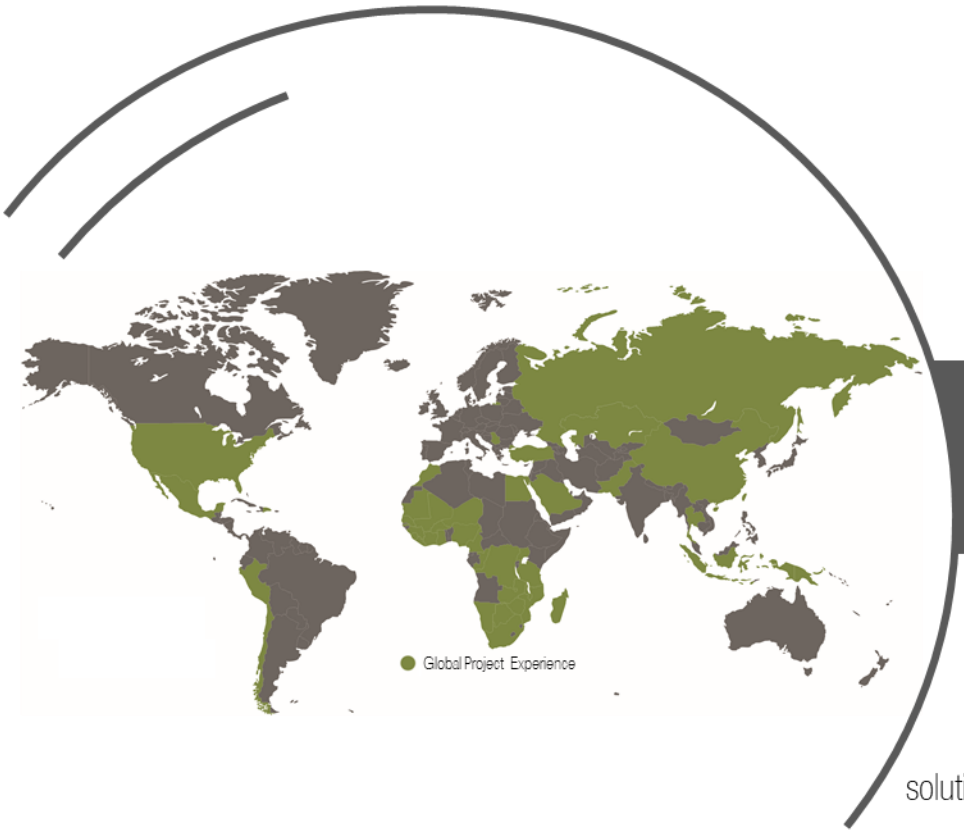


DIGBY WELLS
ENVIRONMENTAL

Your Preferred Environmental and Social Solutions Partner

Providing innovative and sustainable solutions throughout the resources sector

Proposed Environmental Regulatory Process for the Middeldrift Resources Within the Existing New Clydesdale Colliery Mining Right, Situated in the Magisterial District of Nkangala, Mpumalanga Province

Final Scoping Report

Prepared for:
Universal Coal Development IV (Pty) Ltd

Project Number:
UCD6587

DMRE Reference:
MP30/5/1/2/2/492(EM)

March 2021

Digby Wells and Associates
(South Africa) (Pty) Ltd
Company Registration: 2010/008577/07

Turnberry Office Park,
Digby Wells House.
48 Grosvenor Road,
Bryanston,2191

Phone: +27 (0) 11 789 9495
Fax: +27 (0) 11 789 9495
E-mail: info@digbywells.com
Website: www.digbywells.com

This document has been prepared by Digby Wells Environmental.

Report Type:	Final Scoping Report
Project Name:	Proposed Environmental Regulatory Process for the Middeldrift Resources Within the Existing New Clydesdale Colliery Mining Right, Situated in the Magisterial District of Nkangala, Mpumalanga Province
Project Code:	UCD6587

Name	Responsibility	Signature	Date
Njabulo Mzilikazi	Project Manager and Report Compiler		March 2021
Anela Sotashe	Report Compiler		March 2021
Mia Smith	Senior Reviewer		March 2021

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

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

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

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

OBJECTIVE OF THE SCOPING PROCESS

The objective of the scoping process is, through a consultative process, to: -

- identify the relevant policies and legislation relevant to the activity;
- motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of 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;
- identify the key issues to be addressed in the assessment phase;
- 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 to determine 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
- identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

EXECUTIVE SUMMARY

Introduction

Universal Coal Development IV (Pty) Ltd (hereafter Universal Coal) operates the New Clydesdale Colliery (NCC), situated in the Nkangala Magisterial District of the Mpumalanga Province with Mining Right (MR) reference **MR Ref. No. MP30/5/1/2/2/492MR.**

Universal Coal had identified coal resources north of this existing MR and as such is proposing to extend the proposed North Opencast Pit to the Middeldrift Resources (Middeldrift). This involves the following activities:

- Opencast coal mining through a pan (wetland);
- Diversion of the district road D1651;
- Construction of a new road (linked to the diversion) (approximately 4km long); and
- Construction of a bridge over the Steenkoolspruit.

Digby Wells Environmental (hereafter Digby Wells) has been appointed by Universal Coal to undertake an Environmental Authorisation (EA) Application Process for the mining of Middeldrift within the existing NCC MR boundary (the "Project"). This will include the undertaking of a Scoping and Environmental Impact Assessment (EIA) process and compilation of an Environmental Management Programme (EMPr); and applications for an Integrated Water Use License (IWUL) supported by an Integrated Water and Waste Management Plan (IWWMP).

Project Applicant

Company name:	Universal Coal Development IV Proprietary Limited
Contact person:	Sthembiso Hinani
Physical address:	467 Fehrsen Street, Brooklyn, Pretoria, 0181
Telephone:	+27 (0)10 900 2384
Email:	s.hinani@universalcoal.com

Project Overview

Opencast mining from the Roodekop Resources is on-going and will continue until the reserves are depleted; after which mining will progress into Middeldrift (approximately 150 ha in extent). The box cut for Middeldrift will be created at the same time as when the last coal is mined at the Roodekop Resources. This will allow production to continue uninterrupted. Universal Coal proposes to mine Middeldrift through a wetland (pan) using opencast truck-and-shovel methods.

The existing infrastructure at NCC for stockpiling and processing of coal will be used. Additional infrastructure proposed at Middeldrift is as follows:

- District road (D1651) diversion around the opencast pit to allow mining through the identified coal seams; and
- Bridge construction over the Steenkoolspruit for access to the mining area.

Purpose of this Report

A Scoping Report forms part of the EIA process and aims to identify those biophysical and socio-economic issues or concerns that require investigation, as well as determine feasible alternatives. This information is then used to determine the scope of work for the EIA Phase. During the Scoping Phase, people interested or affected by the Project are informed of the Project and provided the opportunity to raise issues and concerns. Therefore, the purpose of this Scoping Report includes the following:

- To provide a description of the proposed Project and its activities;
- To provide a high-level description of the baseline environment in which the proposed Project will occur;
- To predict potential impacts as a result of the Project and its activities;
- To provide a detailed plan of study for the EIA Phase; and
- To share Project information with Interested and Affected Parties (I&APs) and to record their comments and issues raised.

Environmental Assessment Practitioner

Digby Wells Environmental (Digby Wells) has been appointed by Universal Coal as the independent Environmental Assessment Practitioner (EAP) to undertake the EIA process, the IWUL Application process, associated specialist studies and the required Public Participation Process (PPP) for the proposed Project. The details of the EAP are contained in the table below.

Company name:	Digby Wells and Associates (South Africa) (Pty) Ltd
Contact person:	Njabulo Mzilikazi
Physical address:	Digby Wells House, 48 Grosvenor Road, Bryanston, Johannesburg, 2191
Telephone:	011 789 9495
Email:	Njabulo.Mzilikazi@digbywells.com

Approach and Methodology for the Public Participation Process

The COVID-19 Regulations, 2020 [Directions Regarding Measures to Address, Prevent and Combat the Spread of Covid-19 Relating to National Environmental Management Permits and Licences (GN R650 of 5 June 2020)] as well as the EIA Regulations, 2014 (GN R982 of 4 December 2014 as amended) (the “EIA Regulations, 2014”) promulgated under the National

Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), have been considered for this PPP. The PPP is central to the investigation of environmental and social impacts. Stakeholders who are affected by the proposed Project will be given an opportunity to raise concerns to ensure that local knowledge, needs and values are understood and taken into consideration as part of the EIA process.

