Act (Act 57 of 2002) in order to present proposed mechanisms to be undertaken for the remainder of the of the public participation process (Scoping and EIA Phase). The public participation plan was approved by the Department of Mineral Resources and Energy prior to the commencement of the Scoping Phase public review period.

ENVIRONMENTAL IMPACT ASSESSMENT

A high-level assessment was undertaken to identify all the potential risks and impacts associated with each phase of the mining operations. The background information from previous EIA and specialist studies undertaken for the mine were consulted as well as additional specialist screening of all the activities underway and planned for the mine to ensure that all the potential impacts have been identified. Each of the identified risks and impacts for these phases was assessed using the impact assessment methodology described in the body of the report. The assessment criteria include the nature, extent, duration, magnitude/intensity, reversibility, probability, public response, cumulative impact, and irreplaceable loss of resources.

The following impacts were determined to have a potentially moderate - high negative final significance:

- Disturbance/ Destruction of graves;
- Disturbance/ destruction of fossils;
- Loss/ destruction of natural habitat;
- Introduction of alien species;
- Displacement of faunal species;
- Continued removal and fragmentation of EN vegetation communities;
- Flora Direct and indirect mortality;
- Potential leaks, discharges, pollutant from mining activities leaching into the surrounding environment;
- Subsidence effects on ground water;
- Subsidence - physical alteration of surface-level environment;
- Impact of general mining activities on aquatic ecology;
- Impacts on groundwater quantity;
- Depletion in aquifer storage;
- Impact on groundwater quality due to leachate;
- Decanting of poor-quality water;
- Loss of catchment yield;
- Loss of soil fertility;
- Loss of flow paths;
- Loss of wetlands;

- Emissions and dust; and
- Fly rock, air blast and ground vibration impacts.

The positive and negative impacts will be further assessed during the EIA phase of the project. Potential mitigation measures have been identified and will be refined and supplemented based on further input from the EAP, public consultation, and specialist assessments during the EIA phase of the project. The EMPr will, identify appropriate mechanisms for avoidance and mitigation of negative impacts and the enhancement of positive impacts.

1. INTRODUCTION

Elandsfontein Colliery Pty Ltd (hereafter referred to as the applicant) has appointed Geo Soil and Water cc (GSW) as the Environmental Assessment Practitioner (EAP) to assist with undertaking the necessary Environmental Authorisation and amendment processes for Elandsfontein Colliery.

The Elandsfontein Colliery comprises of 2 distinct mining rights (MR314 and MR63). The applicant plans to consolidate the two mining right areas into a single mining right with associated consolidated EMPr. In addition, the applicant wishes to expand their existing mining operations to include additional mineral resource areas (i.e.: new open cast & underground areas within the consolidated mining right boundary).

The proposed project includes inter alia the following application processes with associated activities:

- New Integrated Environmental Authorisation and Waste Management Licence (Scoping and Environmental Impact Report (S&EIR));
- New Integrated Water Use Licence (IWUL) with renewal of existing IWUL; and
- Section 102 consolidation of mining rights as well as consolidation of EMPr's into one holistic EMPr.

The proposed new mining operations will necessitate additional infrastructure establishment including Pollution Control Dams (PCD), internal haul roads, stockpiles, etc. An application for the amendment to the existing Mine Works Programme (MWP), Social and Labour Plan (SLP) and EMPr, through an MPRDA Section 102 Application, and a full Environmental Impact Assessment (EIA) for the proposed new mining area is therefore required to support an application for environmental authorisation (EA) / waste management licence (WML) as applicable. A new (or amendment to the existing) water use licence application (WULA) for the relevant water use triggers associated with the proposed project will also be undertaken.

The proposed project is located on a portion of the remaining extent of portion 8; remaining extent of portion 1; a portion of the remaining extent of portion 6; portion 44; portion 14 and the remaining extent of portion 7 of the Farm Elandsfontein 309 JS, located in Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province. The site is ~4km south of Kwa-Guqa and ~16k west of Emalahleni. The centre point of the site is 25°53'05.01"S and 29°05'36.57"E.

The current land use of the proposed mine expansion area consists of arable (mostly maize) and grazing land. Several roads and power lines run through the area. The region has been largely affected by historical mining. Agriculture is the predominant land use in the areas surrounding project area. The main crop is dryland cultivation of maize with some pasture. Subsistence vegetable farming and rearing of chickens and livestock is associated with settlements near the mine.

In terms of the mineral resource and further to the need and motivation of the project, the quality of the coal dictates that the coal will be used in the power generation sector whilst export quality coal also occurs. Elandsfontein will beneficiate the ROM coal from the underground No. 1 resources to produce coal products with the split between the products being approximately 60 % for the export market and 40% for the domestic market. The underground coal resources from the No. 1 Seam will be washed and the primary product will be for the export market. The secondary product will be blended with the coal resources from the No. 2 Seams from the opencast pit that will be crushed and screened and sold as a domestic product to Eskom. Up to now the No. 1 Seam, No. 2 Seam and the No. 4 Seam have been the main target of exploitation. The planned future mining is to be based on the remaining No. 1 Seam (underground operation) and the No. 2 Seam (open-cast operation).

1.1 REPORT STRUCTURE

This report has been compiled in accordance with the 2014 NEMA EIA Regulations (as amended). A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 1 below.

Table 1: Report Structure.

Environmental Regulation	Description	Section in Report
NEMA Regulation 982 (2014)		
Appendix 2(2)(a):	Details of – o The EAP who prepared the report; and o The expertise of the EAP, including a curriculum vitae;	Section 1.2 Section 0
Appendix 2(2)(b):	The location of the activity. Including – o The 21-digit Surveyor General code of each cadastral land parcel; o Where available, the physical address and farm name; o Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 2
Appendix 2(2)(c):	o A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – o A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	Section 2.1

	○ On a land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
Appendix 2(2)(d):	A description of the scope of the proposed activity, including – ○ All listed and specified activities triggered; ○ A description of the activities to be undertaken, including associated structures and infrastructure;	Section 3
Appendix 2(2)(e):	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	Section 4
Appendix 2(2)(f):	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 5
Appendix 2(2)(h):	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including – ○ Details of all alternatives considered; ○ Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; ○ A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; ○ The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; ○ The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts –	Section 6 Section 7 Section 8 Section 9

	• Can be reversed; • May cause irreplaceable loss or resources; and • Can be avoided, managed or mitigated; • The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; • Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community, that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; • The possible mitigation measures that could be applied and level of residual risk; • The outcome of the site selection matrix; • If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and • A concluding statement indicating the preferred alternatives, including preferred location of the activity;	
Appendix 2(2)(i):	A plan of study for undertaking the environmental impact assessment process to be undertaken, including – o A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; o A description of the aspects to be assessed as part of the environmental impact assessment process; o Aspects to be assessed by specialists;	Section 11

	○ A description of the proposed method of assessing the environmental aspects, including a description of the proposed method assessing the environmental aspects to be assessed by specialists; ○ A description of the proposed method of assessing duration and significance; ○ An indication of the stages at which the competent authority will be consulted; ○ Particulars of the public participation process that will be conducted during the environmental impact assessment process; and ○ A description of the tasks that will be undertaken as part of the environmental impact assessment process; ○ Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	
Appendix 2(2)(j)	An undertaking under oath or affirmation by the EAP in relation to – ○ The correctness of the information provided in the report; ○ The inclusion of comments and inputs from stakeholders and interested and affected parties; and ○ Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Section 14
Appendix 2(2)(k):	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Section 14
Appendix 2(2)(l):	Where applicable, any specific information required by the competent authority; and	N/A
Appendix 2(2)(m):	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

1.2 DETAILS OF THE EAP

GSW was founded in 2008 and has steadily grown to be a significant player in the Environmental Management Consulting industry in South Africa. GSW and its resources have been involved with many EIA projects and offers access to a broad body of knowledge and experience with the various Integrated Environmental Management tools (EIA; EMPr; EMP; SEA; EMF; etc.). GSW is responsible for project management and the compilation of the relevant reports for the Elandsfontein project. Details of the EAP are provided below:

- EAP Name: Adri Joubert
- SACNASP Registration Number: 400058/01
- Contact no: 082 926 8460
- Email address: adri@geosoilwater.co.za

1.3 EXPERTISE OF THE EAP

1.3.1 QUALIFICATIONS OF THE EAP

In terms of Regulation 13 of the EIA Regulations (Government Notice R. 982), an independent Environmental Assessment Practitioner (EAP), must be appointed by the applicant to manage the application. GSW has been appointed by the Applicant as the EAP and is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations and Section 1 of the NEMA. This includes, *inter alia*, the requirement that GSW is:

1) Objective and independent;
2) Has expertise in conducting EIA's;
3) Comply with the NEMA, the Regulations and all other applicable legislation;
4) Takes into account all relevant factors relating to the application; and
5) Provides full disclosure to the applicant and the relevant environmental authority.

The declaration of independence of the EAP and the Curriculum Vitae (indicating the experience with environmental impact assessments and relevant application processes) are attached as Appendix B

1.3.2 SUMMARY OF THE EAP'S PAST EXPERIENCE

GSW is a private and independent environmental management-consulting firm that was founded in 2008. GSW has significant experience in conducting EIAs, including many EIA's for mines and mining related projects. Please refer to the GSW website (www.geosoilwater.co.za) for examples.

Adri Joubert is the sole owner and project manager at GSW and has been involved in numerous significant projects over the past 20 years. She has extensive experience in Project Management as well as with undertaking Environmental Impact Assessments and Environmental Auditing. Adri has acted as Project Manager and Quality Reviewer for several mining related projects.

1.3.3 SPECIALIST CONSULTANTS

Specialist consultants will provide discipline specific input during the EIA phase and the following specialist disciplines are proposed at this stage:

- Air Quality;
- Terrestrial and Aquatic Biodiversity;
- Wetlands;
- Heritage and Palaeontology;

- Hydrogeology;
- Blasting and Vibration;
- Hydropedology;
- Traffic Study;
- Hydrology; and
- Soils.

In line with NEMA GNR 982 Appendix 6, the details of the relevant specialists, a summary of their expertise as well as their declarations of independence are included in their respective reports in Appendix D.

2. DESCRIPTION OF THE PROPERTY

Elandsfontein Colliery is situated approximately 10km south of Delmas off the R42 road in the Emalahleni Local Municipality, immediately west of the village of Clewer. Table 2 provides a summary of the properties that fall within the mining right areas and those affected by this application.

Table 2: Property description

Property Info	Details					
Farm Name	Mining Right holder Elandsfontein Colliery (Pty) Ltd. is the holder of a Mining Right in respect of certain properties of the farm Elandsfontein 309 JS.					
Application Area (Ha)	The mining footprint, existing and future infrastructure cover an area ~830 hectares (ha) (GIS).					
Magisterial District	The Elandsfontein Colliery is situated in the Emalahleni Local Municipality, situated in the Nkangala District Municipality.					
Distance and direction from nearest town(s)	The Elandsfontein Colliery is situated west and directly adjacent to Clewer and ~5 km south of Kwa-Guqa.					
21-digit Surveyor General Code for each Portion	Properties within approved Mining Right areas			Properties affected by this Application		
	Farm Name:	Portion:	SG Codes:	Farm Name:	Portion:	SG Codes:
	Elandsfontein 309 JS	1	T0JS00000000030900001	Elandsfontein 309 JS	1	T0JS00000000030900001
	Elandsfontein 309 JS	6	T0JS00000000030900006	Elandsfontein 309 JS	7	T0JS00000000030900007
	Elandsfontein 309 JS	7	T0JS00000000030900007	Elandsfontein 309 JS	8	T0JS00000000030900008
	Elandsfontein 309 JS	8	T0JS00000000030900008	Elandsfontein 309 JS	14	T0JS00000000030900014
	Elandsfontein 309 JS	14	T0JS00000000030900014	Elandsfontein 309 JS	44	T0JS00000000030900044
	Elandsfontein 309 JS	44	T0JS00000000030900044			

2.1 LOCALITY MAP

Figure 1 below illustrates the existing NEMA/WUL approved mining areas in relation to the approved mining right area as well as the proposed future mining areas which form the basis of this integrated EIA application.

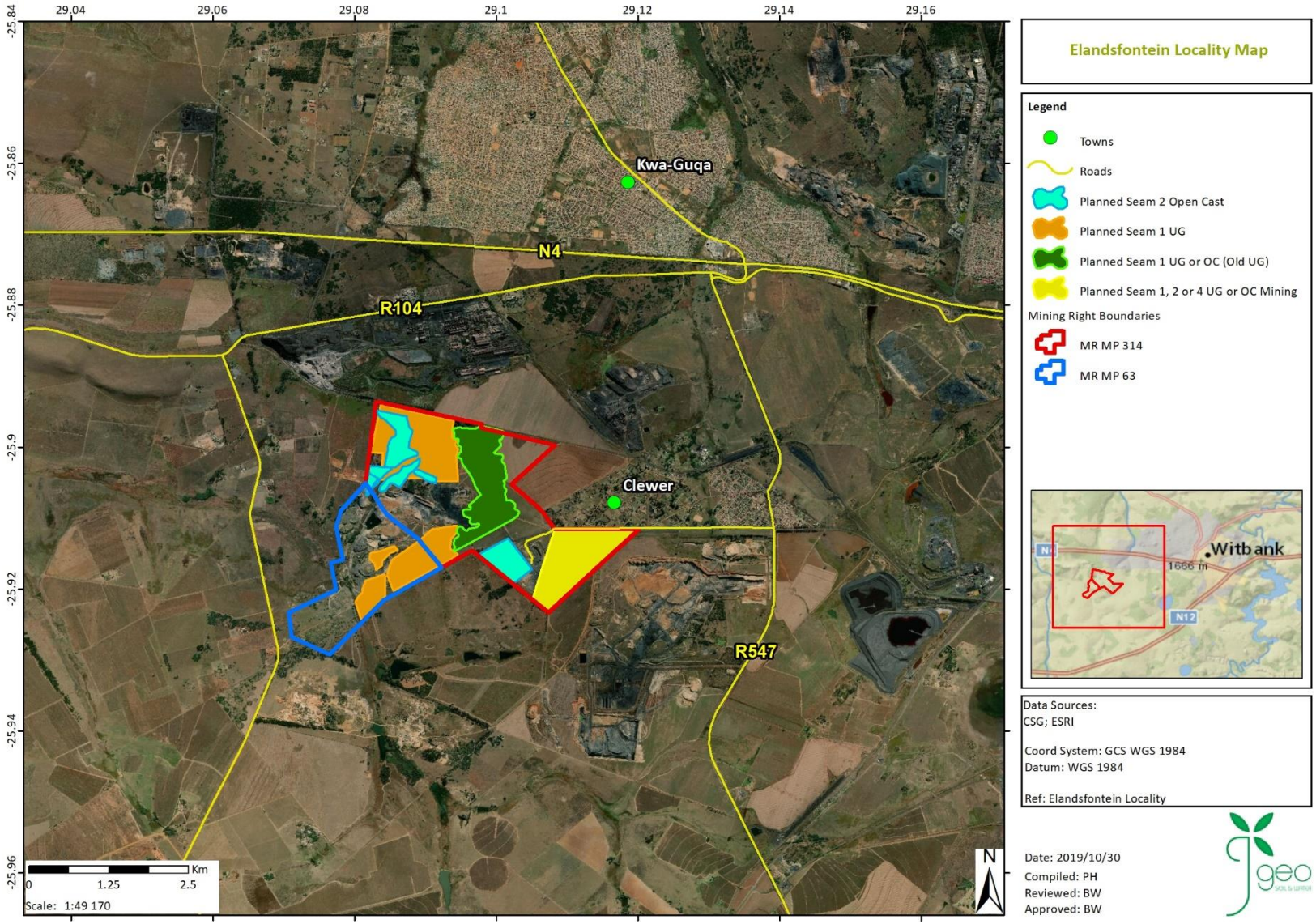

Figure 1: Locality map of Elandsfontein Colliery and relevant existing and proposed future mining areas.

3. DESCRIPTION AND SCOPE OF THE PROPOSED ACTIVITY

This section provides a detailed project description. Much of the key information presented in this Section was obtained from the latest Mine Works Programme for Elandsfontein Colliery. The aim of the project description is to indicate the activities that are currently being undertaken at Elandsfontein as well as the proposed future activities and amendments that are being applied for in this application. Furthermore, the detailed mine/project description is designed to facilitate the understanding of the project related activities which result in the impacts identified and assessed and for which management measures have been designed.

3.1 MINING OPERATIONS OVERVIEW

Elandsfontein Colliery holds two mining right areas i.e. MP 314 MR (593 ha) as well as MP63 MR (237 ha). The roll over strip mining method is utilised to extract coal from the shallower No.2 coal seam. The existing opencast operations has an approximate extent of 257 ha while the applicant wishes to authorise an additional 69.47 ha. Deeper coal is extracted by underground bord and pillar mining using decline shafts to access No. 1 coal seam. The historical underground footprint covers an approximate area of 182 ha, while Elandsfontein Colliery wishes to authorise an additional 379 ha. Associated infrastructure consists of a discard dump, coal RoM stockpiles, overburden stockpiles, pollution control dams (PCD) and slurry dam.

Elandsfontein Colliery is an existing mine with opencast and underground sections. It produces coal for the local and the export market, at a rate of 500 000 t/annum. Coal has been produced historically from the No. 1 Seam (underground bord and pillar operation) and an opencast operation on the No. 4 Seam and on the No. 2 Seam.

Elandsfontein Colliery is planning to extend their opencast and underground mining areas within the existing mining right areas to extend the life-of-mine (LoM). As such a MPRDA S102 amendment process is being undertaken by the mine, supported by the integrated EIA/WML and WULA applications. The EIA process will result in a consolidation of the numerous authorisation processes that have been undertaken to date to produce a single overarching EMPr for holistic management of the Colliery going forward. Elandsfontein will be applying for the relevant approvals to cover their extended LoM which will include future opencast and underground mining operations and associated infrastructure. This additional scope will ensure that the EIA process considers the cumulative impacts of the mining operations. Various amendments to the existing EA/EMP as well as IWUL will also be applied for to align the specific conditions with the current status of the mine as well as to clarify certain conditions.

Figure 2 indicates the typical mining sequence and can be summarized as initial topsoil removal with subsequent removal of the overburden which will then be stockpiled behind the mining area to ensure it can be replaced back in the initial box cut. The physical mining of the coal seam follows, which is then placed into trucks to be taken to the processing facility. From here discard coal will be extracted and replaced in the bottom of the opencast pit, while the product will be taken to the weighbridge via trucks and then removed off site. The overburden is replaced back into the pit as mining progress leaving a minimum area open at a single time. The topsoil which was stripped and stockpiled separately before mining commenced is then replaced and rehabilitated to ensure the environment can be restored.

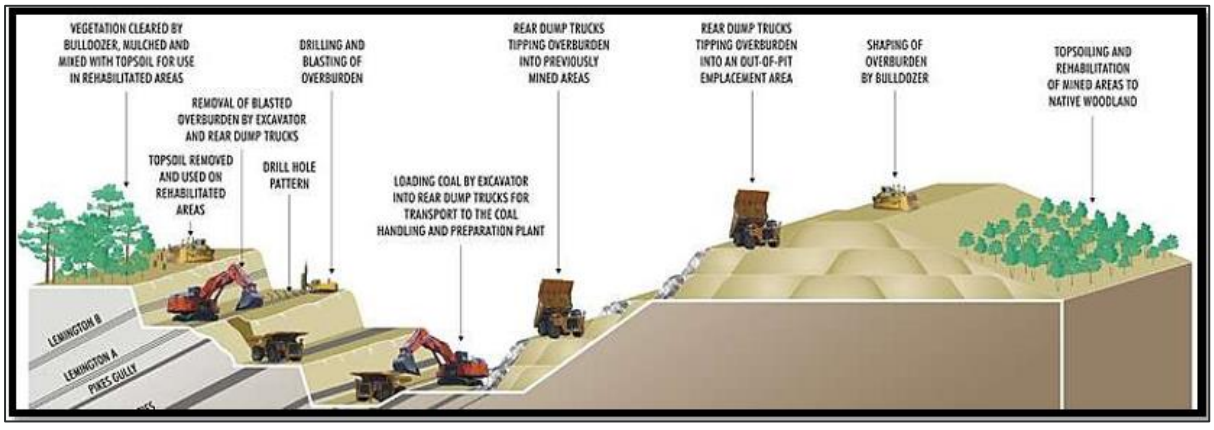

Figure 2: Typical coal surface mining opencast sequence indicating rollover backfill rehabilitation methodology.

The following rights, authorisations and approvals are currently in place and have been considered in the compilation of the report:

- Mining Right 63 MR renewal, granted to Elandsfontein Colliery (Pty) Ltd, in terms of Section 24 (3) of the MPRDA on 6 August 2019 which covering the following portions of the farm Elandsfontein 309 JS: Portion of the RE of Portion 6, Portion of the RE of Portion 8 and RE of Portion 1.
- Mining Right 314 MR renewal, granted to Elandsfontein Colliery (Pty) Ltd, in terms of Section 24 (3) of the MPRDA on 6 August 2019 which covering the following portions of the farm Elandsfontein 309 JS: RE of Portion 7, Portion of the RE of Portion 8, Portion 44 and Portion 14;
- An amended EMPr dated August 2017;
- Approved IWUL, File No. 16/2/7/B100/C11 granted on 20 October 2015 for various S21 (g), (c) and (i) which covers Portions 1, 7, 8 and 14 of Elandsfontein 309 JS (amended 23 July 2019).

The existing infrastructure at Elandsfontein Colliery consists of the following:

- Opencast pit;
- Underground mining areas;
- Stockpiles;
- Offices;
- Plant area (crushing and screening);
- Contractors yard;
- Weighbridge;
- Access and haul roads;
- Security point and fencing;
- Pumps and sumps;
- Clean water trenches;
- Dirty water trenches;
- PCD's; and
- Storm water control trenches.

3.2 DESCRIPTION OF ACTIVITIES TO BE UNDERTAKEN

It is the intention of this Scoping Report to provide the necessary information regarding the proposed extension of the mining areas (opencast and underground) as well as to address the proposed amendments to certain existing conditions contained in the EA/EMPr/WUL. The proposed project includes *inter alia* the following application processes with associated activities:

- New Integrated Environmental Authorisation (Scoping and Environmental Impact Report (S&EIR)) for:
    - New opencast and underground mining areas;
    - New residue deposits and/or residue stockpiles (requiring Waste Management Licence); and
    - Various activities including the primary processing of a mineral resource related to the extended LoM.
- Renewal of Integrated Water Use Licence (IWUL) and application for new water uses for:
    - Residue stockpiles/deposits;
    - Dewatering of pits and underground;

- PCD's and stormwater management infrastructure; and
- GN704 exemptions.

o Section 102 Amendment:

- Revised Mine Works Programme;
- Revised Social and Labour Plan;
- Revised Regulation 2.2 Plan; and
- Revised consolidated EMPr.

3.2.1 THE MINERAL RESOURCES

On Elandsfontein Colliery a maximum of 82 m of coal measure is present. This is hosted by the Vryheid Formation and rests on tillite and diamictite of the Dwyka Group. The Dwyka in turn rests on a basement of Precambrian felsite. Elandsfontein Colliery is an existing mine with opencast and underground sections. It produces coal for the local and the export market, at a rate of ~500 000 t/annum. Coal has been produced from the No. 1 Seam (underground bord and pillar operation) and an opencast operation on the No. 4 Seam and on the No. 2 Seam. The general stratigraphy is provided in Figure 3.

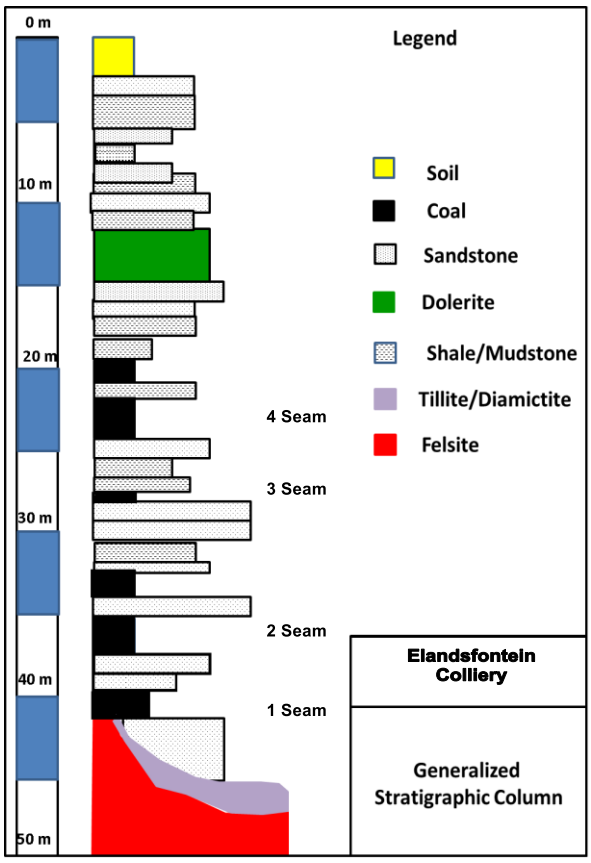

Figure 3: General stratigraphy at Elandsfontein Colliery

The quality of the coal dictates that the coal will be used in the power generation sector. The coal will be sold as an export product and a domestic product to Eskom. Elandsfontein will beneficiate the ROM coal from the underground No. 1 resources to produce coal products with the split between the products being approximately 60 % for the export market and 40% for the domestic market. The underground coal resources from the No. 1 Seam will be washed and the primary product will be for the export market. The secondary product will be blended with the and the coal resources from the No. 2 Seams from the opencast pit that will be crushed and screened and sold as a domestic product to Eskom. Up to now the No. 1 Seam, No. 2 Seam

and the No. 4 Seam have been the main target of exploitation. The planned future mining is to be based on the remaining No. 1 Seam (underground operation) and the No. 2 Seam (open-cast operation).

3.2.1.1 NO. 1 SEAM

In the Elandsfontein Colliery area the No.1 Seam occasionally splits into the No.1 Seam and the No.1 Upper Seam. Historically the No. 1 Seam was the main target and has been extensively mined both underground and opencast. The average seam-width of the No. 1 Seam is 2.11 m and 1.03 m for the No. 1 Upper Seam. The two seams are separated by a 7.39 m rock parting. In the present investigation the remaining resources of the No.1 Seam is planned for underground mining methods. The No. 1 Upper Seam occurs only in the south eastern corner of Elandsfontein Colliery and it is planned to mine the No.1 Upper Seam underground, or by opencast mining methods where the depth below surface permits.

Due to its quality, the No. 1 Seam has been the target of historic exploitation by means of underground mining. The thickness, distribution and quality of the No. 1 Seam is a function of the topography, the palaeo-surface on which it was deposited, the rate of at which the basin subsided during the peat accumulation, syn-depositional erosion cycles as well as the influx of detrital material. Said detrital material presents itself as in-seam partings of shale and siltstone.

The floor elevation of the No. 1 Seam dips southward and this is a function of the palaeo-topography and the general southward dip of the Karoo sediments in this part of the Karoo Basin. The depth below surface to the roof of the No. 1 Seam is a function of the present-day erosion surface, which is generally sloping south-westwards to the drainage channels. This is superimposed onto the southward dip of the seam. Therefore the maximum depth from surface to the seam of 80 m is found in the northeast of the property. Currently the workings are filled with water.

3.2.1.2 NO. 2 SEAM

The floor elevation of the No. 2 Seam dips southward and this is a function of the paleo-topography and the general southward dip of the Karoo sediments in this part of the Karoo. The depth below surface to the roof of the No. 2 Seam is a function of the present-day erosion surface, which is generally sloping south-westwards to the drainage channels. This is superimposed onto the southward dip of the seam. Therefore the maximum depth from surface to the seam of 80 m is found in the northeast of the property. Currently the workings are filled with water.

3.2.2 OPENCAST AND UNDERGROUND MINING

Elandsfontein Colliery is mined by opencast and underground mining methods. Elandsfontein Colliery produces approximately 500 000 t of RoM coal per month. All the necessary infrastructure requirements are in place to maintain the said production. The required infrastructure for the opencast mining at Elandsfontein Colliery is in place. For the underground mining operations existing shafts will be utilised, and where the existing shafts are not adequate new shafts will be constructed. The minimum infrastructure required are offices and workshops for the machinery and these are in place. A beneficiation plant is in operation and haul roads exists. Pumping and drainage management, plans and layouts are in operation. Carbonaceous material and the required dumping facilities exist. Waste dumps are currently under investigation and the ultimate extent will be determined for the Coal Reserves. Opencast mining is done in a roll over operation (mining and backfilling concurrently).

The following design parameters were used during the design and scheduling of the opencast mining operations:

- Monthly production of 50 000 tonnes per month;
- Mining strip width of 40 m;
- Maximum bench width of 20 m on hards;
- Maximum mining depth of 60 m;
- Wetlands and floodline boundary of 100 m; and
- Minimum coal thickness of 0.5m after losses.

- The following design parameters were used during the design and scheduling of the underground mining operations:
- Monthly production of 50 000 tonnes per month to be produced by three sections;
- Road width of 6m;
- Number of roadways per panel 5 to 9;
- Pillar design formula – Salamon and Munro for Square pillars;
- Minimum safety factor for Main Developments 2.0;
- Minimum Safety factor for production panels 1.6;
- Minimum seam thickness of 1.4m; and
- Brushing between 1.2m to 1.4m is applied along roadways to connect coal reserve blocks.

Table 3: Coal Resources Statement for Elandsfontein Colliery Area as at 30 September 2019

Resource Statement: 30 September																									
Resource Block	SAMREC CATEGORY	Seam	Area m²	Thick m	RD g/cm³	RD g/cm³ #	GTIS tons*	Geological Loss (%)	TTIS tons*	MTIS tons*	Raw Qualities (Air dried)						Washed @ RD 1.7 (Air dried)								
											Ash (%)	Vol (%)	S (%)	CV (MJ/kg)	FC (%)	IM (%)	Ash (%)	CV (MJ/kg)	Vol (%)	S (%)	FC (%)	IM (%)	Yield (%)		
Block A	MEAS	S1	680294	1.24	1.44	1.4	1 181 000	10	1 062 900	1 062 900	18.83	27.05	1.69	26.58	51.35	2.77	13.5	28.4	28.27	1.05	54.85	3.22	85.5		
Block A	IND	S1 Upper	680294	1.24	1.5	1.45	1 226 000	15	1 042 100	1 042 100	28.83	21.43	1.69	21.96	46.64	3.1	21.9	24.5	23.29	0.55	50.35	3.28	72.9		
Block B	MEAS	S1	183769	2.86	1.62	1.58	829 000	10	746 100	746 100	28.76	20.66	1.54	21.98	47.93	2.65	19.1	25.6	22.69	0.77	52.32	2.96	64.9		
Block C	MEAS	S1	76392	2.05	1.66	1.62	254 000	10	228 600	228 600	33.99	19.38	0.82	19.74	48.14	2.32	20.5	25.4	23.08	0.69	51.41	2.68	53.2		
Block D	MEAS	S1	326871	2.06	1.6	1.56	1 052 000	10	946 800	946 800	25.06	24.45	1.3	23.98	48.14	2.35	16.7	27.2	27.1	0.58	53.32	2.81	69.5		
Block E	IND	S1	1149128	1.67	1.61	1.57	1 968 000	15	1 672 800	1 672 800	29.21	23.53	1.35	22.47	45.01	2.25	17.3	27	27.11	0.82	53.04	2.62	67.8		
Block F	MEAS	S2	88583	2.55	1.66	1.62	365 000	10	328 500	328 500	36.91	19.2	0.56	18.45	41.23	2.66	28	21.7	21.04	0.32	47.36	2.97	50.7		
Block G	MEAS	S2	1847792	2.87	1.62	1.58	1 161 000	10	1 044 900	1 044 900	42.2	19.36	0.56	16.12	36.15	2.29	26.9	22.6	22.05	0.33	47.77	2.76	32.8		
Total							8 036 000		7 072 700	7 072 700															
Inferred Resources: 30 September																									
Block H	INF	S2	255696	1.82	1.62	1.58	733 000	25	549 750	549 750															

GTIS - Gross tons in-situ	MEAS - Measured
TTIS - Total tons insitu	IND - Indicated
MTIS - Mineable tons insitu	INF - Inferred
ROM - Run of Mine	
* tons are rounded	
# Insitu Relative density as as per Preston and Sanders methodology	

3.2.3 MINING SCHEDULE

Elandsfontein Colliery is an existing coal mine, which has been producing coal for more than 25 years. Up to now the No. 1 Seam (mainly underground) and the No. 4 Seam (opencast), with minor No. 2 Seam (opencast) were the main producers. GeoRock conducted a SAMREC-compliant Resource/Reserve assessment for Elandsfontein Colliery. This study is based on data supplied by Elandsfontein from its databases. The present investigation found that the No. 4 Seam has been mined out, leaving the No. 1 Seam and the No. 2 Seam as the remaining future economic mining targets (the subject of this investigation). In the southeast of the mining-right a substantial block (Block A) of un-mined No. 1 Seam is present. Here it was found that the No. 1 Seam is split into the No. 1 Seam and the No. 1 Upper Seam. The two units are separated by a 5 to 7 m thick parting consisting of sandstone and shale. Further diamond-core drilling is required to better outline the resource and to obtain additional coal quality information, whilst producing rock-core for a proper rock-quality assessment of the inter-seam parting.

No. 1 Seam is further present below the mined-out No. 4 Seam open-cast quarry (Block D and E). Further rock-engineering studies are required here to determine in how far the mining of the No. 4 Seam has affected the condition of the No. 4 Seam/No. 1 Seam inter-burden and what mining technique (if any) will be the most advantageous for the extraction of the No. 1 Seam.

A depletion schedule for Elandsfontein Colliery was developed based on the target mine production and resulted in a 12 year life of mine (LoM). The opencast mine plan takes into account the volumes of overburden and waste. The geological yield was converted to a practical yield and applied to the RoM tonnages to determine the sales tonnage. The mine makes use of contractor mining for the opencast mining and will make use of contractor mining for the underground. The labour complement to support the mine was selected according to specific job categories. Life cycle costing and productivity data was obtained from the original equipment manufacturers and applied to complement the production schedule. Capital is allowed for the replacement programme over the LoM, however this forms part of the contractors' rate. Mining costs were obtained from contractors mining similar operations in the industry. The assessors investigated the immediate LoM and are confident for a 12-year life at the present production rate of 1 200 000 t per annum, provided that the recommended additional exploration is done in advance to the mining-faces.

3.2.4 MINERALS PROCESSING

The throughput of the Elandsfontein Colliery Coal Handling and Preparation Plant (CHPP) is 300 tons per hour. The plant is run at an efficiency of 70 %.

The CHPP can be divided into different sections for the ease of discussions. These sections are as follows:

- RoM transfer point and reclaim system;
- RoM crushing system;
- Transfer conveyor to overland conveyor to plant RoM stockpile;
- RoM feed conveyor;
- Dense medium cyclone plant;
- Fines treatment plant;
- Stockpiling of final product and fines spiral plant; and
- Conveying of discard to a bin with overflow facility located at the plant.

The RoM feed material is reduced in size to -300mm with a feeder breaker. Thereafter the coal is conveyed to a coal sizing station. The -300mm coal passes through a secondary sizer (roll crusher) and the coal is reduced to a 120mm top size. Only the +50mm to -120mm material is fed to the tertiary sizer. The coal is then reduced to -50mm. The material is then fed into the dense medium separation plants. The material is passed over a de-sliming screen that removes the -1.4mm fraction from the feed. The remainder is then routed to the coarse dense medium cyclones. The -1.4mm fraction reports to the fine coal processing circuit.

The overflow of the de-sliming screen reports to the primary large diameter cyclone. Here waste is removed through high density separation. The underflow reports to the discard bin. The overflow from the primary cyclone is pumped to the secondary large diameter cyclone for further beneficiation. All product and waste streams run over drain- and rinse screens to ensure maximum water and magnetite recovery. The products are placed on product stockpiles and the discard is returned to the mining void.

The 1.4mm material from the de-sliming circuit passes over a sieve bed. The 0.25mm to 1.4mm material reports to the fines reflux classifier. The undersize material (0.25mm) is pumped to a classifying cyclone. The cyclone overflow, the 0.075mm material, reports straight to the thickener. The underflow is pumped to the ultra-fine reflux classifier.

The floats of the fines reflux classifiers are passed through a filter press from where the excess moisture is removed. The sinks are thrown on the rejects belt. The ultra-fines cyclone floats are dewatered and placed on the product stockpile. The filter cake is added to the reject conveyor. All rejects are placed on the rejects conveyor that feeds the reject bin for collection to be discarded in the mining void.

The plant process described above is well-known technology used by many coal operations in South Africa. The plant is based on the premise that the coal can be separated from the waste rock by means of their respective densities.

3.2.5 RESIDUE STOCKPILES

Information on the various residue stockpiles at Elandsfontein Colliery is provided below.

3.2.5.1 RUN OF MINE STOCKPILES

The run of mine (ROM) coal is conveyed by haul trucks to the Elandsfontein Colliery RoM tipping point. The RoM is crushed and conveyed by conveyors into the DMS plant where it is beneficiated and the product is placed on the product stockpiles. The product is reclaimed by front end loaders and loaded on haul trucks. It is then transported either to Oosbank siding (for export market) or to the inland customers. The discard is transported by haul trucks to the discard dumps and dumped back into the north

3.2.5.2 NON-CARBONACEOUS STOCKPILES

Overburden stockpiles comprising of both hards and softs will be stockpiled, mostly on top of backfilled, mined out areas. This stockpiling will continue until the face length comprises the entire resource width and all waste material can be rolled over back into the pit as part of the normal mining operation. Hards will be stockpiled separately.

3.2.5.3 CARBONACEOUS STOCKPILES

Surface carbonaceous stockpiles will be minimised as far as possible, and the aim will be to place such waste directly back into the pit.