The following activities were undertaken to announce the Project and initiate the Scoping Phase:

- A Background Information Document (BID) was distributed on 28 January 2021;
- A newspaper advertisement was placed in the Highveld Chronicle on 29 January 2021**;**
- An announcement letter including a registration form were distributed to identified Interested and Affected Parties (I&APs) via email on 28 January 2021;
- Site notices were placed around the site at prominent places on 28 January 2021; and
- The Draft Scoping Report was made available to I&APs through a data free website allowing access to download at no cost to the I&AP. The electronic copy of the report could also be accessed and downloaded from the Digby Wells website - www.digbywells.com (Public Documents). The public review period was from 27 January 2021 to 1 March 2021.

Project Alternatives

The alternatives considered in this report include:

- The mining method which was determined by the location of the resource;
- The footprint of the opencast pit which is dependent on the approval of a wayleave application granting Universal Coal to construct the road diversion and mine through the existing road; and
- The “No-Go” alternative (the option of not proceeding with the Project).

Environmental Baseline

The following baseline specialist studies were completed, and its findings included in the Final Scoping Report:

- PPP;
- Groundwater;
- Hydrology;
- Soils, Land Use and Capability;
- Fauna and Flora;
- Freshwater Ecosystems (Wetland and Aquatic Biodiversity);
- Air Quality;

- Hydropedology; and
- Heritage.

Potential impacts of the Project on the baseline environment have been identified and can be summarised as follows:

- Loss of the wetland (pan);
- Air quality deterioration;
- Disturbance in traffic flows;
- Surface and groundwater quality deterioration;
- Increased surface water runoff;
- Terrestrial and aquatic habitat disturbance, loss and/or fragmentation; and
- Soil loss, erosion and compaction.

Closure, rehabilitation, visual and traffic impact studies shall be undertaken and included in the EIA Phase.

Conclusions and Recommendations

Based on the findings of the Scoping Phase, the proposed Project does not present any fatal flaws in terms of negative impacts to the environment. The significance of impacts identified during the preliminary assessment of the baseline environment can be reduced with the implementation of mitigation and management measures. However, the destruction of the wetland (pan) will be irreversible. A Wetland Offset Plan is recommended.

There are, however, several anticipated impacts that will require a more detailed investigation and assessment. Digby Wells will assess these impacts in more detail during the EIA Phase and present the findings in the EIA Report. Detailed mitigation and management measures will also be identified during this phase.

I&APs consulted during the Draft Scoping Phase Focus Group Meetings (FGMs) were opposed to the Project for reasons explained in the Comments and Response Report (CRR) herein; and expressed the need for further engagements with the Applicant. Issues were raised that related to the Social and Labour Plan and do not necessarily form part of the Middeldrift Project. Ongoing consultations with the affected community and all I&APs is recommended throughout the EA application process, as well as the Project lifetime.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF PLANS

LIST OF ACRONYMS, ABBREVIATIONS AND TERMS

AMD	Acid Mine Drainage
ASTM	American Standard Test Method
CBA	Critical Biodiversity Area
CEC	Cation Exchange Capacity
CRR	Comments and Response Report
dBA	Decibels
DEFF	Department of Environment, Forestry and Fisheries
Digby Wells	Digby Wells Environmental
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation (previously DWA)
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ELM	Emalahleni Local Municipality

EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
GDP	Gross Domestic Product
Ha	hectares
HGM	Hydro Geomorphic Unit
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IUCN	International Union for the Conservation of Nature
IWUL	Integrated Water Use Licence
LC	Least Concern
LoM	Life of Mine
MAE	Mean Annual Evaporation
Mamsl	Metres Above Mean Sea Level
mbgl	Metres below ground level
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
Middeldrift	Middeldrift Resources Area
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MR	Mining Right
NBA	National Biodiversity Assessment
NCC	New Clydesdale Colliery
NDM	Nkangala District Municipality
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 od 1999)
NT	Near Threatened
NWA	National Water Act, 1998 (Act No. 36 of 1998)

PES	Present Ecological Status
PPP	Public Participation Process
Project Area	The Middeldrift Resources Area, including the proposed construction of a bridge and diversion of the district road.
QDS	Quarter Degree Square
ROM	Run of Mine
SADC	Southern Africa Development Community
SAHRA	South African Heritage Resources Agency
SAIAB	South African Institute of Aquatic Biodiversity
SANAS	South African National Accreditation System
SANParks	South African National Parks
SANS	South African National Standards
SSC	Species of Special Concern
Universal Coal	Universal Coal Development IV (Pty) Ltd
USEPA	United States Environmental Protection Agency
VU	Vulnerable
WMA	Water Management Area

1 Introduction

Universal Coal Development IV (Pty) Ltd (hereafter Universal Coal) operates the New Clydesdale Colliery (NCC), situated in the Nkangala Magisterial District of the Mpumalanga Province with Mining Right (MR) reference **MR Ref. No. MP30/5/1/2/2/492MR.**

Universal Coal had identified coal resources north of this existing MR and as such is proposing to extend the proposed North Opencast Pit to the Middeldrift Resources (Middeldrift). This involves the following activities:

- Opencast coal mining through a pan (wetland);
- Diversion of the district road D1651;
- Construction of a new road (linked to the diversion) (approximately 4km long)and
- Construction of a bridge over the Steenkoolspruit.

Digby Wells Environmental (hereafter Digby Wells) has been appointed by Universal Coal to undertake an Environmental Authorisation (EA) Application Process for the mining of Middeldrift within the existing NCC operations (the "Project"). This will include the undertaking of a Scoping and Environmental Impact Assessment (EIA) process and compilation of an Environmental Management Programme (EMPr); and applications for an Integrated Water Use License (IWUL) supported by an Integrated Water and Waste Management Plan (IWWMP) in accordance with the following relevant legislation:

- EIA Regulations, 2014 (GN R982 of 04 December 2014, as amended) (the "EIA Regulations, 2014) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA); and
- Section 21 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

2 Project Applicant and Environmental Assessment Practitioner

This section provides the details of the Project Applicant, as well as the appointed Environmental Assessment Practitioner (EAP).

2.1 Details of the Applicant

Table 2-1 provides the contact details of the applicant.

Table 2-1: Contact Details of the Applicant

Name of Applicant:	Universal Coal Development IV (Pty) Limited
Registration number (if any):	2008/028397/07
Trading name (if any):	N/A
Responsible Person :	Minah Moabi

(E.g. CEO, Director, etc.)			
Contact person:	Sthembiso Hinani		
Physical address:	Universal Coal Head Office 467 Fehrsen Street Brooklyn Pretoria 0181		
Postal address:	PO Box 2423 Brooklyn Square Pretoria		
Postal code:	0075		
Telephone:	+27 71 519 6849 +27 10 900 2384	**Fax:**	012 460 2417
Email:	s.hinani@universalcoal.com		

2.2 Item 2(a)(i): Details of the Environmental Assessment Practitioner

Digby Wells has been appointed by Universal Coal to undertake the environmental-legal applications in support of the proposed Project.

Table 2-2: Contact Details of the EAP

Company name:	Digby Wells and Associates (South Africa) (Pty) Ltd
Contact person:	Njabulo Mzilikazi
Physical address:	Digby Wells House, 48 Grosvenor Road, Bryanston, Johannesburg, 2191
Telephone:	011 789 9495
Email:	Njabulo.Mzilikazi@digbywells.com

2.2.1 Item 2(a)(ii): Expertise of the Environmental Assessment Practitioner

This section provides the qualifications and experience of the EAP for the proposed Project. The EAP's Curriculum Vitae (CV) and qualifications are attached in Appendix B.

2.2.1.1 Qualifications of the Environmental Assessment Practitioner

Ms Njabulo Mzilikazi holds the following degrees:

- BSc Honours Geography – University of the Witwatersrand (2016); and
- BSc Geology and Geography – University of the Witwatersrand (2017).

2.2.1.2 *Experience of the Environmental Assessment Practitioner*

Njabulo started working as a Consultant in 2017 and joined Digby Wells in March 2020. She has four years' experience. The majority of Njabulo's experience pertains to undertaking applications governed by the NEMA and EIA Regulations, 2014 (as amended), the MPRDA and the NWA. Her experience comprises compiling application forms, Basic Assessment Reports, Scoping Reports, EIA Reports, EMPRs, and Integrated Water and Waste Management Plans (IWWMPs).

3 Item 2(b): Description of the Property

The property is located within the Emalahleni Local Municipality (ELM) and the Nkangala Magisterial District (NDM) and is approximately 9 km north of the town of Kriel in the Mpumalanga Province. Table 3-1 provides further locality details and Figure 3-1 indicated the directly affected farm portions. The land tenure map is also attached as Plan 1 in Appendix C.

Table 3-1: Project Locality Details

Farm Name:	**Farm Name**	**21-digit Surveyor General Code**
	Portion 1 of Middeldrift 42 IS	T0IS00000000004200001
	Portion 2 of Middeldrift 42 IS	T0IS00000000004200002
	Portion 3 of Middeldrift 42 IS	T0IS00000000004200003
	Portion 4 of Middeldrift 42 IS	T0IS00000000004200004
	Portion 2 of Diepspruit 41 IS	T0IS00000000004100002
	Portion 9 of Diepspruit 41 IS	T0IS00000000004100009
	Portion 15 of Roodepoort 41 IS	T0IS00000000004000015
	Portion 21 of Roodepoort 41 IS	T0IS00000000004000021
	Portion 3 of Hartbeestfontein 39 IS	T0IS00000000003900003
	Portion 7 of Hartbeestfontein 39 IS	T0IS00000000003900007
	Portion 9 of Kromfontein 30 IS	T0IS00000000003000009
Application Area (Ha):	~150 ha	
Magisterial District:	Nkangala District Municipality	
Distance and direction from nearest town:	Approximately 9 km north of Kriel in the Mpumalanga Province	
21 digit Surveyor General Code for each farm portion:	As above.	

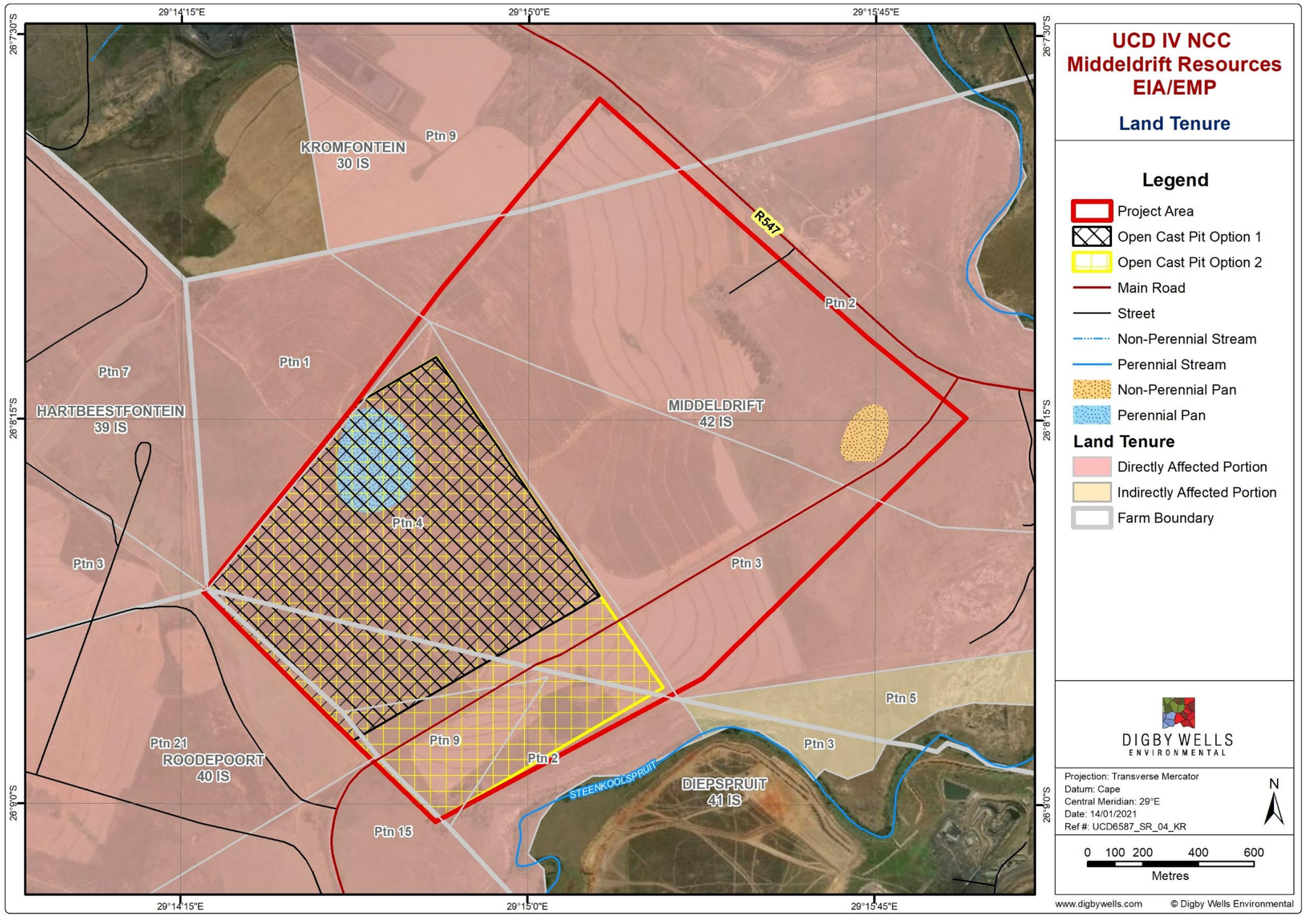


Figure 3-1: Land Tenure Map

4 Item 2(c): Locality Map

The regional and local setting of the Project are depicted in Figure 4-1 and Figure 4-2 which are also attached as Plan 2 and Plan 3 in Appendix C.