3.2.5.4 SOIL STOCKPILES

Stripped soils – topsoil and sub soil will be stockpiled separately until the roll over mining method is in equilibrium. Separation of topsoil and subsoil will ensure that the characteristics of soil stockpiles are suitable for the prevailing landscape and drainage conditions once they are replaced.

3.2.6 WASTE

Domestic, hazardous, industrial and mining and sewerage waste streams are currently, and will continue to be generated at Elandsfontein Colliery. These waste streams are discussed in more detail in the subsections below.

3.2.6.1 DOMESTICWASTE STREAMS

Domestic waste generated will be collected and stored onsite in clearly marked skips. All domestic waste skips will be transported offsite by a registered waste removal contractor for final disposal at a registered facility. Waste disposal certificates will be required from contractors to ensure appropriate waste disposal. Sewage is collected in septic tanks on site and there is therefore no sewage treatment plant located on site. The sewage is removed by tanker for off-site disposal on a need basis

3.2.6.2 HAZARDOUS WASTE STREAMS

Hydrocarbon and other dangerous good and/or contaminated wastes generated (including used oil, diesel, grease, lubricants and explosive emulsions) will be stored in clearly marked skips for solid hazardous waste and containers for liquid waste. Hazardous waste will be stored in bunded areas or on hard, impervious surfaces. When full, the containers will be collected and transported offsite by a registered waste removal contractor for final disposal at a registered facility. Waste disposal certificates will be required from contractors to ensure appropriate waste disposal.

3.2.6.3 INDUSTRIAL AND MINING WASTE STREAMS

Industrial wastes (including metals, rubber, tyres and conveyor belt sheets) will be separated and stored in clearly marked skips. Materials may occasionally be salvaged for re-use but will generally be traded to registered recycling companies who will collect and transport material offsite for re-use or final disposal at a registered facility. Waste disposal certificates will be required from contractors to ensure appropriate waste disposal.

Two general forms of mineralised waste are currently, and will be, generated at Elandsfontein Colliery namely plant discards and coal falling of articulated dump trucks on the way to the RoM stockpile. Coal falling from trucks will be periodically collected and transported to the wash plant. Fines will be channelled to the PCD where water will be recycled, and the fines eventually cleared from a silt trap and transported to in pit disposal.

3.2.7 GENERAL INFRASTRUCTURE

The required infrastructure for the opencast mining at Elandsfontein Colliery is in place. For the underground mining operations existing shafts will be utilised, and where the existing shafts are not adequate new shafts will be constructed. The minimum infrastructure required are offices and workshops for the machinery and these are in place. A beneficiation plant is in operation and haul roads exists. Pumping and drainage management, plans and layouts are in operation. Carbonaceous material and the required dumping facilities exist. Waste dumps are currently under investigation and the ultimate extent required for these is to be determined.

3.2.7.1 HAZARDOUS GOODS STORAGE

Existing diesel storage represents the largest volume of hazardous material on site and it is adequately bunded according to regulatory requirements. Explosives are currently delivered as and when required from offsite locations. Oils and other lubricants and/or chemicals are also stored in approved bunded areas for use in the maintenance of plant and machinery. The relevant Health and Safety Standards for the handling and storage of these goods will be strictly adhered to. Average diesel consumption for mine is 4 000 L/ day (mining operation and wash plant). The storage facility consists of two 23 000 L storage tanks. Total storage capacity is 46 000 L.

No authorisation is required for hazardous industrial waste as the volumes on site is maintained at less than 35 m^3. This is a relatively small waste site and the mine has appointed a waste removal contractor to remove this waste on a regular basis.

3.2.7.2 WATER TREATMENT PLANT

Treatment of excess water may be required. Treated water should meet the SANS 241 compliance specification for discharge. More detail on whether a new water treatment plant will be required will be provided in the EIA based on the findings of the hydrological study.

3.2.7.3 SITE ACCESS AND CONTROL

The Elandsfontein Colliery can be accessed from the N4 National Road via the secondary provincial road (R547) through Clewer. All visitors to the mine are required to sign in at the security checkpoint at the mine's offices.

3.2.8 HAUL ROADS

Detail on the planned haul road network for the future mining areas within Elandsfontein Colliery will be provided in the EIA report

3.2.9 WATER SUPPLY

A water use license is in place for sourcing water from water sources as stipulated in the WUL as well as approval of the required water storage facilities. Elandsfontein is in the process of updating its water use licence. Potable water is used in the mine offices, workshops and change house facilities and is sourced from Emalahleni Local Municipality. All water to be used for dust suppression and other mining related processes will be drawn from available process water facilities. An updated water balance will be included in the EIAR and EMPr, which will indicate the specific volumes relating to the use of process water. Furthermore, the various options presented above for augmenting process water will be investigated in more detail and the proposed way forward presented in the EIAR and EMPr.

3.2.10CLEAN AND DIRTY WATER SYSTEMS

Management of clean and dirty water systems is required for effective pollution control. Pollution control will be maximised through facilitating the following:

- Controlling run-off and seepage entering the mining area;
- Controlling run-off emanating from stockpiles; and
- Controlling and separating the mixing of clean water and polluted water which is contained in the PCD.

The collection of dirty water and diversion of clean water would typically be achieved with earthen channels and berms. These systems would be designed so that clean water is effectively diverted from dirty water and allowed to pass through to other downstream users. Figure 4 below indicates a cross section of a typical earthen channel.

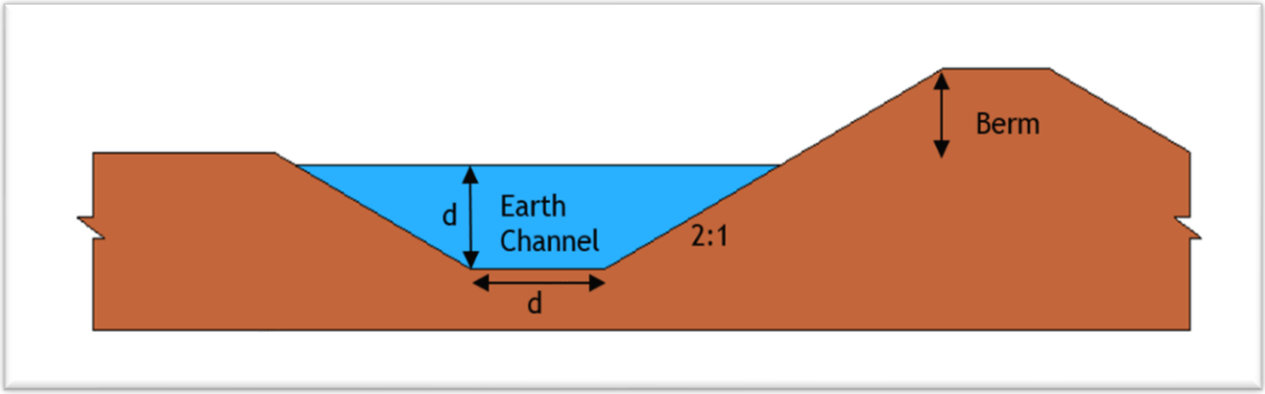

Figure 4: Cross section of typical earthen channel.

As the clean water from the area is expected to be carrying sediments, the channel for clean water diversion would most likely include a gravel bed.

3.2.10.1 POLLUTION CONTROL DAMS AND ASSOCIATED DIRTY WATER MANAGEMENT

The following PCDs are already located at Elandsfontein

- PCD 1 – 25 000 m^2 Volume – 32 006 m^3;
- PCD 2 – 9 814 m^2; Volume - 19 955 m^3; and
- PCD 3 – 7 024 m^2; Volume – 19 575 m^3.

The storm water is diverted by means of cut-off trenches around and away from the mine and berms are used to separate clean and dirty water areas. This ensures that clean water is not contaminated by mining activities and therefore removed from the catchment. Dirty water is collected in PCDs from where it is used for different activities e.g. dust suppression at the Colliery. New PCD dams will most likely be required for the new mining areas and the existing PCDs will be decommissioned. The current mining areas contain various dirty areas which would necessitate a total of 8 new lined PCD's. The mine is currently optimising these dirty areas by removing contaminated materials to a central location. In this way, the total number of PCD's that will be required can be reduced to 5.

3.2.11 LIST OF MAIN MINING ACTIONS, ACTIVITIES AND PROCESSES OCCURRING OR TO OCCUR ON SITE

The main mining actions, activities and process that are planned to take place on site are listed in the Table 4. All actions, activities and processes have been grouped into each of the relevant project phases namely: pre-construction, construction, operation, decommissioning, rehabilitation and closure. It is important to bear in mind that Elandsfontein Colliery is an existing mining operation and as such, certain of these activities/phases have already commenced (i.e.: operational phase is currently underway in certain areas). For this report, the following broad definitions apply:

- Pre-construction refers to the phase in which planning takes place;
- Construction refers to the phase in which the site is prepared, and infrastructure is established;

- Operation refers to the phase in which physical mining and production takes place;
- Decommissioning refers to the phase in which infrastructure is removed and rehabilitation efforts are applied, and their success monitored; and
- Closure refers to the phase in which maintenance and rehabilitation monitoring are undertaken to ensure that the mines closure objectives are met.

Table 4: List of main action, activities or processes on site and per phase

Main Activity/Action/Process	Ancillary Activity	Pre-Construction	Construction	Operation	Decommissioning	Closure
Site preparation	Vegetation clearance		As required	As required	As required	
	Removal of infrastructure		As required	As required	As required	
	Planned placement of infrastructure		At start of phase	As required		
	Relocation of contractor camp area		At start of phase	As required		
Human resources management	Employment/recruitment		At start of phase	As required	As required	As required
	I&AP consultations		At start of phase	On-going	On-going	On-going
	CSI initiatives		At start of phase	On-going	On-going	On-going
	Skills development programmes	At start of phase	On-going	On-going	On-going	On-going
	Environmental awareness training		At start of phase	On-going	On-going	As required
	HIV/AIDS Awareness programmes		At start of phase	On-going	On-going	
	Integration with Municipalities' strategic long-term planning	At start of phase	On-going	On-going	On-going	
Earthworks	Stripping and stockpiling of soils		At start of phase	As required	As required	
	Cleaning, grubbing and bulldozing		At start of phase	As required	As required	
	Removal of building waste and cleared vegetation		At start of phase	As required		
	Digging trenches and foundations		At start of phase	As required	As required	
	Blasting		As required	As required	As required	
	Establishing storm water management measures		At start of phase	As required	As required	
	Establishment of firebreak		At start of phase	As required	As required	
	Establishment of infrastructure and services		At start of phase	As required		

Civil Works	Mixing of concrete and concrete works		As required	As required		
	Establishment of PCD and storm water/return water dam		At start of phase	As required	On-going	
	Establishment of dewatering pipelines		At start of phase	As required		
	Establishment of mobile office and ablution block		At start of phase	As required	As required	
	Sewage and sanitation		At start of phase	On-going	On-going	
	Establishment of fuel storage area		At start of phase			
	Establishment of chemical storage area		At start of phase			
	Establishment of general waste area		At start of phase	On-going		
	Access control and security		At start of phase	As required	As required	
	General site management		On-going	On-going	On-going	On-going
Open-cast and Underground Mining	Drilling		As required	As required		
	Blasting		As required	As required		
	Excavations		As required	As required		
	Removal of overburden by dozing and load haul			As required		
	Establishment of internal haul roads			As required	As required	
	Removal of ore			On-going		
	Establishment of RoM stockpiles			As required	As required	
	Establishment of Product Stockpiles			On-going	On-going	
	De-watering of old underground workings			On-going	On-going	
	Pumping of water to PCD			On-going	On-going	
	Waste rock dumps for backfilling			On-going	On-going	
	Soil management		On-going	On-going	On-going	On-going

	Water management		On-going	On-going	On-going	On-going
	Concurrent rehabilitation			On-going	On-going	On-going
	Water treatment			On-going	On-going	On-going
Infrastructure removal	Dismantling and demolition of infrastructure				As required	
	Blasting				As required	
	Safety control				On-going	On-going
Rehabilitation	Backfilling of pits and voids			On-going	On-going	
	Slope stabilisation			On-going	On-going	On-going
	Erosion control			On-going	On-going	On-going
	Landscaping			On-going	On-going	On-going
	Replacing topsoil			On-going	On-going	On-going
	Removal of alien/invasive vegetation			On-going	On-going	On-going
	Re-vegetation			On-going	On-going	On-going
	Restoration of natural drainage patterns				On-going	On-going
	Remediation of ground and surface water			On-going	On-going	On-going
	Rehabilitation of external roads				On-going	On-going
Maintenance	Initiate maintenance and aftercare program				At end of phase	On-going
	Environmental aspect monitoring			On-going	On-going	On-going
	Monitoring of rehabilitation					On-going

4. POLICY AND LEGISLATIVE CONTEXT

This section provides an overview of the governing legislation identified which may relate to the proposed project. A summary of the applicable legislation is provided in Table 5 below. The primary legal requirement for this project stems from the need for an EA to be granted by the competent authority, which is the DMR, in accordance with the requirements of both the NEMA and MPRDA. In addition, there are numerous other pieces of legislation governed by many acts, regulations, standards, guidelines and treaties on an international, national, provincial and local level, which should be considered to assess the potential applicability of these for the proposed activity. More detail on the legislative framework is presented in Section 4.1 below.

Table 5: Applicable Legislation and guidelines overview

Applicable Legislation and Guidelines	Reference Where Applied
APPLICABLE LEGISLATION	
<u>Constitution of the Republic of South Africa, Act 108 of 1996</u> **The constitution of any country is the supreme law of that country. The Bill of Rights in chapter 2 section 24 of the Constitution of South Africa Act (Act 108 of 1996) makes provisions for environmental issues and declares that: "Everyone has the right -** **(a) to an environment that is not harmful to their health or well-being; and** **(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:** **(i) prevent pollution and ecological degradation;** **(ii) promote conservation; and** **(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development"** **Therefore, the EIA is conducted to fulfill the requirement of the Bill of Rights.**	Throughout the SR and EIR process
National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) and the EIA Regulations (2014) thereunder: **The NEMA (1998) requires that a project of this nature (inclusive of a Mining Right) must undergo a Scoping and Environmental Impact Assessment; an Environmental Management Programme must also be compiled. Regulations applicable to this project include the following:** **EIA Regulations R.982 (2014) in terms of NEMA.** **Listing Notice 1: R.983 (2014) in terms of NEMA.** **Listing Notice 2: R.984 (2014) in terms of NEMA.** **Listing Notice 3: R.985 (2014) in terms of NEMA.**	Throughout the SR and EIR process
Minerals and Petroleum Resources Development Act (MPRDA) (Act no 28 of 2002), as amended and Mineral and Petroleum Resource Development Regulations, 2004 as amended: **The MPRDA (2002) requires an applicant who wishes to proceed with a mining project to obtain a Mining Right, part of which requires the applicant to obtain Environmental Authorisation in terms of the NEMA (1998).**	Throughout the SR and EIR process
National Water Act (NWA) (Act 36 of 1998):	Throughout the process – all water related aspects

The NWA recognizes that water is a scarce and unevenly distributed national resource which must managed encompassing all aspects of water resources. **In terms of Chapter 4 of the NWA, activities and processes associated with the proposed mine extension and associated infrastructure, are required to be licensed by the Department of Water and Sanitation (DWS). An Integrated Water Use License Application (IWULA) will be lodged with the DWS in terms of Section 21 of the NWA, which lists several water uses requiring authorisation. Furthermore, an amended Integrated Water and Waste Management Plan (IWWMP) will be compiled and submitted in support of the IWULA.**	
National Heritage Resources Act, 1999 (Act no 25 of 1999): **The National Heritage Resources Act aims to promote good management of cultural heritage resources and encourages the nurturing and conservation of cultural legacy so that it may be bestowed to future generations. Due to the extent of the project, it is possible that some heritage resources and palaeontological features are likely to occur within the project boundary area.**	Heritage specialist study and Palaeontological, EIA, EMP.
Occupational Health and Safety Act, 1993 (Act no 85 of 1993): **The Occupational Health and Safety Act aims to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work. Regulations applicable to this project include the following:** **Explosives Regulations R.109 (2003) in terms of the OHS Act.**	Throughout the process – all blasting and explosives management related aspects
Specific Environmental Management Acts (SEMAs): **The SEMAs refer to specific portions of the environment where additional legislation over and above the NEMA (1998) is applicable. SEMAs relevant to this application include the following:** **National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004).** **National Environmental Management: Air Quality Act, 2004 (Act no 39 of 2004).** **National Environmental Management: Waste Act, 2008 (Section 4.1.4) (Act no 59 of 2008).**	Specialist studies, Baseline description and EMPr. Permits to be applied for if any protected tree species are to be removed from the site.
APPLICABLE GUIDELINES	
Integrated Environmental Management Information Guidelines series: **This series of guidelines was published by the Department of Environmental Affairs (DEA), and refers to various environmental aspects. Applicable guidelines in the series include:** **Guidelines 5: Companion to NEMA EIA Regulations of 2010.** **Guideline 7: Public Participation.** **Guideline 9: Need and desirability.** **Additional guidelines published in terms of the NEMA EIA Regulations, in particular:** **Guideline 3: General Guide to Environmental Impact Assessment Regulations, 2006.**	The guidelines will be used throughout the Scoping and Environmental Impact Report process.

Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, 2006. **Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, 2006.**	
Best Practice Guideline (BPG) series: **The BPG series is a series of publications by the then Department of Water Affair and Forestry (now DWS – Department of Water and Sanitation) providing best practice principles and guidelines relevant to certain aspects of water management. Best practice guidelines relevant to this project include the following:** **BPG A4: Pollution Control Dams.** **BPG H1: Integrated Mine Water Management.** **BPG H2: Pollution Prevention and Minimisation of Impacts.** **BPG H3: Water Reuse and Reclamation.** **BPG H4: Water treatment.** **BPG G1: Storm Water Management.** **BPG G2: Water and Salt balances.** **BPG G3: Water Monitoring Systems.** **BPG G4: Impact Prediction**	Surface water and groundwater specialist studies, EIA and EMP.

4.1 APPLICABLE NATIONAL LEGISLATION

The legal framework within which the Elandsfontein Colliery operates is governed by many Acts, Regulations, Standards and Guidelines on an international, national, provincial and local level. Legislation applicable to the project includes (but is not limited to):

4.1.1 THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT

The MPRDA aims to "make provision for equitable access to, and sustainable development of, the nation's mineral and petroleum resources". The MPRDA outlines the procedural requirements that need to be met to acquire mineral and petroleum rights in South Africa. The MPRDA governs the sustainable utilisation of South Africa's mineral resources. The MPRDA aims to "make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources". The MPRDA outlines the procedural requirements that need to be met to acquire mineral and hydrocarbon rights in South Africa. The MPRDA also requires adherence with related legislation, chief amongst them is the National Environmental Management Act (Act No. 107 of 1998, NEMA) and the National Water Act (Act No. 36 of 1998, NWA).

Several amendments have been made to the MPRDA. These include, but are not limited to, the amendment of Section 102, concerning amendment of rights, permits, programmes and plans, to requiring the written permission of the Minister for any amendment or alteration; and the section 5A(c) requirement that landowners or land occupiers receive twenty-one (21) days' written notice prior to any activities taking place on their properties. One of the most recent amendments requires all mining related activities to follow the full NEMA process as per the 2014 EIA Regulations, which came into effect on 4 December 2014. Section 102 applications for amendment of both the existing EMPr, MWP and SLP for Elandsfontein Colliery will be completed as part of the project.

In support of the amendment to the mining right submitted be Elandsfontein Colliery, the applicant is required as to conduct a Scoping Report, EIA /EMP and I&AP consultations that need to be submitted to the DMR for adjudication. This report has been compiled in accordance with Regulation 49 of the MPRDA to satisfy the criteria for a Scoping Report. Pending presentation of the results of the study and inclusion of comment from I&APs, the Final Scoping Report will be submitted to the DMR for review. The dates of the review and

commenting period for the draft EIA/EMPr will be determined at a later date and communicated to all registered I&AP's.

4.1.2 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The main aim of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA Environmental Impact Assessment (EIA) regulations, the applicant is required to appoint an environmental assessment practitioner (EAP) to undertake the EIA, as well as conduct the public participation process. In South Africa, EIA became a legal requirement in 1997 with the promulgation of regulations under the Environment Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported on to the competent authority responsible for granting the relevant environmental authorisation. On 21 April 2006 the Minister of Environmental Affairs and Tourism promulgated regulations in terms of Chapter 5 of the NEMA. These regulations, in terms of the NEMA, were amended in June 2010 and again in December 2014. The December 2014 NEMA regulations are applicable to this project. Mining Activities officially became governable under the NEMA EIA in December 2014.

The objective of the Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the activities that have been identified. The purpose of these procedures is to provide the competent authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorized, and that activities which are authorized are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

In accordance with the provisions of Sections 24 (5) and Section 44 of the NEMA the Minister has published Regulations (GN R. 982) pertaining to the required process for conducting EIA's to apply for, and be considered for, the issuing of an EA. These Regulations provide a detailed description of the EIA process to be followed when applying for EA for any listed activity. The Regulations differentiate between a simpler Basic Assessment Process (required for activities listed in GN R. 983 and 985) and a more complete EIA process (activities listed in GN R. 984). In the case of this project there are activities triggered under GN R. 983, 984 and 985 and as such a full EIA process is necessary. Table 8 presents all the anticipated listed activities under the NEMA EIA Regulations (2014) that are applicable to this project.

Approval is sought for the following activities:

- Construction of pollution control dams and dirty water storage reservoirs with a combined capacity of 50 000m^3 or more. The dam wall height falls below 5m;
- Construction of access roads and haul roads where the road is wider than 8m;
- Extending of existing farm roads/ haul roads by more than 1km;
- Physical alteration of vacant agricultural land for mining. The total area to be transformed exceeds 20 hectares;
- Construction of fuel storage facilities; and
- Construction of clean and dirty water canals in and around the mining areas .

A Scoping and EIA process is reserved for activities which have the potential to result in significant impacts which are complex to assess. Scoping and EIA accordingly provides a mechanism for the comprehensive assessment of activities that are likely to have more significant environmental impacts. Figure 5 below provides a graphic representation of all the components of a full EIA process.

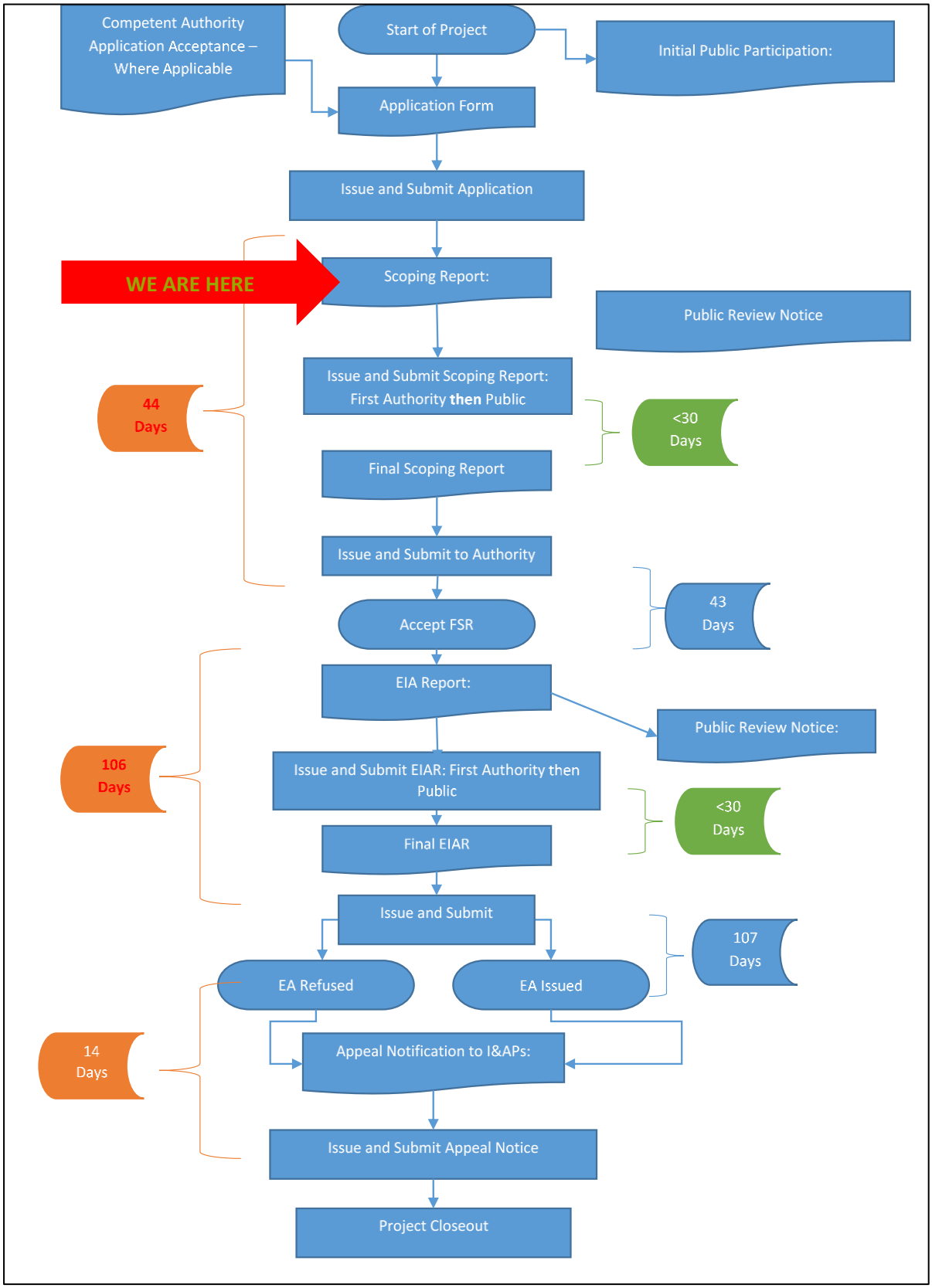

Figure 5: EIA process diagram.

Section 24 P of the NEMA requires that an applicant for an environmental authorisation relating to prospecting, mining or production must, before the Minister responsible for mineral resources issues the environmental authorisation, comply with the prescribed financial provision for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts. Therefore, the potential environmental liabilities

associated with the proposed activity must be quantified and indicate the method of financial provision in line with the National Environmental Management Act (1998): Regulations pertaining to the financial provision for prospecting exploration, mining and production, (2015). The requirement for existing mining operations to comply with the NEMA financial provisioning regulations becomes effective as from February 2021 . As such, the update of Elandsfontein's closure costing as per the NEMA guidelines will be presented in the EIA report. y.

Table 6 below indicates the listed activities in terms of the NEMA Regulations that are applicable to the proposed extension of the Elandsfontein Colliery.

Table 6: Listed activities in terms of the NEMA Regulations

Name of activity	Aerial extent of the activity	Listed Activity	Applicable listing notice
Water pipelines "The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area."	Size to be confirmed in EIAR	9	GN983
Pollution Control Dams (PCD) "The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared. "	Size to be confirmed in EIAR	12	GN983

PCD The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	Size to be confirmed in EIAR	13	GN983
Diesel Storage Facilities (approximately 100 cubic meters) The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	Size/extent to be confirmed in EIAR	14	GN983
Infilling/deposition during upgrade/expansion of bridges/river crossings. "The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies. "	Size/extent be confirmed in EIAR	19	GN983
Internal roads – Internal Haul Roads "The development of a road— (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road— (a) which is identified and included in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban area; or (c) which is 1 kilometre or shorter."	Routes & area to be confirmed in EIAR	24	GN983
PCDs The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2000 cubic metres but less than 15000 cubic metres.	Size to be confirmed in EIAR	25	GN983
All infrastructure and open cast and underground mining extension	To be confirmed in EIAR once	27	GN983

The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	biodiversity specialist has confirmed amount of indigenous vegetation on site		
Mining (industrial) development Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	Up to 830 ha	28	GN983
Decommissioning and relocation of existing facilities The decommissioning of existing facilities, structures or infrastructure for— (i) any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014; (ii) any expansion and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014; (iii) ……. (iv) any phased activity or activities for development and related operation activity or expansion or related operation activities listed in this Notice or Listing Notice 3 of 2014; or (v) any activity regardless the time the activity was commenced with, where such activity: (a) is similarly listed to an activity in (i) or (ii) above; and (b) is still in operation or development is still in progress; excluding where— (aa) activity 22 of this notice applies; or (bb) the decommissioning is covered by part 8 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies.	To be confirmed in the EIA phase.	31	GN983
Possibility of utilization of existing pipelines The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure— (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion—	To be confirmed in EIAR	45	GN983

(aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or (bb) will occur within an urban area.			
Possibility of utilization of existing pipelines The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure— (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion— (aa) relates to the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve or railway line reserve; or (bb) will occur within an urban area.	To be confirmed in EIAR	46	GN983
Possible expansion in these areas – location of watercourses to be confirmed in EIA The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding— (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.	To be confirmed in EIAR	48	GN983
Should expansion of the existing PCD be required The expansion of facilities or infrastructure for the off- stream storage of water, including dams and reservoirs, where the combined capacity will be increased by 50000 cubic metres or more.	To be confirmed once the hydrological study has been concluded in the EIA phase.	50	GN983
Possibility for expansion of existing fuel storage facility The expansion and related operation of facilities for the storage, or storage and handling, of a dangerous	To be confirmed in the EIA phase.	51	GN983

good, where the capacity of such storage facility will be expanded by more than 80 cubic metres.			
Internal roads - Upgrades to existing roads for transport of RoM to minerals processing complex "The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas."	Routes & area to be confirmed in EIA phase	56	GN983
Possible expansion of existing PCD The expansion and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage where the capacity will be increased by 15000 cubic metres or more per day and the development footprint will increase by 1000 square meters or more.	To be confirmed by the hydrological specialist in EIAR	57	GN983
General mining activities Phased activities for all activities— (i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; excluding the following activities listed in this Notice- 17(i)(a-d); 17(ii)(a-d); 17(iii)(a-d); 17(iv)(a-d); 17(v)(a-d); 20; 21; 22; 24(i); 29; 30; 31; 32; 34; 54(i)(a-d); 54(ii)(a-d); 54(iii)(a-d); 54(iv)(a-d); 54(v)(a-d); 55; 61; 64; and 65; or (ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold."	To be confirmed in EIAR	67	GN983
Possibly triggered if new PCD inflow exceeds 2000 cubic meters / day "The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding— (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater	To be confirmed during the EIA phase.	6	GN984

or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day. "			
Dewatering opencast and/or underground The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding— (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.	To be confirmed in the EIAR following specialist input.	7	GN984
All infrastructure and open cast and underground mining extension "The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan."	To be confirmed in the EIAR following specialist input.	15	GN984
PCDs "The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more."	To be confirmed in the EIA phase.	16	984
General mining activities **"**Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including— (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.	Up to 830 ha	17	984
Unlikely but to be confirmed by soils study if peat occurs in the area. The extraction or removal of peat or peat soils, including the disturbance of vegetation or soils in	To be confirmed in the EIAR	24	GN984

anticipation of the extraction or removal of peat or peat soils, but excluding where such extraction or removal is for the rehabilitation of wetlands in accordance with a maintenance management plan.	following soils study.		
Infrastructure and mine extension The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004	To be confirmed once the Biodiversity Specialist Study has been concluded in the EIA phase.	12	GN985
Wastewater/temporary modular treatment plant. The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage.	To be confirmed in the EIA phase.	B1	GN921
Processing plant The reuse or recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.	To be confirmed in the EIA phase.	B2	GN921
PCDs The recovery of waste including the refining, utilisation, or co-processing of the waste at a facility that processes in excess of 100 tons of general waste per day or in excess of 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.	To be confirmed in the EIA phase.	B3	GN921
Residue deposits / carbonaceous waste to pit The disposal of any quantity of hazardous waste to land.	To be confirmed in the EIA phase.	B7	GN921
Residue dumps The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	To be confirmed in the EIA phase.	B 10	GN921
Dumps & stockpiles The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	To be confirmed in the EIA phase.	B 11	GN921
Storage of hazardous waste in a PCD. The storage of hazardous waste at a facility that has the capacity to store in excess of 80m^3 of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste.	To be confirmed in the EIA phase.	C 1	GN921

4.1.3 THE NATIONAL WATER ACT

The National Water Act, 1998 (Act 36 of 1998) (NWA) makes provision for two types of applications for water use licences, namely individual applications and compulsory applications. The NWA also provides that the responsible authority may require an assessment by the applicant of the likely effect of the proposed licence on the resource quality, and that such assessment be subject to the EIA regulations. A person may use water, if the use is-

- Permissible as a continuation of an existing lawful water use (ELWU);
- Permissible in terms of a general authorisation (GA);
- Permissible under Schedule 1; or
- Authorised by a licence.

These processes are described in Figure 6.

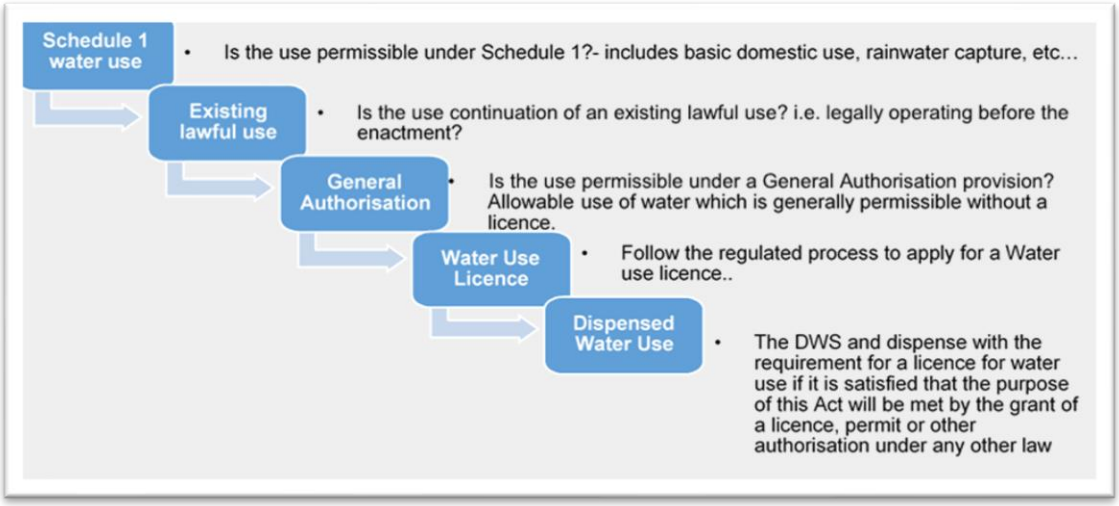

Figure 6: Authorization Process for new water uses

The NWA defines 11 water uses. A water use may only be undertaken if authorised by the DWS. Water users are required to register certain water uses that took place on the date of registration, irrespective of whether the use was lawful or not. The water uses for which an authorisation issued can be issued includes:

a) taking water from a water resource;

b) storing water;

c) impeding or diverting the flow of water in a watercourse;

d) engaging in a stream flow reduction activity contemplated in section 36;

e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);

f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits;

g) disposing of waste in a manner which may detrimentally impact on a water resource;

h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;

i) altering the bed, banks, course or characteristics of a watercourse;

j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and

k) using water for recreational purposes.

Elandsfontein Colliery was granted an Integrated Water Use Licence (IWUL) in terms of Chapter 4 of the NWA, Licence No: 04/B20G/CGI/3843 dated 20 October 2015 – amended 23 July 2019, for the following water uses:

Section 21(c): Impeding or diverting the flow of water in a watercourse;

Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource;

Section 21(i): altering the bed, banks, course or characteristics of a watercourse; and

Section 21(j): Removing, discharging or disposing of water found underground.

The mine will apply for renewal of the existing IWUL as well as certain amendments and additional water uses to incorporate the proposed changes to the MWP and associated new water uses. The possible water uses that could be triggered are presented in Table 7 and these will be confirmed following the specialist studies and finalisation of the project proposal in the EIA phase.

Table 7: Water uses that may be applicable to mine expansion

Activity #	Listed Activity Description	Reason for Inclusion
NWA Activities		
Section 21(a)	Taking water from a water resource	Potable water purposes from borehole(s) for use as drinking water.
Section 21(b)	Storing water	There may be a requirement to store water for use during the winter months.
Section 21(e)	Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1)	Depending on the disposal options to be considered (e.g.: mist sprays to remove excess water from PCD's).
Section 21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource; and	PCD, waste stockpiles (discard dumps, filter cake and possibly waste rock dumps), dust suppression, wash bay consumption.
Section 21(j)	Removing, discharging or disposing of water found underground.	Dewatering of opencast and underground mining areas
Section 21 (c) and 21 (i)	21(c) Impeding or diverting the flow of water in a watercourse; and 21(i) Altering the Bed, Banks, Course or Characteristics of a Water Course	Watercourse crossings

An important regulation under NWA is the GN704 (1999). This is a guideline document for the implementation of regulations on use of water for mining and related activities aimed at the protection of water resources.

4.1.3.1 MINE WATER MANAGEMENT POLICY POSITION (DRAFT - 2017)

Acid Mine Drainage (AMD) and related mine water impacts have in the past decade evolved to become a major environmental challenge. Whilst the challenge is limited to the mining sector during operations, it eventually becomes externalised during mining downturn, and is especially pertinent post-mining closure, especially if mine closure does not proceed according to regulatory-approved recommendations.

To deal with this challenge at a very high level, an Inter-Ministerial Committee (IMC) comprising the Ministers of Mineral Resources, Water and Environmental Affairs, Science and Technology, and the Minister in the Presidency: National Planning Commission was established. Mine water impacts, including AMD, are phenomena that plague all countries with rich mineral deposits. Depending on the geology/ mineralogy of a region, the terms Acid Rock Drainage (ARD), Acid Mine Drainage (AMD), Neutral Mine

Drainage (NMD), and Saline Drainage (SD) are the characteristic nomenclature for reporting different mine water types. Given the long history of mining in south Africa, and the mineral wealth still locked across various parts of South Africa, and the potential this deposit has for local economic development and attracting foreign investment, it is prudent that the DWS formulates a policy principle to support its response to mine water challenges.