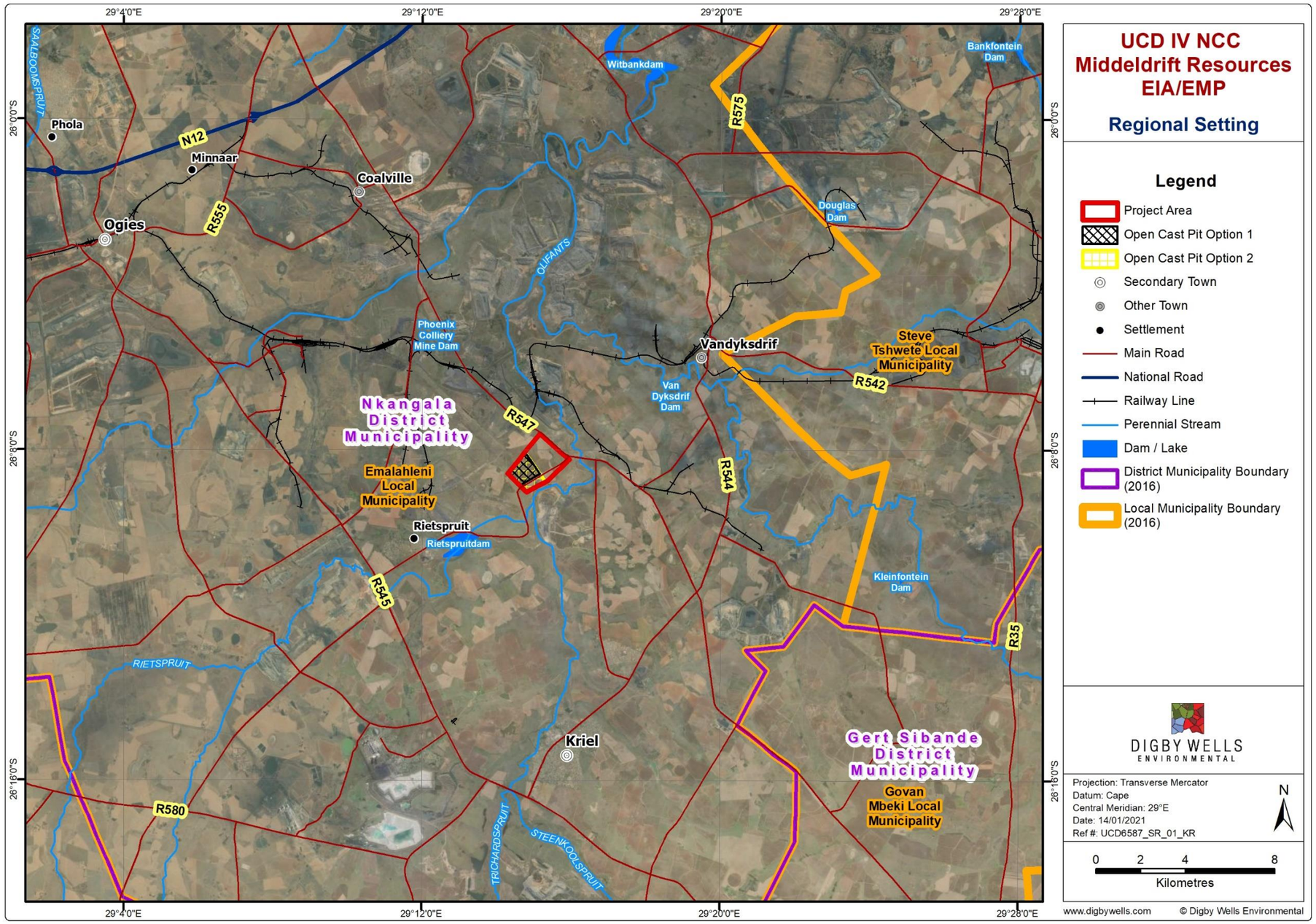


Figure 4-1: Regional Setting

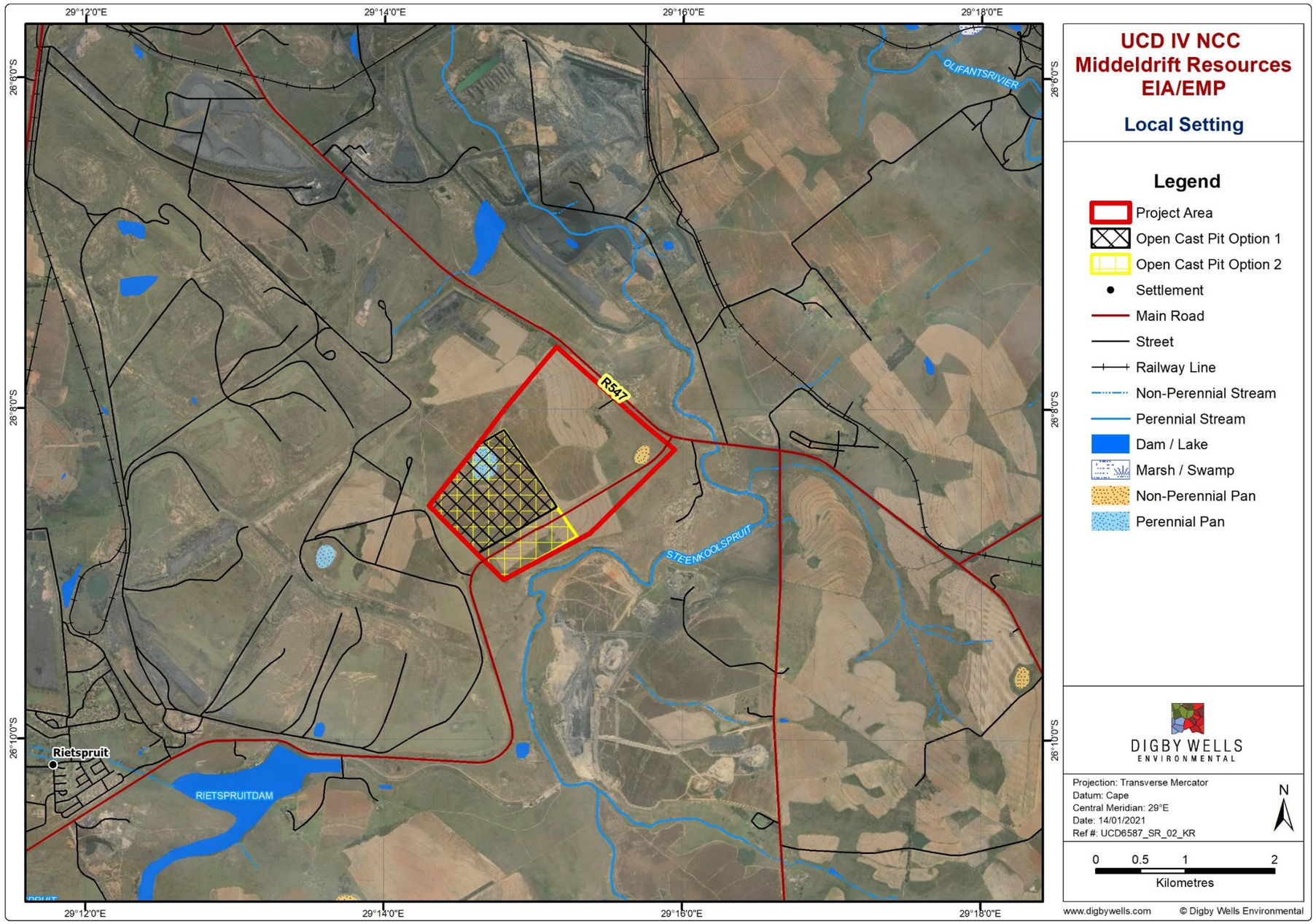


Figure 4-2: Locality Map

5 Item 2(d): Description of the Scope of the Proposed Overall Activity

For the purpose of the report, the following terms apply:

- **MR area** defines the farms included in the NCC MR boundary;
- **Project Area** defines farm portions directly associated with Middeldrift; and
- **Study Area** will be determined by each specialist and the zone of influence in terms of potential impact the Project will have, relevant to the individual specialist fields.

5.1 Item 2(d)(i): Listed and Specified Activities

This section details the proposed Project activities to be undertaken on site, as well as the Listed Activities in terms of the EIA Regulations, 2014 (as amended). Table 5-1 details the Project activities per phase (i.e. Construction, Operational and Decommissioning Phases).

Table 5-1: Project activities

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Opencast mining 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.	150 ha	17	Listing Notice 2 (GN R984 of 04 December 2014, as amended)	N/A
Mining through a Watercourse (Pan).	10 ha	19	Listing Notice 1 (GN R983 of 04	N/A

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
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.			December 2014, as amended)	
Clearance of vegetation 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 during the EIA	2	Listing Notice 2 (GN R984 of 04 December 2014, as amended)	N/A
Construction of a bridge over the Steenkoolspruit to access Middeldrift The development of infrastructure or structures with a physical footprint of 100 square metres or	To be determined during the EIA	12 (ii)(a)	Listing Notice 1 (GN R983 of 04 December 2014, as amended)	N/A

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
more where such development occurs within a watercourse.				
Diversion of the provincial road which runs through the Middeldrift area The development of a road with a reserve wider than 30 metres.	Approximately 4 km long	27	Listing Notice 2 (GN R984 of 04 December 2014, as amended)	N/A

Table 5-2: Listed Activities Applicable to the Project provides the identified Listed Activities as provided by Listing Notice 1 (GN R983 of 04 December 2014, as amended) and Listing Notice 2 (GN R984 of 04 December 2014, as amended). As indicated in Table 5-2 below, activities listed under Listing Notice 1 and 2 will be triggered; and therefore, a Scoping and EIA process must be undertaken, and approval received prior to the activities commencing.

Table 5-2: Proposed Project Activities

Project Phase	Project Activity
Construction Phase	Site/vegetation clearance
	Contractors laydown yard
	Access and haul road construction
	Topsoil stockpiling
Operational Phase	Open pit establishment
	Removal of rock (blasting)
	Stockpiling (i.e. soils) establishment and operation
	Operation of the open pit workings
Decommissioning Phase	Rehabilitation – rehabilitation mainly consists of spreading of the preserved subsoil and topsoil, profiling of the land and re-vegetation
	Post-closure monitoring and rehabilitation

Table 5-3: Listed Activities Applicable to the Project

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Opencast mining 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.	150 ha	17	Listing Notice 2 (GN R984 of 04 December 2014, as amended)	N/A
Mining through a Watercourse (Pan)[1]. 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	10 ha	19	Listing Notice 1 (GN R983 of 04 December 2014, as amended)	N/A

[1] This activity will also require a WUL in terms of Section 21(c) and (i) of the NWA.

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.				
Clearance of vegetation 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 during the EIA	2	Listing Notice 2 (GN R984 of 04 December 2014, as amended)	N/A
Construction of a bridge over the Steenkoolspruit to access Middeldrift[2] The development of infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs within a watercourse.	To be determined during the EIA	12 (ii)(a)	Listing Notice 1 (GN R983 of 04 December 2014, as amended)	N/A
Diversion of the provincial road which runs through the Middeldrift area The development of a road with a reserve wider than 30 metres.	Approximately 4 km long	27	Listing Notice 2 (GN R984 of 04 December 2014, as amended)	N/A

[2] This activity will also require a WUL in terms of Section 21(c) and (i) of the NWA.

5.2 Description of the Activities to be Undertaken

The current mining activities at the NCC consists of:

- Diepspruit Underground: Three board-and-pillar sections mining the No. 2 lower seam;
- Diepspruit West: Opencast truck and shovel mining operation; and
- Roodekop: Opencast truck and shovel mining operation.

Opencast mining from the Diepspruit West and Roodekop Resources is on-going and will continue until the reserves are depleted; after which mining will progress into the Middeldrift Resources. The box cut for Middeldrift will be created at the same time as when the coal is depleted at Roodekop. This will allow production to continue uninterrupted. The total Life of Mine (LoM) of Middeldrift is approximately ten years.

In the existing NCC area, the strip ratios are favourable for opencast mining. Middeldrift will be an opencast truck-and-shovel operation, focusing on the No. 4 upper and lower seams; No. 2 upper and lower seams; and the No. 1 and No. 1A seams. A total of 12.23 million tonnes (Mt) of coal have been identified. The target market for the coal is Eskom's Kriel Power Station. This will ensure the minimum quality specifications for Eskom is achieved on a continuous basis. From the Middeldrift area, the coal will be transported to the NCC by truck via haul road. ROM coal will be washed at the NCC coal handling and processing plant (CHPP). No new infrastructure is proposed to be constructed at Middeldrift.

Middeldrift is separated from the existing NCC opencast areas by a river, the Steenkoolspruit. To protect this water course, it is intended that Middeldrift be mined as a separate opencast operation once the existing NCC areas have been mined out. This will require the diversion of the district road around the north of the existing Roodekop opencast pit in order to continue with mining. A bridge over the Steenkoolspruit will be constructed to gain access to Middeldrift. A preliminary infrastructure layout has been included as Figure 5-1 and in Appendix C.

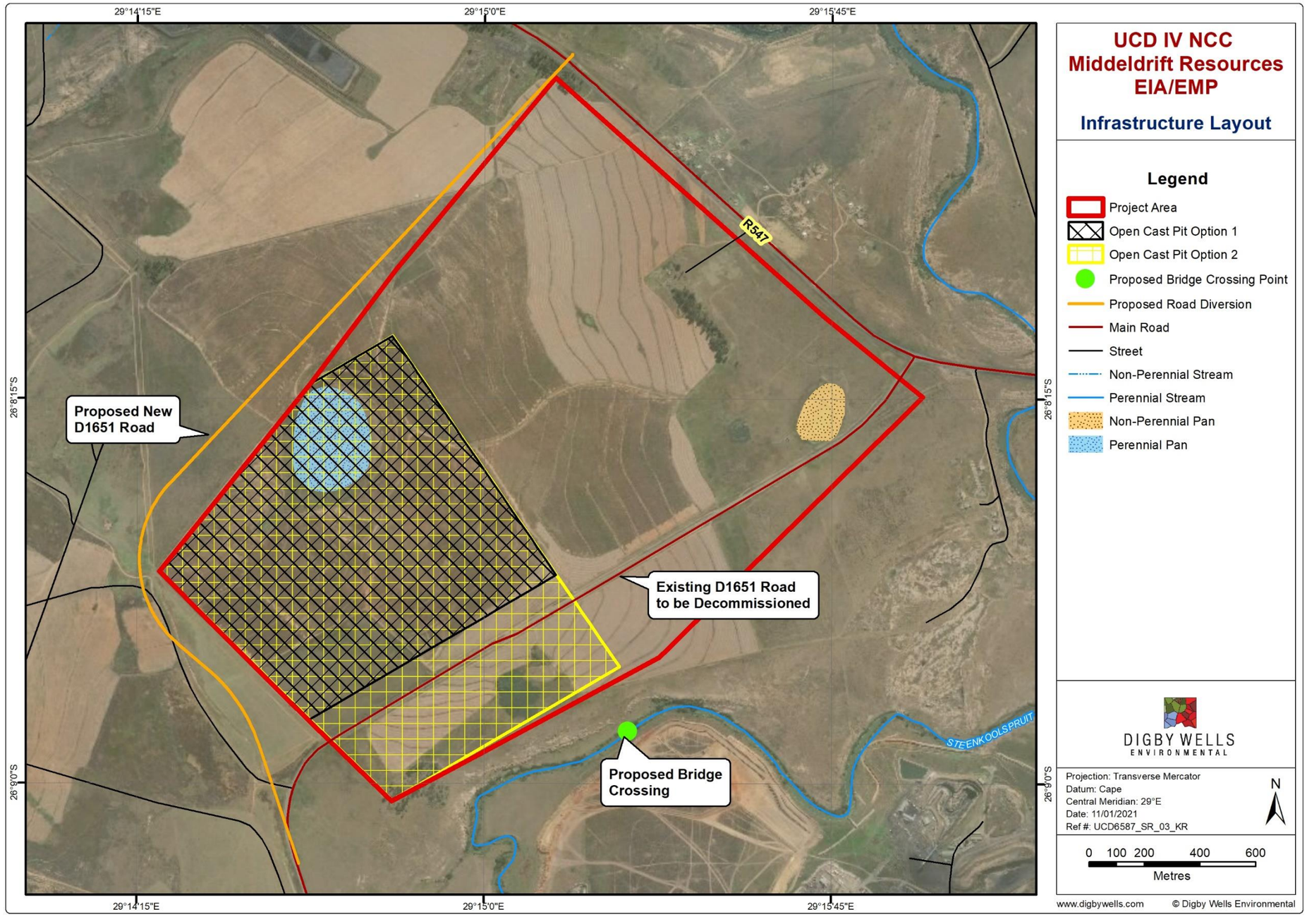


Figure 5-1: Preliminary Infrastructure Layout Plan

6 Item 2(e): Policy and Legislative Context

From an environmental and social perspective, the proposed Project is required to comply with all the obligations in terms of the provisions of the NEMA and MPRDA. The additional legislative guidelines directing the project are outlined in further detail in Table 6-1 below.

Table 6-1: Policy and Legislative Context

Applicable legislation and guidelines used to compile the report	Application
The Constitution of the Republic of South Africa, 1996 Under Section 24 of the Constitution of the Republic of South Africa, 1996 (the Constitution) it is clearly stated that: *Everyone has the right to* *(a) 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.*	Digby Wells is undertaking an EIA process to identify and determine the potential impacts associated with the Project. Mitigation measures recommended will aim to ensure that the potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.
NEMA and EIA Regulations, 2014 (as amended) NEMA was set in place in accordance with Section 24 of the Constitution. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that: *The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.* The EIA Regulations, 2014 were published under GN R982 on 4 December 2014 and came into operation on 08 December 2014. The Minister also published GN R983 (Listing Notice No. 1), GN R984 (Listing Notice No. 2) and GN R985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended. The EIA Regulations, 2014 have been made applicable to prospecting and mining activities.	Activities associated with the proposed mine are identified as Listed Activities in the Listing Notices (as amended) and therefore require environmental authorisation prior to being undertaken. This Scoping Report and proceeding EIA Report will be informed by the requirements of the NEMA and Regulations thereunder.
MPRDA The MPRDA sets out the requirements relating to the development of the nation's mineral and petroleum resources. It also aims to ensure the promotion of economic and social development through exploration and mining related activities. The MPRDA requires that mining companies assess the socio-economic impacts of their activities from start to closure and beyond. Companies must develop and implement a comprehensive Social and Labour Plan (SLP) to promote socio-economic development in their host communities and to prevent or lessen negative social impacts.	After granting of the EA, Universal Coal plan to apply for the Middeldrift Resources EMP to be included into their existing NCC operations. The EIA process will be undertaken to meet the requirements of the MPRDA read with the EIA Regulations, 2014 (as amended). Financial Provisioning and Closure Costs will be included in the EIA.
NWA The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA. Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 4 June 1999) (GN R704) promulgated under the NWA aim to regulate the use of water for mining and related activities for the protection of water resources and states the following: • Regulation 4: No residue deposit, reservoir or dam may be located within the 1:100-year flood line, or less than a horizontal distance of 100 m from the nearest watercourse. Furthermore, person(s) may not dispose of any substance that may cause water pollution;	An IWUL Application and an associated IWWMP are required in terms of Section 21 of the NWA for the Project. The IWUL Application and IWWMP will be compiled and submitted to the Department of Water and Sanitation (DWS) as the decision-making authority.