The draft policy document's purpose is to provide the position of the DWS on mine water management, including AMD. Furthermore, it aims to provide measures on protection of water resources from prospective, operational and historical mine activities that have negative water quality impacts. Based on the formulation of this policy document, it is clear that the DWS intends to focus more heavily on ensuring that the mining sector in particular, undertakes every possible action to prevent the deterioration of the surrounding water quality.

4.1.3.2 CATCHMENT MANAGEMENT STRATEGIES

Catchment Management Agencies (CMAs) are tasked with coordinating the water demands, interests and responsibilities of all relevant government departments, institutions and water users within a specific CMA. This is to ensure that on a regional scale, water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The main instrument that guides and governs the activities of a CMA is the Catchment Management Strategy (CMS) which, while conforming to relevant legislation and national strategies, provides detailed arrangements for the protection, use, development, conservation, management and control of the region's water resources. According to DWS' water management areas delineations, the Elandsfontein Colliery mining right area falls within the Olifants Water Management Area, delineated as water management area No, 4, which subsequently falls under the B Primary drainage area.

4.1.4 THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT

The applicable waste act is no. 59 of 2008: National Environmental Management: Waste Act, 2008 (NEMWA). On 2 June 2014 the National Environmental Management: Waste Amendment Act came into force. Waste is accordingly no longer governed by the MPRDA but is subject to all the provisions of the National Environmental Management: Waste Act, 2008 (NEMWA).

Section 16 of the NEMWA must also be considered which states as follows:

A holder of waste must, within the holder's power, take all reasonable measures to-

a) "Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;

b) Reduce, re-use, recycle and recover waste;

c) Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;

d) Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts;

e) Prevent any employee or any person under his or her supervision from contravening the Act; and

f) Prevent the waste from being used for unauthorised purposes."

These general principles of responsible waste management will be incorporated into the requirements in the EMPr to be implemented for this project.

Waste can be defined as either hazardous or general in accordance to Schedule 3 of the NEMWA (2014) as amended. "Schedule 3: Defined Wastes" has been broken down into two categories – Category A being hazardous waste; and Category B being general waste. Under Category A (hazardous waste), the act makes allowance for, but not limited to, "wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal; Oil wastes and wastes of liquid fuels; and Construction wastes".

In order to attempt to understand the implications of these waste groups, it is important to ensure that the definitions of all the relevant terminologies are defined:

Hazardous waste: means "any waste that contains organic or inorganic elements or compounds that may, owning to the inherent physical, chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles."

Residue deposits: means "any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right."

Residue stockpile: means "any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act."

General waste: means "waste that does not pose an immediate hazard or threat to health or to the environment, and includes – domestic waste; building and demolition waste; business waste; inert waste; or any waste classified as non-hazardous waste in terms of the regulations made under Section 69."

Table 8 below presents the anticipated NEMWA listed activities for the mine extension project which require authorisation.

Table 8: Anticipated NEMWA Listed Activities requiring authorisation.

Activity #	Listed Activity Description	Reason for Inclusion
NEMWA listed activities - Government Notice R921		
B1	The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage.	PCD's
B2	The reuse or recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.	Processing plant and filter cake. Filter cake may be blended into product.
B3	The recovery of waste including the refining, utilisation, or co-processing of the waste at a facility that processes in excess of 100 tons of general waste per day or in excess of 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.	PCD's
B7	The disposal of any quantity of hazardous waste to land.	Residue deposits / carbonaceous material back to pit.
B10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	The construction of PCD's and possible water treatment plant.
B11	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	Dumps & stockpiles are residue deposits resulting from activities which require a mining right.

4.1.4.1 NEMWA PLANNING AND MANAGEMENT OF RESIDUE STOCKPILES AND RESIDUE DEPOSITS REGULATIONS, 2015 (GN R 632)

The purpose of these Regulations is to regulate the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation. The identification and assessment of environmental impacts arising from residue stockpiles and residue deposits must be done as part of the environmental impact assessment conducted in terms of the NEMA. A risk analysis based on the characteristics and the classification set out in Regulation 4 and 5 must be used to determine the appropriate mitigation and management measures. The pollution control barrier system shall be informed by the-

National Norms and Standards for the Assessment of Waste for Landfill Disposal, 2013; and

National Norms and Standards for Disposal of Waste to Landfill, 2013.

In terms of the amended regulations (21 September 2018), a competent person must recommend the pollution control measures suitable for a specific residue stockpile or residue deposit on the basis of a risk analysis. The planning, management and reporting of residue stockpiles and residue deposits is shown schematically in Figure 7 below.

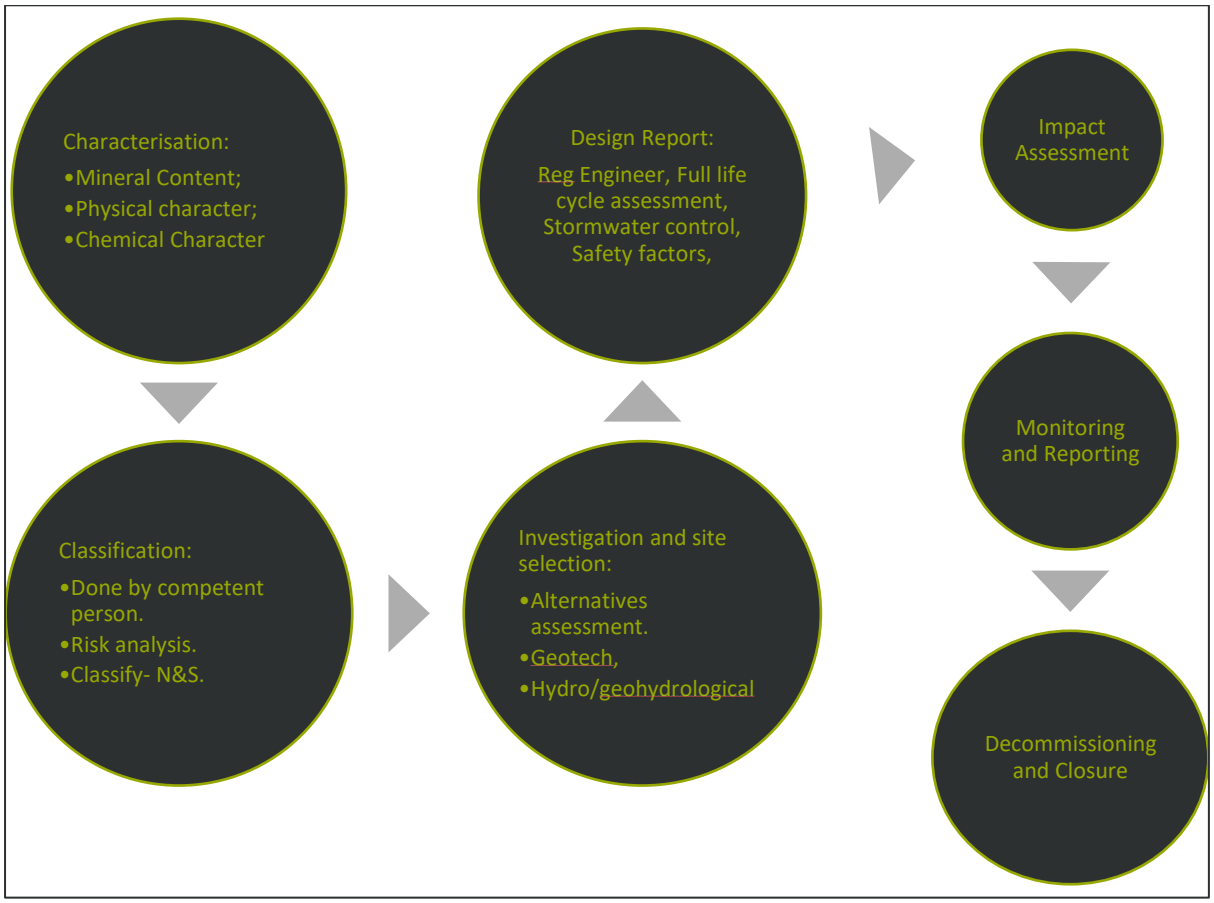

Figure 7: Overview of the planning and management of residue stockpiles and residue deposits regulations.

4.1.4.2 NEMWA NATIONAL NORMS AND STANDARDS FOR THE ASSESSMENT OF WASTE FOR LANDFILL DISPOSAL, 2013 (GN R. 635)

These norms and standards prescribe the requirements for the assessment of waste prior to disposal to landfill. The aim of the waste assessment tests is to characterise the material to be deposited or stored

in terms of the above-mentioned waste assessment guidelines set by the DEA. Analysis of representative samples will be discussed in the EIA phase where the characterisation of the materials will determine the required mitigation measures to be put forward in the EMPr.

4.1.4.3 NEMWA WASTE CLASSIFICATION AND MANAGEMENT REGULATIONS, 2013 (GN R. 634)

Chapter 9 of the Waste Classification and Management Regulations stipulates the requirements for a motivation for and consideration of listed Waste Management Activities that do not require a Waste Management License. The motivation must:

- Demonstrate that the waste management activity can be implemented without unacceptable impacts on, or risk to, the environment or health;
- Must provide a description of the waste;
- Description of waste minimisation or waste management plans; and
- Description of potential impacts, etc.

Waste streams generated from mine activities will, where applicable, be classified accordingly to determine their nature (i.e. general or hazardous), and subsequently managed and disposed of in accordance with the relevant legislative requirements. Analysis of representative samples will be discussed in the EIA phase where the characterisation of the materials will determine the required mitigation measures to be put forward in the EMPr.

4.1.4.4 NEMWA NATIONAL NORMS AND STANDARDS FOR DISPOSAL OF WASTE TO LANDFILL, 2013 (GN R. 636)

Once the waste has been assessed and classification is done (waste type identified) the guidelines in this Regulation can be used to determine the minimum requirements for the landfill and containment barrier design. This will distinguish between Class A, Class B, Class C, or Class D landfills (where relevant) and the associated requirements (as presented in Figure 8).

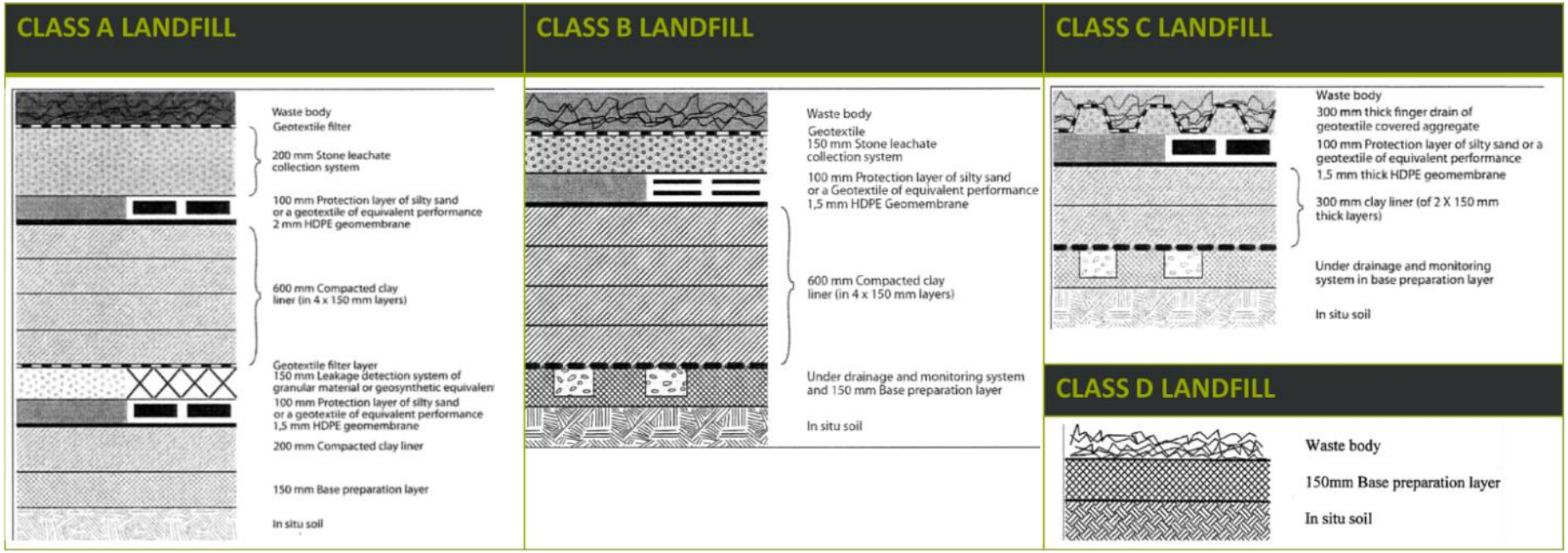

Figure 8: Overview of NEMWA Class A to D landfill containment barrier designs.

4.1.5 THE NATIONAL ENVIRONMENTAL MANAGEMENT AIR QUALITY ACT

The National Environmental Management: Air Quality Act (NEMAQA) is the main legislative tool for the management of air pollution and related activities. The Object of the Act is:

To protect the environment by providing reasonable measures for-

i. the protection and enhancement of the quality of air in the republic;

ii. the prevention of air pollution and ecological degradation; and

iii. securing ecologically sustainable development while promoting justifiable economic and social development; and

Generally, to give effect to Section 24(b) of the constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and wellbeing of people.

The NEMAQA (Act No. 39 of 2004 as amended) mandates the Minister of Environment to publish a list of activities which result in atmospheric emissions and consequently cause significant detrimental effects on the environment, human health and social welfare. All scheduled processes as previously stipulated under the Air Pollution Prevention Act (APPA) are included as listed activities with additional activities being added to the list. The updated Listed Activities and Minimum National Emission Standards were published on the 22nd November 2013 (Government Gazette No. 37054).

According to the Air Quality Act, air quality management control and enforcement is in the hands of local government with District and Metropolitan Municipalities as the licensing authorities. Provincial government is primarily responsible for ambient monitoring and ensuring municipalities fulfil their legal obligations, with national government primarily as policy maker and co-ordinator. Each sphere of government must appoint an Air Quality Officer responsible for co-ordinating matters pertaining to air quality management. Given that air quality management under the old Act was the sole responsibility of national government, local authorities have in the past only been responsible for smoke and vehicle tailpipe emission control.

The National Pollution Prevention Plans Regulations were published in March 2014 (Government Gazette 37421) and tie in with the National Greenhouse Gas Emission Reporting Regulations which took effect on 3 April 2017. In summary the regulations aim to prescribe the requirements that pollution prevention plans of greenhouse gases, declared as priority air pollutants, need to comply with in terms of the NEMAQA. The regulations specify who needs to comply, and by when, as well as prescribing the content requirements. Mines do have an obligation to report on the GHG emissions under these regulations as well as register with NAEIS.

The National Dust Control Regulations 2013 (NDCR, 2013) are promulgated under the NEMAQA and within these regulations, the standard for the acceptable dust fall rate for residential and non-residential areas is presented in Table 9.

Table 9: Acceptable dust fall rates (National Dust Control Regulations 2013).

Restriction Areas	Dust fall rate (D) (mg/m²/day, 30-days average)	ermitted frequency of exceeding dust fall rate
Residential area	D < 600	Two within a year, not sequential month
Non-residential area	**1.1.** 600 < D < 1200	Two within a year, not sequential months

4.1.6 THE NATIONAL HERITAGE RESOURCES ACT

The National Heritage Resources Act (NHRA) (Act 25 of 1999) stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, "no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…". The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008b):

The NEMA 23(2)(b) states that an integrated environmental management plan should, "…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage".

A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 (Fourie, 2008b).

The MPRDA defines 'environment' as it is in the NEMA and, therefore, acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment and identification of impacts on all heritage resources as identified in Section 3(2) of the National Heritage Resources Act that are to be impacted on by activities governed by the MPRDA. Section 40 of the same Act requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA. This implies the evaluation of Heritage Assessment Reports in Environmental Management Plans or Programmes by the relevant heritage authorities (Fourie, 2008b).

4.1.7 THE NATIONAL FORESTS ACT

According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that "*no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister*."

The presence of protected species on the proposed site is not known at this stage however a biodiversity study will be conducted to inform the EIA phase of the project.

4.1.8 NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT

The National Environmental Management Biodiversity Act (NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA as well as the protection of species and ecosystems that warrant national protection. Within the framework of this act, various regulations are promulgated which provide specific requirements and management measures relating to protecting threatened ecosystems, threatened or protected species as well as the control of alien and invasive species. An assessment of the application area will be undertaken by a biodiversity specialist and the findings of this assessment will be presented in the EIA phase. A summary of these regulations is presented below.

4.1.8.1 NATIONAL LIST OF ECOSYSTEMS THAT ARE THREATENED AND NEED OF PROTECTION (GN 1002 OF 2011)

The NEMBA provides for listing of threatened or protected ecosystems in one of the following categories:

Critically Endangered (CR) ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;

Endangered (EN) ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;

Vulnerable (VU) ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and

Protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.

The Biodiversity Specialist will assess whether any of these threatened or protected ecosystems occur within the study area and provide recommendations on how the development should or should not

proceed based on the findings of the assessment. The results of this assessment will be presented in the EIA phase of this study.

4.1.8.2 THREATENED OR PROTECTED SPECIES REGULATIONS (GNR 152 OF 2007)

The purpose of these regulations is to -

(a) further regulate the permit system set out in Chapter 7 of the Biodiversity Act insofar as that system applies to restricted activities involving specimens of listed threatened or protected species;

(b) provide for the registration of captive breeding operations, commercial exhibition facilities, game farms, nurseries, scientific institutions, sanctuaries and rehabilitation facilities and wildlife traders;

(c) provide for the regulation of the carrying out of a specific restricted activity, namely hunting;

(d) provide for the prohibition of specific restricted activities involving specific listed threatened or protected species;

(e) provide for the protection of wild populations of listed threatened species; and

(f) provide for the composition and operating procedure of the Scientific Authority.

4.1.8.3 ALIEN AND INVASIVE SPECIES LIST

This Act is applicable since it protects the quality and quantity of arable land in South Africa. Loss of arable land should be avoided and declared Weeds and Invaders in South Africa are categorised according to one of the following categories, and require control or removal:

Category 1a Listed Invasive Species: Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combated or eradicated;

Category 1b Listed Invasive Species: Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled;

Category 2 Listed Invasive Species: Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be; and

Category 3 Listed Invasive Species: Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.

The provisions of this Act will be considered and where relevant incorporated into the proposed mitigation measures and requirements of the EMPr during the EIA phase of this application.

4.1.9 THE SUB-DIVISION OF AGRICULTURAL LAND ACT

In terms of the Subdivision of Agricultural Land Act (Act 70 of 1970), any application for change of land use must be approved by the Minister of Agriculture, while under the Conservation of Agricultural Resources Act (Act 43 of 1983) no degradation of natural land is permitted.

4.1.10 THE CONSERVATION OF AGRICULTURAL RESOURCES ACT

The Conservation of Agricultural Resources Act (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal. The Conservation of Agriculture Resources Act (Act 43 of 1983) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

4.1.11 SPATIAL PLANNING AND LAND USE MANAGEMENT ACT

The Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA) promotes optimal exploitation of minerals and mineral resources. The act provides a framework for a planning system for the country. The Act introduces provisions to cater for development principles; norms and standards; inter-governmental support;

Spatial Development Frameworks (SDFs) across national, provincial, regional and municipal areas; Land Use Schemes (LUS); and municipal planning tribunals.

4.1.12NOISE STANDARDS

There are a few South African scientific standards (SABS) relevant to noise from mines, industry and roads. They are:

- South African National Standard (SANS) 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication';
- SANS 10210:2004. 'Calculating and predicting road traffic noise';
- SANS 10328:2008. 'Methods for environmental noise impact assessments';
- SANS 10357:2004. 'The calculation of sound propagation by the Concave method';
- SANS 10181:2003. 'The Measurement of Noise Emitted by Road Vehicles when Stationary'; and
- SANS 10205:2003. 'The Measurement of Noise Emitted by Motor Vehicles in Motion'.

The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. With regards to SANS 10103:2008, the recommendations are likely to inform decisions by authorities, but non-compliance with the standard will not necessarily render an activity unlawful per se.

4.1.13ENVIRONMENT CONSERVATION ACT

The Environment Conservation Act (Act 73 of 1989) (ECA) was, prior to the promulgation of the NEMA, the backbone of environmental legislation in South Africa. To date the majority of the ECA has been repealed by various other Acts, however Section 25 of the Act and the Noise Regulations (GNR 154 of 1992) promulgated under this section are still in effect. These regulations serve to control noise and general prohibitions relating to noise impact and nuisance.

The Noise Control Regulations were revised under GN R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. The Free State Province did promulgate provincial regulations (PN 24) in 1998 however the Mpumalanga Province has not done so yet and as such, the ECA Noise Control Regulations apply. These noise control regulations will need to be considered in relation to the potential noise that may be generated mainly during the construction and decommissioning phases of the proposed project. The two key aspects of the noise control regulations relate to disturbing noise and noise nuisance.

Section 4 of the regulations prohibits a person from making, producing or causing a disturbing noise, or allowing it to be made produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the regulations as 'a noise level which exceeds the zone sound level or if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more.

Section 5 of the noise control regulations prohibits the creation of a noise nuisance. A noise nuisance is defined as 'any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person'. Noise nuisance is anticipated from the proposed project particularly to those residents that are situated in close proximity to the project site. South African National Standard 10103 also applies to the measurement and consideration of environmental noise and should be considered in conjunction with these regulations.

5. NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

This section will examine the need and desirability of the proposed Elandsfontein project and will examine the importance of coal as a resource as well as the desirability of continuing coal mining operations at the mine.

5.1 THE IMPORTANCE OF COAL AS A RESOURCE

Coal as a resource, is important in South Africa, as it remains the main source or fuel for energy generation. Eskom's existing coal-fired power stations are critical in terms of electricity production towards meeting the energy requirements of South Africa as a whole. As a result, coal mining beneficiation and supply is of paramount importance to South Africa for continued electricity generation in order to meet the current energy demands of the country in the short, medium and long term. Currently, coal provides for more than 70 % of the country's primary energy needs. About 53% of the coal that South Africa produces is used for electricity generation, 33% for petrochemical industries, 12% for metallurgical industries, and 2 % for domestic heating and cooking (Webb, 2015).

The National Development Plan (NDP) identifies the need for South Africa to invest in a strong network of economic infrastructure designed to support the country's medium and long-term economic and social objectives. Energy infrastructure is a critical component that underpins economic activity and growth across the country and therefore, it needs to be robust and extensive enough to meet industrial, commercial and household needs. The NDP envisages that, by 2030, South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates, is socially equitable through expanded access to energy at affordable tariffs and environmentally sustainable through reduced pollution.

Coal produced is used locally within the region and is also exported. Eskom is the largest local buyer while China is the major export buyer. Demand for coal is generally very high for both market segments. Selling prices are generally regarded as stable both currently and in the foreseeable future. Elandsfontein Colliery's coal is currently transported by 34tonne coal haulers/side tippers to various power stations and sidings.

The coal sector in South Africa is set to receive a demand boost from the electricity sector in the form of South Africa's Coal Baseload IPP Procurement Programme, under which the Department of Energy is aiming to procure 2,500 megawatts (MW) of new electricity capacity. These projects will require significant coal supplies. After coal consumption for electricity generation, Sasol, which operates coal-to-liquid plants, is the next biggest consumer of coal in South Africa. Sasol's subsidiary, Sasol Mining, supplies the majority of the group's coal needs. Other coal consumers in South Africa include industries such as cement, chemicals and steelmaking, small businesses, and households. The largest consumer of metallurgical coal is steelmaker ArcelorMittal South Africa, which has for years sourced the material locally from Exxaro's Tshikondeni Mine in Limpopo. Exxaro closed the mine in September 2014 and the steel producer is importing coking coal from other countries, including neighbouring Mozambique

5.2 ELANDSFONTEIN OPEN CAST AND UNDERGROUND EXTENSION

Elandsfontein Colliery's coal is currently transported by coal haulers/side tippers to various power stations and sidings. The extension of the mining operations at Elandsfontein Colliery, will allow the continued contribution of the mine to favourable economic impacts on both the local and regional economies. The current approved mining area will be depleted by around 2027, which will result in a loss of jobs and economic drivers in the region. Therefore, the mine extension will extend the profitability and life of the mining operation until 2032, and potentially secure the jobs of the current employees for the foreseeable future. If the mining operations were not to be extended, the additional economic activity, skills development and available jobs would not be created and/or maintained, and the coal reserves would remain unutilised. If Elandsfontein Colliery were not to proceed with the proposed extension of mining, mining of these coal reserves will not necessarily be avoided, as another application in terms of the MPRDA, Act 28 of 2002 can be made by another company. Unless the government declares the area "off limits" to mining, or the demand for coal subsides, mining houses will continue to attempt to mine the coal reserves in the area. In summary, the proposed project will allow the applicant to continue producing a secure, steady supply of coal for use by Eskom.

The needs and desirability analysis component of the "Guideline on need and desirability in terms of the EIA Regulations (Notice 819 of 2014)" includes, but is not limited to, describing the linkages and dependencies between human well-being, livelihoods and ecosystem services applicable to the area in question, and how the proposed development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site,

opportunity costs, etc.). Table 10 present the needs and desirability analysis undertaken for the Elandsfontein extension project.

Table 10: Needs and desirability analysis for the Elandsfontein project

Ref No.	Question	Answer
1	Securing ecological sustainable development and use of natural resources	
1.1	How were the ecological integrity considerations taken into account in terms of: Threatened Ecosystems, Sensitive and vulnerable ecosystems, Critical Biodiversity Areas, Ecological Support Systems, Conservation Targets, Ecological drivers of the ecosystem, Environmental Management Framework, Spatial Development Framework (SDF) and global and international responsibilities.	The following specialist studies are being conducted in support of this application: Air Quality Study; Biodiversity, Aquatic Ecology and Wetland Study; Hydrological Study; Blasting Study; Hydrogeological Study; Heritage and Paleontological Study; and Soils and Land Use Study. The initial conclusions of these studies are included in this scoping report and the identified impacts and mitigation measures stemming therefrom will also be included in the EIA and EMPr. The need of the project in terms of the Nkangala District Municipal SDF will also be further considered in the EIA and EMPr.
1.2	How will this project disturb or enhance ecosystems and / or result in the loss or protection of biological diversity? What measures were explored to avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	Refer to baseline ecological information in Section 8, and the impact assessment and mitigation measures in Section 9 of this Scoping Report. These sections will be further expanded in the EIA and EMPr.
1.3	How will this development pollute and / or degrade the biophysical environment? What measures were explored to either avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	
1.4	What waste will be generated by this development? What measures were explored to avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and / or	Refer to waste generation and disposal in Section 3.2.6 of this Scoping Report. This aspect will be further explored in the EIA and EMPr

	recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	
1.5	How will this project disturb or enhance landscapes and / or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	A Heritage and paleontological specialist study has been undertaken in scoping and additional studies inform the subsequent EIA and EMPr.
1.6	How will this project use and / or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	Refer to the impact assessment and mitigation methods in Section 9 of this Scoping Report. It is noted that due to the nature of this project (mining of coal), a non-renewable resource will be depleted. Coal mining does, however, contribute significantly to the country's economy and power generation needs, and therefore, at the current stage mining of coal is still needed within South Africa.
1.7	How will this project use and / or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and / or impacts on the ecosystem jeopardise the integrity of the resource and / or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	Refer to the impact assessment and mitigation methods in Section 9 of this Scoping Report.
1.7.1	Does the proposed project exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)?	The proposed project will rely on / depend on the extraction of a natural, non-renewable resource (coal) for selling to Eskom.
1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used?	The proposed project will extend the life of the mine in an area where coal reserves have already been identified and are already being mined. Refer to Section 6 on alternatives in this Scoping Report.
1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	The Elandsfontein Mine is already an existing mine and the proposed project will be an extension of the existing mine partially utilising existing infrastructure. Additional

		/ new infrastructure will be required to mine the additional coal and to enhance the quality of the product.
1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts:	
1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	While the expected potentially significant impacts have been preliminarily identified as part of this Scoping Process, the impacts on all environmental aspects will be explored in more detail and quantified wherever possible during the EIA Phase. More detailed and thorough mitigation measures associated with the impacts will also be included in the EIA report.
1.8.2	What is the level of risk associated with the limits of current knowledge?	The level of risk is low as this report represents the preliminary scoping level study whilst the EIA and EMPr will be further informed by the various EIA-phase specialist studies and feedback from the I&AP's (during Scoping review).
1.8.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	Sufficient information was gathered prior to the onset of this process to indicate that the potential mining of additional coal is feasible. In addition, it is noted that this project extends a current mining operation.
1.9	How will the ecological impacts resulting from this development impact on people's environmental right in terms following?	
1.9.1	Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the impact assessment and mitigation measures in Section 9 in this Scoping Report. This aspect will be further explored in the EIA and EMPr.
1.9.2	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	Refer to Section 8 and the impact assessment and mitigation measures in Section 9 in this Scoping Report. This aspect will be further explored in the EIA and EMPr.

1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	Refer to the impact assessment and mitigation measures in Section 9 in this Scoping Report. This aspect will be further explored in the EIA and EMPr.
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	Refer to Section 6, details of the alternatives considered, and Section 5 the advantages and disadvantages of the proposed activity, of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
1.13	Describe the positive and negative cumulative ecological / biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Refer to Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr
2	Promoting justifiable economic and social development	
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following:	
2.1.1	The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks or policies applicable to the area,	The Emalahleni Local Municipality Integrated Development Plan (IDP) for the period of 2019 – 2020 details an unemployment rate of 21.3%. The local economy is relatively diversified with the largest sector, in terms of output as well as proportional contribution being the mining sector. The proposed LoM extension will allow the mine to continue providing coal to industry for an extended period of time. The surrounding communities will also continue to benefit through direct and indirect income; as well as the mine's use of local contractors and suppliers.
2.1.2	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	The mine will make use of labourers from the local community as far as possible. A copy of the Social Labour Plan (SLP) will be included in the EIA/EMPr.
2.1.3	Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and	Refer to the baseline environment in Section 8 of this Scoping Report.
2.1.4	Municipal Economic Development Strategy ("LED Strategy").	The proposed project will promote and support the sustainability of existing business; and assist in increasing local beneficiation and shared economic growth, through extending the life of the mine.

2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	Refer to the impact assessment and mitigation measures in Section 9 in this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.2.1	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	The proposed project will increase the life of mine, which will ensure that the community projects initiated by the mine will have an increased life. This will complement the local socio-economic initiatives identified for the area.
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Refer to the proposed public participation process in Section 7 of this Scoping Report. This aspect will be further expanded on in the EIA and EMPr.
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	Refer to the impact assessment and mitigation measures in Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.5	In terms of location, describe how the placement of the proposed development will:	
2.5.1	Result in the creation of residential and employment opportunities in close proximity to or integrated with each other.	Refer to Section 6, details of alternatives considered, in this Scoping Report.
2.5.2	Reduce the need for transport of people and goods.	
2.5.3	Result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms of public transport),	
2.5.4	Compliment other uses in the area,	Refer to item 1.3 of this table (above). The proposed project entails the mining of additional areas to be accessed within an approved mining area. The existing land use and mining of coal will therefore be complimented by the continuation of the project.
2.5.5	Be in line with the planning for the area.	Refer to item 2.2.1 of this table (above).
2.5.6	For urban related development, make use of underutilised land available with the urban edge.	Not applicable. The proposed project is not located in an urban area.

2.5.7	Optimise the use of existing resources and infrastructure,	Refer to Section 3 of this Scoping Report.
2.5.8	Opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	
2.5.9	Discourage "urban sprawl" and contribute to compaction / densification.	The proposed project will result in the continued employment of workers. Therefore, the influx of additional workers to the area as a direct result of the proposed project is not anticipated.
2.5.10	Contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	Refer to items 2.5.7 – 2.5.9 of this table (above).
2.5.11	Encourage environmentally sustainable land development practices and processes	The proposed end land use will be developed in order to be environmentally sustainable in the long term.
2.5.12	Take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	Refer to item 1.7.3 of this table (above). The proposed project is associated with a portion of a strategic mineral resource (coal reserve).
2.5.13	The investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential).	The proposed project will allow the mine to continue contributing to the local, regional and national Gross Domestic Product (GDPs), and also on the local communities through continued employment of employees and local contractors, as well as other influences that the mine has in the community, such as contributions to community upliftment programmes that are undertaken by the mine through their SLP.
2.5.14	Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	Refer to impact assessment in Section 9 of this Scoping Report.
2.5.15	In terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	The proposed project will ensure continued employment in the region, as well as projects implemented from the mine's SLP.
2.6	How was a risk-averse and cautious approach applied in terms of socio-economic impacts:	

2.6.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	In terms of the socio-economic impacts, the current knowledge gaps include: While the expected potentially significant impacts have been preliminarily identified as part of this Scoping Process, the impacts on socio-economic aspects will be explored in more detail and quantified wherever possible during the EIA Phase. The mitigation measures associated with the impacts need to still be determined.
2.6.2	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	The level of risk is low as the project is not expected to have far reaching negative impacts on socio-economic conditions. In fact, the extended LoM would have a positive impact in terms of employment security for the years to come.
2.6.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	As this project extends a current mining operation, and does not constitute a new mine, a cautious approach has been implemented.
2.7	How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1	Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the impact assessment and mitigation measures in Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	Refer to the impact assessment and mitigation measures in Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	Refer to the impact assessment and mitigation measures in Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.9	What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	Refer to the impact assessment and mitigation measures in Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice,	Refer to the impact assessment and mitigation measures in Section 9 of this Scoping Report. The mine will be in line with the regulatory requirements, provide financial provision to ensure that the mitigation measures proposed can be carried out. This aspect will be further explored in the EIA and EMPr.

	do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	
2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	By conducting a Scoping and Environmental Impact Assessment Process, the applicant ensures that equitable access has been considered. Refer to the impact assessment and mitigation measures in Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	Refer to the impact assessment and mitigation measures in Section 9 of this Scoping Report. The EIA and EMPr will specify timeframes within which mitigation measures must be implemented.
2.13	What measures were taken to:	
2.13.1	Ensure the participation of all interested and affected parties.	Refer to Section 7 of this Scoping Report, describing the public participation process to be undertaken for the proposed project.
2.13.2	Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	Refer to Section 7 of this Scoping Report, describing the public participation process to be implemented for the proposed project. The advertisement and site notice have been made available in English and Afrikaans to assist in understanding of the project. Public meetings are also planned to be held in the scoping and EIA phases of the project. Translators will be available at the public meetings to be held to ensure that all participants can participate in a language they are able to understand (English/Afrikaans).
2.13.3	Ensure participation by vulnerable and disadvantaged persons,	
2.13.4	Promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	
2.13.5	Ensure openness and transparency, and access to information in terms of the process,	
2.13.6	Ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge,	

2.13.7	Ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein will be promoted?	
2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	Refer to Section 7 of this Scoping Report, describing the public participation process to be implemented for the proposed project. This aspect will be further explored in the EIA and EMPr. The SLP will be included in the EIA/EMPr.
2.15	What measures have been taken to ensure that current and / or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Workers are educated on a regular basis as to the environmental and safety risks that may occur within their work environment, adequate measures have been taken to ensure that the appropriate personal protective equipment is issued to workers based on the areas that they work and the requirements of their job.
2.16	Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1	The number of temporary versus permanent jobs that will be created.	It is not anticipated that any new jobs will be created; rather, existing jobs will be maintained for a longer period of time.
2.16.2	Whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area).	
2.16.3	The distance from where labourers will have to travel.	The current workers travel from the local area to the mine and back and as such, this aspect is an existing aspect with no new impacts.
2.16.4	The location of jobs opportunities versus the location of impacts.	It is not anticipated that any new jobs will be created; rather, existing jobs will be maintained for a longer period.
2.16.5	The opportunity costs in terms of job creation.	
2.17	What measures were taken to ensure:	
2.17.1	That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.	

2.17.2	That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures.	The Scoping and EIA Process requires governmental departments to communicate regarding any application. In addition, all relevant departments will be notified at various phases of the project by the EAP.
2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	Refer to Section 7 of this Scoping Report, describing the public participation process to be implemented for the proposed project, as well Section 8, the impact on any national estate, in the Scoping Report. The SLP will be included in the EIA and EMP
2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Refer to the impact assessment and mitigation measures in Section 9 of the Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.20	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	Elandsfontein will provide a Bank guarantee to DMR. The amount will be calculated using the published GN1147 document as required by NEMA Financial Provision Regulations (2015).
2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Refer to Section 6, description of the process followed to reach the proposed preferred site, of the Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Refer to Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr.

6. PROJECT ALTERNATIVES

The identification of alternatives is a key aspect of the success of the scoping process. All reasonable and feasible alternatives must be identified and screened to determine the most suitable alternatives to consider and assess in the EIA phase. There are however some significant constraints that have to be taken into account when identifying alternatives for a project of this scope. Such constraints include social, financial and environmental issues, which will be discussed in the evaluation of the alternatives. Alternatives can typically be identified according to:

- Location/layout/design alternatives;
- Process alternatives;
- Technological alternatives; and
- Activity alternatives (including the No-go option).

For any alternative to be considered feasible such an alternative must meet the need and purpose of the development proposal without presenting significantly high associated impacts. The alternatives are described, and the advantages and disadvantages are presented. It is further indicated which alternatives are considered feasible from a technical as well as environmental perspective.

Alternatives can also be distinguished into discrete or incremental alternatives. Discrete alternatives are overall development options, which are typically identified during the pre-feasibility, feasibility and or scoping phases of the EIA process (DEAT; 2004). Incremental alternatives typically arise during the EIA process and are usually suggested as a means of addressing identified impacts. These alternatives are closely linked to the identification of mitigation measures and are not specifically identified as distinct alternatives. This section provides information on the development footprint alternatives, the properties considered, as well as the type of activity, activity layout, technological and operational aspects of the activity.

6.1 DETAILS OF LOCATION ALTERNATIVES

The section below describes the site / location alternatives considered as part of the project. As indicated above, Elandsfontein Colliery is an existing operational mine, and has been subject to previous environmental processes, which considered alternatives in the form of both development and land use alternatives prior to approval.

6.1.1 DETAILS OF DEVELOPMENT PROPERTY

Elandsfontein is a mining company holding two mining rights over the proposed extension area and therefore, there is no practical development alternative for the future mining area. The proposed extension of the current mining area has taken into consideration economic viability and practicality as well as the location of the coal resource.

6.1.2 CONSIDERATION OF PROPERTY

The proposed amendment of the existing MWP includes areas that are already included in the existing Mining Rights. Therefore, no other alternatives were considered with regards to the consideration of property.

6.1.3 LOCATION, LAYOUT OR DESIGN OF THE ACTIVITY

Numerous alternatives were evaluated with regard to the extent of the area to be mined, mostly linked to the presence of surface infrastructure within and adjacent to the target coal resource. The relocation of the existing infrastructure will enable the underlying coal to be accessed, thereby increasing the total coal resources that would be available for extraction over the LoM.

Layout options have been investigated with regards to the placement of the infrastructure at the site including positioning of various aspects of the mine infrastructure including the opencast vs underground mining, stockpiles (location and height options), roads, power line, PCD and contractors camp relocation. This preliminary layout will be investigated further in the EIA phase, and where necessary alternative locations and options assessed. If any infrastructure is planned to be located in areas identified as being of high environmental sensitivity or if any other significant environmental concerns are noted with regards to the proposed layout then the layout

may be required to be amended based on these findings. More details regarding the preliminary layout and on-site sensitivities will be provided in the EIA phase once the EIA phase specialist studies have been completed. The micro-siting information will be provided to the specialists and will inform the specialist impact assessments at the EIA phase.

The location alternatives to be investigated in the EIA phase are described below

Location Alternative S1a - *Maximum mining over entire area*: This alternative involves mining over the entire proposed open cast and underground areas. This option can only be considered if no high-sensitivity "No-Go" areas are identified in these areas. In this development alternative, the mining and economically efficient production of coal is emphasised. Less restrictive mitigation measures will be used to protect the environmental features, thus allowing for maximum coal production. This approach has the potential to increase the financial viability of the mine at the expense of any identified environmental features on site.

Location Alternative S1b - *Sensitivity-based approach:* This alternative avoids no go areas and considers specialist recommendations regarding buffer distances from important features. In this development alternative environmental resource protection is emphasised and relies on the use and implementation of stringent mitigation measures to minimise identified adverse impacts. This development alternative will use environmental specialist planning and evaluation of mining methodologies (opencast vs. underground), mining footprint alteration, and infrastructure placement and logistic options to avoid consolidated sensitive environmental features and locate the operation in the least (relative) to site, sensitive location.

It is important to note that through the EIA Phase a balance between options S1a and S1b may be identified to try and optimise the mineral extraction but at the same time ensure adequate environmental and social protection. This will be comparatively assessed in the EIA by all relevant specialists.

6.2 DETAILS OF PROCESS ALTERNATIVES

The subsections below describe the various process alternatives considered in this scoping report.

6.2.1 DISPOSAL OF WASTES

Two main options, with additional sub-options, have been identified and are being investigated for disposal of carboniferous waste e. These include:

Process Alternative P1a - *Disposal to surface waste disposal facility- located on old rehabilitated mine area.*

Process Alternative P1b - Disposal to surface waste disposal facility- located on un-mined area.

Process Alternative P1c - *Disposal of wash plant waste rock (discard) to pit and filter cake to surface disposal site:* This option would involve the discarding of coal waste to pit and the filter cake to an open ground co-disposal facility.

Process Alternative P1d - Disposal of discard and filter cake to pit.

6.2.2 WATER SUPPLY FOR DUST SUPPRESSION

Two alternatives for the supply of water were identified, namely:

Process Alternative P2a - *Water obtained from dirty water containment facilities*: Water would be obtained from dirty water containment facilities (i.e.: PCD's).

Process Alternative P2b - *Water from natural ground or surface water resources*: For this alternative water would be abstracted from boreholes.

6.2.3 MINING METHOD

Both opencast and underground mining methods are proposed within the proposed extension areas due to the depth of the coal resource in the area. Where proposed mining areas are marked as EITHER Open Cast **(Process Alternative P3a)** or Underground **(Process Alternative P3b)** - both options should be assessed in the EIA phase.

6.3 DETAILS OF TECHNOLOGY ALTERNATIVES

The subsections below describe the technological alternatives considered in this scoping report.

6.3.1 TRANSPORT OPTIONS

There are several coal product transport options. The feasibility of these options would hinge on the final market for the coal, as well as the proximity of available transport infrastructure. The following alternatives have been considered:

Technology Alternative T2a – *Road:* This would involve the transport of the product by existing road networks to the respective buyer. This is the alternative currently used to transport the coal. The coal to Eskom goes via truck all the way while the coal to export goes via truck to a nearby siding and then via rail to Port

Technology Alternative T2b – *Rail:* This option would involve transport of the coal by rail utilizing a railway siding.

Technology Alternative T2c - *Use of conveyor:* This option would involve transport of the coal by conveyor to the buyer. There is no existing coal conveyor network within close proximity to the mine.

6.4 DETAILS OF ACTIVITY ALTERNATIVES

Open cast and underground mining have been put forward within the proposed extension areas due to the varying depth of the coal resource. The proposed extension areas are currently under agricultural land use (e.g.: grazing and crop lands). Two activity alternatives are considered in this scoping report (activity alternatives A1 and A2).

Activity Alternative A1 – *Mining*: The land would be purchased from the current landowners (where necessary) and transformed into mining areas.

Activity Alternative A2 – *No-go option*. The 'no-go' or 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

The implication of not amending the existing MWP (within the approved mining right boundary) to include the mining of additional coal resources, as indicated in the MWP, includes a reduction in the existing mining operations overall LoM, as well as compromising the ability of Elandsfontein Colliery to ensure consistent coal supply to Eskom for electricity generation and extended local and regional economic benefits. The area is included in the mining right boundary and if the no-go option is opted for, then most likely the mine will cease to operate soon and the known coal reserves would remain available for future extraction. An opportunity will then be provided for a future mine applicant to apply for rights to access the coal reserves remaining and thereby possibly re-activate mining at a later stage.

The no-go alternative means that the benefits of local and regional employment at the mine would not be realized in the long term. The proposed extension project would increase the LoM by approximately 12 years. The potential employment and economic benefits will therefore be foregone. The no-go alternative would therefore maintain the current environmental status quo at the site but would reduce the potential LoM by approximately 12 years.

6.5 ALTERNATIVE ASSESSMENT

This section describes the pros and cons of various alternatives described above. The findings are presented here in Table 11. The table also notes which alternatives are to be taken forward for consideration in the EIA report.

Table 11: Summary of alternative options for assessment in EIA

Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Preliminary Extent, Duration and Significance of potential key impacts for each alternative	Additional Comments	Carried forward into EIA?
Disposal of carboniferous wastes (wash plant waste rock and possibly filter cake)	P1a	Disposal to surface waste disposal facility- located on old rehabilitated mine area.	Area already disturbed- i.e. brownfields. Carboniferous material easily accessible should there be a future change in technologies and mineral demands.	Future permanent dump on surface. Differential settling on rehabilitated surface may compromise any foundation liner/barrier (if required). AMD seepage if not lined. Potential long-term runoff of contaminated water as well as contaminated seepage emanating from the disposal facility. Long term – permanent environmental risk/liability associated with future dump integrity (e.g. erosion of cap, illegal mining).	Water contamination: *Significance: Moderate - High* *Duration: Long-term* *Probability: High* *Reversibility: None* *Irreplaceable loss: Yes* Acid Mine Drainage: *Significance: High* *Duration: Long-term* *Probability: High* *Reversibility: Limited* *Irreplaceable loss: Yes*		✓
	P1b	Disposal to surface waste disposal facility- located on un-mined area.	Opportunity to line the storage facility and reduce contamination. Carboniferous material easily accessible should there be a future change in technologies and mineral demands.	Further disturbance of surface. Potential of spontaneous combustion AMD seepage if not lined. Potential runoff of contaminated water as well as contaminated	Acid Mine Drainage: *Significance: High* *Duration: Long-term* *Probability: Moderate* *Reversibility: Limited* *Irreplaceable loss: Yes*	Would result in cumulative impact on sterilisation of agricultural resources.	Not considered a viable and acceptable option.

Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Preliminary Extent, Duration and Significance of potential key impacts for each alternative	Additional Comments	Carried forward into EIA?
				seepage emanating from the disposal facility, reduced natural cover in catchment resulting in water quality and hydrological impacts to local water resources. Requirement to purchase additional agricultural land due to limited space on the mining footprint which would result in further sterilisation of agricultural resources.	Surface disturbance: *Significance: High* *Duration: Permanent* *Probability: Moderate* *Reversibility: Moderate* *Irreplaceable loss: Yes*		
	P1c	Disposal of wash plant waste rock to pit and filter cake to surface disposal site.	Smaller sterilisation of land area for future development.	Potential groundwater contamination and seepage emanating from the pit and disposal facility subsequently resulting in surface water contamination. The presence of two separate sources of contamination will be more difficult to manage.	Ground water contamination due to seepage: *Significance: Moderate - High* *Duration: Long-term* *Probability: Moderate* *Reversibility: None* *Irreplaceable loss: Yes*	Both material types are carboniferous – no reason to use two different disposal facilities.	*No reason to use two different disposal facilities*
	P1d	Disposal of discard and filter cake to pit.	Reduce final void size. Limited addition to pit salt load if disposed below pit water level.	Leaching to water resources (if disposed above groundwater level).	Ground water contamination from leaching or seepage:	Most ideal option, no new dump on surface. Already authorized as in current WUL.	✓

Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Preliminary Extent, Duration and Significance of potential key impacts for each alternative	Additional Comments	Carried forward into EIA?
			Rehabilitation of the pit to ground level thereby reducing hydrological and soil impacts.	Potential groundwater contamination and seepage emanating from the pit subsequently resulting in surface and ground water contamination. Limitations and technical challenges related to options for barrier layers.	*Significance: Moderate - High* *Duration: Long-term* *Probability: Moderate* *Reversibility: None* *Irreplaceable loss: Yes*		
Dust suppression water supply	P2a	Water obtained from dirty water containment facilities (i.e.: PCD's).	Assist to reduce water to be treated. Reduced use of clean water thus reducing overall water impact. This will reduce the risk of surface water discharge.	Lead to further deterioration of water quality within the dirty water containment facilities.			✓
	P2b	Water from ground or surface water resources.	No significant advantages identified	Clean ground water resources to be used for water on mine. Negative impacts to water resources in the catchment through hydrological alteration (reduction in water availability).	Impact on water resources through hydrological alteration: *Significance: High* *Duration: Permanent* *Probability: Moderate* *Reversibility: Low* *Irreplaceable loss: Yes*		✓

Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Preliminary Extent, Duration and Significance of potential key impacts for each alternative	Additional Comments	Carried forward into EIA?
Coal product transport options	T2a	Road	Flexible to deliver to any market (e.g. power stations). Limited anticipated soil, aquatic and wetland impacts- existing road network. Current method employed on the mine for transportation of product.	Dust impacts due to vehicle entrainment will be higher than conveyor and rail option. Road safety and traffic impacts. Damage to local and regional road infrastructure.	Dust Creation: *Significance: High* *Duration: Long-term* *Probability: Moderate* *Reversibility: Low* *Irreplaceable loss: No*		Dust and safety impacts
	T2b	Rail	Low dust impact.	Limited flexibility to deliver to different markets. Contaminated runoff from the siding resulting in contamination of surface and groundwater resources and subsequently negatively effecting the wetlands and aquatic ecology.	Surface and ground water contamination: *Significance: Moderate - High* *Duration: Long-term* *Probability: Moderate* *Reversibility: None* *Irreplaceable loss: Yes*	Elandsfontein Colliery's export is currently transported by rail to the port of Richards Bay from its Oosbank siding	✓
	T2c	Use of conveyor	Low dust impact.	Customer needs to be very close to conveyor. Limited flexibility to deliver to different markets.	Surface disturbance leading to impacts on biodiversity: *Significance: Moderate - High* *Duration: Medium-term*		*Not practical*

Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Preliminary Extent, Duration and Significance of potential key impacts for each alternative	Additional Comments	Carried forward into EIA?
				Potential additional soil, wetland and aquatic impacts associated with the construction and operation of the conveyor.	*Probability: High* *Reversibility: Moderate* *Irreplaceable loss: Yes*		
Land-use Alternatives	A1	Land used for mining	Economic advantages: continued employment for mine workers.	Potential for hydrological and chemical modification in local soils, wetlands and aquatic ecosystems.	Mining impacts identified above as well as in Section 9 of this report.	The mine is an existing operational mine, continued mining at the site is considered a feasible land use going forward unless environmental impacts associated with the expansion cannot be mitigated to acceptable levels	✓
	A2	No-go alternative	Reduced risk for water contamination and subsequent wetland and aquatic ecological degradation. Reduced risk to the health and safety of the local communities.	Agricultural activities will likely continue to take place if the no-go alternative is followed. This would result in continued impacts to soils, wetlands and aquatic ecology.	Soil impacts associated with farming: Significance: Moderate - High Duration: Long-term – Permanent Probability: Moderate Reversibility: Moderate		✓

Activity Alternatives

Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Preliminary Extent, Duration and Significance of potential key impacts for each alternative	Additional Comments	Carried forward into EIA?
					Irreplaceable loss: Yes Hydrological impacts associated with farming (alteration of watercourses): Significance: Moderate - High Duration: Long-term – Permanent Probability: Moderate Reversibility: Low Irreplaceable loss: Yes		
Location/layout/design Alternatives Micro siting alternatives	S1a	Maximum mining over entire area	Mining all coal in basin. Most infrastructure on mined out areas or on to-be-mined areas.	Unregulated, buffer insensitive mining can result in permanent impacts to soil, wetland habitats as well as downstream aquatic ecosystems.	Ecological impacts due to surface disturbance, however this alternative will only be considered if the on-site investigations reveal no areas on site of particular concern or sensitivity.	The possibility of maximum mining will be considered in the EIA phase if the on-site investigations reveal no areas on site of particular concern. If no-go areas are identified, then this alternative will be discarded.	✓
	S1b	Sensitivity-based approach	The avoidance of wetland and riverine areas and the preservation of a buffer	Less mining area for the expansion therefore making project less	No significant impacts apart from economic impact on mine.		

Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Preliminary Extent, Duration and Significance of potential key impacts for each alternative	Additional Comments	Carried forward into EIA?
		(avoid / buffer sensitive areas).	zone can assist in the regulation of potential water quality impacts and reduce ecosystem degradation overall.	economically viable and profitable.			✓

7. STAKEHOLDER ENGAGEMENT

The Public Participation Process (PPP) is a requirement of several pieces of South African legislation and aims to ensure that all relevant Interested and Affected Parties (I&APs) are consulted, involved and their comments are considered, and a record included in the reports submitted to the Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study. The PPP for the proposed project needs to be managed sensitively and according to best practises to ensure and promote:

- Compliance with international best practice options;
- Compliance with national legislation;
- Establishment and management of relationships with key stakeholder groups; and
- Involvement and participation in the environmental study and authorisation/approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Introduce the proposed project;
- Explain the authorisations required;
- Explain the environmental studies already completed and yet to be undertaken (where applicable);
- Solicit and record any issues, concerns, suggestions, and objections to the project;
- Provide opportunity for input and gathering of local knowledge;
- Establish and formalise lines of communication between the I&APs and the project team;
- Identify all significant issues for the project; and
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent negative environmental impacts and maximize and/or promote positive environmental impacts associated with the project.

7.1 GENERAL APPROACH TO SCOPING AND PUBLIC PARTICIPATION

The PPP for the proposed project has been undertaken in accordance with the requirements of the MPRDA and NEMA EIA Regulations (2014), and in line with the principles of Integrated Environmental Management (IEM). IEM implies an open and transparent participatory process, whereby stakeholders and other I&APs are afforded an opportunity to comment on the project and have their views considered and included as part of project planning.

An initial I&AP database has been compiled based on known key I&AP's, Windeed searches and stakeholder databases provided by the mine. The I&AP database includes amongst others, landowners, communities, regulatory authorities and other special interest groups.

7.1.1 LIST OF ORGANS OF STATE/ AUTHORITIES IDENTIFIED AND NOTIFIED

- The following, but not limited to, Government Authorities were notified of the proposed project:

- Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
- Mpumalanga Department of Economic Development and Tourism
- Mpumalanga Department of Health
- Mpumalanga Department of Human Settlement
- Mpumalanga Department of Mineral Resources
- Mpumalanga Department of Public Works, Roads and Transport
- Mpumalanga Department of Social Development
- Mpumalanga Department of Water and Sanitation
- Mpumalanga Lakes District Protection Group
- Mpumalanga Tourism and Parks Agency
- National Department of Agriculture, Forestry and Fisheries
- National Department of Environmental Affairs
- National Department of Mineral Resources
- National Department of Rural Development and Land Reform
- National Department of Water and Sanitation
- Nkangala District Municipality
- South African National Roads Agency Limited (SANRAL)
- South African Heritage Resources Agency (SAHRA)
- Eskom Holdings SOC Limited
- Transnet SOC Limited
- Emalahleni Local Municipality

7.1.2 OTHER KEY STAKEHOLDERS IDENTIFIED AND NOTIFIED

- Birdlife South Africa
- Wildlife & Environmental Society of South Africa (WESSA)
- AFGRI
- Agri SA Mpumalanga
- Federation for a Sustainable Environment
- South African National Biodiversity Institute (SANBI)
- Endangered Wildlife Trust

7.1.3 INITIAL NOTIFICATION (NOTICES, ADVERTISEMENTS, AND BACKGROUND INFORMATION DOCUMENT)

The PPP commenced on the 8th of November 2019 with an initial notification and call to register for a period of 30 days, ending on the 8th of December 2019. The initial notification was given in the following manner:

7.1.4 REGISTERED LETTERS, FAXES AND EMAILS

Notification letters (English and Afrikaans), faxes, and emails were distributed to all pre-identified key I&APs including government organisations, NGOs, relevant municipalities, ward councillors, landowners and other organisations that might be affected.

The notification letters included the following information to I&APs:

- List of anticipated activities to be authorised;
- Scale and extent of activities to be authorised;
- Information on the intended mining operation to enable I&APs to assess/surmise what impact the activities will have on them or on the use of their land;
- The purpose of the proposed project;
- Details of the affected properties (including details of where a BID and locality map could be obtained);
- Details of the relevant MPRDA and NEMA Regulations;
- Initial registration period timeframes; and
- Contact details of the EAP.

7.1.5 BACKGROUND INFORMATION DOCUMENT (BID)

A BID in English was prepared and distributed by post e-mails and made available on the EIMS website (www.eims.co.za). The BID contains the following information:

- Project name;
- Applicant name;
- Project location (including map of study area);
- Description of the EA application process, EIA flow chart, and public participation process;
- Information on future document review opportunities;
- A detailed questionnaire/I&AP registration form; and
- Relevant EIMS contact person for the project.

7.1.6 NEWSPAPER ADVERTISEMENTS / GOVERNMENT GAZETTE

Advertisements describing the proposed project and EIA process were placed in newspapers with circulation in the vicinity of the study area. The initial advertisements were placed in the Witbank News (in English and Afrikaans) on the 8 November 2019. The newspaper adverts included the following information:

- Project name;
- Applicant name;
- Project location;
- Nature of the activity; and

- Relevant EIMS contact person for the project.

7.1.7 SITE NOTICE PLACEMENT

8 A1 Correx site notices in English and Afrikaans were placed at 8 locations along and within the perimeter of the proposed project area on the 7th of November 2019 during the initial notification. The on-site notices included the following information:

- Project name;
- Applicant name;
- Project location;
- Map of proposed project area;
- Project description;
- Legislative requirements; and
- Relevant EIMS contact person for the project.

7.1.8 POSTER PLACEMENT

A3 posters in English and Afrikaans were placed local public gathering places in town near the study area.

The notices and written notification afforded all pre-identified I&APs the opportunity to register for the project as well as to submit their issues/queries/concerns and indicate the contact details of any other potential I&APs that should be contacted. The contact person at EIMS, contact number, email and faxes were stated on the posters. Comments/concerns and queries were encouraged to be submitted in either of the following manners:

- Electronically (fax, email);
- Telephonically; and/or
- Written letters.

7.2 AVAILABILITY OF SCOPING REPORT NOTIFICATION

Notification regarding the availability of this Scoping Report for public review was given in the following manner to all registered I&APs (which includes key stakeholders and landowners):

Registered letters with details on where the scoping report can be obtained and/or reviewed, as well as the public review comment period;

Facsimile notifications with information similar to that in the registered letter described above; and/or

Email notifications with a letter attachment containing the information described above.

The scoping report will be available for public review from the 13th July 2020 to the 14th August 2020 for a period of 30 days. I&APs will also be notified of the availability of a high-level presentation presenting the findings of the scoping report.

7.3 PUBLIC PARTICIPATION

Comments raised to date have been addressed in a transparent manner and included in the Public Participation Report (**Error! Reference source not found.**). Specialist input into the EIR/EMPr phase will investigate and address these issues in more detail.

8. ENVIRONMENTAL ATTRIBUTES AND BASELINE ENVIRONMENT

This section of the Scoping Report provides a description of the environment that may be affected by the proposed project. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from existing information available for the area as well as previous specialist reports undertaken for the Elandsfontein Colliery. The DEA screening tool was also used to inform this section and the results of this are included in Appendix F.

8.1 LOCATION

The project extent and mine area is located on a portion of the remaining extent of portion 8; remaining extent of portion 1; a portion of the remaining extent of portion 6; portion 44; portion 14 and the remaining extent of portion 7 of the Farm Elandsfontein 309 JS, situated approximately 4.0 km south of Kwa-Guqa and about 16.0 km west of Emalahleni, Mpumalanga Province, South Africa.

8.2 TOPOGRAPHY

The topography of the greater study area is characterised by moderately undulating plains and pans. The northeastern perimeter is shaped by a topographical high at 1565 mamsl and forms the watershed between quaternary catchments B20G and B11K. The lowest on-site elevation is situated towards the southwest and is recorded at 1476 mamsl. On-site gradients are relatively gentle to moderate with the average slope calculated at 2.30% and –2.20% respectively. A topographical map is included as Figure 9.

The resource management of the greater study area falls under the Olifants WMA and quaternary catchment B20G. Although local surface water drainage on site is inferred to be in a general southwestern direction, the regional drainage occurs in a general north to north-western direction. The Grootspruit drainage transects the project area to the southwestern perimeter.

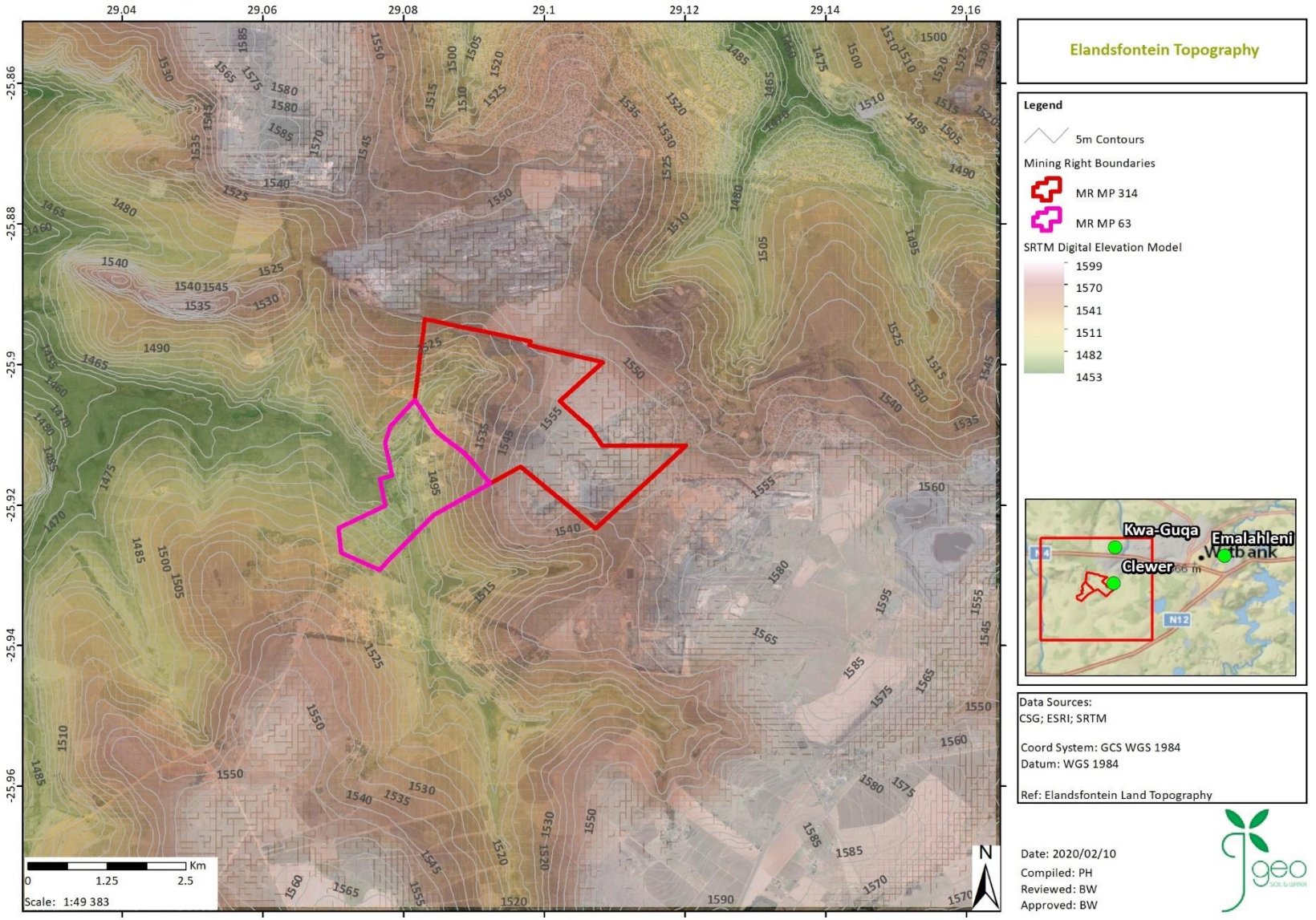

Figure 9: Topography / digital elevation model.

8.3 GEOLOGY

The study area is underlain by the Ecca Group of the Karoo Supergroup and fall within the Madzaringwe Formation, consisting mainly of arenaceous strata. On a regional scale, two geological lineaments (potentially faults zones) exist in close proximity to the greater study area, striking in a general north-south and southwestnortheast orientation respectively. The site is predominantly underlain by an intergranular and fractured aquifer system comprising mostly fractured and weathered compact sedimentary/ arenaceous rocks. It is worth noting that the subsidence investigation report (Geomech Consulting, 2019) indicated various areas characterised by a "High" risk of subsidence, with various other areas characterised by "Moderate" risks. These areas are indicated in Figure 11.

8.4 CLIMATE

The study area's weather pattern reflects a typical summer rainfall region, with > 85.0% of precipitation occurring as high-intensity thunderstorms from October to March. Patched rainfall and evaporation data were sourced from the WR2012 database (Rainfall zone B2C) and span a period of some 90 years (1920 – 2009). The calculated mean annual precipitation (MAP) for this rainfall zone is 530.76 mm/a, with the 5th percentile of the data set (roughly equivalent to a 1:20 year drought period) calculated at 342.74 mm/a and the 95th percentile (representing a ~1:20 flood period) 717.84 mm/a. The highest MAP for the 90 years of rainfall data was recorded as of 940.85 mm (1995) while the lowest MAP of 291.38 mm was recorded during 1965. This quaternary catchment is categorised under evaporation zone 4A which have a mean annual evaporation (s-pan) of 1689.0 mm/a, more than double the annual precipitation for the greater study area.

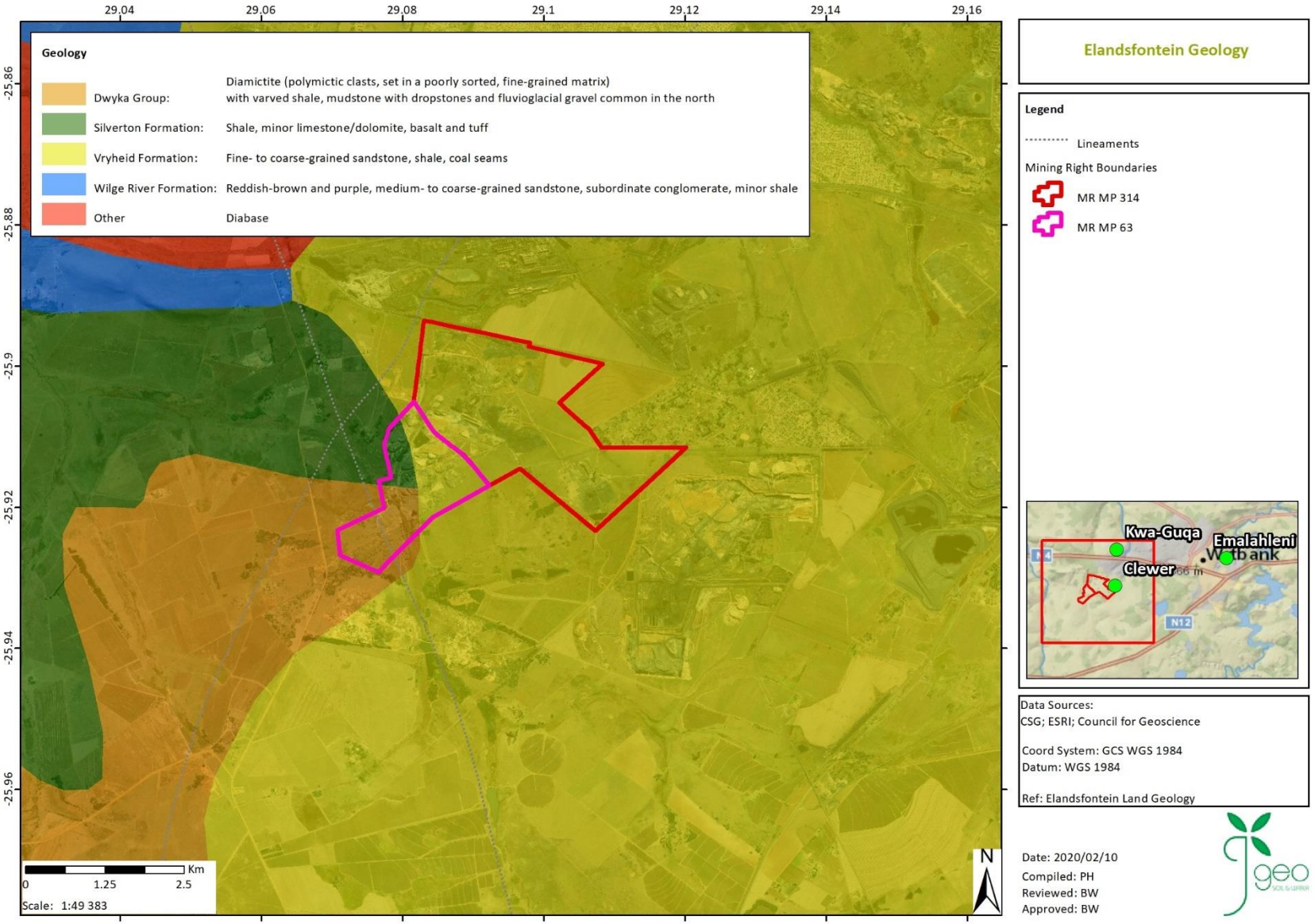

Figure 10: Regional geological map.

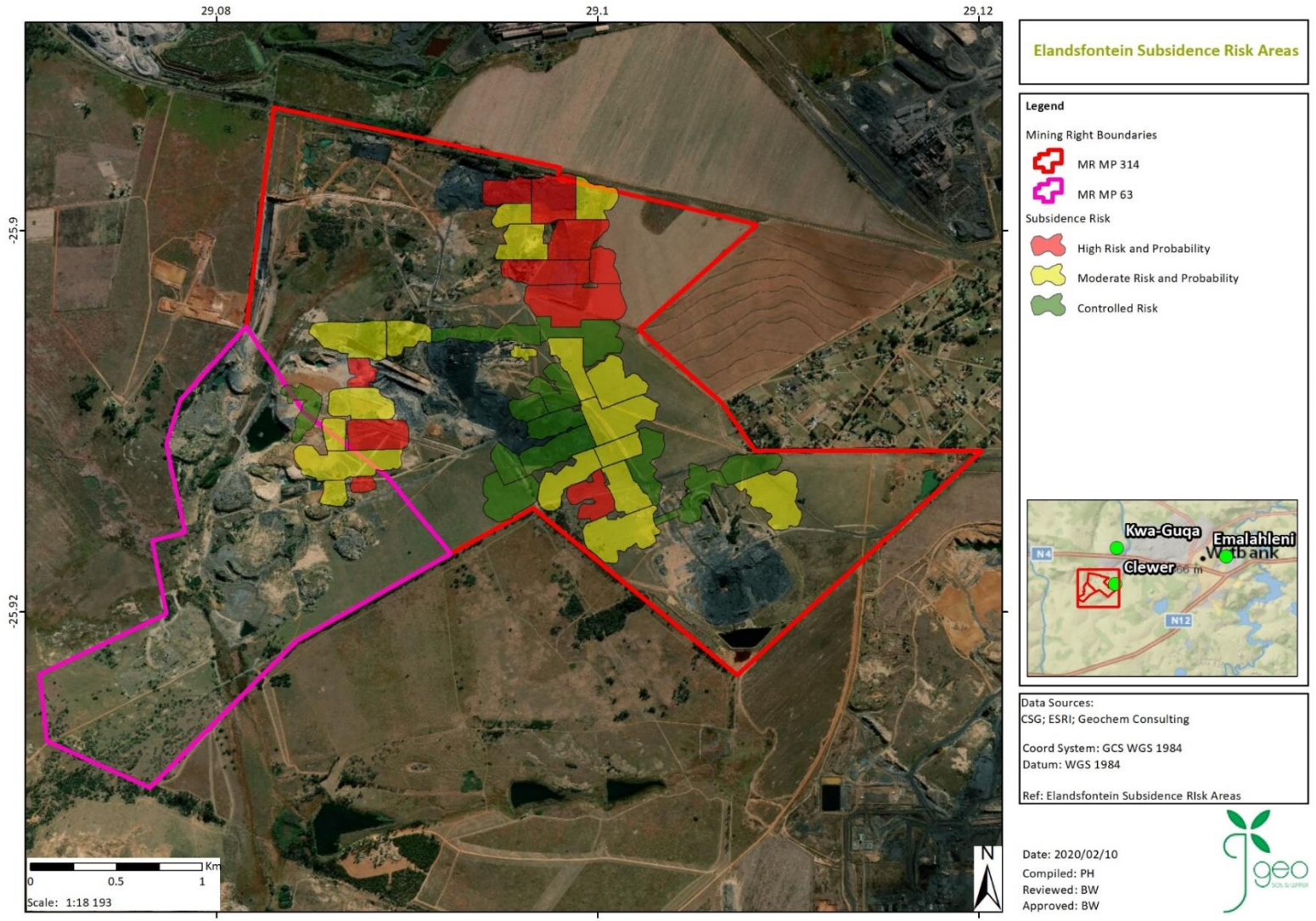

Figure 11: Subsidence Risk Areas

8.5 SOCIO-ECONOMIC

The following section provides a summary of the social and economic environment that may be influenced by the proposed project. Information in this section was sourced from Stats SA and the Integrated Development Plans (IDP's) for the Emalahleni Local Municipality as well as the Nkangala District Municipality.

According to the National Environmental Management Act (NEMA, 1998) environment refers to the surroundings in which humans exist. When viewing the environment from a socio-economic perspective the question can be asked what exactly the social environment is. Different definitions for social environment exist, but a clear and comprehensive definition that is widely accepted remains elusive. Barnett & Casper (2001) offers the following definition of human social environment:

> *"Human social environments encompass the immediate physical surroundings, social relationships, and cultural milieus within which defined groups of people function and interact. Components of the social environment include built infrastructure; industrial and occupational structure; labour markets; social and economic processes; wealth; social, human, and health services; power relations; government; race relations; social inequality; cultural practices; the arts; religious institutions and practices; and beliefs about place and community. The social environment subsumes many aspects of the physical environment, given that contemporary landscapes, water resources, and other natural resources have been at least partially configured by human social processes. Embedded within contemporary social environments are historical social and power relations that have become institutionalized over time. Social environments can be experienced at multiple scales, often simultaneously, including households, kin networks, neighbourhoods, towns and cities, and regions. Social environments are dynamic and change over time as the result of both internal and external forces. There are relationships of dependency among the social environments of different local areas, because these areas are connected through larger regional, national, and international social and economic processes and power relations."*

The environment influences and constrains behaviour, but behaviour also leads to changes in the environment. The impacts of a project on people can only be truly understood if their environmental context is understood. The baseline description of the social environment will include a description of the area within a provincial, district and local context that will focus on the identity and history of the area as well as a description of the population of the area based on a number of demographic, social and economic variables.