Applicable legislation and guidelines used to compile the report	Application
• Regulation 5: No person(s) may use substances for the construction of a dam or impoundment if that substance will cause water pollution; • Regulation 6 is concerned with the capacity requirements of clean and dirty water systems, and • Regulation 7 details the requirements necessary for the protection of water resources. Furthermore, the Regulations Regarding the Procedural Requirements for Water Use Licence Applications and Appeals (GN R267 of 24 March 2017) (GN R267) promulgated under the NWA will be applied.	
DWS[3] Best Practice Guideline – G1: Storm Water Management Plan (SWMP) These are guidelines provided by the DWS for the development of a SWMP. The following will be undertaken to develop the conceptual SWMP: • Delineate the clean and dirty area contributing to runoff (based on the final layout plans) and site-specific hydrological assessments to determine volumes that require to be handled. The SWMP should ensure that temporary drainage installations should be designed, constructed, and maintained for recurrence periods of at least a 25-year, 24-hour event, while permanent drainage installations should be designed for a 50-year, 24-hour recurrence period; and • Site specific assessments to establish the appropriate mitigation measures and surface water monitoring programme.	All water management infrastructure will be designed for a 1:100-year, 24-hour rainfall event.
DWS Best Practice Guideline – G4: Impact Prediction The impacts of mine activities on the groundwater environment must be assessed as part of the MR Application, as well as for the IWUL Application. The baseline conditions must be assessed to define the current aquifer systems, groundwater use and groundwater conditions before mine commencement and to determine the extent of possible future impacts on the groundwater resources.	An IWUL Application and an associated IWWMP are required in terms of Section 21 of the NWA. The IWUL Application and IWWMP will be compiled and submitted to the DWS as the decision-making authority. The EIA as part of the MR Application will assess potential impacts on groundwater resources as a result of the Project.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) The NEM:BA regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and takes into account the management of alien and invasive species. The following regulations which have been promulgated in terms of the NEM:BA are also of relevance: • Alien and Invasive Species Lists, 2014 published (GN R599 in GG 37886 of 1 August 2014); • Threatened and Protected Species Regulations, 2015 (GN R255 of 31 March 2015); and • National list of Ecosystems Threatened and in need of Protection under Section 52(1)(a) of the Biodiversity Act (GN R1002, 9 December 2011).	A Fauna and Flora Impact Assessment will be conducted as part of the EIA Phase.
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) The prevailing legislation in the Republic of South Africa with regards to the Air Quality field is the National Environment Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA). According to the Act, the DEA, the provincial environmental departments and local authorities (district and local municipalities) are separately and jointly responsible for the implementation and enforcement of various aspects of NEM:AQA. A fundamental aspect of the new approach to the air quality regulation, as reflected in the NEM:AQA is the establishment of National Ambient Air Quality Standards (NAAQS). These standards provide the goals for air quality management plans and also provide the benchmark by which the effectiveness of these management plans is measured. The NEM:AQA provides for the identification of priority pollutants and the setting of ambient standards with respect to these pollutants.	An Air Quality Impact Assessment will be undertaken as part of the EIA Phase. The Project's activities will set out to abide by the NEM:AQA and standards set out in the NAAQS. The required mitigation will be included in the EMPr as part of the EIA Phase.

[3] Previously the Department of Water Affairs (DWA)

Applicable legislation and guidelines used to compile the report	Application
National Dust Control Regulations, 2013 The Minister of Water and Environmental Affairs, released on the 01 November 2013 the National Dust Control Regulations, 2013 (GN R827 of 2013) in terms of Section 53, read with Section 32 of the NEM:AQA. In the published National Dust Control Regulations, terms like target, action and alert thresholds were omitted. Another notable observation was the reduction of the permissible frequency of exceedance from three to two incidences within a year. The standard actually adopted a more stringent approach than previously and would require dedicated mitigation plans now that it is in force.	An Air Quality Impact Assessment will be undertaken as part of the EIA Phase. The Project's activities will set out to abide by the NEM:AQA and standards set out in the NAAQS. The required mitigation will be included in the EMPr as part of the EIA Phase.
National Noise Control Regulations, 1992 (GN R154 of 10 January 1992) promulgated in terms of Section 25 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA) The National Noise-Control Regulations (GN R154 of 10 January 1992) form part of the ECA and these Regulations apply to external noise. The National Noise-Control Regulations, 1992 differentiate between Disturbing Noise levels (which is objective and scientifically measurable which are generally compared to existing ambient noise level) and Noise Nuisance (which is a subjective measure and is defined as noise that "*disturbs or impairs or may disturb or impair the convenience or peace of any person*"). Local Authorities use Controlled Areas to identify areas with high noise levels. Restrictions have been set out for development that occurs in these Controlled Areas. These regulations make provision for guidelines pertaining to noise control and measurements. The regulations make reference to the use of the SANS 10103:2008 guidelines for the Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication. As such, a Noise Impact Assessment in accordance with the National Noise-Control Regulations, 1992 must be undertaken for submission to determine the potential disturbing and nuisance noise levels associated with a particular development.	A Noise Impact Assessment will not be conducted during the EIA. Universal Coal will need to comply with the National Noise-Control Regulations, 1992.
The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa. The Act requires that Heritage Resources Agencies in this case the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Resources Authority of Gauteng (PHRA-G), be notified as early as possible of any developments that may exceed certain minimum thresholds. This act is enforced through the National Heritage Regulations, 2000 (GN R548 of 2 June 2000).	A Heritage Impact Assessment will form part of the EIA Phase.
Financial Provisioning Regulations, 2015 (GN R 1147 of 20 November 2015) The Financial Provisioning Regulations, 2015 prescribe methods for determining the quantum of financial provision for rehabilitation and mechanisms for providing for it. Section 41 (1) of the MPRDA has been repealed and Section 24P of the NEMA, as amended, which provides that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision must guarantee the availability of sufficient funds.	The Financial Provisioning Regulations, 2015 are applicable to rehabilitation and closure plans as they prescribe the minimum content of an annual rehabilitation plan and the minimum content of a final rehabilitation, decommissioning and mine closure plan. This will be undertaken and included in the EIA.
MPRDA Regulations, 2004 (GN R527 of 23 April 2004) The MPRDA Regulations, 2004 specifies that the EMPr must include environmental objectives and specific goals for mine closure. The applicant for a mining right must make prescribed financial provision for the rehabilitation or management of negative environmental impacts, which must be reviewed annually. The Regulations provide specific principles for mine closure including safety and health, residual and latent environmental impacts, etc.	A preliminary EMPr is provided in Section 12.9 of this report.
Climate Change Bill, 2018 (GN R580 of 8 June 2018) *To build the Republic's effective climate change response and the long term, just transition to a climate resilient and lower carbon economy and society in the context of an environmentally sustainable development framework; and to provide for matters connected therewith.*	Although not promulgated, Universal Coal must adhere to national climate change legislation in terms of South Africa's goals and commitments in terms of the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement.

7 Item 2(f): Need and Desirability of the Proposed Activities

Globally, coal plays a vital role in electricity generation. South Africa is primarily reliant on electricity generation from coal-fired power stations. About 77% of the country's primary energy needs are provided by coal (Eskom, 2018). In addition to supplying the local economy, approximately 28% of South Africa's production is exported. Renewable and alternative energy sources cannot yet meet the demands of the country's electricity needs. Coal mining is therefore crucial for the supply of coal to meet the energy needs of the country's economy and until alternative energy generation options can be implemented on a sufficiently large scale, South Africa remains mainly dependent on coal mining.

The Project will provide coal for supply to Eskom, thereby assisting with the alleviation of the shortage of supply. It can be noted that NCC has an existing contract and commitment to supply Eskom with coal and Middeldrift would contribute to the continuance or honouring of that contract.

Coal mining is already ongoing at the existing NCC MR areas; however, these are becoming depleted. The extension of the mining into Middeldrift will ensure continued employment for existing staff and may include the benefits of additional income generation in the area. The proposed Project will result in the development of the mine within the ELM and thus ensure that the mining activities create economic benefits to support the local and national economic and social needs. The employment of local labour will decrease the unemployment rate (by implementing a Social Labour Plan) in the area, as well as allow for the uplifting of the local communities. Thus, the proposed Project will result in employment opportunities and skills development in the area.

7.1 Questions to be Engaged with when Considering Need and Desirability

The Guideline on the assessment of Need and Desirability (DEA, 2017) includes a number of questions, the answers to which should be considered during the EIA Process. Table 7-1 presents the needs and desirability analysis undertaken for the Project.