In 2015, eMalahleni's share of population was below the lower-bound poverty line was the lowest (favourable) among the municipal areas.The number of people below the lower bound poverty line was however relatively high at more than 90 000 people in 2015. According to the 2016 Community Survey of StatSA, the so-called poverty headcount (multi-dimensionally) of Emalahleni deteriorated from 8.0% in 2011 to 10.9% in 2016 and second highest in the Province and the so-called poverty intensity also increased from 43.6% to 45.4% in the same period. The unemployment rate of eMalahleni decreased from 27.3% in 2011 to 23.2% in 2015. eMalahleni's unemployment rate was the 5th lowest among all the municipal areas of Mpumalanga. Unemployment rate for females is 29.8% and that of males is 19.2%. Youth unemployment rate according to the Census figure is 36.0%. The municipal economy is dominated by mining and therefore a high dependence on the mining industry. Other industries in the area are making contribution to the local economy; these include trade and community services. Emalahleni ccontribution to the Mpumalanga economy is the highest in the province at more than 20% and is the largest economy in the province.

8.6 CULTURAL AND HERITAGE RESOURCES

The desktop study revealed that the surroundings of the study area are characterised by a long and significant history, while previous archaeological and heritage studies from this area have revealed a number of heritage sites that include mainly informal graves or burial grounds and historic farmsteads and homesteads or the remains of such structures. During the field work a total of eleven heritage resource were identified (

Figure 12). The majority of these (eight) were graves and burial grounds (EFN001, EFN002, EFN003, EFN004, EFN007, EFN008, EFN010, EFN011), with the remaining three being structures or remains of structures (EFN005, EFN006, EFN009).

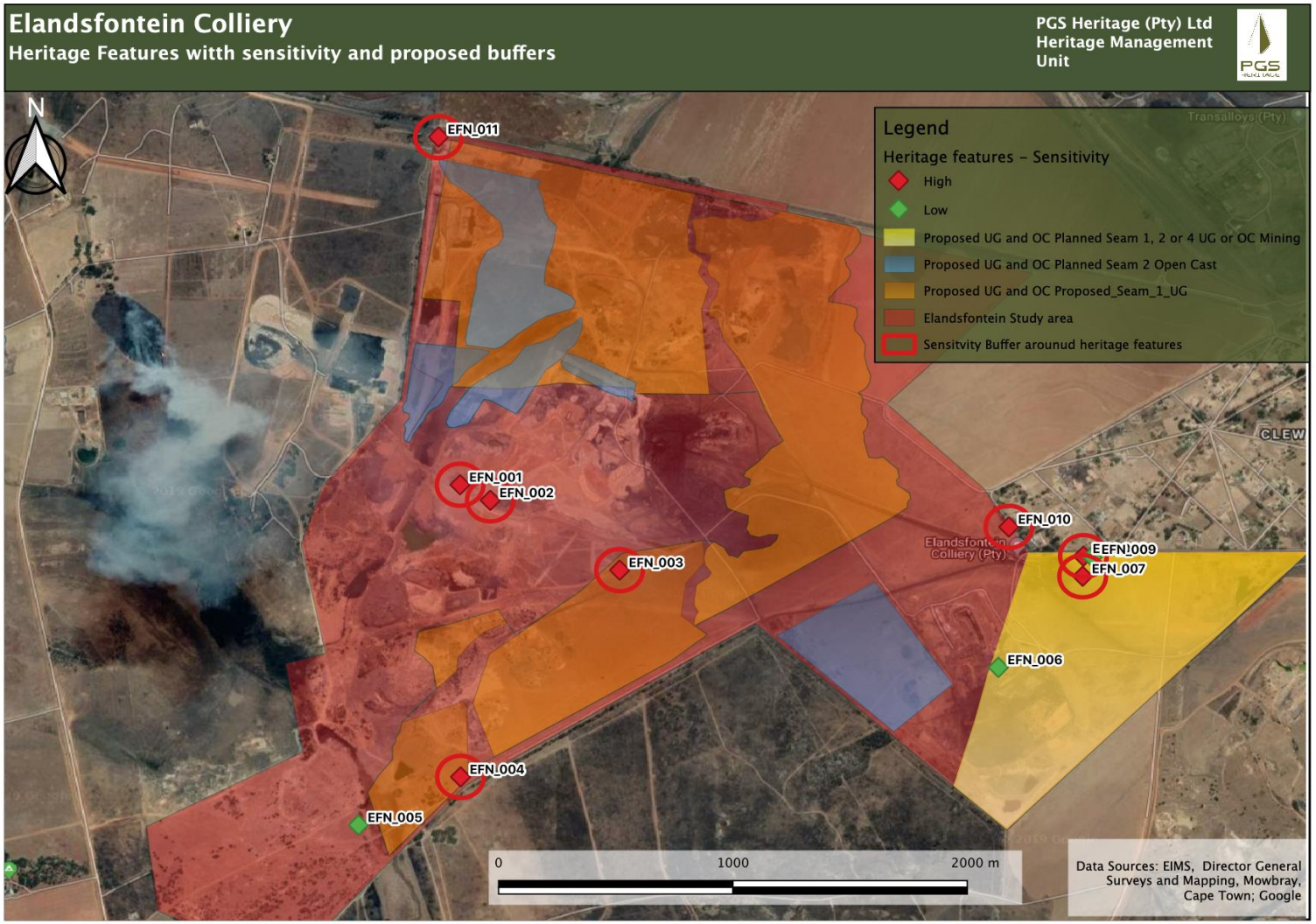

Figure 12: Heritage sites

8.7 PALAEONTOLOGICAL RESOURCES

The geology of the proposed Elandsfontein Colliery, Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province is shown on the 1:250 000 2528 Pretoria Geological Map (Council for Geosciences). The proposed development is primarily underlain by the Ecca Group (Vryheid Formation), as well as a small portion in the Dwyka Group. According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Vryheid Formation is Very High, while the Dwyka Group has a Moderate Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). Rock formations of moderate to high Palaeontological Sensitivity are present in the study area and thus a field-based assessment by a palaeontologist is required. Diabase is a Basalt and thus unfossiliferous and not further discussed in this report. (Butler 2019).

According to the SAHRIS palaeo-sensitivity map there is very high possibility of finding fossils in Vryheid Formation (Very High Palaeontological Sensitivity) while there is a moderate chance finding fossils in the Dwyka Group while the basalt has a Zero Palaeontological Sensitivity. Updated information on the palaeontological resources of the area will be presented in detail in the EIA report once the Palaeontological Impact Assessment has been concluded.

8.8 SOILS AND LAND COVER

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Bb 13 and the Ba 5 land types. A soil map is provided in Figure 13. A land cover map is provided in Figure 14.

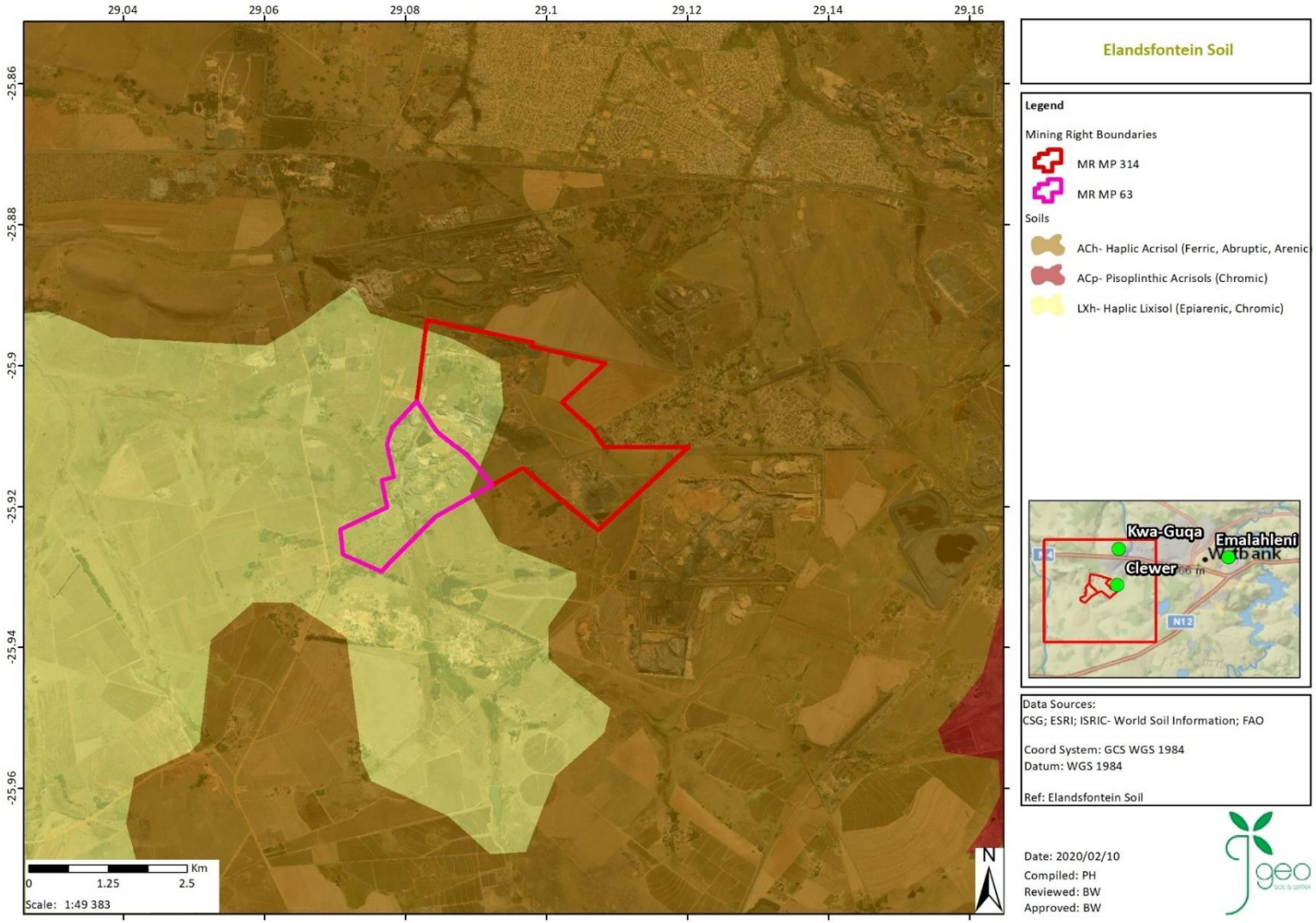

Figure 13: Soils map (ENPAT 2000).

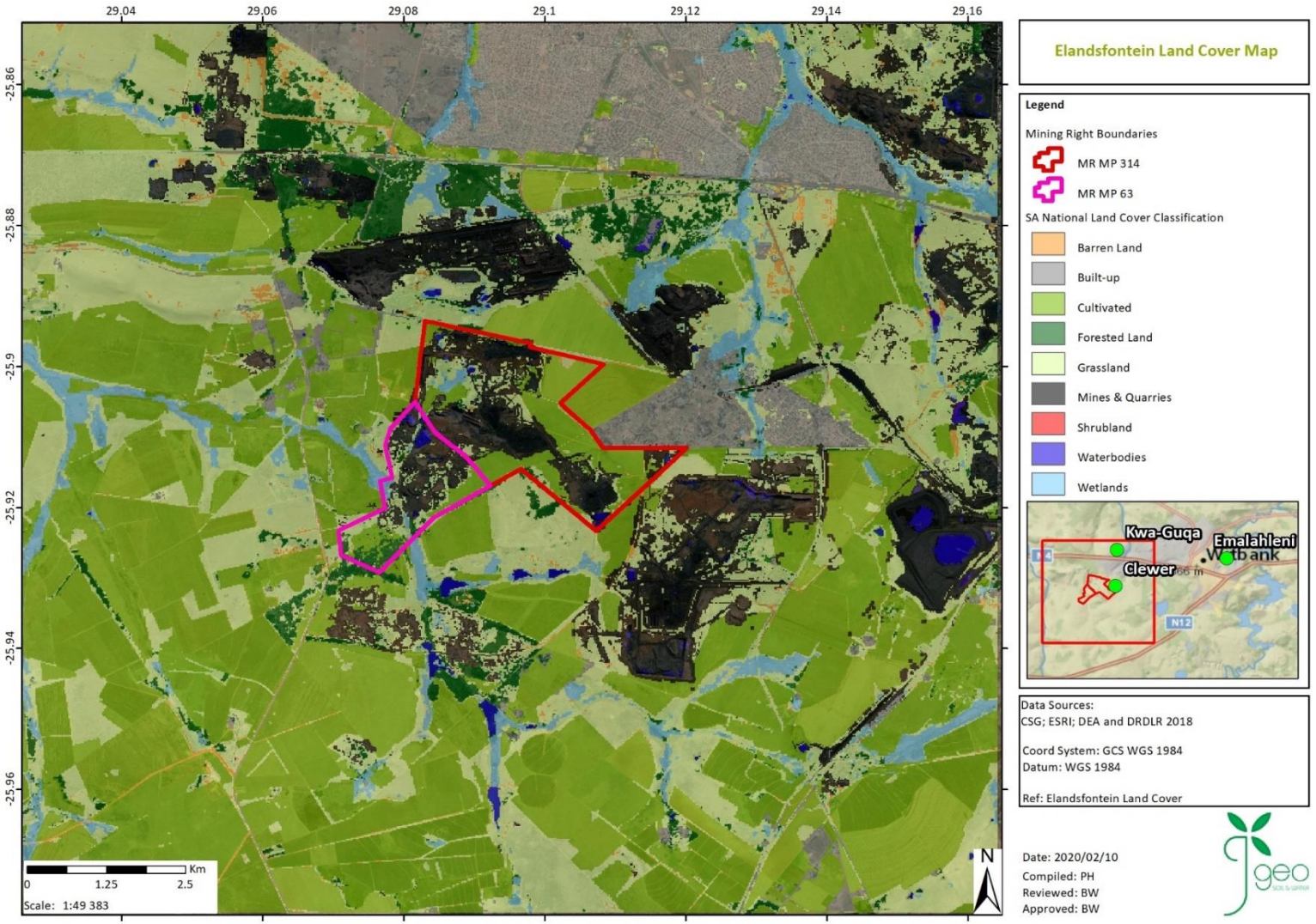

Figure 14: Land use / land cover map.

8.9 FLORA

The project area is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include:

- Seasonal precipitation; and
- The minimum temperatures in winter (Mucina & Rutherford, 2006).

The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level. Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees. The grassland biome comprises many different vegetation types. The project area is situated within two vegetation types; namely the Eastern Highveld Grassland and Rand Highveld Grassland vegetation type according to Mucina & Rutherford (2006). The vegetation distribution of the site and surrounding areas is shown in Figure 15.The Mpumalanga Biodiversity Sector Plan (MBSP) specifies two different CBA areas, Irreplaceable CBA's and Optimal CBA's. Irreplaceable CBA's include: (1) areas required to meet targets and with irreplaceability biodiversity values of more than 80%; (2) critical linkages or pinch-points in the landscape that must remain natural; or (3) critically Endangered ecosystems (MTPA, 2014). A map showing all Critical Biodiversity Areas (CBAs) is included in Figure 16.

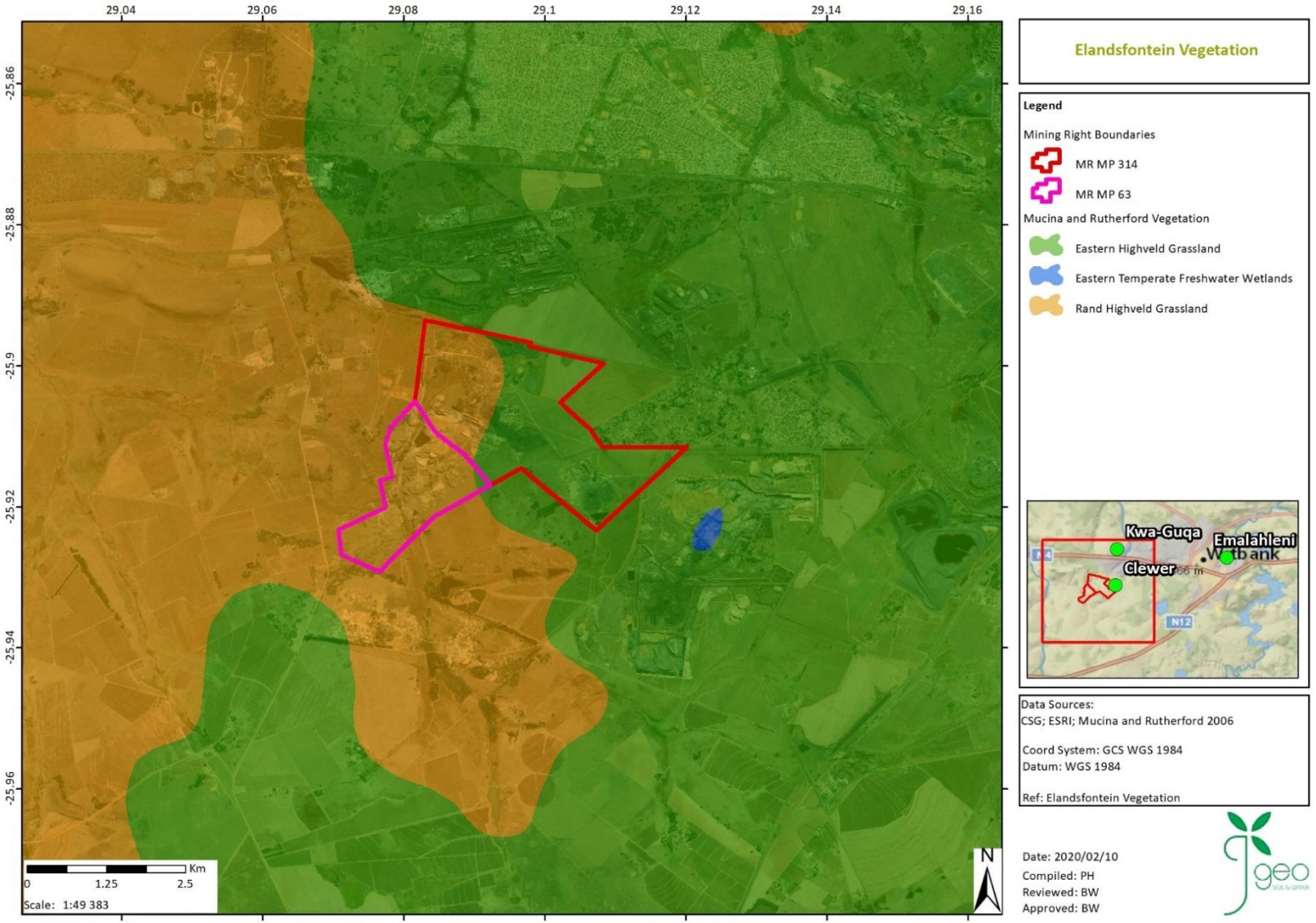

Figure 15: Vegetation map.

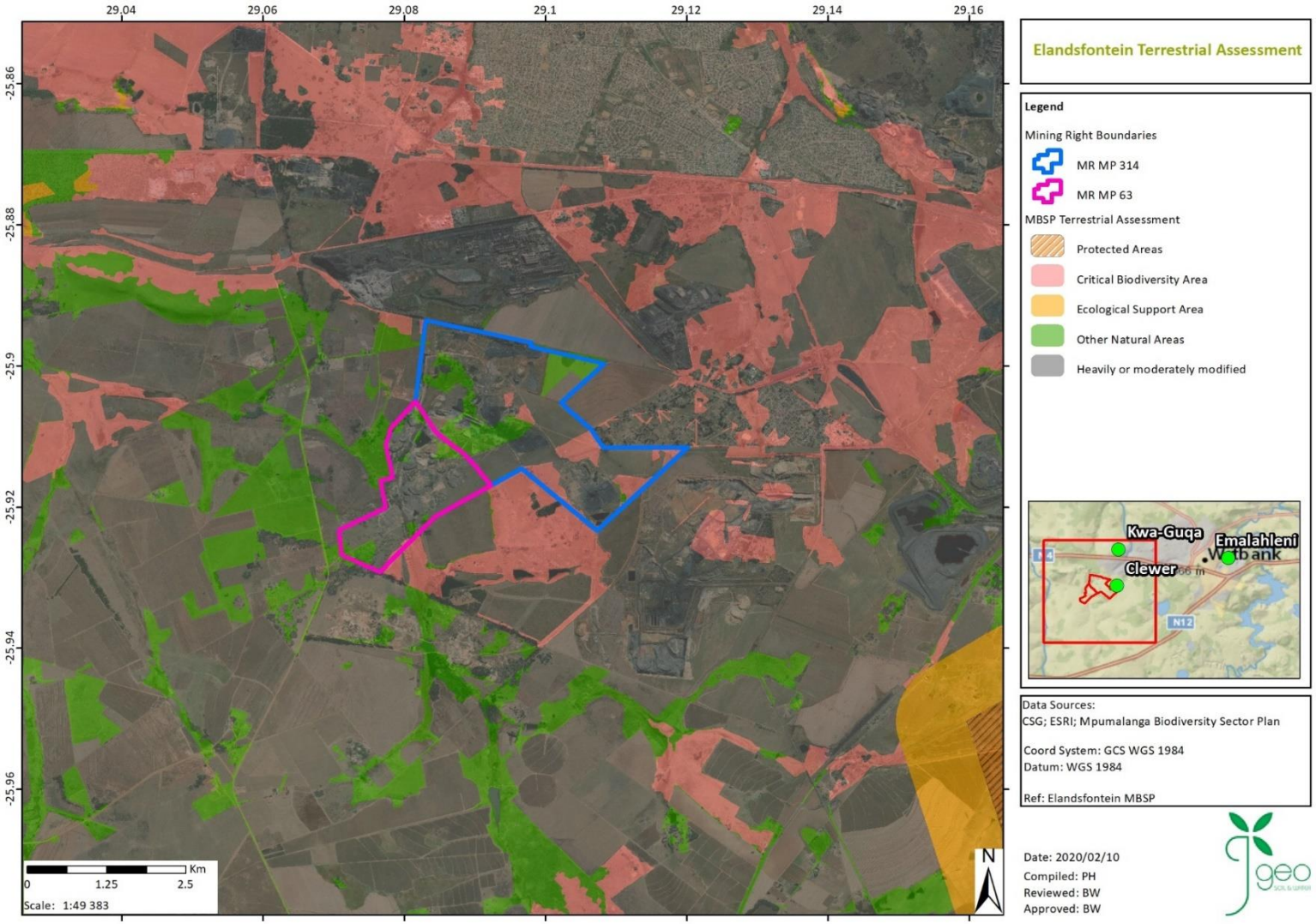

Figure 16: Terrestrial Critical Biodiversity Areas (CBA) map.

8.10 FAUNA

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 235 bird species have the potential to occur in the vicinity of the project area. Of the potential bird species, nine (9) species are listed as SCC either on a regional or global scale (Table 12).

Table 12: List of bird species of regional or global conservation importance that are expected to occur in close vicinity to the project area.

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
Anthropoides paradiseus	Crane, Blue	NT	VU	Low
Circus ranivorus	Marsh-harrier, African	EN	LC	Moderate
Geronticus calvus	Ibis, Southern Bald	VU	VU	Moderate
Mirafra cheniana	Lark, Melodious	LC	NT	Low
Oxyura maccoa	Duck, Maccoa	NT	NT	Low
Phoenicopterus minor	Flamingo, Lesser	NT	NT	Low
Phoenicopterus ruber	Flamingo, Greater	NT	LC	Low
Polemaetus bellicosus	Eagle, Martial	EN	VU	Low
Sagittarius serpentarius	Secretarybird	VU	VU	Moderate

The IUCN Red List Spatial Data (IUCN, 2017) lists 87 mammal species that could be expected to occur within the project area. Of these species, 7 are medium to large conservation dependant species, such *Ceratotherium simum* (Southern White Rhinoceros) and *Tragelaphus oryx* (Common Eland) that, in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the project area and are removed from the expected SCC list. They are however still included in the expected species list. Of the remaining 80 small to medium sized mammal species, sixteen (16) (20%) are listed as being of conservation concern on a regional or global basis (Table 13).

Table 13: List of mammal species of conservation concern that may occur in the project area as well as their global and regional conservation statuses.

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
Aonyx capensis	Cape Clawless Otter	NT	NT	Low
Atelerix frontalis	South Africa Hedgehog	NT	LC	Moderate
Cloeotis percivali	Short-eared Trident Bat	EN	LC	Low
Crocidura maquassiensis	Makwassie musk shrew	VU	LC	Low
Dasymys incomtus	Africa Marsh rat	NT	LC	Low
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Low
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Low
Leptailurus serval	Serval	NT	LC	High
Mystromys albicaudatus	White-tailed Rat	VU	EN	Low
Ourebia ourebi	Oribi	EN	LC	Low
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	Low

Pelea capreolus	Grey Rhebok	NT	LC	Low
Poecilogale albinucha	African Striped Weasel	NT	LC	Moderate
Redunca fulvorufula	Mountain Reedbuck	EN	LC	Low

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the ReptileMap database provided by the Animal Demography Unit (ADU, 2019) 73 reptile species have the potential to occur in the project area. One of the expected species are SCCs (IUCN, 2017). Based on the IUCN Red List Spatial Data (IUCN, 2017) and the AmphibianMap database provided by the Animal Demography Unit (ADU, 2019) 26 amphibian species have the potential to occur in the project area. One amphibian SCCs should be present in the project area (Table 14) according to the above-mentioned sources but in situ confirmation is required.

Table 14: List of amphibian species of conservation concern that may occur in the project area as well as their global and regional conservation statuses (IUCN, 2017; SANBI, 2016).

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
Reptiles				
Crocodylus niloticus	Nile Crocodile	VU	LC	Low
Amphibians				
Pyxicephalus adspersus	Giant Bullfrog	NT	LC	Low

An updated Biodiversity Impact Assessment will be undertaken in support of this application and the results presented in the EIA phase.

8.11 AQUATIC ECOLOGY

The study area considered in this assessment is located within the Southern Temperate Highveld Freshwater Ecoregion (Abel et al., 2008). In comparison to northern African river systems, the aquatic fauna of the considered ecoregion is "lacking in diversity" (Abel et al., 2008). This ecoregion is known to contain approximately 67-101 freshwater fish species of which 1-11 are known to be endemic. The ecoregion is known to have increased flow rates during the spring and summer seasons (October to March) and the indigenous fish species breed during this period.

Table 4: Expected fish species in the B20G-1099 Sub Quaternary Reach

Species	Common Name	IUCN Status (IUCN, 2019)
Enteromius anoplus	Chubby Head Barb	LC
Enteromius paludinosus	Straightfin Barb	LC
Enterormius cf. brevipinnis	Steelpoort Barb	NE
Clarias gariepinus	Sharptooth Catfish	LC
Psuedocrenilabrus philander	Southern Mouth-Brooder	LC

Tilapia sparmanii	Banded Tilapia	LC
LC: Least Concern, NE: Not Evaluated		

A total of nine fish species are expected in the study area. The majority of the fish species were listed as Least Concern (IUCN, 2019). However, as noted in the freshwater ecoregion setting, the species *Enteromius cf. brevipinnis* is expected in the project area and is regarded as a Species of Conservation Concern.

8.12 SURFACE WATER

The surface water attributes within and surrounding the study area are depicted in **Error! Reference source not found.**.

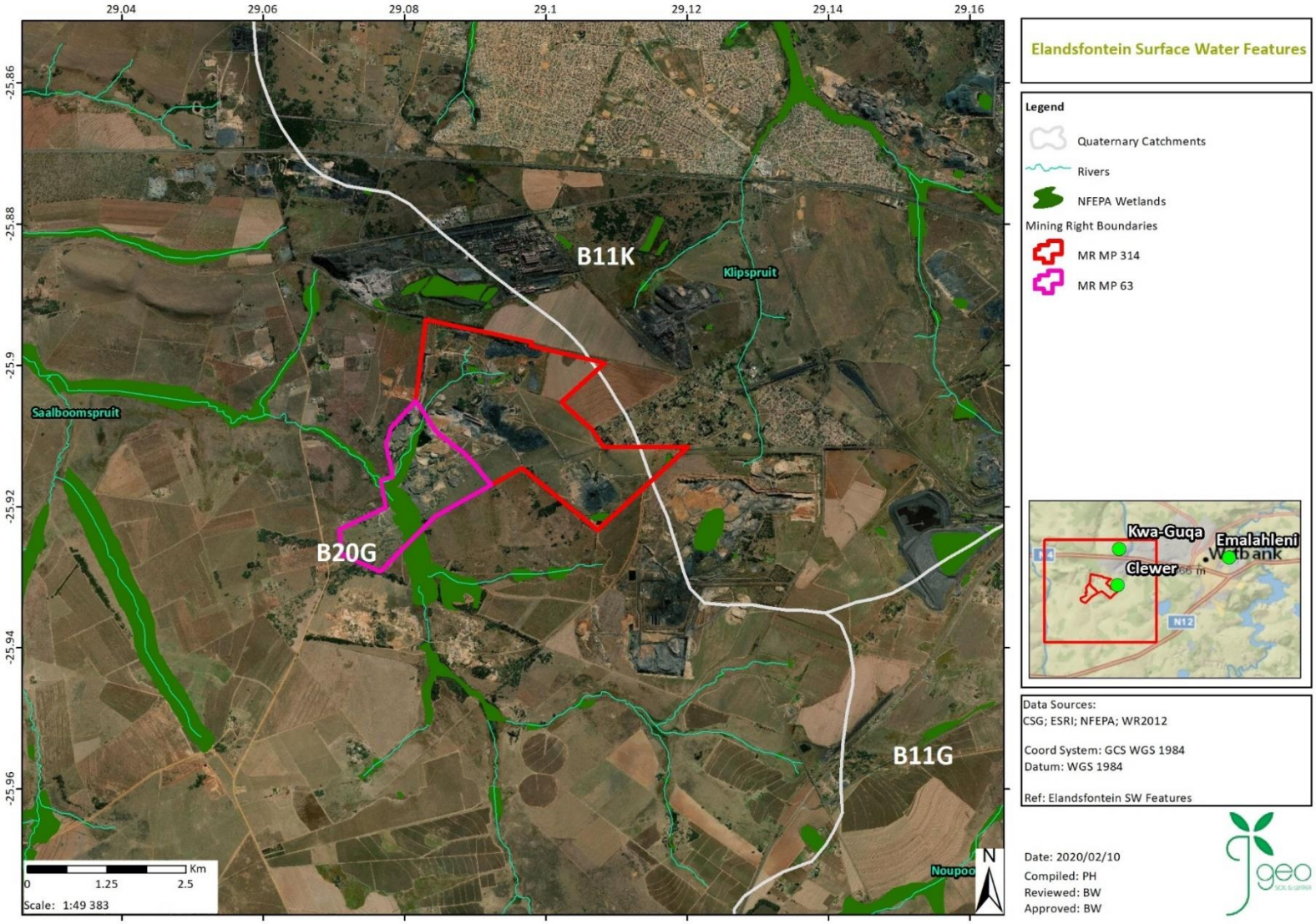

Figure 17: Surface water attributes.

8.12.1 WATER MANAGEMENT AREA

Elandsfontein Colliery is located within the Olifants water management area which falls within three provinces, namely: Gauteng, Mpumalanga and the Limpopo provinces. The Olifants River originates in the Highveld of Mpumalanga and initially flows northwards before curving in an easterly direction through the Kruger National Park and into Mozambique. The Olifants water management area is divided into four major river catchments i.e. the Elands River, Wilge River, Steelpoort River and Olifants River catchments. Elandsfontein Colliery falls within the Wilge River sub-catchment. Elandsfontein Colliery occurs within the B11K and B20G tertiary drainage regions.

Apart from the Elandsfontein mining operations, the Grootspruit catchment is undeveloped and consists mostly of impacted grasslands and dry land agriculture. The topography is relatively flat. Localised areas have steeper slopes, particularly in the vicinity of the streams. The Grootspruit is dammed with multiple farm dams. The water course has an ill-defined channel in the study area and contains significant reedbeds. The flood plains are not well developed.

The Elandsfontein mining operations occur on both sides of the Grootspruit Tributary stream along most of its length. The upper reaches are dammed with pollution control and water supply dams. The natural tributary has a poorly defined water course but is generally heavily reeded. The lower reaches have been modified and the stream is canalised for roughly half its length.

The 50-year and 100-year flood peaks for the Grootspruit are 246 m^3/s and 326 m^3/s respectively, calculated at the point just beyond the mining rights area. The 50-year and 100-year flood peaks for the Grootspruit tributary are 55 m3/s and 75 m3/s respectively, calculated at its confluence with the Grootspruit. The surface water buffer zone is the greater of the 100-year floodline or 100 m from the water course. The buffer zone for the Grootspruit is a combination of these buffers. The buffer zone for the Grootspruit tributary is predominantly the 100 m offset from the water course.

8.12.1.1 MEAN ANNUAL RUNOFF

The Grootspruit has a 81.562 km^2 catchment up to just beyond the mining rights area. The tributary of the Grootspruit has a catchment measuring 8.169 km^2 up to its confluence with the Grootspruit. The mean annual runoff for the Grootspruit and its tributary are 3.57 Mm^3/a and 0.36 Mm^3/a respectively. Dry weather flows are between May and October.

8.12.1.2 NORMAL DRY FLOW

Due to the small catchment size of the Grootspruit tributary, dry weather flows are likely to be very low and will often be limited to sub-surface flow only. Average dry weather flows appear high, but these are influenced by storm flow from occasional winter rainfall events and unseen subsurface flow.

8.12.1.3 SURFACE WATER QUALITY

Elandsfontein's monthly water monitoring programme currently includes 10 surface water sites of which three are wastewater facilities. Water contaminated with high concentrations of metals, sulphide minerals, dissolved solids, or salts can negatively affect surface and groundwater resources in the area.

The elevated element concentrations in the surface water bodies are potentially associated with high evaporation, low flow conditions and mine water run-off. High SO4 concentration indicates some form of pollution in this case from coal mining or effluent runoff. Surface water at Elandsfontein has been contaminated and measures to remedy will be put in place.

The latest 2019 surface water monitoring reports were made available. The surface water sites were benchmarked against the Olifants Catchment water quality limits and the wastewater sites were benchmarked against the WUL objectives limits. The surface water sites at Elandsfontein have sulphate dominant type water and are typical of water impacted by the oxidation of pyrite and is commonly associated with mining impacts.

The following can be concluded from the latest available 2019 surface water monitoring reports:

- Sample TCMSW02 has elevated concentrations of Cl, and low Ph from month of May as dilution process decreased due to dry season, and it is situated at the downgradient of the mining area and the inlet of stream passing through the mining area.

- Sample TCMSW01 is the outlet of the stream also located downstream of the mining area, TCMSW01 has elevated concentrations of EC, Cl, SO_4 and a low pH.
- Sample Farm dam which is located within the mining area in the wetland area, has elevated concentrations of EC, Cl, and SO4 and low pH. This is expected in coal mining area as the production of pyrite.
- Sample DECANT is located 10m away from TCMPCD3 and the DECANT point is feeding the TCMPCD3, the point was not sampled due to access to the area, there are reeds which covered the point.
- Sample ELAN is located in the opposite farm, which is believed to be a natural spring, the spring is located downstream of TCMPCD1 and has elevated concentration of Cl, the water of the stream does not show any impact from mining.
- Sample GSHL02 and GSHL03 are the two dams that are fed by the spring ELAN, but the two dams have elevated concentration of CL, SO_4 and a low pH, this might be an indication that the dams are not fed by the spring only.
- All the waste water sites were sampled and the following results were observed Table 7: as the three sampling points are used as waste water facilities, it is expected that the quality of water is not good, therefore according the WUL the limits given are for the discharge of the water into the clean environment.
- Sample TCMPCD3: Exceeded the WUL limits for SO_4, Ca, Mg, Al, Fe, Mn and have a very low pH which indicates acid water; TCMPCD3 is being recharged by a underground seepage(sample DECANT) and surface runoff, of which currently studies are being conducted to determine the source.
- Sample TCMPCD1: Exceeded the WUL objectives for SO_4, Ca, Mg, Fe, Al, Mn and also have a very low pH which indicates acidic water, TCMPCD1 is used to capture all the dirty runoff from the old discard dump of which we are currently reclaiming.
- Sample TCMSW03: Exceeded the WUL objectives for SO_4, Ca, Mg, Fe, Al, Mn and also have a very low pH, TCMSW03 is used as containment for all the dirty water runoff from the mining area.

The elevated element concentrations in the surface water bodies are potentially associated with high evaporation, low flow conditions and mine water run-off. High SO_4 concentrations indicate potential pollution from coal mining or effluent runoff.

8.12.2 SURFACE WATER USE

Surface water users in the Wilge River sub-catchment are mainly domestic and agriculture in the form of irrigation and livestock watering. Water uses also take place in the form of impoundments such as farm dams. Surface water within the sub-catchment especially within the mining right area is used primarily for agricultural purposes (irrigation and livestock watering).

8.13 WETLANDS

Various non-perennial and perennial streams have been identified within the proposed project area by means of the "2529" quarter degree square topographical river line data set. Two types of NFEPA wetlands were identified within the MRA, namely channelled valley bottom wetlands as well as seeps. The channelled valley bottom wetlands are classified as natural and the seeps are classified as artificial. The Mpumalanga Highveld Grassland Wetland Layer indicates an additional wetland within the MRA, namely a floodplain wetland with various other wetland types located within the MRA's surroundings.

8.14 GROUNDWATER

According to the DWS Hydrogeological map (DWS Hydrogeological map series 2526 Johannesburg) the site is predominantly underlain by an intergranular and fractured aquifer system comprising mostly fractured and weathered compact sedimentary/ arenaceous rocks). The Ecca Group consists mainly of shales and sandstones that are very dense with permeability usually very low due to poorly sorted matrices. Water is stored mainly in

decomposed/partly decomposed rock and water bearing fractures are principally restricted to a shallow zone below the static groundwater level. Sustainable borehole yields are limited to < 0.5 l/s, while higher yielding boreholes (> 3.0 l/s) may occur along structural features i.e. fault and fracture zones (Barnard, 2000). Water levels are variable and controlled by topography, ranging from 10.0 mbgl (in low laying areas) to > 40.0 mbgl in higher elevated areas (Olifants ISP DWS, 2004). The maximum aquifer depth fluctuates between 30.0 – 50.0 mbgl.

On a regional scale, two geological lineaments (potentially faults zones) exist in close proximity to the greater study area, striking in a general north-south and southwest-northeast orientation respectively. Faults zones may have an impact on the local hydrogeological regime as it can serve as potential preferred pathways for groundwater flow and contaminant transport.

8.14.1 AQUIFER CHARACTERISATION

Two main hydrostratigraphic units can be inferred in the saturated zone:

- A shallow, weathered zone aquifer occurring in the transitional soil and weathered bedrock formations underlain by more consolidated bedrock. Ecca sediments are weathered to depths between 5.0 – 15.0 mbgl (Digby Wells, 2018). Groundwater flow patterns usually follow the topography, discharging as natural springs and/or baseflow at topographic low-laying areas. Usually this aquifer can be classified as a secondary porosity aquifer and is generally unconfined with phreatic water levels. Due to higher effective porosity (n) this aquifer is most susceptible to impacts from contaminant sources. i
- An intermediate/deeper fractured aquifer where groundwater flow will be dictated by transmissive fracture zones that occur in the relatively competent host rock. Fractured sandstones and shales sequences are considered as hard-rock aquifers holding water in storage in both pore spaces and fractures. Groundwater yields, although more heterogeneous, can be expected to be higher than the weathered zone aquifer. This aquifer system usually displays semi-confined or confined characteristics with piezometric heads often significantly higher than the water-bearing fracture position.

Analysed data indicate that the regional groundwater elevation correlates moderately to the topographical elevation suggesting a dynamic environment. However, water level data for the shallow aquifer indicate that the majority of levels correlate very well to the topographical elevation. Accordingly, it can be assumed that the regional groundwater flow direction of the shallow aquifer is dictated by topography. Accordingly, the inferred groundwater flow direction of the shallow aquifer will be in a general southwestern direction towards the lower laying drainage system of the Grootspruit transecting the project area from where it will discharge as baseflow. On-site water levels of the underground mine void do not correlate well to topography and is a function of the coal seam floor contours historically mined.

8.14.2 HYDROCENSUS AND GROUNDWATER USE

A hydrocensus user survey within the greater study area was conducted during August 2019 where relevant hydrogeological baseline information was gathered. The aim of the hydrocensus survey is to determine the ambient and background groundwater conditions and applications prior to the proposed activities and to identify potential sensitive environmental receptors i.e. groundwater users in the direct vicinity of the operations. Geosites visited include 21 boreholes as well as two surface water features i.e. drainages. Of the boreholes recorded, the majority are in use (>73.0%) with only two boreholes are not currently utilised.

8.14.3 GROUNDWATER QUALITY

The South African National Standards (SANS 241: 2015) have been applied to assess the water quality within the project area. The standards specify a maximum limit based on associated risks for constituents. Water samples were submitted for analysis at a SANAS accredited laboratory for inorganic analysis. Parameters exceeding the stipulated SANS 241:2015 thresholds are highlighted in red (acute health), elemental concentrations above this range are classed as unsuitable for domestic consumption without treatment whereas yellow highlighted cells indicate parameters above aesthetic limits. These standards were selected for use as the current and future water uses in the area are primarily domestic application and/or livestock watering.

The overall ambient groundwater quality of the shallow aquifer is good with the majority of macro and micro determinants below the SANS 241:2015 limits. Isolated sampling localities indicate above limits ammonium

(NH4) concentrations which may suggest nearby anthropogenic activities. The local groundwater quality is indicative of an impacted groundwater system and suggest coal mine pollution and acid mine drainage (AMD) conditions present. The latter is characterised by a low pH environment increasing the solubility and concentrations of metals i.e. usually aluminum, iron and manganese. Leaching from mined out faces as well as other waste facilities i.e. discard dumps containing carbonaceous material and sulphides will allow for oxidation and hydration resulting in the generation of acidity (H+), sulphates (SO42-) and ferric (Fe3+) and ferrous (Fe2+) iron species and the movement of other conservative contaminants with groundwater in a downgradient direction from the source.

The latest 2019 monitoring reports were made available. Groundwater analysis were compared against the Water Use Licence Objectives from DWS:

- Sample GW1 is located upstream of the wash plant and coal stockpile, the sample contains elevated concentrations of Na, Cl, SO4 and NO_3. But the borehole was not sampled during the June sampling run due to access to the site.
- Sample GW5 is located behind TCMPCD1 downstream of the pollution control dam and has elevated concentrations of EC, Ca, Mg and SO4 and a low pH. This might be an indication of mining impact or the pollution control dam impact. Currently Elandsfontein is in the process to rebuild TCMPCD2 which is backup for TCMPCD1 when it overflows.
- Borehole TCMBH02 is located downstream of the mine and also at the downstream of the stream that passes through the mine area. The borehole have all constituents falling within the WUL objectives. Borehole TCMBH03 exceeds the WUL limits for NO3 which is located upstream of the mining area in the village, it is located in one of the houses close to the mine area and the borehole have all the constituents falling within the limits of the WUL except for Cl and SO4. The borehole is currently not being used for domestic or livestock watering, it is only used by Elandsfontein for their baseline. The NO3 concentration might from pesticides used or cattle get close to the borehole.
- Borehole EFNBH11 was drilled close to the railway which is located upstream of the mining area and its drilled behind the tailings dam of the Alloy company. The borehole is used to monitor the impact the tailing has on the groundwater flowing towards Elandsfontein pits and dams. The site exceeds the WUL limits foe Ca, Cl, SO4 and Na, high concentration of S04 might indication of impact from the tailings dam.

8.15 AIR QUALITY

Mining operations like drilling, blasting, hauling, and transportation are the major sources of emissions and air pollution. Emissions of particulate matter and nuisance dust will result from mineral plant operations such as crushing, screening and processing for final transportation. Fugitive emissions are also possible from roads and open stockpiles. As part of the commitments made in the approved EMP, dust fallout monitoring has been implemented at the Elandsfontein Colliery.

Nuisance dust can reduce visibility; soil or damage buildings and other materials; and increase costs due to the need for washing, cleaning and repainting. Plants can be affected by dust fallout through reduced light transmission which affects photosynthesis and can result in decreased growth. Fallout dust can also collect in watercourse causing sedimentation and a reduction in the water quality and can also affect aquatic life through the smothering of riverine habitat and fish gill clogging. Coarse dust particles are produced during mining operations which can lead to an increase in fallout dust.

The period wind field and diurnal variability in the wind field are shown in Figure 18. Seasonal variations in the wind field are provided in Figure 19. The wind field was predominantly from the north, east and east-southeast, also the directions associated with the strongest winds. The night-time wind rose shows a decrease in the northerly and the north-westerly winds with an increase in the easterly and east-southeasterly winds. The night-time is also characterised by a higher frequency of calm conditions. Summer and autumn show similar wind direction profiles to the period average, while winter shows more frequent winds from the west and spring more from the north.

The main air quality receptors near the mine are Clewer immediately to the east, Kwa-Guqa 3 km to the north-northeast, Ackerville 6 km to the northeast, Phola 6 km to the southwest and Emalahleni 10 km to the east.

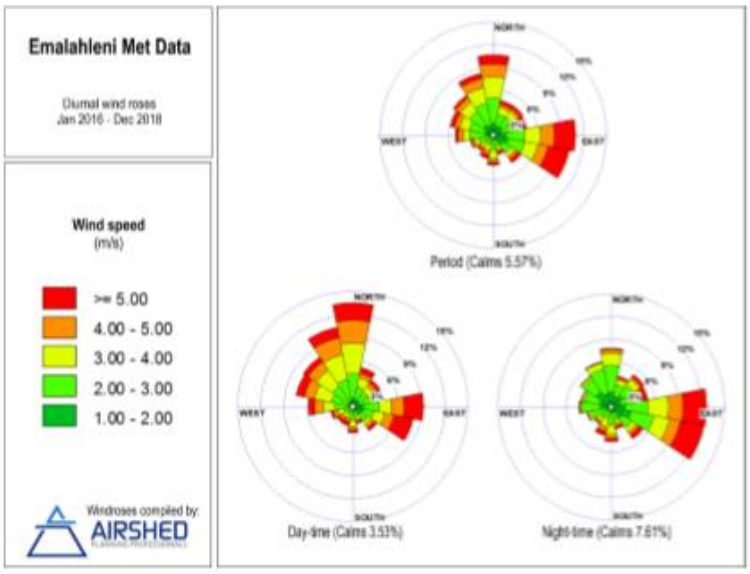

Figure 18: Period, day- and night-time wind roses

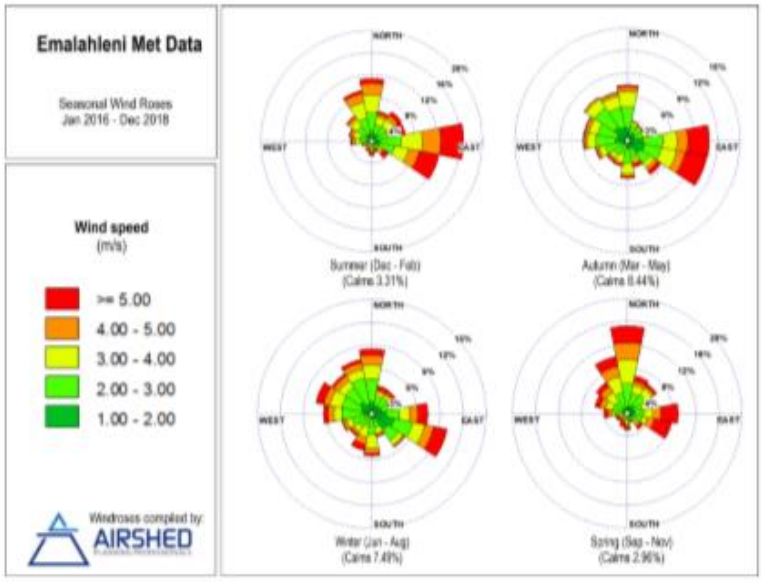

Figure 19: Seasonal wind roses

9. ENVIRONMENTAL IMPACT ASSESSMENT

9.1 THE IMPACT ASSESSMENT METHODOLOGY

The impact significance rating methodology is guided by the requirements of the NEMA EIA Regulations. The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER).

The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{E + D + M + R}{4} \times N$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 15.

Table 15: Criteria for determination of impact consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),

	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude / Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 16.

Table 16: Probability scoring

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

ER= C x P

Table 17: Determination of environmental risk

Consequence						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
	Probability					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described Table 18.

Table 18: Significance classes

Environmental Risk Score	
Value	**Description**
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥ 9; < 17	Medium (i.e. where the impact could have a significant environmental risk),
≥17	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

In accordance with the requirements of Regulation 31 (2)(l) of the EIA Regulations (GNR 543), and further to the assessment criteria presented above it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition, it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision-making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority / significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/ mitigation impacts are implemented.

Table 19: Criteria for the determination of prioritisation

Impact Prioritisation

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented Table 19. The impact priority is therefore determined as follows:

Priority = PR + CI + LR

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (refer to Table 20).

Table 20: Determination of prioritisation factor

Priority	Ranking	Prioritisation Factor
3	Low	1
4	Medium	1.17
5	Medium	1.33
6	Medium	1.5
7	Medium	1.67
8	Medium	1.83
9	High	2

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class,

if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance). The environmental significance rating is presented in Table 21.

Table 21: Environmental Significance Rating

Value	Description
< -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ -10 < -20	Medium negative (i.e. where the impact could influence the decision to develop in the area).
≥ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
0	No impact
< 10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).
≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

9.2 IMPACTS IDENTIFIED

This Section presents the potential impacts that have been identified during the scoping phase assessment. It should be noted that this report will be made available to I&AP's for review and comment and their comments and concerns will be addressed in the final Scoping report submitted to the DMR for adjudication. The results of the public consultation will be used to update the identified potential impacts which will be further refined during the course of the EIA assessment and consultation process.

Potential environmental impacts were identified during the scoping process. These impacts were identified by the EAP, the appointed specialists, as well as the public. Table 22 provides the list of potential impacts identified.

Without proper mitigation measures and continual environmental management, most of the identified impacts may potentially become cumulative, affecting areas outside of their originally identified zone of impact. The potential cumulative impacts have been identified, evaluated, and mitigation measures suggested which will be updated during the detailed EIA level investigation.

When considering cumulative impacts, it is vitally important to bear in mind the scale at which different impacts occur. There is potential for a cumulative effect at a broad scale, such as regional deterioration of air quality, as well as finer scale effects occurring in the area surrounding the activity. The main impacts which have a cumulative effect on a regional scale are related to the transportation vectors that they act upon. For example, air movement patterns result in localised air quality impacts having a cumulative effect on air quality in the region. Similarly, water acts as a vector for distribution of impacts such as contamination across a much wider area than the localised extent of the impacts source. At a finer scale, there are also impacts that have the potential to result in a cumulative effect, although due to the smaller scale at which these operate, the significance of the cumulative impact is lower in the broader context.

Table 22: Identified Environmental Impacts.

Main Activity / Action / Process	Ancillary Activity	Geo-physical (geology, topography, air, water)	Biological	Socio-economic	Heritage and cultural
Site preparation (Planning)	Vegetation clearance Removal of infrastructure Planned placement of infrastructure Re-establishment of construction contractor area		○ Temporary disturbance of wildlife		○ Disturbance/ destruction of archaeological sites or historic structures
Human resources management (Planning)	Employment/recruitment I&AP consultations CSI initiatives Skills development programmes Environmental awareness training HIV/AIDS Awareness programmes Integration with Municipalities' strategic long-term planning			○ Employment Opportunities. ○ Inability of the community to capture economic benefits & managing expectations.	
Earthworks (Construction)	Stripping and stockpiling of soils Cleaning, grubbing and bulldozing Removal of building waste and cleared vegetation Digging trenches and foundations Blasting Establishing storm water management measures Establishment of firebreak	○ Erosion due to storm water runoff ○ Impact due to topsoil stripping ○ Surface water contamination ○ Loss of fertility ○ Loss of flow paths ○ Emissions and dust	○ Loss/ destruction of natural habitat ○ Introduction/ Invasion by Alien Species ○ Displacement of faunal species ○ Impact of haul roads on aquatic ecology ○ Overburden stripping and stockpiling	○ Visual impact and impact on sense of place ○ Interference with Existing Land Uses ○ Nuisance and Impact on Sense of Place (i.e. noise, dust, etc.). ○ Safety and security (i.e. access to properties, theft, fire hazards, etc.). ○ Damage / disruption of services (i.e. water,	○ Disturbance/ destruction of archaeological sites or historic structures ○ Disturbance/ Destruction of Unmarked Graves ○ Disturbance/ destruction of fossils

				electricity, sewage, etc.). o Impact on existing infrastructure (i.e. roads, fences, etc.) o Perceptions and Expectations o Employment Opportunities	
Civil Works (Construction)	Establishment of infrastructure and services Mixing of concrete and concrete works Establishment of PCD and storm water/return water dam Establishment of dewatering pipelines Establishment of mobile office and ablution block Sewage and sanitation Establishment of fuel storage area Establishment of chemical storage area Establishment of general waste area Access control and security General site management	o Erosion due to storm water runoff o Impact due to topsoil stripping o Surface water contamination o Loss of fertility o Loss of flow paths o Emissions and dust	o Loss/ destruction of natural habitat o Introduction/ Invasion by Alien Species o Displacement of faunal species o Impact of haul roads on aquatic ecology o Overburden stripping and stockpiling	o Visual impact and impact on sense of place o Interference with Existing Land Uses o Nuisance and Impact on Sense of Place (i.e. noise, dust, etc.). o Safety and security (i.e. access to properties, theft, fire hazards, etc.). o Damage / disruption of services (i.e. water, electricity, sewage, etc.). o Impact on existing infrastructure (i.e. roads, fences, etc.) o Perceptions and Expectations o Employment Opportunities	o Disturbance/ destruction of archaeological sites or historic structures o Disturbance/ Destruction of Unmarked Graves o Disturbance/ destruction of fossils
	Drilling Blasting				

Open-cast Mining (Operation)	Excavations Removal of overburden by dozing and load haul Establishment of internal haul roads Removal of coal Establishment of RoM stockpiles Establishment of Product Stockpiles Pumping of water to PCD Waste rock dumps for backfilling Soil management Water management Concurrent rehabilitation Water treatment	○ Subsidence effects on availability of surface water ○ Subsidence effects on ground water ○ Subsidence - physical alteration of surface-level environment ○ Impacts on groundwater quantity ○ Depletion in aquifer storage ○ Impact on groundwater quality due to leachate ○ Impact on groundwater quality due to hydrocarbon contamination ○ Surface water contamination ○ Impacts from contaminated discharge ○ Contamination from burst water pipes ○ Pollution from vehicle fleet ○ Loss of catchment yield ○ Loss of fertility ○ Loss of flow paths ○ Emissions and dust	○ Displacement of faunal species ○ Continued removal and fragmentation of EN vegetation communities ○ Flora Direct and Indirect Mortality ○ Potential leaks, discharges, pollutant from mining activities leaching into the surrounding environment ○ Impact of general mining activities on aquatic ecology	○ Fly rock, air blast and ground vibration impacts ○ Visual impact and impact on sense of place ○ Reduction in quantity of water (i.e. water consumption) ○ Interference with Existing Land Uses ○ Nuisance and Impact on Sense of Place (i.e. noise, dust, etc.). ○ Safety and security (i.e. access to properties, theft, fire hazards, etc.). ○ Damage / disruption of services (i.e. water, electricity, sewage, etc.). ○ Impact on existing infrastructure (i.e. roads, fences, etc.) ○ Coal supply ○ Employment Opportunities

Infrastructure removal (Decommissioning)	Dismantling and demolition of infrastructure Safety control	○ Subsidence effects on availability of surface water ○ Subsidence effects on ground water ○ Subsidence - physical alteration of surface-level environment ○ Impacts of removal of surface infrastructure on surface water ○ Loss of fertility ○ Loss of flow paths ○ Emissions and dust	○ Introduction/ Invasion by Alien Species ○ Displacement of faunal species ○ Impact of general mining activities on aquatic ecology	○ Safety and security (i.e. access to properties, theft, fire hazards, etc.). ○ Impact on existing infrastructure (i.e. roads, fences, etc.) ○ Perceptions and Expectations ○ Employment Opportunities
Rehabilitation (Closure)	Backfilling of pits and voids Slope stabilisation Erosion control Landscaping Replacing topsoil Removal of alien/invasive vegetation Re-vegetation Restoration of natural drainage patterns Remediation of ground and surface water Rehabilitation of external roads	○ Water Level Rebound ○ Decanting of poor quality water ○ Hydrological impacts due to removal of surface infrastructure ○ Loss of flow paths ○ Emissions and dust	○ Impact of general mining activities on aquatic ecology	
Maintenance (Post closure)	Initiate maintenance and aftercare program Environmental aspect monitoring Monitoring of rehabilitation	○ Decant of poor-quality water		

9.3 DESCRIPTION AND ASSESSMENT OF IMPACTS

The following potential impacts were identified during the scoping phase assessment. These preliminary impact calculations will be subject to amendment based on the EIA phase assessment and the results of public consultation undertaken during the EIA phase. The impact assessment matrix is included in Appendix E **Error! Reference source not found.** and the below subsections describe each impact in more detail.

9.3.1 PRELIMINARY IMPACTS ON HERITAGE AND PALAEONTOLOGICAL RESOURCES

This section presents the preliminary potential impacts identified with regard to heritage resources. While several project phases exist, only impacts associated with the Site Establishment and Earthworks/Construction Phase are included here. The reason for this is that no impacts are anticipated on the identified heritage resources during the other phases of the project. The following preliminary impacts (as well as their impact rating) on heritage resources were identified during scoping:

9.3.1.1 DISTURBANCE/ DESTRUCTION OF ARCHAEOLOGICAL SITES OR HISTORIC BUILDINGS

Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction/damage or disturbance of such sites requires a permit from the responsible heritage authority. Three historical/recent structure sites are present on the property. These structures have low heritage significance and are given a *Not Conservation Worthy* rating. The impact would be damage to identified historical/recent structures due to earth-moving or vegetation clearance activities.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Disturbance/ destruction of archeological sites or historic structures	Planning Construction	-9.75	+3	+3.38

Proposed Preliminary Mitigation:

During design and before construction no-go areas need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases. The recorded localities of these archaeological sites (based on the specialist study to be undertaken) should be avoided during the placement of development footprint areas. These studies will be required to determine the significance of each site and to assess the possible development impacts on each of them during the Heritage Impact Assessment phase.

9.3.1.2 DISTURBANCE/ DESTRUCTION OF GRAVES

Eight burial grounds are present on the property (EFN001, EFN002, EFN003, EFN004, EFN007, EFN008, EFN010, EFN011). Burial grounds and graves have high heritage significance and are given a Grade IIIA significance rating. The impact would be damage to identified graves and burial grounds due to earth-moving or vegetation clearance activities.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Disturbance/ Destruction of Unmarked Graves	Construction	-17.00	-8.25	-12.38

Proposed Preliminary Mitigation:

Mitigation measures would include fencing of the graves and burial grounds and strict avoidance of these sites. Section 17.6(a) of the Mine Health and Safety Act (Act 29 of 1996 and Regulations (2014)) requires the employer to ensure that no mining operations are carried out under or within a horizontal distance of 100m from buildings, roads, railways, reserves, boundaries, any structure whatsoever or any surface which it may be necessary to protect. Reduction of this distance can only be approved by the DMR.

9.3.1.3 DISTURBANCE/ DESTRUCTION OF FOSSIL MATERIAL

The impact will destroy fossil heritage or permanently seal-in fossils at or below the ground surface. These fossils will no longer be available for research.

Activities that can potentially contribute to the impact would be the site clearance and excavations for the Elandsfontein mine will include widespread digging into the shallow sediment cover as well as into the underlying bedrock. The excavations will also change the topography of the development site. According to the Geology of the project site there is a Very High possibility of finding fossils.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Disturbance/ destruction of fossils	Construction	-17.05	-11.25	-16.88

Proposed Preliminary Mitigation:

It is recommended that an EIA level palaeontology report should be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment will be conducted and research in the site-specific study area as well as a comprehensive assessment of the impacts identified during the scoping phase.

9.3.2 PRELIMINARY IMPACTS ON ECOLOGY

The following preliminary impacts on the ecological resources within the study area were identified and assessed for the various project phases (planning and design, construction, operation, rehabilitation and closure). No impacts on the ecological receiving environment have been identified that will occur during the Decommissioning Phase and the Rehabilitation and Closure Phase. The removal of the vegetation cover on site and other disturbances may increase the erosion potential of the site. Below are the planning, construction and operational phase preliminary impacts on ecological resources identified during scoping, as well as their impact rating.

9.3.2.1 TEMPORARY DISTURBANCE OF WILDLIFE DUE TO INCREASED HUMAN PRESENCE AND POSSIBLE USE OF MACHINERY AND/OR VEHICLES

As more vehicles will be driving in the area to survey various components of the project, the wildlife will be disturbed. The e use of heavy machinery can also lead to the trampling of both vegetation and faunal species.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Temporary disturbance of wildlife	Planning	-5.00	-4.00	-8.00

Proposed Preliminary Mitigation:

-
- Restrict vehicle access outside of demarcated work areas as much as possible; and
- Ensure someone is walking ahead of heavy machinery to chase up any faunal species.

9.3.2.2 LOSS/ DESTRUCTION OF NATURAL HABITAT AND REMOVAL OF PROTECTED SPECIES

The proposed activities on site will lead to localised damage to the open cast areas as well as areas containing infrastructure. The vegetation communities are classed as EN, though site clearing more of the vegetation communities will be lost. This will also lead to habitat fragmentation and the establishment of alien invasive species as well as soil erosion.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss/ destruction of natural habitat	Construction	-16.00	-9.00	-13.50

Proposed Preliminary Mitigation:

- The areas to be developed must be specifically demarcated to prevent movement of workers into sensitive surrounding environments;
- Areas of indigenous vegetation, even secondary communities outside of the direct mining footprint, should under no circumstances be fragmented or disturbed further or used as an area for the dumping of waste;
- Appropriate speed humps and drainage must be constructed along the access roads (every three metres of elevation) in order to slow the flow of water run-off from the road surface, if this does not already exist; and
- Where possible, existing access routes and walking paths must be made use of, and the development of new routes limited.

9.3.2.3 INTRODUCTION/ INVASION BY ALIEN SPECIES

The spread of alien invasive species will result in the loss of habitat and water for indigenous fauna and flora. It can also contribute to the spreading of potentially dangerous diseases due to invasive and pest species. Overall the fauna assemblage will be changed.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Introduction/ Invasion by Alien Species	Construction	-15.00	-9.00	-13.99
	Decommissioning	-18.00	-9.00	-13.50

Proposed Preliminary Mitigation:

- The footprint area of the construction should be kept a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas;
- An extensive alien plant management plan be compiled to remove all alien vegetation from within the project area; The use of herbicide needs to be monitored and only be used by a qualified person;
- Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site; and
- A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the likely presence of SCCs.

9.3.2.4 EROSION DUE TO STORMWATER RUNOFF

Erosion will lead to the loss of vegetation, the removal/ relocation of the topsoil and the destruction of habitat.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Erosion due to storm water runoff	Construction	-16.00	-5.50	-7.56

Proposed Preliminary Mitigation:

- The areas to be developed must be specifically demarcated to prevent movement of workers into sensitive surrounding environments;
- Appropriate speed humps and mitre drains must be constructed along the access roads (every three metres of elevation) in order to slow the flow of water run-off from the road surface, if this does not already exist;
- Where possible, existing access routes and walking paths must be made use of, and the development of new routes limited;
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events; and
- A storm water management plan must be compiled and implemented.

9.3.2.5 DISPLACEMENT OF FAUNAL SPECIES

The proposed activities on site will lead to localised damage to the environment and possibly also damage to habitats associated with travelling along access routes. This impact would be temporary, as upon completion of mining activities, the disturbed areas would be rehabilitated which would stimulate the migration of faunal species back to these areas. During operation the faunal community will be influenced in a number of ways, including the loss of their habitat, disturbances that will either make them move out of the area if possible or have to adapt and possible deaths due to physical harm or indirect harm from pollution.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Displacement of faunal species	Construction	-14.00	-5.00	-6.25
	Operation	-15.00	-8.25	-11.34
	Decommissioning	-15.00	-8.25	-12.38

Proposed Preliminary Mitigation:

- The areas to be developed must be specifically demarcated to prevent movement of workers into sensitive surrounding environments;
- All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife;
- No trapping, killing or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals;
- All laydown, storage and temporary infrastructure areas must be within the existing disturbed areas, and not within the adjacent grassland areas;
- During the construction phase, noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species and nocturnal mammals;
- Outside lighting should be designed to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas such as the wetland. Fluorescent and mercury vapour lighting should be avoided and sodium vapour (yellow) lights should be used wherever possible;
- No trapping, killing or poisoning of any wildlife is to be allowed;
- The intentional killing of any animals including snakes, insects, lizards, birds or other animals should be strictly prohibited;
- Based on the expected avifaunal species, bird strikes, and electrocutions will be a highly likely, bird flappers must be placed on the transmission line and the towers must be insulated to prevent electrocutions; and

- If any indigenous faunal species are recorded during construction, activities should temporarily cease, and an appropriate specialist should be consulted to identify the correct course of action.

9.3.2.6 CONTINUED REMOVAL AND FRAGMENTATION OF EN VEGETATION COMMUNITIES, CBA: IRREPLACEABLE AND CBA: OPTIMAL HABITATS AND A HIGHEST BIODIVERSITY IMPORTANCE AREA DUE TO THE CREATION OF NEW OPEN CAST PITS

The vegetation communities are classed as EN, CBA and "Highest importance area" though site clearing more of the vegetation communities will be lost. This will also lead to habitat fragmentation and the establishment of alien invasive species as well as soil erosion.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Continued removal and fragmentation of EN vegetation communities	Operation	-21.25	-13.00	-19.50

Proposed Preliminary Mitigation:

- The areas to be mined must be specifically demarcated to prevent movement of workers into sensitive surrounding environments;
- Areas of indigenous vegetation, even secondary communities outside of the direct mining footprint, should under no circumstances be fragmented or disturbed further or used as an area for the dumping of waste;
- All removed soil and material must not be stockpiled within the watercourse and buffer. stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;
- Encouraged indigenous vegetation growth within the disturbed area to assist in erosion control; and
- Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.

9.3.2.7 VEGETATION LOSS DUE TO EROSION AND ENCROACHMENT BY ALIEN INVASIVE PLANT SPECIES

The spread of alien invasive species will result in the loss of habitat and water for indigenous fauna and flora. It can also contribute to the spreading of potentially dangerous diseases due to invasive and pest species. Overall the fauna assemblage will be changed. Erosion will also disrupt the vegetation in the surrounding areas and result in habitat loss.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Flora Direct and Indirect Mortality	Operation	-15.00	-8.25	-10.31

Proposed Preliminary Mitigation:

- The footprint area of the opencast should be kept a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas;
- An extensive alien plant management plan be compiled to remove all alien vegetation from within the project area; The use of herbicide needs to be monitored and only be used by a qualified person;

- Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site;
- Appropriate speed humps and mitre drains must be constructed along the access roads (every three metres of elevation) in order to slow the flow of water run-off from the road surface, if this does not already exist;
- Where possible, existing access routes and walking paths must be made use of, and the development of new routes limited;
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events; and
- A storm water management plan must be compiled and implemented.

9.3.2.8 POTENTIAL LEAKS, DISCHARGES, POLLUTANT FROM MINING ACTIVITIES LEACHING INTO THE SURROUNDING ENVIRONMENT

Acid mine draining leaching into the surrounding area will result in the loss of usable water resources, the loss of fauna and flora species.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Potential leaks, discharges, pollutant from mining activities leaching into the surrounding environment	Operation	-16.00	-9.00	-11.25

Proposed Preliminary Mitigation:

- Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the surrounding environment; and
- The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly.

9.3.2.9 SUBSIDENCE - NEGATIVE IMPACTS ON AVAILABILITY OF SURFACE WATER FOR FAUNA. CATCHMENT MORPHOLOGY AND RESULTANT MODIFICATION TO SURFACE WATER BASEFLOW AND RIVERINE HABITAT

As subsidence will lower the surface area the likelihood that water will drain away faster exist resulting in a loss of surface water for faunal species. With the loss of the water the habitats will also change.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Subsidence effects on availability of surface water	Operation	-18.00	-9.00	-12.38
	Decommissioning	-23.75	-14.00	-21.00

Proposed Preliminary Mitigation:

- Follow the subsidence reports guidelines (Geomech Consulting (Pty) Ltd Report No. GEOM13-2019-003) on which areas can be undermined without a significant subsidence risk; and
- Monitor the surface water level on a monthly basis; ensuring that the water level does not decrease.

9.3.2.10 SUBSIDENCE - DETRIMENTAL EFFECTS TO HABITAT COMPOSITION (INCLUDING WETLANDS) AND FLORAL DISTRIBUTION DUE TO CHANGING GROUNDWATER DYNAMICS.

As subsidence will lower the surface area the likelihood that water will drain away faster exist resulting in a loss of surface water for flora species. With the loss of the water the habitats will also change.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Subsidence effects on ground water	Operation	-16.00	-9.00	-13.50
	Decommissioning	-16.00	-12.00	-16.50

Proposed Preliminary Mitigation:

- Follow the subsidence reports guidelines (Geomech Consulting (Pty) Ltd Report No. GEOM13-2019-003) on which areas can be undermined without a significant subsidence risk; and
- Monitor the surface water level on a monthly basis; ensuring that the water level does not decrease.

9.3.2.11 SUBSIDENCE - PHYSICAL ALTERATION OF SURFACE-LEVEL ENVIRONMENT LEADING TO NEGATIVE IMPACTS ON HABITATS (INCLUDING CBAS) AND ASSOCIATED FAUNA.

Through the change of the surface level the overall layout of the habitat will be altered and depending on the level of subsidence smaller faunal species such as amphibians might be trapped in the subsidence area restricting their access to necessary resources.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Subsidence - physical alteration of surface-level environment	Operation	-16.00	-9.00	-13.50
	Decommissioning	-15.00	-8.25	-10.31

Proposed Preliminary Mitigation:

- Follow the subsidence reports guidelines (Geomech Consulting (Pty) Ltd Report No. GEOM13-2019-003) on which areas can be undermined without a significant subsidence risk; and
- Monitor the surface water level on a monthly basis; ensuring that the water level does not decrease.

9.3.3 PRELIMINARY IMPACTS ON AQUATIC ECOLOGY

The following preliminary impacts on the ecological resources within the study area were identified and assessed for the various project phases (construction, operation, decommissioning and rehabilitation and closure). No impacts on the aquatic receiving environment have been identified that will occur during the Planning and Design phase. The 1: 50 000 river reaches were derived from relevant topographical data and overlaid onto the proposed mining activities to provide a general definition of habitat sensitivity. There will be undermining of the watercourses as well as the opencast mining activities within the proximity of the river reach.

9.3.3.1 IMPACT OF HAUL ROADS ON AQUATIC ECOLOGY

The proposed project will construct haul road infrastructure to gain access to and transport materials throughout the life of the project. Impacts typically associated with haul road infrastructure include altered surface drainage and resultant habitat and water quality impacts to downstream watercourses.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impact of haul roads on aquatic ecology	Construction	-7.50	-5.00	-5.00

Proposed Preliminary Mitigation:

- The project must make use of existing mining infrastructure and access routes;
- Riverine, wetland and drainage line areas associated buffer zones must be avoided and demarcated; and
- General stormwater management practices should be included in the design phase and implemented during the life of the project.

9.3.3.2 IMPACTS FROM OVERBURDEN STRIPPING AND STOCKPILING ON AQUATIC ECOLOGY

The stripping of overburden material will take place within the construction phase. The stripped material will then be deposited on a stockpile until such a time comes that rehabilitation begins. These activities will take place within proximity to watercourses. Thus, impacts related to a change in land use within a delineated catchment can be anticipated within the directly associated watercourses.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Overburden stripping and stockpiling	Construction	-9.75	-6.50	--6.50

Proposed Preliminary Mitigation:

- The project must make use of existing mining infrastructure and access routes;
- Riverine, wetland and drainage line areas associated buffer zones must be avoided and demarcated;
- No mining must occur under rivers, wetland or drainage lines should there be a high risk for subsidence where engineering controls will not suffice to reduce the risk to a suitable rating;
- Appropriate recommendations from the rock engineering study regarding pillar size must be implemented to reduce the overall risk for subsidence, particularly in regions where watercourses are undermined;
- Groundwater models of the mining activities must be completed updated following the completion of the mining activities, this will allow for the identification of areas where mine-water decant may occur;
- Standard surface water management must be in place, this includes clean and dirty water separation; and
- An alien vegetation removal and management plan must be implemented for the from the onset of the opencast mining phase of the project.

9.3.3.3 IMPACTS OF GENERAL MINING ACTIVITIESON AQUATIC ECOLOGY

Open cast activities in proximity to a watercourse expose un-weathered materials which readily leach dissolved substances via seepage and direct runoff. The seepage and runoff emanating from these areas will typically have increased levels of dissolved solids in the form of sulphate and potentially sulphide bound metals such as manganese, lead and copper. Fine particulate matter as mentioned above, increases the concentration of suspended solids in the waterbody which may impact water quality and clarity. These impacts effect the quality of water in the riverine ecosystem and therefore are assessed as water quality impacts in this study.

The undermining of a watercourse (wetland, drainage line or river) usually requires groundwater dewatering to facilitate access. This may lead to surface water drawdown and the subsequent reduction in water volumes of associated surface watercourses. The effects of undermining on surface topography has shown to often result in ground subsidence. Ground subsidence can have an impact on local drainage which typically impacts on surface water volumes and associated habitat quality.

The rehabilitation phase of the proposed project will involve the backfilling and contouring of the open pit. Thus, earthworks will take place during this phase. The disturbance of surface topography can again result in water and habitat quality degradation in associated riverine environments.

The largest anticipated impact for the proposed project post closure will be the decant of groundwater which has been exposed to the carboniferous mine workings and oxygen. This water is anticipated to contain elevated levels of dissolved solids and may potentially be acidic. Information on the status of potential mine water decant would be provided in the groundwater specialist study. In addition, underground mine subsidence will occur during the closure phase, this may alter surface topography and thus negatively affect natural drainage patterns.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impact of general mining activities on aquatic ecology	Operation	-14.00	-7.00	-7.88
	Decommissioning	-13.00	-9.75	-10.97
	Rehabilitation and Closure	-17.00	-12.75	-15.94

Proposed Preliminary Mitigation:

- The project must make use of existing mining infrastructure and access routes;
- Riverine, wetland and drainage line areas associated buffer zones must be avoided and demarcated;
- No mining must occur under rivers, wetland or drainage lines should there be a high risk for subsidence where engineering controls will not suffice to reduce the risk to a suitable rating;
- Appropriate recommendations from the rock engineering study regarding pillar size must be implemented to reduce the overall risk for subsidence, particularly in regions where watercourses are undermined;
- Groundwater models of the mining activities must be completed updated following the completion of the mining activities, this will allow for the identification of areas where mine-water decant may occur
- Should groundwater decant occur, the quality of the water should be determined and the effect upon the surface water determined, and managed accordingly;
- Standard surface water management must be in place, this includes clean and dirty water separation; and
- An alien vegetation removal and management plan must be implemented for the from the onset of the opencast mining phase of the project.

9.3.4 PRELIMINARY IMPACTS ON GEOHYDROLOGY

The following preliminary impacts on the geohydrological resources within the study area were identified and assessed for the various project phases (planning and design, construction, operation, decommissioning, and rehabilitation and closure). No impacts on the geohydrological receiving environment have been identified that will occur during the Planning and Design Phase, Construction Phase and the Decommissioning Phase. Below are the preliminary impacts on geohydrological resources for the operational, and rehabilitation and closure phases identified during scoping, as well as their impact rating according to the methodology described above.