Table 7-1: Results of the Need and Desirability Analysis

Theme	No.	Question	Response
Securing ecological sustainable development and use of natural resources"	1	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	The proposed Project is within an ecologically sensitive area, especially with regards to the pan to be mined through. During the EIA Phase, the impacts to each environmental aspect will be assessed according to the Digby Wells impact assessment methodology.
	1.1	How were the following ecological integrity considerations taken into account?	
	1.1.1	Threatened Ecosystems	The Project is located within the Endangered Eastern Highveld Grassland. Several Near Threatened fauna and flora have been identified as potentially occurring. These will need to be verified during the site assessment. Refer to Section 10.7 for a list of these species.
	1.1.2	Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.	The DWE Wetland Scoping Report (2020) has identified a Depression and Seep National Freshwater Ecosystem Priority Areas (NFEPA) Wetland within the Project Area. The transformed habitat unit was associated historical agricultural activities, altering the ecological structure of the associated Eastern Highveld Grassland. The overall ecological functionality was deemed to be low.
	1.1.3	Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs)	The Project Area consists of areas that are classified as Other Natural Areas and is in very close proximity to a CBA.
	1.1.4	Conservation targets	These will be considered during the EIA Phase and responded to accordingly.
	1.1.5	Ecological drivers of the ecosystem	
	1.1.6	Environmental Management Framework	

Theme	No.	Question	Response
	1.1.7	Spatial Development Framework (SDF)	The NDM IDP which is informed by the SDF will be considered in the EIA Phase.
	1.1.8	Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)	A desktop survey of wetlands was carried out for the Scoping Phase which referenced NFEPA wetlands. No RAMSAR sites are present in the vicinity of the Project area.
	1.2	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	With the identification of a Depression and Seep NFEPA wetland, the hierarchy of mitigation measures will be employed by the wetland specialist during the EIA Phase. This will inform the final mitigation measures which Universal Coal will need to consider. Digby Wells' impact assessment methodology will be utilised to identify, determine and assess the potential impacts during the EIA Phase.
	1.3	How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	
	1.4	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	The alternatives take into consideration options to minimise the amount of waste stockpile material on site and / or ways to reduce their impact on the receiving environment. The existing waste management infrastructure at NCC will be utilised to minimise the generation of waste at Middeldrift and therefore no waste material will be stored at Middeldrift.

Theme	No.	Question	Response
	1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	A desktop survey was conducted for the Scoping Phase, but the extent to which cultural heritage sites will/may be disturbed will be investigated in the EIA Phase.
	1.6	How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Coal is a non-renewable energy resource, however, South Africa is dependent on coal and until the energy supply and demand can feasibly be replaced with renewable energy, non-renewable energy sources will be required. The extent of any positive impacts associated with this Project will be investigated in the EIA Phase. Preliminary impacts of the proposed project have been identified and mitigation measures aimed at avoiding, reducing and / or managing the negative impacts as well as enhancing the positive impacts have been recommended.
	1.7	How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	The Project Area lies within the Olifants Water Management Area. The Scoping Phase has confirmed the presence of wetlands and the potential for extensive water management on site for the proposed mine due to disturbance of the natural groundwater aquifers and surface flows. The extent of these impacts and potential mitigation can only be determined in the EIA Phase. It must be noted that avoidance of this impact would result in the No-Go alternative being implemented, as the coal seams' extents are unsuitable for underground mining.

Theme	No.	Question	Response
	1.7.1	Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)	Historically, Eskom has struggled to secure coal from South African mining operations due to international prices of coal yielding more profit for mines. South Africa will be a coal-dependent country for the foreseeable future.
	1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)	
	1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	The Project is for the mining of a coal resource. The resource was identified to be suitable for exploitation. The EIA will provide mitigation measures to reduce the overall impact of the mine in terms of scarce resource usage.
	1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts?	Sufficient information was gathered prior to the onset of this process to indicate that the potential mining of coal is feasible.
	1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Each specialist will investigate the impacts and present the gaps and / or limitations in knowledge in their respective reports. Gaps in knowledge are collated and expressly provided in the EIA Report, which is submitted to the Competent Authority for consideration.
	1.8.2	What is the level of risk associated with the limits of current knowledge?	

Theme	No.	Question	Response
	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?	Universal Coal are yet to approve the undertaking of a Social Impact Assessment which does not form part of Digby Wells' scope.
	1.9	How will the ecological impacts, resulting from this development impact on people's environmental right in terms following:	These will be investigated and quantified by each specialist and presented in the EIA Phase.
	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?	
	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.)?	
	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?	
	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	Alternatives in terms of mining method have been considered; however, the application is to mine through the depression and seep wetland due to the identified underlying coal resource.

Theme	No.	Question	Response
		the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	
	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?	Cumulative impacts will be investigated and presented during the EIA Phase.
Promoting justifiable economic and social development"	2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
	2.1.1	The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,	The spatial and economic development projects will be implemented through the Municipal IDP. The proposed Project will promote and support the sustainability of existing business, as well as assist in increasing local beneficiation and shared economic growth for the confirmed 12-year LoM.
	2.1.2	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	
	2.1.3	Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and	
	2.1.4	Municipal Economic Development Strategy ("LED Strategy").	
	2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	The proposed Project will result in limited job opportunities as well as the continuation of the existing employment at the NCC.
	2.2.1	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	The Applicant is committed towards contributing to the socio-economic activities of the immediate community and the region. In addition, the company will ensure that the contractors have fully

Theme	No.	Question	Response
			developed skills plans and all colliery employees receive training and development in accordance with these plans.
	2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Universal Coal will implement the SLP Community Development projects and initiatives which are based on the requirements identified by surrounding communities through the SLP consultation process.
	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?	The aim of the SLP is to initiate projects which develop the surrounding communities which may be impacted by a proposed mining project. The mine itself will have a LoM of 12 years and therefore will present long-term sustainable employment. However, the SLP initiatives must also provide long-term sustainable projects that the community can adopt and manage.
	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,	The Project will result in the continuance of existing employment at the NCC and short term employment opportunities during the construction phase.
	2.5.2	reduce the need for transport of people and goods	Coal product will be trucked or transported via road to Eskom for electricity generation.
	2.5.3	result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	
	2.5.4	compliment other uses in the area,	A Traffic Impact Assessment will be undertaken in the EIA Phase, which will establish potential congestion on surrounding roads and provide mitigation measures to manage the impact of the district

Theme	No.	Question	Response
			road diversion. The Applicant will be required to obtain wayleave approvals in regard to the road diversion.
	2.5.5	be in line with the planning for the area,	The proposed LoM is 12 years and the Closure and Rehabilitation Report will consider the post-closure end land use.
	2.5.6	for urban related development, make use of underutilised land available with the urban edge,	Not applicable. The proposed Project area is outside an urban area.
	2.5.7	optimise the use of existing resources and infrastructure,	No infrastructure is available on site which can be utilised as part of the mining operation. The existing infrastructure at NCC will be utilised as far as possible.
	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),	No bulk infrastructure will form part of this development.
	2.5.9	discourage "urban sprawl" and contribute to compaction/densification,	The Project Area and surrounds are agricultural and rural and cannot therefore influence urban sprawl.
	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,	The employment will prioritise Historically Disadvantaged South Africans as beneficiaries. Existing infrastructure at the NCC will be utilised as far as possible for the transportation, stockpiling and processing of coal. No municipal infrastructure will be used.
	2.5.11	encourage environmentally sustainable land development practices and processes,	The proposed land use for the Project will be developed with effort made towards being environmentally sustainable in the long term. One of the key aspects to ensuring long terms land sustainability

Theme	No.	Question	Response
			will be to ensure successful rehabilitation and post mining land-use capability.
	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.),	The location of the proposed Project is dependent on the location of the identified coal resource.
	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 to the local communities through continued employment of workers and local contractors, as well as other influences and community upliftment programmes that are undertaken by the mine.
	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	The impact to cultural heritage will be investigated during the EIA Phase.
	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 area, as well as programmes implemented from the mine's SLP.
	2.6	How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	The existing SLP was compiled in consideration of the socio-economic impacts for the entire MR area.
	2.6.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Gaps in knowledge, uncertainties and assumptions will be determined during the EIA Phase and presented in the EIA Report.
	2.6.2	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic	

Theme	No.	Question	Response
		vulnerability and sustainability) associated with the limits of current knowledge?	
	2.6.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
	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?	A Social Impact Assessment may be considered during the EIA Phase which will need to consider the extent and significance of the proposed impacts presented in this section. The Middeldrift Resources lie within the existing NCC MR boundary and as such shall comply with the existing and approved SLP.
	2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	
	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 socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	
	2.9	What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	
	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	

Theme	No.	Question	Response
		need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	
	2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	
	2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	
	2.13	What measures were taken to:	
	2.13.1	ensure the participation of all interested and affected parties,	During the pre-application and Scoping Phase, an Interested and Affected Parties (I&AP) database was developed to identify and verify the directly and indirectly affected landowners or land occupiers as well as the potentially affected surrounding communities. This database will be updated throughout the EIA Process to ensure adequate consultation.
	2.13.2	provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	Digby Wells will maintain and update the I&AP database to ensure communication with all registered I&APs. Site notices have been erected in various locations around the site and in the nearest communities to announce the Project, SMS notifications will be utilised to provide progress reports to I&APs as well as Digby Wells contact information for further consultation. Public meetings will be held in both the Scoping and EIA Phases to engage with any I&AP