9.3.4.1 IMPACT ON THE GROUNDWATER QUANTITY AND CHANGE IN THE REGIONAL PHREATIC/ PIEZOMETRIC LEVELS DUE TO MINE DEWATERING.

There will be an impact on the groundwater quantity and change in the regional phreatic/ piezometric levels due to mine dewatering.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impacts on groundwater quantity	Operation	-10.00	-8.00	-10.00

Proposed Preliminary Mitigation:

Development and implementation of an integrated groundwater monitoring program to assess regional groundwater levels will serve as early warning mechanism to implement mitigation measures. Lowering of regional piezometric levels is inevitable and cannot be mitigated, however it is recommended that alternative water supply sources or compensation measures should be investigated for nearby users impacted on.

The existing groundwater flow model should be recalibrated with time-series monitoring data in order to be applied as water management tool for scenario predictions.

The applicant shall appoint a suitably qualified and responsible person to give effect to all recommendations as stipulated in specialist reports to ensure compliance to licence conditions pertaining to activities in order to ensure that potential impact(s) are minimised and mitigation measures proposed are functioning effectively

9.3.4.2 IMPACT ON AQUIFER

Depletion in aquifer storage and formation of a depression zone may potentially lead to a reduction in groundwater contribution to baseflow of local drainages and/or groundwater supported wetlands.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Depletion in aquifer storage	Operation	-12.00	-12.00	-15.00

Proposed Preliminary Mitigation:

Development and implementation of an integrated groundwater monitoring program evaluating the regional water quality will serve as early warning mechanism to implement mitigation measures. Effectiveness of alternative barrier systems such as seepage capturing/ scavenger boreholes and/or cut-off trenches down-gradient of waste facilities should be evaluated in order to constrain the migration of contaminants from site. it is recommended that alternative water supply sources or compensation measures should be investigated for nearby users impacted on.

Monitoring should be conducted by suitably qualified and experienced persons according to an approved water monitoring program. Water samples should be analysed by an accredited laboratory. The monitoring network should be refined and updated based on hydrochemical results obtained to ensure optimisation and adequacy of the proposed localities.

Mine heavy vehicles and machinery must be serviced and maintained regularly in order to ensure that oil spillages are limited. Spill trays must be provided if refuelling of construction vehicles is done on site. Further to this spill kits must be readily available in case of accidental spillages.

9.3.4.3 IMPACT ON GROUNDWATER QUALITY

There will be an impact on groundwater quality due to leachate of contaminants from waste facilities. There will also be an impact on groundwater quality due to hydrocarbon contamination caused by mine heavy vehicles and machinery.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impact on groundwater quality due to leachate	Operation	-14.00	-8.25	-10.31
Impact on groundwater quality due to hydrocarbon contamination	Operation	-10.5	-5.00	-6.25

Proposed Preliminary Mitigation:

Development and implementation of an integrated groundwater monitoring program evaluating the regional water quality will serve as early warning mechanism to implement mitigation measures. Effectiveness of alternative barrier systems such as seepage capturing/ scavenger boreholes and/or cut-off trenches down-gradient of waste facilities should be evaluated in order to constrain the migration of contaminants from site. it is recommended that alternative water supply sources or compensation measures should be investigated for nearby users impacted on.

Monitoring should be conducted by suitably qualified and experienced persons according to an approved water monitoring program. Water samples should be analysed by an accredited laboratory. The monitoring network should be refined and updated based on hydrochemical results obtained to ensure optimisation and adequacy of the proposed localities.

Mine heavy vehicles and machinery must be serviced and maintained regularly in order to ensure that oil spillages are limited. Spill trays must be provided if refuelling of construction vehicles is done on site. Further to this spill kits must be readily available in case of accidental spillages.

9.3.4.4 POST-OPERATIONAL WATER LEVEL REBOUND AND FLOODING OF MINE VOIDS

Groundwater levels will naturally rebound post operation and open voids will be flooded.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Water Level Rebound	Rehabilitation and Closure	+9.00	+8.00	+9.00

Proposed Preliminary Mitigation:

None required

9.3.4.5 DECANTING OF POOR QUALITY WATER CAUSED BY LEACHATE (AMD)

There will be decanting of poor water quality caused by leachate of sulphide bearing minerals such as pyrite in the presence of oxygen and water to create an acidic environment (i.e. acid rock drainage).

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Decanting of poor-quality water	Rehabilitation and Closure	-14.00	-8.25	-10.31

Proposed Preliminary Mitigation:

Monitoring of surface water and groundwater in accordance with the implemented monitoring network and protocol should be continued throughout the post operational phase;

Ensure that rehabilitation is properly conducted and in accordance with best practise guidelines as well as the approved mine closure and rehabilitation plan; and

The groundwater capture zone should return back to the pre-mining equilibrium after cessation of mine dewatering and replenishment of groundwater in storage, however the lasting effect and subsequent impact on neighbouring borehole water levels and yields should be monitored with alternative water supply sources or compensation measures available for nearby users if impacted on.

9.3.4.6 SEEPAGE OF POOR QUALITY WATER

There will be seepage of poor-quality water from waste facilities.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Seepage of poor-quality water	Rehabilitation and Closure	-14.00	-7.50	-9.38

Proposed Preliminary Mitigation:

Monitoring of surface water and groundwater in accordance with the implemented monitoring network and protocol should be continued throughout the post operational phase;

Ensure that rehabilitation is properly conducted and in accordance with best practise guidelines as well as the approved mine closure and rehabilitation plan; and

The groundwater capture zone should return back to the pre-mining equilibrium after cessation of mine dewatering and replenishment of groundwater in storage, however the lasting effect and subsequent impact on neighbouring borehole water levels and yields should be monitored with alternative water supply sources or compensation measures available for nearby users if impacted on.

9.3.5 PRELIMINARY IMPACTS ON HYDROLOGY

The following preliminary impacts on the hydrological resources within the study area were identified and assessed for the various project phases (planning and design, construction, operation, decommissioning, and rehabilitation and closure). No impacts on hydrology have been identified that will occur during the Planning and Design Phase.

Below are the preliminary impacts on hydrological resources for the construction, operation, decommissioning, and rehabilitation and closure phases identified during scoping, as well as their impact rating.

9.3.5.1 IMPACTS ON HYDROLOGY DUE TO TOPSOIL STRIPPING

During the construction phase, topsoil from all facility footprints will be stripped and stockpiled for future use. This may result in the following impacts:

Areas that have been stripped of vegetation and topsoil will be prone to erosion. This could lead to increased suspended solids being deposited into the local streams. It is unlikely that impacts will extend beyond the Grootspruit and the Grootspruit tributary.

The topsoil stockpile will be prone to erosion prior to it being vegetated. Natural re-vegetation will likely take more than one season to completely cover the topsoil stockpile. The resultant erosion could lead to increased suspended solids being deposited into the Grootspruit and the Grootspruit tributary.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impact due to topsoil stripping	Construction	-11.25	-8.75	-9.84

Proposed Preliminary Mitigation:

Areas that are stripped should be optimised to limit unnecessary stripping;

Storm water from upslope of the stripped areas should be diverted around these areas to limit the amount of storm water flowing over from these areas;

The timing of the topsoil stripping should be optimised to limit the time between stripping and construction. Where practical constraints exist and areas need to be left stripped for long periods, contour ploughing, or ripping could reduce run-off and hence reduce erosion;

Dry season construction is preferable where practical; and

Hydro seeding of the topsoil stockpile is recommended to speed up vegetation cover. An appropriate seed mix should be designed by a vegetation specialist.

9.3.5.2 SURFACE WATER CONTAMINATION DURING CONSTRUCTION

During the construction phase a significant number of vehicles will be driving around the site. In addition to this, fuels are stored on site and chemicals are used during normal construction activities. This may result in the following impacts:

If the construction vehicles are poorly maintained hydrocarbon spills could cause pollution if washed off roads by storm water;

Vehicle wash bays are a common source of hydrocarbon pollutants;

Leaks from fuel depots could result in surface water pollution;

Spillage and unsafe storage of chemicals could result in surface water contamination; and

The affected areas will be the entire construction site. Spillage impacts will be short-term and will cease after the completion of construction. If soils have become contaminated, this will leach out over a prolonged period.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Surface water contamination	Construction Operation	-6.75	-4.50	-5.06

Proposed Preliminary Mitigation:

All construction vehicles should be well maintained and inspected for hydrocarbon leaks weekly;

Wash bay discharge water should flow through an oil separator;

Fuel depots and refuelling areas should be bunded;

Chemicals should be stored in a central secure area; and

Regular toolbox talks on the responsible handling of chemicals should be undertaken.

9.3.5.3 IMPACT DUE TO CONTAMINATED WATER DISHCARGE

Some of the study area should be considered as dirty areas. These areas include the opencast operations, the hards and RoM stockpiles, and any pollution control dams. Storm water and seepage generated from these dirty

areas will likely be contaminated and have a detrimental effect on the water quality in the local streams, the Grootspruit and the Grootspruit tributary. These impacts will be most acute during the dry season when stream flows are low.

The colliery must undertake to comply with Government Notice 704 of the South African National Water Act (Act 36 of 1998). This act limits discharges of contaminated water from mining related activities to less than once in 50 years on average. Storm water from dirty areas must be routed to a dirty water management system, in accordance with Government Notice 704 of the National Water Act (Act 36 of 1998).

Should a legal discharge occur as a result of extreme rainfall conditions, the Grootspruit and the Grootspruit tributary, and the local streams should have enough capacity to dilute poor quality water. The impacts from extreme rainfall conditions should be low and will last for a short duration.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impacts from contaminated discharge	Operation	-17.50	-5.50	-5.50

Proposed Preliminary Mitigation:

Contaminated shallow seepage and storm water run-off must be collected and routed to a lined pollution control dam. The pollution control dam must be sized in accordance with Government Notice 704 of the South African National Water Act;

The pollution control dam water levels must be constantly monitored. Steps and procedures must be put in place to manage situations where excess water builds up in the pollution control dam;

The pollution control dam must be operated empty as far as practicable and cannot fulfil the same role as a water storage dam, unless specifically designed to fulfil both purposes; and

Water reuse from the pollution control dam must be maximised.

9.3.5.4 IMPACT DUE TO BURST WATER PIPES

Water pipes may transport polluted water between the pollution control dam and other facilities on the proposed colliery. If any of these pipes burst, significant quantities of poor-quality water could be pumped into the environment.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Contamination from burst water pipes	Operation	-10.00	-6.00	-6.75

Proposed Preliminary Mitigation:

It is preferable to run the dirty water pipelines through areas already serviced by dirty water systems where possible; and

Pipelines should be subjected to frequent patrols. An efficient system of reporting should be available to allow the immediate tripping of pumps should a leak be found.

9.3.5.5 IMPACTS DUE TO WASH BAYS AND WORKSHOPS

During the operational phase storm water generated from the proposed mining areas and pollution control dams must be considered as dirty and must be collected in the dirty water system. This water would have contributed to the flow into the Grootspruit and the Grootspruit tributary and in the local wetlands. The impounding of this water will result in a small reduction in the yield of the catchment.

If surface subsidence occurs above the underground workings, this will reduce the yield of the Grootspruit and the Grootspruit tributary and the local wetlands. Run-off from this area would have contributed to the flow in these streams. This water will be intercepted and lost from the surface water system to evaporation and infiltration.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Pollution from vehicle fleet	Operation	--6.75	-4.50	-4.50

Proposed Preliminary Mitigation:

All drains that collect the wash water and storm water must be maintained regularly. These should be free of debris and silt;

All diversion canals, trenches and conduits must be designed to convey run-off from a 50-year design storm; and

The wash bays and workshops must be equipped with oil separators to remove hydrocarbons from wash down water.

9.3.5.6 LOSS OF CATCHMENT YIELD

During the operational phase storm water generated from the proposed mining areas and pollution control dams must be considered as dirty and must be collected in the dirty water system. This water would have contributed to the flow into the Grootspruit and the Grootspruit tributary and in the local wetlands. The impounding of this water will result in a small reduction in the yield of the catchment.

If surface subsidence occurs above the underground workings, this will reduce the yield of the Grootspruit and the Grootspruit tributary and the local wetlands. Run-off from this area would have contributed to the flow in these streams. This water will be intercepted and lost from the surface water system to evaporation and infiltration.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss of catchment yield	Operation	-17.50	-15.50	-20.63

Proposed Preliminary Mitigation:

As is best practice, dirty areas should be minimised. This will have the dual benefit of smaller dirty water management systems and reduction in catchment yield loss; and

The loss of catchment yield due to underground subsidence can be mitigated by preventing subsidence and surface cracking. The mine must commit to adhering to suitable surface subsidence safety factors.

9.3.5.7 THE REMOVAL OF SURFACE INFRASTRUCTURE AND REHABILITATION

During the decommissioning phase, most impacts will be associated with the removal of surface infrastructure, final pit closure and removal and rehabilitation of the RoM stockpiles and the hards dump. Haul roads will be removed, as will berms and diversion trenches.

During this process, short-term impacts will be moderate, as heavy earthmoving machinery will disturb large areas. Previously vegetated areas may be disturbed which will increase erosion potential. These short-term impacts will give way to long-term benefits.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impacts of removal of surface infrastructure on surface water	Decommissioning	-12.50	-10.00	-11.25

Proposed Preliminary Mitigation:

Apart from due diligence care while performing decommissioning tasks, no mitigation is necessary. Due diligence care includes the following:

Plant should be well maintained to ensure that hydrocarbon spills are minimised;

Existing roads should be used where possible; and

New disturbed areas should be minimised.

9.3.5.8 PIT DECANT

The groundwater study has indicated that decant may occur from the mine workings. After the colliery is closed, contaminated water management becomes passive. Groundwater inflows and recharge through the rehabilitated spoils may create decant from the opencast and underground workings. This decant will be driven by rainfall recharge through the rehabilitated surface and groundwater inflows. The decant water quality is likely to be poor and will contaminate the Grootspruit and the Grootspruit tributary. Decant flows will likely be seasonal and volumes will be dependent on the quality of rehabilitation done and the degree of surface subsidence. Poor rehabilitation will increase the decant volumes. The water quality is likely to remain poor in the long term (>20 years). Eventually as pollutants are leached out of the workings and natural stratification occurs, the seepage water quality will improve.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Hydrological impacts due to removal of surface infrastructure	Closure and rehabilitation	-20.00	+11.25	+11,25

Proposed Preliminary Mitigation:

The rehabilitation work should strive to minimise recharge and maximise run-off;

A final void could be optimised to evaporate excess pit water if approved by the Department of Water Affairs;

Where feasible, materials likely to produce the highest amounts of pollution should be replaced in sections of the pit where they will be permanently flooded, thus preventing oxidation of these materials;

Should passive mitigation measures not be suitable, active alternatives can be considered such as some form of treatment, prior to release;

The planned mining method and the commitment to adhering to appropriate safety factors must be made by the mine to prevent surface subsidence;

Methods to stop or reduce decant volumes could include sealing some areas of the mine workings or leaving some areas unmined to act as a barrier to decant; and

Methods to improve the decant water quality could include flooding of the mining areas, where practical, to reduce oxygen ingress. Routing seepage through lime pits can also improve the water quality if the flows are low enough.

9.3.6 PRELIMINARY IMPACTS ON SOILS

Preliminary impacts on the soils within the study area were identified and assessed for the various project phases (planning and design, construction, operation, decommissioning, and rehabilitation and closure).

The major potential impact that would occur as a result of coal mining and related activities would be the loss of potentially productive agricultural land, along with a reduction in land capability. Where storage facilities are established, this impact is virtually permanent, while for other disturbed areas, spoil and topsoil can be replaced and rehabilitated to a certain degree, although a reduction in agricultural potential usually occurs. Successful rehabilitation will depend on how well the mine personnel follow the prescribed guidelines in terms of correct

stripping practice (depth and mapping units), optimum stockpiling (height and duration) and proper rehabilitation (physical manipulation and fertilization).

Below are the preliminary impacts on soils and geology features during the construction, operation, decommissioning rehabilitation and closure phases, as well as the impact rating.

9.3.6.1 REDUCTION IN AGRICULTURAL POTENTIAL AND LOSS OF FERTILITY

Reduction in natural soil fertility may be caused by removal, storage (stockpiling) and replacement of the soil profile. Aspects such as acidification, loss of nutrients and organic matter could apply. Such an impact will probably become greater, the longer such conditions apply however active rehabilitation would mitigate this situation to a degree.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss of fertility (open cast)	Planning and Design	-2.50	-2.50	-3.13
	Construction	-14.00	-13.00	-17.88
	Operation	-16.00	-15.00	-20.63
	Decommissioning	-7.50	-6.75	-9.28
	Closure and Rehabilitation	-4.00	-4.00	-5.00
Loss of fertility (underground)	Planning and Design	-2.50	-2.50	-3.13
	Construction	-2.50	-2.50	-8.25
	Operation	-7.50	-7.50	-10.31
	Decommissioning	-6.00	-6.00	-8.25
	Closure and Rehabilitation	-4.00	-4.00	-5.00

Proposed Preliminary Mitigation:

If any erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place;

If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion;

Only the designated access routes are to be used to reduce any unnecessary compaction;

Compacted areas are to be ripped to loosen the soil structure;

The topsoil should be stripped by means of an excavator bucket, and loaded onto dump trucks;

Topsoil stockpiles are to be kept to a maximum height of 4 m;

Topsoil is to be stripped when the soil is dry, as to reduce compaction;

The subsoil approximately 0.3 – 0.8 m thick will then be stripped and stockpiled separately;

The handling of the stripped topsoil will be minimised to ensure the soil's structure does not deteriorate significantly;

Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles;

The stockpiles will be vegetated in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.

Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks;

If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities;

All vehicles are to be serviced in a correctly bunded area or at an off-site location;

Subsidence monitoring must occur quarterly with any signs of subsidence reported;

Leaking vehicles will have drip trays place under them where the leak is occurring;

Pipelines must be maintained; and

If there are leaks the pipelines must be repaired immediately.

9.3.7 PRELIMINARY IMPACTS ON HYDROPEDOLOGY

Various areas within the mining right areas have been determined to have "Moderate" and "High" subsidence risks, which indicates the potential for the loss of interflow. One main hydropedological impact has been identified for the proposed activities, namely "loss of hydropedological flow paths. Below are the preliminary impacts on hydropedology during the planning and design, construction, operation, decommissioning rehabilitation and closure phases, as well as the impact rating.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss of flow paths (open cast)	Planning and Design	-2.50	-2.50	-3.13
	Construction	-16.00	-16.00	-22.00
	Operation	-16.00	-15.00	-20.63
	Decommissioning	-7.50	-6.75	-9.28
	Closure and Rehabilitation	-4.00	-4.00	-5.00
Loss of flow paths (underground)	Planning and Design	-2.50	-2.50	-3.13
	Construction	-2.50	-2.50	-8.25
	Operation	-7.50	-7.50	-10.31
	Decommissioning	-6.00	-6.00	-8.25
	Closure and Rehabilitation	-4.00	-4.00	-5.00

Proposed Preliminary Mitigation:

The EIA report will quantify expected loss of interflow, which can be rectified by means of irrigating water from opencast pits and underground mines back into wetland areas.

9.3.8 PRELIMINARY IMPACTS ON WETLANDS

A number of different wetland types and HGM units potentially are located within the project area. None of these wetlands appear to be in a largely natural state, which is likely a result of the local land uses, and predominantly the mining of the area. The identification and delineation of these wetland areas will be further assessed during the EIA studies, and the ecological significance of these systems established.

The proposed mining alternatives may result in the loss of some of these wetland systems, with indirect impacts resulting in a loss or degradation of ecological services and the overall integrity of these wetland systems. The proposed opencast mining area is located within close proximity to a local wetland system and there is likely to be a recommendation to implement a buffer area to be adhered to. Below are the preliminary impacts on wetlands during the planning and design, construction, operation, decommissioning rehabilitation and closure phases, as well as the impact rating.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss / degradation of wetlands (open cast)	Planning and Design	-2.50	-2.50	-3.13
	Construction	-14.00	-9.00	-12.38
	Operation	-16.00	-10.50	-14.44
	Decommissioning	-11.00	-9.00	-12.38
	Closure and Rehabilitation	-2.50	-2.50	-3.13
Loss / degradation of wetlands (underground)	Planning and Design	-2.50	-2.50	-3.13
	Construction	-8.25	-7.50	-10.31
	Operation	-9.75	-9.00	-12.38
	Decommissioning	-6.00	-6.00	-8.25
	Closure and Rehabilitation	-2.50	-2.50	-3.13

Proposed Preliminary Mitigation:

Make use of existing mining infrastructure and access routes as far as possible;

Wetland areas and associated buffer zones must be avoided;

Areas with a high-risk subsidence risk which underlay wetlands may only be considered for bord and pillar mining methods;

Areas where high risk for subsidence may occur must be avoided or mitigated through effective engineering controls;

Undermined wetland areas must not be mined using the high extraction method;

Appropriate recommendations from the rock engineering study regarding pillar size. must be implemented to reduce the overall risk for subsidence, particularly in regions where wetlands and watercourses are undermined;

Groundwater models of the mining activities must be updated following the completion of the mining activities;

Following the completion of the mining activities, groundwater studies must re-determine whether mine water decant will occur and the quality of the potential decants;

Should groundwater decant occur, the quality of the water should be determined and the effect upon the surface water determined, and managed accordingly;

Vehicles are to be serviced at a suitable workshop and re-fuelled at designated filling areas with appropriate pollution control facilities;

An alien vegetation removal and management plan must be implemented for the from the onset of the opencast mining phase of the project;

General stormwater management practices should be included in the design phase and implemented during the life of the project; and

An inspection of the rehabilitated areas should be completed within one month of completing this phase.

9.3.9 PRELIMINARY IMPACTS ON AIR QUALITY

Although there are a number of ambient air pollutants in the vicinity of the proposed Elandsfontein Colliery, the pollutants of concern due to the mining activities will consist primarily of particulate matter. The proposed operations at Elandsfontein Colliery will comprise underground and opencast mining operations, road transportation and materials handling. During the construction phase, two areas will be affected namely:

The north of the opencast reserve of Block H where a new box-cut will be opened with cuts developed in a southerly direction, and

Resource Block D and E where a new decline will be developed to access the No.1 Seam. It is understood that the existing infrastructure will be used to access the other underground Resource Blocks and the new opencast areas.

Both the box-cut and decline shaft construction will result in impacts from vehicle tailpipe emissions due to the transport and general construction activities but these impacts are likely to be localised. Depending on the type and extend of the construction activities, especially for opencast operations in the eastern part of the mine, the PM10 and PM2.5 may reach the western part of Clewer. Fortunately, the prevailing wind is from the east and the north and should result mostly in impacts away from Clewer. Gaseous emissions, especially NO_2, CO and SO_2 could be a concern at both the box-cut operations and the decline shaft.

Clearing of vegetation and topsoil and levelling of transportation route areas can result in significant levels of particulate matter if not mitigated. There are no AQSR within 1 km from the haul roads, but Clewer is close to the main access route and could be impacted on by additional traffic as part of construction.

Opencast mining activities would have significantly higher air quality impacts than underground operations. This is primarily due to excavation, material handling and vehicle entrainment on roads (haulage of RoM coal, waste and topsoil). The main pollutant of concern is particulate matter, specifically PM10 and PM2.5 due to the potential for health impacts. Dustfall is likely to be high close to the active mining areas. The AQSR most likely to be affected by the opencast operations are the residents of Clever to the east of the mine and to the northeast of the planned open pit. Various controls could be applied to opencast mining, with control efficiencies (CE) ranging from 50% due to water suppression to 99% control by using fabric filters on drills (NPI, 2012).

Underground mining activities would mainly result in gaseous and particulate emissions from the ventilation shaft and the tipping of RoM from the conveyor onto the RoM stockpile. Vehicle entrained dust from road surfaces, windblown dust from trucks and gaseous emissions from truck exhaust (PM, SO_2; NO_x; CO; CO_2) are most likely to impact the AQSR near the haul roads. Controls on the haul roads could range between watering (50% CE) to 100% for sealed or salt-crusted roads (NPI, 2012).

The CHPP is an existing plant but the production would increase from the current 500 000 tpa to 1,365,000 tpa (based on 300 tph, 6500 hrs/yr and 70% efficiency). This would result in increased emissions especially from the crushing and screening circuit.

From an air quality perspective, the only sources of pollution during the closure phase would be vehicles as part of the rehabilitation process and windblown dust from exposed surfaces. The impacts would be significantly lower that during the operational phase and even the construction phase. Below are the preliminary impacts on air quality during the construction, operation, decommissioning rehabilitation and closure phases, as well as the impact rating. No air quality impacts were identified for the planning and design phase.

9.3.9.1 GASEOUS AND PARTICULATE EMISSIONS (INCLUDING DUST)

Mining activities have a high potential to cause dust in the immediate and surrounding areas if not adequately managed.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Emissions and dust	Construction	-7.50	-6.75	-9.28
	Operation	-15.00	-9.75	-14.63
	Decommissioning	-6.75	-6.00	-8.25
	Closure	-4.50	-4.50	-5.63

Proposed Preliminary Mitigation:

Various controls could be applied to opencast mining, with control efficiencies (CE) ranging from 50% due to water suppression to 99% control by using fabric filters on drills. Controls on the haul roads could range between watering (50% CE) to 100% CE for sealed or salt-crusted roads. Mitigation measures on crushing and screening range between 30% for windbreaks to 100% by enclosing the crusher and screen.

9.3.10 PRELIMINARY VIBRATION AND BLASTING IMPACTS

The potential impacts investigated due to blasting operations are ground vibration, air blast and fly rock. There are no densely populated areas within close proximity to the proposed mining areas and as such, this impact is considered to be adequately managed through the mines current blasting controls. Below are the preliminary blasting impacts during the operational phase, as well as the impact rating. No impacts were identified for the planning and design, construction, decommissioning and closure and rehabilitation phases.

9.3.10.1 BLASTING AND VIBRATION IMPACTS

The potential impacts considered can be described as follows:

- Ground vibration: Levels greater than recommended limits may be damaging to structures. Different structures will also have different permitted levels. Ground vibration may cause damage if levels exceed the structures safe limit. People may also experience ground vibration as perceptible at very low levels and normally react negatively to the experience of ground vibration.
- Air blast: In most cases the effect of air blast is underestimated. High levels of air blast could cause damage and normally windows are first to be damaged. Levels lower than required to induce damage may rattle windows and large roof surfaces. These effects are generally mistaken as ground vibration effect and leads to complaints. Rattling of doors and roofs causes concern and leads to people being upset.
- Fly Rock: Fly rock can be mitigated but possibility never eliminated. However, it can be managed properly with relative ease. Control of fly rock will also control the effects of air blast. Fly rock is a greater concern when an open pit is near houses or structures or installations. Wild fly rock could cause damage to structures and installations but also be lethal to people and animals.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Fly rock, air blast and ground vibration impacts	Operation	-14.00	-9.00	-11.25

Proposed Preliminary Mitigation:

Mitigation will be based on what is considered safe blasting criteria with regards to structures and what is considered as an acceptable level with regards to human perception. Compliance with the relevant legislation as well as the current mine blasting procedure must be adhered to.

9.3.11 PRELIMINARY VISUAL IMPACTS

Visual impacts would result from the construction, operation and decommissioning phase of the Elandsfontein project. Specifically, impacts would result from the overburden stockpiles and the mining activities being seen from sensitive viewpoints. People working within the mine would be regarded as having a lower sensitivity as they would be focused on their work activities. Permanent views would be those from the farmsteads and residences within the area as well as from the nearby communities. The application is an extension of an existing operational mine and furthermore there are also several coal mines in the area. The area is therefore already compromised visually and aesthetically. Based on this, a visual impact assessment is not considered necessary for the EIA phase.

9.3.11.1 VISUAL IMPACTS

Mining has known visual impacts such as the stockpiles, activities, etc. Elandsfontein Colliery is located in a mining rich area and as such, the general landscape is scattered with mines.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Visual impact and impact on sense of place	Construction Operation	-11.00	-5.00	-5.00

Proposed Preliminary Mitigation:

Construction areas must be kept clean and tidy and adequate dust suppression must be undertaken. Stockpiles should be constructed in designated areas to limit the number of stockpiles required at any one time.

9.3.12 PRELIMINARY SOCIO-ECONOMIC IMPACTS

The following preliminary impacts on the socio-economic environment within the study area were identified and assessed for the various project phases (planning and design, construction, operation, decommissioning, and rehabilitation and closure). No impacts on socio-economics have been identified that will occur during the Planning and Design Phase and the Rehabilitation and Closure Phase.

Below are the construction and operational phase preliminary impacts on socio-economic environment identified during scoping, as well as their impact rating.

9.3.12.1 REDUCTION IN QUANTITY OF WATER (I.E. WATER CONSUMPTION)

The utilisation of groundwater for any purpose may result in the alteration/ reduction of groundwater levels on site thereby affecting local users.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Reduction in quantity of water (i.e. water consumption)	Construction Operation Closure	-13.00	-5.00	-6.67

Proposed preliminary Mitigation:

Pre-construction water levels should be recorded for the water sources and should be monitored regularly to ascertain if the water levels are dropping drastically. Should a negative impact be recorded on a water users water availability, this should be compensated proportionally.

9.3.12.2 INTERFERENCE WITH EXISTING LAND USES

Existing land uses would be affected during construction and operation as land affected by the development footprint can no longer be used for other purposes.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Interference with Existing Land Uses	Construction Operation	-14.00	-5.50	-7.33

Proposed Preliminary Mitigation:

Where relevant, directly affected landowners must be engaged and agreements must be reached on compensation for any loss of use of the land. There must be a formal procedure in place on how to report incidents to ensure records of all grievances are kept, and responses are given within a certain time. As far as possible interference with existing land uses/livelihoods of those surrounding the mining area should be avoided. If any interference takes place, the landowner should be compensated for their losses following suitable investigations.

9.3.12.3 NUISANCE AND IMPACT ON SENSE OF PLACE (I.E. NOISE, DUST, ETC.)

The proposed mine extension project will impact on the established sense of place of a particular property. Additional vehicles, increased noise and dust, the removal of vegetation, and presence of workers will all contribute to the alteration of the sense of place as well as creating a possible nuisance.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Nuisance and Impact on Sense of Place (i.e. noise, dust, etc.).	Construction Operation	-12.00	-5.00	-5.83

Proposed Preliminary Mitigation:

Adequate dust suppression measures should be utilized to minimize dust production. There must be a formal procedure in place on how to report incidents to ensure records of all grievances are kept, and responses are given within a certain time.

Sense of place is defined as an individual's personal relationship with their local environment, both social and natural, which the individual experiences in their daily life. It is therefore difficult to mitigate the impact as it is experienced on a personal level.

9.3.12.4 SAFETY AND SECURITY (I.E. ACCESS TO PROPERTIES, THEFT, FIRE HAZARDS, SPONTANEOUS COMBUSTION OF COAL STOCKPILES ETC.)

Future mining activities may result in a risk to the safety and security of landowners, lawful occupiers, and community members in close proximity to the mining areas due to the increase in number of unfamiliar people in the area. Furthermore, any spontaneous combustion of carbonaceous material could cause fires if not adequately controlled.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Safety and security (i.e. access to properties, theft, fire hazards, etc.).	Construction Operation Decommissioning	-10.50	-5.50	-5.50

Proposed Preliminary Mitigation:

All mining contractors and employees should wear appropriate identification. Vehicles should be clearly marked for ease of identification. Entry and exit points at the mine should also be controlled. Coal stockpiles should be kept for limited time on site and adequate control of any combustion of coal stockpiles must immediately be initiated.

9.3.12.5 DAMAGE/ DISRUPTION OF SERVICES (I.E. WATER, ELECTRICITY, SEWAGE, ETC.)

Mining operations have the potential to disrupt or damage services such as water supply, electricity supply or sewage collection pipes if not situated correctly within the study area.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Damage / disruption of services (i.e. water, electricity, sewage, etc.).	Construction Operation	-13.00	-5.00	-5.83

Proposed Preliminary Mitigation:

Before the project commences, an asset and services baseline of services that may be affected must be compiled. A copy of the baseline records should be given to each landowner/service provider, and a master document kept by the applicant. If any damage occurs it should be reinstated to its pre-project status on conclusion of investigations into the cause. Furthermore, compliance with the Eskom requirements must be adhered to for any activities within close proximity to the Eskom transmission powerlines.

9.3.12.6 IMPACT ON EXISTING INFRASTRUCTURE (I.E. ROADS, FENCES, ETC.)

Activities may impact on existing infrastructure such as increased traffic on the adjacent road network, damage to fences and other local infrastructure.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impact on existing infrastructure (i.e. roads, fences, etc.)	Construction Operation Decommissioning	-13.00	-5.00	-5.83

Proposed preliminary Mitigation:

An asset and infrastructure baseline of any new public and/or private infrastructure that may be affected by mining activities must be compiled. A copy of the baseline records should be given to the relevant landowner/s or service providers, and a master document kept by the applicant. If any damage occurs it should be reinstated to its pre-project status on conclusion of investigations into the cause.

9.3.12.7 PERCEPTIONS AND EXPECTATIONS

The proposed mine extension is likely to create great interest, particularly with regards to the potential for employment, perceived safety and security risks, and the exact nature of the proposed project. It must be born in mind that the mine is already in operation and the proposed extension of the life of mine will largely only result in ongoing employment, etc. The scale of the mining operation is not anticipated to be ramped up to such a degree that the current impacts would be greatly exacerbated.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Perceptions and Expectations	Construction Operation	-12.00	-6.75	-6.75

Proposed Preliminary Mitigation:

Perceptions and expectations must be managed through ongoing, open and transparent communication with affected stakeholders, communities, landowners and occupiers.

9.3.12.8 EMPLOYMENT OPPORTUNITIES

Minor employment opportunities for some unskilled, skilled labour as well as providing services during construction (e.g. accommodation, transportation, etc.) may arise from this project. It is important to note that the project is an extension of the existing mining operations to extend the life of mine and therefore new job opportunities may be limited.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Employment Opportunities	Construction Operation Decommissioning	2.25	6.00	6.00

Proposed Preliminary Mitigation:

Recruitment for any additional labour or services should be focused in the local area and preference given to the local communities if possible.

9.3.12.9 COAL SUPPLY FOR ENERGY SECURITY

The continued supply of coal to Eskom will aid in energy security for the country.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Coal supply	Operation	15.00	15.00	15.00

Proposed Preliminary Mitigation:

No mitigation required.

10. CLOSURE OBJECTIVES

The goals and objectives for closure are determined based on the baseline environment and the land uses that will be established post mining. The initial overarching closure objectives include the following:

- To return land, mined by opencast methods, to a minimum level of natural grazing land;
- Reshape the land disturbed by mining so that it is stable, adequately drained and suitable for the desired long-term end land use (ELU);
- To ensure that as little water as possible seeps out of the various sections of the mine and where this is unavoidable, to ensure that the water is contained, if the volume is significant and if it does not meet the statutory water quality requirements;
- To clean up all coal stockpiles, loading areas and spillages within the opencast areas and to rehabilitate these so as to meet the ELU Objectives. The cleared coal, if not saleable, will be placed in the pit during ongoing rehabilitation or on a discard dump;
- Make all areas safe for both humans and animals;
- Make all areas stable and sustainable;
- Any residue deposits must be stable in the long term to prevent erosion, subsidence or collapse. These facilities must also be closed in such a way that they do not continue to contribute to long term water quality problems from leachates which spread in an uncontrolled fashion;
- Remove the entire infrastructure other than the residue deposits/discard dumps and other waste disposal facilities unless alternative users can be found;
- Dispose of all rubble and waste at approved sites;
- Rehabilitate areas as soon as possible (continual rehabilitation during rollover mining);
- Return rehabilitated land to the pre-mining environment where possible;
- Minimise the impact on the local and surrounding communities;
- To ensure that the areas mined by underground methods do not subside and that it will be safe to conduct normal activities above these workings by using appropriate safety factors and mine design; and
- To close off all entries to the underground workings so that the water table will be restored thereby preventing the ingress of air and preventing spontaneous combustion of the pillars. Any access to the working will also be restricted in accordance with the MPRDA.

The above closure objectives will be revised during the EIA phase with specialist and public input.

11. PLAN OF STUDY FOR THE IMPACT ASSESSMENT

The section below outlines the proposed plan of study which will be conducted for the various environmental aspects during the EIA Phase. It is also important to note that the plan of study will also be guided by comment obtained from I&AP's and other stakeholders during the PPP.

11.1 DESCRIPTION OF ALTERNATIVES TO BE CONSIDERED

The alternatives considered and discussed in Section 6, including land use, location, and mining alternatives have culminated into the identification of potentially feasible development alternatives. The feasible development alternatives are discussed below.

11.1.1 PROCESS ALTERNATIVES

The following process alternatives will be taken forward for consideration in the EIA phase:

- For the disposal of carboniferous wastes (wash plant waste rock and possibly filter cake), the option of disposal of beneficiation plant waste rocks and filter cake to pit (P1d) and disposal to a surface waste disposal facility located on a rehabilitated mine area (P1a) are deemed feasible and these disposal options will be considered as alternatives in the EIA phase.
- For water supply for dust suppression, this water will either need to be obtained from dirty water containment facilities (Alternative P2a) or surface water resources (Alternative P2b). Both options will be assessed in the EIA phase.

11.1.2 TECHNOLOGY ALTERNATIVES

The following technology alternatives will be taken forward for consideration in the EIA phase:

- Regarding the various transport options considered, the continued use of rail (Alternative T2b) appears to be the preferred option as the infrastructure already exists and is use. It is suited for the mines current and future clients. Both the road(T2a) and conveyor (T2c) options will therefore be excluded from the EIA phase.

11.1.3 ACTIVITY ALTERNATIVES

Both the mining option (Alternative A1) and the no-go option (Alternative A2) will be assessed in the EIA phase.

11.1.4 LOCATION/LAYOUT/DESIGN ALTERNATIVES

The following location, layout or design alternatives will be taken forward for consideration in the EIA phase:

- Both location alternatives will be addressed in the EIA phase. This includes maximum mining over entire area (Alternative S1a) and the sensitivity-based approach to avoid or buffer sensitive areas if high sensitivity areas are identified (Alternative S1b). The most appropriate development alternative at this stage is likely to be the sensitivity-based approach although the maximum-mining approach may be viable if specialist studies confirm limited sensitivities on the ground during the EIA phase. This development alternative is also likely to have further implications in terms of mine design and the economic viability of the proposed project, all of which will be evaluated in the EIA investigation to be undertaken. Furthermore, it is important to note that the EIA to be undertaken will also involve the quantitative assessment of all development alternatives which were not included in this scoping report, indicating the impacts of each and then selecting the most appropriate development alternative going forward.

11.2 DESCRIPTION OF THE ASPECTS TO BE ASSESSED AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The following aspects will be assessed further during the EIA phase investigation to be undertaken:

- Air Quality;
- Blasting;
- Cultural and Heritage Resources;
- Geohydrology;
- Hydropedology;
- Soils;
- Surface Water;
- Terrestrial and Aquatic Ecology;
- Wetlands;
- Traffic Study;
- Closure and rehabilitation (including updated financial provisions); and
- Waste Classification.

The following aspect will be disregarded at scoping

- Social impacts;
- Noise impacts; and
- Visual impacts.

11.3 ASPECTS TO BE ASSESSED BY SPECIALISTS

Table 23 below details the various aspects of the project to be addressed in the EIA through detailed specialist studies. The table also includes a proposed Scope of Work (SoW) / Terms of Reference (ToR) for each of the EIA specialist studies.

Table 23: Details of specialists input during the EIA Phase

Aspect	Component	Company Responsible	Consultant	Scope of Work / Terms of Reference
Hydrology	Hydrological impact assessment (surface water) Development of Storm Water Management Plan Update water balance in line with future mining areas	BEAL Consulting Engineering and Project Management	Bruce Randell	The impact assessment documented in this report is a scoping level impact assessment that is based on assumptions and high-level information that is available. During the EIA phase of the project, these assumptions will be verified and refined and more detailed information will be used to increase the confidence in the impact assessment to a level suitable for an EIA. The following plan of study is proposed to achieve this level of impact assessment: o Additional fieldwork will be conducted to verify unknowns and assumed input data. o Additional water quality and flow data will be sourced and reviewed to more accurately reflect activities that could have impacts on the surface water environment. o Any revisions in infrastructure layout will be incorporated into the impact assessment. o The impact scoring will be updated to reflect the increased confidence in the impact assessment. o Updated water and salt balance. o Stormwater management plan will be compiled.
Hydropedology	Hydropedological survey	The Biodiversity Company	Andrew Husted	The following methodology is proposed: o Identification of representative hillslopes from satellite imagery, terrain analysis and legacy soil data. o Hydropedological survey of representative hillslopes on the site according to the methodology of van Tol et al., 2017. o Conceptualisation of hydrological behaviour of representative hillslopes based on interpretations of soil morphological properties and their spatial distribution (dominant drivers and responses). o Determination of the impacts of the underground mining activities. o Undisturbed Sampling o Undisturbed samples will be collected for each of the diagnostic horizons. o These samples will be sent to a relevant laboratory to determine the particle size distribution, saturated hydraulic conductivity (Ks), bulk density, and water retention characteristics. o In-Situ Ks Tests • In-situ Ks will be tested by means of a single ring infiltrometer within the excavated pits.

				• A single ring infiltrometer consists of a metal sheet driven into a soil profile which is used as a constant head test. ○ Modelling • Various modelling methods will be used to quantify and assess various sub-surface flow paths. • The type of software used will depend on the nature of soil properties, the size of the catchment and the nature of the hillslope hydrology.
Ground Water	Hydrogeological study including geochemical assessment, groundwater models and waste classification	Gradient Consulting (Hydrogeology) and WSP (Waste Classification)	Ferdinand Mostert	The following recommendations are proposed following this investigation: ○ It is recommended that this hydrogeological baseline assessment report be reviewed and distributed as part of the public participation and scoping phases. Relevant input and/or comments received from I&AP's should be addressed as part of the EIA phase to follow. ○ It is suggested that all hydrocensus and monitoring localities be revisited in order to gather wet-season data and information for comparison and time series trend analysis. ○ A spatial distribution of mine discard dumps, overburden as well as waste material samples should be analysed to determine the risk for acid rock drainage potential as well as a source term for the mass transport model. ○ A numerical groundwater flow model should be developed based on the hydrogeological conceptual model defined from site characterisation data and information gathered. The groundwater flow model should be calibrated with applicable groundwater data to an acceptable level. The latter should be used to simulate estimated mine inflow and dewatering volumes, groundwater capture zones and water level drawdown, contamination plume migration curves. Accordingly, the model output should be used to qualify and quantify preliminary groundwater impacts as stated in this report.
Terrestrial Ecology	Biodiversity, Wetland, Aquatic Ecology and Pedological Study	The Biodiversity Company	Andrew Husted	The following methodology is proposed: 1. Floristic Analysis The fieldwork and sample sites will be placed within targeted areas (i.e. target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which included the latest applicable biodiversity datasets) available prior to the fieldwork. The focus of the fieldwork will therefore be to maximise coverage and navigate to each target site in the field in order to perform a rapid vegetation and ecological assessment at each sample site. Emphasis will be placed on sensitive habitats, especially those overlapping with proposed infrastructure development areas. Homogenous vegetation units will be subjectively identified using satellite imagery and existing land cover maps. The floristic diversity and search for flora SCC will be conducted through timed meanders within representative habitat units delineated. Emphasis will be placed mostly on sensitive habitats overlapping with the proposed infrastructure areas. The timed random meander method is a highly efficient method for conducting floristic analysis, specifically in detecting flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling flora species lists and therefore gives a rapid indication of flora diversity. The timed meander search was performed based on the

				original technique described by Goff et al. (1982). Suitable habitat for SCC will be identified according to Raimondo et al. (2009) and targeted as part of the timed meanders. At each sample site notes will be made regarding current impacts (e.g. livestock grazing, erosion etc.), subjective recording of dominant vegetation species and any sensitive features (e.g. wetlands, outcrops etc.). In addition, opportunistic observations will be made while navigating through the project area. Effort will be made to cover all the different habitat types within the limits of time and access. 1. Faunal Assessment (Mammals & Avifauna) The field survey component of the study utilised a variety of sampling techniques including, but not limited to, the following: o Camera trapping; o Visual observations; o Small mammal trapping; o Identification of tracks and signs; and o Utilization of local knowledge. Site selection for trapping will focus on the representative habitats within the project area. Sites will be selected on the basis of GIS mapping and Google Earth imagery and then final selection will be confirmed through ground truthing during the surveys. Habitat types that will be sampled include pristine, disturbed and semi-disturbed zones, drainage lines, wetlands and rocky ridges. 2. Herpetology (Reptiles & Amphibians) A herpetofauna assessment of the project area will be conducted, including in-depth, site-specific research and focused searching. Ideally, surveys for herpetofauna will be conducted at those times when the target species or communities are known to be active because these periods of activity are more likely to lead to capture success (for most species). In South Africa this is during the summer months and ideally after or during periods when rainfall is most likely or has recently occurred. Surveys will be conducted in each habitat or vegetation type within the project area, as identified from the desktop study, with a focus on those areas which will be most impacted by the proposed development (i.e. the infrastructure development and waste dumping areas). The herpetological field survey will comprise of the following techniques: o Diurnal hand searches - are used for reptile species that shelter in or under particular microhabitats (typically rocks, exfoliating rock outcrops, fallen timber, leaf litter, bark etc.); o Visual searches - typically undertaken for species whose behaviour involves surface activity or for species that are difficult to detect by hand-searches or pitfall trapping. may include walking transects or using binoculars to view species from a distance without them being disturbed;

				○ Amphibians – many of the survey techniques listed above will be able to detect species of amphibians. Over and above these techniques, vocalisation sampling techniques are often the best to detect the presence of amphibians as each species has a distinct call; and ○ Opportunistic sampling - Reptiles, especially snakes, are incredibly illusive and difficult to observe. Consequently, all possible opportunities to observe reptiles are taken, in order to augment the standard sampling procedures described above. This will include talking to local people and staff at the site and reviewing photographs of reptiles and amphibians that the other biodiversity specialists may come across while on site.
Aquatic Ecology	Biodiversity, Wetland, Aquatic Ecology and Pedological Study	The Biodiversity Company	Andrew Husted	A single survey is proposed for this study. Standard methods utilised in the River Ecosystem Monitoring Programme (REMP) will be used to establish the baseline PES of the considered river reaches. Details pertaining to the specific methodologies applied are provided in the relevant sections below. To enable the replication of the methods applied in this study a specific spatial PES framework is applicable. 1. Water Quality Water quality will be measured in situ using a calibrated handheld ExStik II meter. The following constituents will be ere measured: pH, conductivity (µS/cm), temperature (°C) and dissolved oxygen (DO) in mg/l. 2. Aquatic Habitat Integrity and Riparian Assessment The Intermediate Habitat Assessment Index (IHIA) as described in the Procedure for Rapid Determination of Resource Directed Measures for River Ecosystems (Section D), 1999 will be used to define the ecological status of the river reach. The IHIA model will be used to assess the integrity of the habitats from a riparian and in-stream perspective. The habitat integrity of a river refers to the maintenance of a balanced composition of physico-chemical and habitat characteristics on a temporal and spatial scale which are comparable to the characteristics of natural habitats of the region (Kleynhans, 1996).This model compares current conditions with reference conditions that are expected to have been present. Specification of the reference condition follows an impact-based approach where the intensity and extent of anthropogenic changes are used to interpret the impact on the habitat integrity of the system. To accomplish this, information on abiotic changes that can potentially influence river habitat integrity are obtained from surveys or available data sources. These changes are all related and interpreted in terms of modification of the drivers of the system, namely hydrology, geomorphology and physico-chemical conditions and how these changes would impact on the natural riverine habitats. The riparian delineation will be completed according to DWAF (2005). Indicators such as topography and vegetation were the primary indicators used to define the riparian zone. Contour data obtained from topography spatial data was also utilised to support the infield assessment. 3. Aquatic Macroinvertebrate Assessment

				Macroinvertebrate assemblages are good indicators of localised conditions because many benthic macroinvertebrates have limited migration patterns or a sessile mode of life. They are particularly well-suited for assessing site-specific impacts (upstream and downstream studies) (Barbour et al., 1999). Benthic macroinvertebrate assemblages are made up of species that constitute a broad range of trophic levels and pollution tolerances, thus providing strong information for interpreting cumulative effects (Barbour et al., 1999). The assessment and monitoring of benthic macroinvertebrate communities forms an integral part of the monitoring of the health of an aquatic ecosystem. 4. South African Scoring System The South African Scoring System version 5 (SASS5) is the current index being used to assess the status of riverine macroinvertebrates in South Africa. According to Dickens and Graham (2002), the index is based on the presence of aquatic invertebrate families and the perceived sensitivity to water quality changes of these families. Different families exhibit different sensitivities to pollution, these sensitivities range from highly tolerant families (e.g. Chironomidae) to highly sensitive families (e.g. Perlidae). SASS5 results are expressed both as an index score (SASS5 score) and the Average Score Per recorded Taxon (ASPT value). Sampled invertebrates will be identified using the "Aquatic Invertebrates of South African Rivers" Illustrations book, by Gerber and Gabriel (2002). Identification of organisms was made to family level (Thirion et al. 1995; Dickens and Graham, 2002; Gerber and Gabriel, 2002). All SASS5 and ASPT scores are compared with the SASS5 Data Interpretation Guidelines (Dallas, 2007) for the relevant ecoregion. This method seeks to develop biological bands depicting the various ecological states and is derived from data contained within the Rivers Database and supplemented with other data not yet in the database. 5. Macroinvertebrate Response Assessment Index The Macroinvertebrate Response Assessment Index (MIRAI) was used to provide a habitat-based cause-and-effect foundation to interpret the deviation of the aquatic invertebrate community from the calculated reference conditions for the SQR. This does not preclude the calculation of SASS5 scores if required (Thirion, 2007). The four major components of a stream system that determine productivity for aquatic macroinvertebrates are as follows: o Flow regime; o Physical habitat structure; o Water quality; and o Energy inputs from the watershed riparian vegetation. The results of the MIRAI will provide an indication of the current ecological category and therefore assist in the determination of the PES. 6. Fish Community

				A standard qualitative fish assessment was completed for this assessment. Fish sampling was completed through electroshocking techniques. A total of 15 minutes effort will be applied at each sampling point. 7. Present Ecological Status Ecological classification refers to the determination and categorisation of the integrity of the various selected biophysical attributes of ecosystems compared to the natural or close to natural reference conditions (Kleynhans and Louw, 2007). For this study ecological classifications have been determined for biophysical attributes for the associated water course. This was completed using the river eco-classification manual by Kleynhans and Louw (2007).
Wetlands	Biodiversity, Wetland, Aquatic Ecology and Pedological Study	The Biodiversity Company	Andrew Husted	The following is proposed for the EIA phase: The wetland areas are delineated in accordance with the DWAF (2005) guidelines, a cross section is presented in Figure 7. The outer edges of the wetland areas were identified by considering the following four specific indicators: o The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur; o The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (2018), which are associated with prolonged and frequent saturation. o The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and o The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils. Vegetation is used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role. 1. Wetland Delineation The wetland indicators are used to determine the boundaries of the wetlands within the project area. These delineations are then illustrated by means of maps accompanied by descriptions. The assessment of the ecosystem services supplied by the identified wetlands was conducted per the guidelines as described in WET-EcoServices (Kotze et al., 2008). 2. Determining the Present Ecological Status (PES) of wetlands The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, and then to convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of impact of individual activities/occurrences and then separately assessing the intensity of impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. 3. Determining the Ecological Importance and Sensitivity of Wetlands

				The method used for the EIS determination was adapted from the method as provided by DWS (1999) for floodplains. The method takes into consideration PES scores obtained for WET-Health as well as function and service provision to enable the assessor to determine the most representative EIS category for the wetland feature or group being assessed. A series of determinants for EIS are assessed on a scale of 0 to 4, where 0 indicates no importance and 4 indicates very high importance. The mean of the determinants is used to assign the EIS category as listed in Table 5 (Rountree & Kotze, 2013). 4. Ecological Classification and Description The National Wetland Classification Systems (NWCS) developed by the South African National Biodiversity Institute (SANBI) will be considered for this study. This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels, and then also includes structural features at the lower levels of classification (Ollis et al., 2013). 5. Determining Buffer Requirements The "Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries" (Macfarlane et al., 2009) was used to determine the appropriate buffer zone for the proposed activity.
Soils	Biodiversity, Wetland, Aquatic Ecology and Pedological Study	The Biodiversity Company	Andrew Husted	The following is proposed for the EIA phase: 1. Field Survey The site will be traversed by vehicle and on foot. A soil auger will be used to determine the soil form/family and depth. The soil was hand augured to the first restricting layer or 1.5 m. Soil survey positions were recorded as waypoints using a handheld GPS. Soils were identified to the soil family level as per the "Soil Classification: A Taxonomic System for South Africa" (Soil Classification Working Group, 1991). Landscape features such as existing open trenches were also helpful in determining soil types and depth. 2. Agricultural Potential Assessment Land capability and agricultural potential is determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long-term sustainable use of land under rain-fed conditions. At the same time an indication is given about the permanent limitations associated with the different land use classes (Smith, 2006) The land potential classes are determined by combining the land capability results and the climate capability of a region.
Heritage and Palaeontology	Heritage Impact Assessment Palaeontological Impact Assessment	PGS Heritage	Wouter Fourie	The Heritage Impact Assessment (HIA) report to be compiled by PGS Heritage (PGS) for the proposed Elandsfontein Project will assess the heritage resources found on site. This report will contain the applicable maps, tables and figures as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002). The HIA process consists of three steps:

				○ Step I - Literature Review and cartographic analysis: a high-level desktop study was undertaken to identify potential heritage resources and areas of potential heritage sensitivity (desktop level Heritage Scoping report) ○ Step II – Physical Survey: A physical survey was conducted through the proposed project area by qualified and experienced heritage specialists, aimed at locating and documenting heritage resources falling within and adjacent to the proposed development footprint. ○ Step III – The final step will involve the recording and documentation of relevant heritage resources, as well as the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and constructive recommendations. The HIA will compile a heritage management plan to be incorporated into the Environmental Management Plan, the following further work will be required for the EIA phase of this project. ○ Heritage field study of the specific areas where the project will have a direct impact (development footprint); and ○ Palaeontological field assessment of the study area.
Air quality	Air quality impact assessment	Airshed	Hanlie Liebenberg-Enslin	The following methodology is proposed: ○ The compilation of an emissions inventory including the identification and quantification of all emissions associated with the proposed mining operations. Pollutants quantified will include particulate matter (TSP, PM10 and PM2.5), gaseous pollutants i.e. carbon monoxide (CO), oxides of nitrogen (NOx) and sulphur dioxide (SO2) as well as selected metals. Use will be made of design emission standards, emissions factors published by the United States Environmental Protection Agency (US EPA) and Australian National Pollutant Inventory (NPI); ○ Atmospheric dispersion simulations of all gaseous pollutants and PM10, PM2.5 and dust fallout for the operations reflecting highest hourly, highest daily and annual average concentrations due to routine and upset emissions from the mining operations; ○ Impact assessment by comparing ambient pollutant concentration levels to the relevant air quality requirements; ○ The identification of air quality management and mitigation measures based on the findings of the compliance and impact assessment; ○ Since greenhouse gas (GHG) emissions reporting is a legal requirement in SA, a Tier 1 (if required Tier 2) greenhouse gas inventory will be compiled and a qualitative discussion on climate change impacts from the proposed mine included; and ○ The development of an air quality monitoring programme to be included in the EMPr.
Blasting and vibration	Blasting impact assessment	Blast Management and Consulting	Danie Zeeman	In order to complete the impact assessment, the following will be required: ○ Conduct a site visit to determine location of structures and structure profile;

				○ Obtain all relevant data and information on proposed blasting methods; ○ Model expected impact based on planned drilling and blasting information. Accepted mathematical equations are applied to determine attenuation. These values are calculated and shown as amplitude level contours. Overlay of these contours with receptors provides an indication of the possible impacts; and ○ Prepare and present report with outcomes and evaluations.
Financial Provisions	Closure and rehabilitation costing	BEAL Consulting Engineering and Project Management	Johan Le Roux	Preparation of updated NEMA financial provisioning report.
Traffic	Traffic Impact assessment	SMEC	Mandy Westwood	The following methodology is proposed: ○ Conduct Field Work - Including 12h classified traffic counts on adjacent road network at 12 intersections; ○ Capacity Analysis ; ○ Preparation of baseline specialist report; ○ Identification of preferred option(s) and relevant aspects and impacts regarding expected traffic scenarios and road infrastructure; ○ Detailed trip generation of proposed option(s); ○ Investigation regarding required road upgrading in the area; and ○ Investigation of Public transport and pedestrian activities ○ EIA report preparation.

11.4 PROPOSED METHOD OF ASSESSING ENVIRONMENTAL ASPECTS

The same method of assessing impact significance as was used during the Scoping phase will be applied during the EIA phase. This methodology is described in detail in Section 9.1.

11.5 PROPOSED METHOD FOR ASSESSING DURATION AND SIGNIFICANCE

The significance of environmental impacts will be rated before and after the implementation of mitigation measures. These mitigation measures may be existing measures or additional measures that may arise from the impact assessment and specialist input. The impact rating system considers the confidence level that can be placed on the successful implementation of the mitigation. The proposed method for the assessment of environmental issues is set out in the Section 9.1. This assessment methodology enables the assessment of environmental issues including: the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

The specialist studies will recommend practicable mitigation measures or management actions that effectively minimise or eliminate negative impacts, enhance beneficial impacts, and assist project design. If appropriate, the studies will differentiate between essential mitigation measures, which must be implemented and optional mitigation measures, which are recommended.

11.6 STAGES AT WHICH COMPETENT AUTHORITIES WILL BE CONSULTED

Competent authorities have been and will be consulted during the initial notification period, the scoping phase, and during the EIA phase. The formal minutes of these meetings are included in Appendix C. A pre-application meeting will also be held with DWS at a later stage as part of the WUL application. No Authority meetings are scheduled during the scoping phase. However, if and/or when an authority requires a meeting one will be arranged. The date, time, and venue of the meeting will be scheduled post dissemination of the project notification documents should one be required. The purpose of the Authority meeting would be to explain the project in detail to authorities and clarify the process going forward.

11.7 PROPOSED METHOD OF EIA PHASE PUBLIC PARTICIPATION

The proposed public participation process to be followed for the EIA phase is provided below.

The commenting periods that will be provided to the I&AP's (and the competent authorities) will be 30 days.

The dates of the review and commenting period for the draft EIA/EMPr will be determined at a later date and communicated to all registered I&AP's through faxes, emails, SMS's and/or registered letters.

The location at which the hard copy of the EIA report will be made available is at the same public places in the project area that the Scoping Report was made available (refer to Section 7.2), sent electronically to stakeholders who request a copy, and placed on the EIMS website: www.eims.co.za.

The public participation will be undertaken in compliance with NEMA GNR 982 (Chapter 6).

A public meeting will be held during the review period for the EIA report. Focus group meetings will also be held with key stakeholders as and where necessary.

All comments and issues raised during the comment period will be incorporated into the EIA/EMP Report to be submitted to the competent and commenting authorities.

11.8 DESCRIPTION OF TASKS THAT WILL BE UNDERTAKEN DURING THE EIA PROCESS

The plan of study detailed in the above sections and is summarised below. The following tasks will be undertaken as part of the EIA phase of the project:

EIA-phase specialist studies.

Public consultation:

- Notification of the availability of the EIAR for review and comment to all registered I&AP's;
- Public and focus group meetings if required.

Authority consultation:

- Consultation with DMR and the commenting authorities; and
- Authorities consultation (including meetings where necessary) to provide authorities with project related information and obtain their feedback.

Document compilation:

- The EIA and EMPr will be compiled in line with the requirements of Appendix 3 and 4 of the NEMA Regulations.
- The EIA and EMPr will be made available for public comment for a period of 60 days.
- The EIA and EMPr will be finalised and submitted to the DMR.

11.9 MEASURES TO AVOID, REVERSE, MITIGATE, OR MANAGE IMPACTS

All comments received from I&APs during the Scoping Report review will be taken into consideration and where applicable inform the high-level mitigation measures. Detailed mitigation measures will be further developed as part of the EIA phase. The potential impacts will further be assessed in terms of the mitigation potential, taking into consideration the following:

Reversibility of impact:

- Reversible.
- Partially reversible.
- Irreversible.

Irreplaceable loss of resources:

- Replaceable.
- Partially replaceable.
- Irreplaceable.

Potential of impacts to be mitigated:

- High.
- Medium.
- Low.

This information for each identified impact will be provided in the EIA and EMPr.

12. SENSITIVITY MAPPING

Environmental sensitivity mapping provides a strategic overview of the environmental, cultural and social assets, opportunities, and constraints in a defined spatial context. The sensitivity mapping technique integrates numerous datasets (base maps and shapefiles) into a single consolidated layer making use of Geographic Information System (GIS) software and analysis tools. Environmental sensitivity mapping is a rapid and objective method applied to identify areas which may be particularly sensitive to development based on environmental, cultural and social sensitivity weightings – which is determined by specialists input within each respective field based on aerial or ground-surveys. Environmental sensitivity is used to aid in decision-making during consultation processes, forming a strategic part of Environmental Assessment processes. Table 24 below provides a breakdown of the sensitivity rating and weightings applied to determine the sensitivity score of each aspect. Figure 20 provides a graphical illustration of the sensitivity mapping exercise applied to determine the overall environmental sensitivity within the study area. A scoping sensitivity map is provided in Figure 21. The identified sensitivities include Terrestrial Biodiversity, Subsidence Risk Areas, Wetland Sensitivities and Aquatic Ecology Sensitivities. Heritage features and various blasting and air quality sensitive receptors are also included on the preliminary sensitivity map.

Table 24: Sensitivity rating and weighting

Sensitivity Rating	Description	Weighting
Least concern	The inherent feature status and sensitivity is already degraded or contain no inherent sensitivities. The proposed development will not affect the current status and/or may result in a positive impact. These features would be the preferred alternative for mining or infrastructure placement.	-1
Low/Poor	The proposed development will not have a significant effect on the inherent feature status and sensitivity.	0
High	The proposed development will moderately negatively influence the current status of the feature.	1
Very high	The proposed development will have a significantly negative influence on the current status of the feature.	2

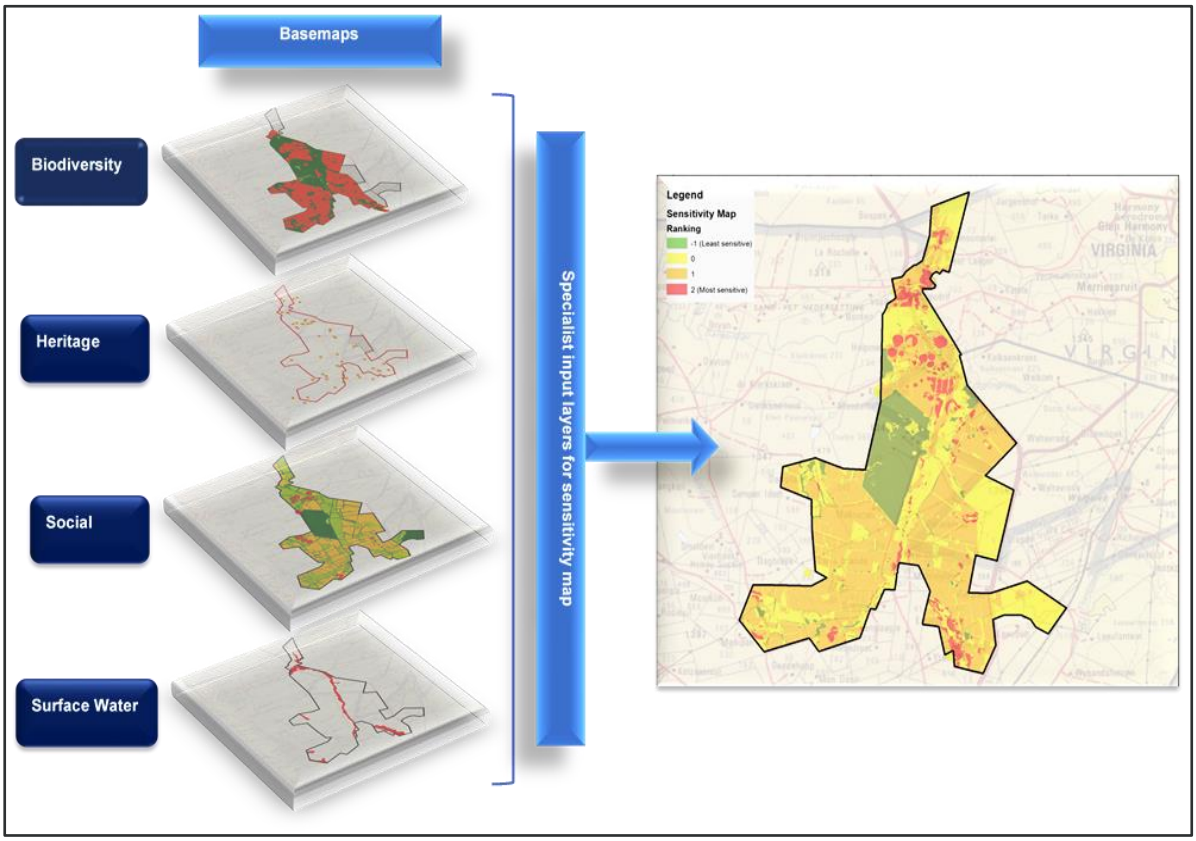

Figure 20: Sensitivity mapping approach.

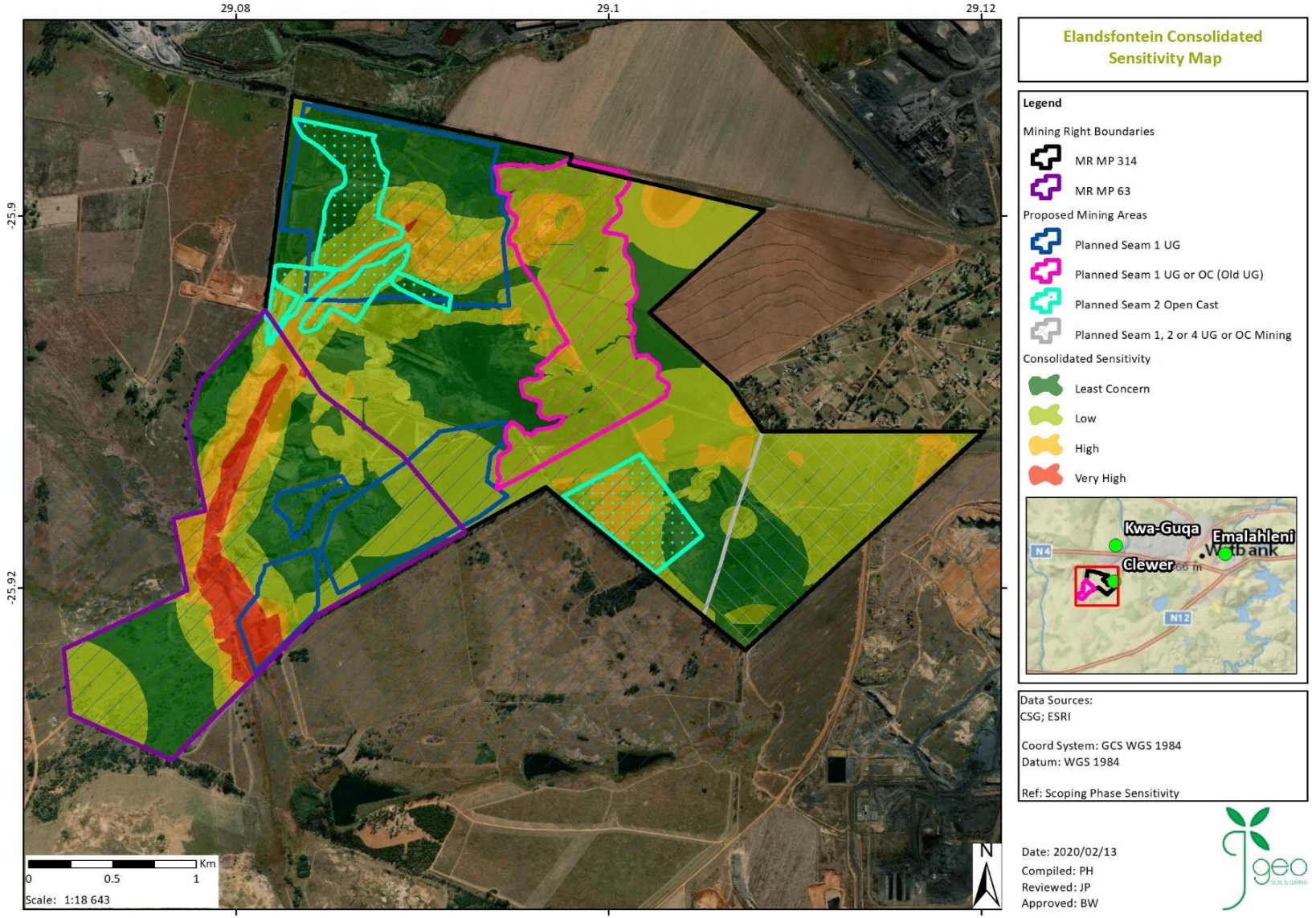

Figure 21: Preliminary Sensitivity Map

13. ASSUMPTIONS, LIMITATIONS, AND UNCERTAINTIES

Certain assumptions, limitations, and uncertainties are associated with the Scoping Phase. This report is based on information that is currently available and, as a result, the following limitations and assumptions are applicable for each specialist study.

13.1 AIR QUALITY

The main assumptions, exclusions and limitations are summarized below:

- Meteorological data: no onsite meteorological data was available and measured data from the Department of Environment, Forestry and Fisheries (DEFF) station in Emalahleni was obtained for the period January 2016 – December 2018. The data is regarded representative with the station located approximately 9 km to the east-northeast of the mining offices.
- All information was obtained from the Independent Competent Person's (CPR) Report – Coal Resources/ Coal Reserves for the Elandsfontein Colliery operated by the Elandsfontein Colliery (Pty) Limited in the Mpumalanga Province of South Africa, dated 30 October 2019 (CPR, 2019). It was assumed that this information is correct.

13.2 AQUATIC ECLOGY

The following limitations were noted for the study:

This assessment represents the Scoping Phase of the project only;

- A detailed riverine ecology baseline and impact assessment report will be submitted for the EIA phase of the project;
- The impact assessment has only been conducted for the proposed opencast and underground mining areas. The construction phase activities have assumed that access roads and topsoil stripping for the initialisation of the open cast activities will form a component of the construction phase;
- The impact assessment assumes that no discard dumps or processing facilities will form part of this application;
- No alternatives have been provided; and
- No infrastructure or activities such as abstraction, discharge, processing plants, Run-of-Mine storage, discard dumps or overburden stockpiles have been included in this impact assessment. Considering this, only the operation phase of the project will be considered.

13.3 BLASTING

At this stage this is not the final list of receptors or types of receptors as a site visit will confirm receptors and more detail review is required of the area during the EIA Phase. This is a basic indication of possible receptors. It is assumed as indicated by the applicant that property belonging to receptors located inside the open pit area will be bought and these receptors will therefore move. Proceeding forward with detail evaluation specific attention will be required regarding high sensitivity areas.

13.4 HYDROLOGY

The following limitations were noted for the study:

- Desktop hydrological analysis of potential stream flows. No long-term flow measurements were conducted in the Grootspruit and the tributary of the Grootspruit.
- Layout plans in electronic format of infrastructure layouts. It is assumed that these layout plans will be reflective of the mining operations that will be implemented.
- Floodline and buffer zone work is depended on the survey data that was used as input into the hydraulic model. The survey was provided by the mine. The quality of this survey data cannot be fully verified and

it is assumed that the survey data provided is an accurate reflection of the topography. It is further assumed that the survey data relating to the floodline represents the topography that will be present during the proposed mining operations; and

- No primary data collection was done during the study. It is assumed that all data provided by the mine is true and accurate.

13.5 GEOHYDROLOGY

The following limitations were noted for the study:

- Data limitations were addressed by following a conservative approach and assumptions include the following: The scale of the investigation was set at 1:50 000 resolutions in terms of topographic and spatial data, a lower resolution of 1:250 000 scale for geological data and a 1: 500 000 scale resolution for hydrogeological information.
- The Digital Elevation Model (DEM) data was interpolated with a USGS grid spacing of 25 m intervals.
- Rainfall data and other climatic data was sourced from the WR2012 database.
- Water management and catchment-based information was sourced from the GRDM and Aquiworx databases.
- The concept of representative elementary volumes (REV) have been applied i.e. a scale has been assumed so that heterogeneity within a system becomes negligible and thus can then be treated as a homogeneous system. The accuracy and scale of the assessment will result in deviations at point e.g. individual boreholes.
- No site characterisation boreholes were drilled as part of this investigation and aquifer parameters as well as hydrostratigraphic units were assumed based on historical investigation and similar studies conducted.
- The investigation relied on data collected as a snapshot of field surveys and existing monitoring data. Further trends should be verified by continued monitoring as set out in the monitoring program.
- Groundwater divides have been assumed to align with surface water divides and it is assumed that groundwater cannot flow across this type of boundaries.
- Where data was absent or insufficient, values were assumed based on literature studies and referenced accordingly.

13.6 HERITAGE

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the existing highly disturbed nature of the study area. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

It was also not possible to access a couple of areas within the larger study area, due to existing opencast mining activities as well as the presence of discard dumps and earth berms that prevented access to certain areas.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply.

13.7 HYDROPEDOLOGY

The following limitations should be noted for the study:

- This assessment represents the Scoping Phase of the project only;
- A detailed hydropedology baseline and impact assessment report will be submitted for the Environmental Impact Assessment (EIA) phase of the project;

- The impact assessment has only been conducted for the proposed opencast and underground mining areas; and
- A field survey still needs to be conducted to advise on the viability of the alternatives.

13.8 SOIL (PEDOLOGY)

The following limitations should be noted for the study:

- This assessment represents the Scoping Phase of the project only;
- A detailed pedology baseline and impact assessment report will be submitted for the Environmental Impact Assessment (EIA) phase of the project;
- The impact assessment has only been conducted for the proposed opencast and underground mining areas; and
- A field survey still needs to be conducted to advise on the viability of the alternatives.

13.9 ECOLOGY

The following limitations should be noted for the study:

- This assessment represents the Scoping Phase of the project only.
- After further field surveys a final biodiversity and impact assessment report will be submitted; and
- A field survey still needs to be conducted to advise on the viability of the alternatives.

13.10 WETLANDS

The following limitations should be noted for the study:

- This assessment represents the Scoping Phase of the project only;
- A detailed wetland baseline and impact assessment report will be submitted for the Environmental Impact Assessment (EIA) phase of the project;
- The impact assessment has only been conducted for the proposed opencast and underground mining areas; and
- A field survey still needs to be conducted to advise on the viability of the alternatives.

14. UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I **Adri Joubert** herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected Parties has been correctly recorded in the report.

Signature of the EAP

Date: 2020/07/07

15. UNDERTAKING REGARDING LEVEL OF AGREEMENT

I **Adri Joubert** herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

Signature of the EAP

Date: 2020/07/07

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