Theme	No.	Question	Response
			who wishes to attend, and the Project will be presented at these meetings as well as the findings of the impact assessments.
	2.13.3	ensure participation by vulnerable and disadvantaged persons,	Site notices have been placed, and Focus Group Meetings (FGMs) will be held with the affected community. The Background Information Document (BID) will be distributed and a translator will also attend all FGMs to fully engage with all affected stakeholders.
	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,	The consultation process seeks to inform affected communities of the positive and negative impacts associated with a proposed Project and provide opportunity for any stakeholder to raise concerns which will be responded to both on record in the reports and through direct written response (where possible).
	2.13.5	ensure openness and transparency, and access to information in terms of the process,	Digby Wells is bound by legislation and regulations to share information pertaining to the Project, to be transparent and impartial.
	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, and	All stakeholder needs will be accommodated as far as is reasonable.
	2.13.7	ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein was be promoted?	The EAP cannot force participation from specific demographic groups. Cultural norms will be respected and adhered to; however, no demographic group can be excluded from public consultation and therefore, all registered stakeholders and meeting attendees will be considered intrinsic to the public consultation process and outcomes.
	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	

Theme	No.	Question	Response
		consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	
	2.15	What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected	The Applicant must produce a Health and Safety Policy and best practice on site, compliant with the Mine Health and Safety Act, 1996 (Act No. 29 of 1996).
	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,	Most of the staffing will be employed by the mining and engineering contractors and will be primarily from the Local Municipality with some from other parts of South Africa and/or neighbouring countries.
	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),	The planned workforce will consist of permanent employees and contractor employees primarily from the Local Municipality with some from other parts of South Africa and/or neighbouring countries.
	2.16.3	the distance from where labourers will have to travel,	Job opportunities will be created as a result of the Project, however, it is too early in the process to confirm from what distance labourers will be required to travel, as the labour force has not yet been appointed. The Applicant is committed to source labour from the nearest affected community and only search beyond the constraints of the immediate employment catchment zone if the skills required cannot be accommodated.
	2.16.4	the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and	

Theme	No.	Question	Response
	2.16.5	the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	The number of farm workers who may be displaced should the Project proceed will be determined during the EIA Phase.
	2.17	What measures were taken to ensure:	
	2.17.1	that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and	Digby Wells has identified the relevant government organisations which must be consulted throughout the EIA Process. Furthermore, this application is in terms of the One Environmental System and Digby Wells shall endeavour to align the various procedures to reduce stakeholder fatigue.
	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 and key stakeholders have been notified about the project by the EAP and registered as I&APs who will continue to be notified and engaged with regarding the project throughout the EIA process.
	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?	As part of the EIA Process, Financial Liability for the Applicant will be calculated to determine the cost of decommissioning and rehabilitating the mine site to a post-closure end land use which is sustainable and in the best interest of both the surrounding communities and the environment.
	2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	
	2.20	What measures were taken to ensure that he 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?	

Theme	No.	Question	Response
	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?	The layout of the proposed Project was informed by the location of coal resources. Refer to Section 9.
	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?	Cumulative impacts will be assessed during the EIA Phase and presented in the EIA Report.

8 Item 2(g): Period for which the Environmental Authorisation is Required

The proposed LoM for the Project will require EA for the same period of time as the existing MR with reference number **MP30/5/1/2/2/492MR** which is until the year 2034 to accommodate the construction and operational phases. A separate EA will have to be applied for when decommissioning takes place and before closure is reached.

9 Item 2(h): Description of the Process Followed to Reach the Proposed Preferred Site

The location of the Project has been decided by the location of the identified coal seams. Coal resources were determined based on the areas where the coal could be mined economically by opencast mining methods. Existing exploration boreholes have been used in identifying the economically viable Middeldrift Resources.

The total reserve at NCC without Middeldrift is estimated at 26.6 Mt and will be mined at 4 to 4.5 million tons per annum (mtpa). Middeldrift will contribute an estimated 20.9 Mt to the reserve bringing the total reserve to 47.7 Mt.

9.1 Item 2(h)(i): Details of all Alternatives Considered

This section details the alternatives considered in terms of mining methods as well as the LoM plan.

9.1.1 Mining Method Alternatives

Exploration boreholes and coal seams are present across the NCC MR Area. The area is subdivided into potential opencast and underground resource areas, using the combined strip ratio as a cut-off at (less than) < 5 cubic metres (m^3) per tonne as a guide to define the opencast area; and areas where the S4 or S2 is deeper than 30 m to define the underground resource area. Minimum seam thickness inclusion is 0.5 m for the opencast area and 1 m for the underground area. No cut-offs are applied on the qualities of the coal.

The Middeldrift Resources have favourable strip ratios for opencast mining operations.

9.1.2 Life of Mine

For the mining at Middeldrift to progress through the district road, it requires wayleave applications, decommissioning of the existing road and construction of a new road around the opencast pit. **Option 1** is based on the possibility of the wayleaves and diversion not being approved while **Option 2** assumes that the road diversion will be permitted. See Figure 9-1 and Figure 9-2 for the respective options.

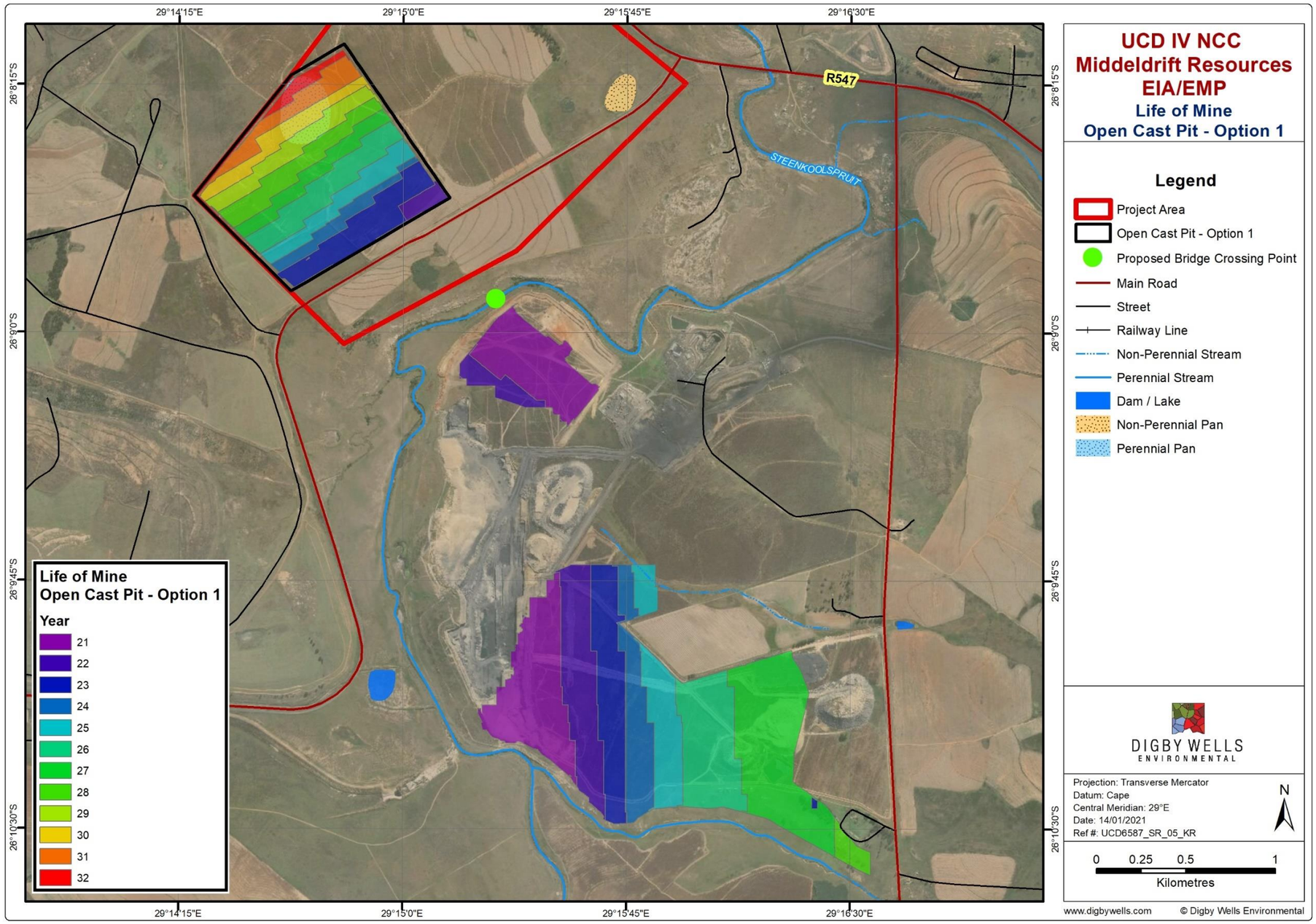


Figure 9-1: Progression of Mining Option 1

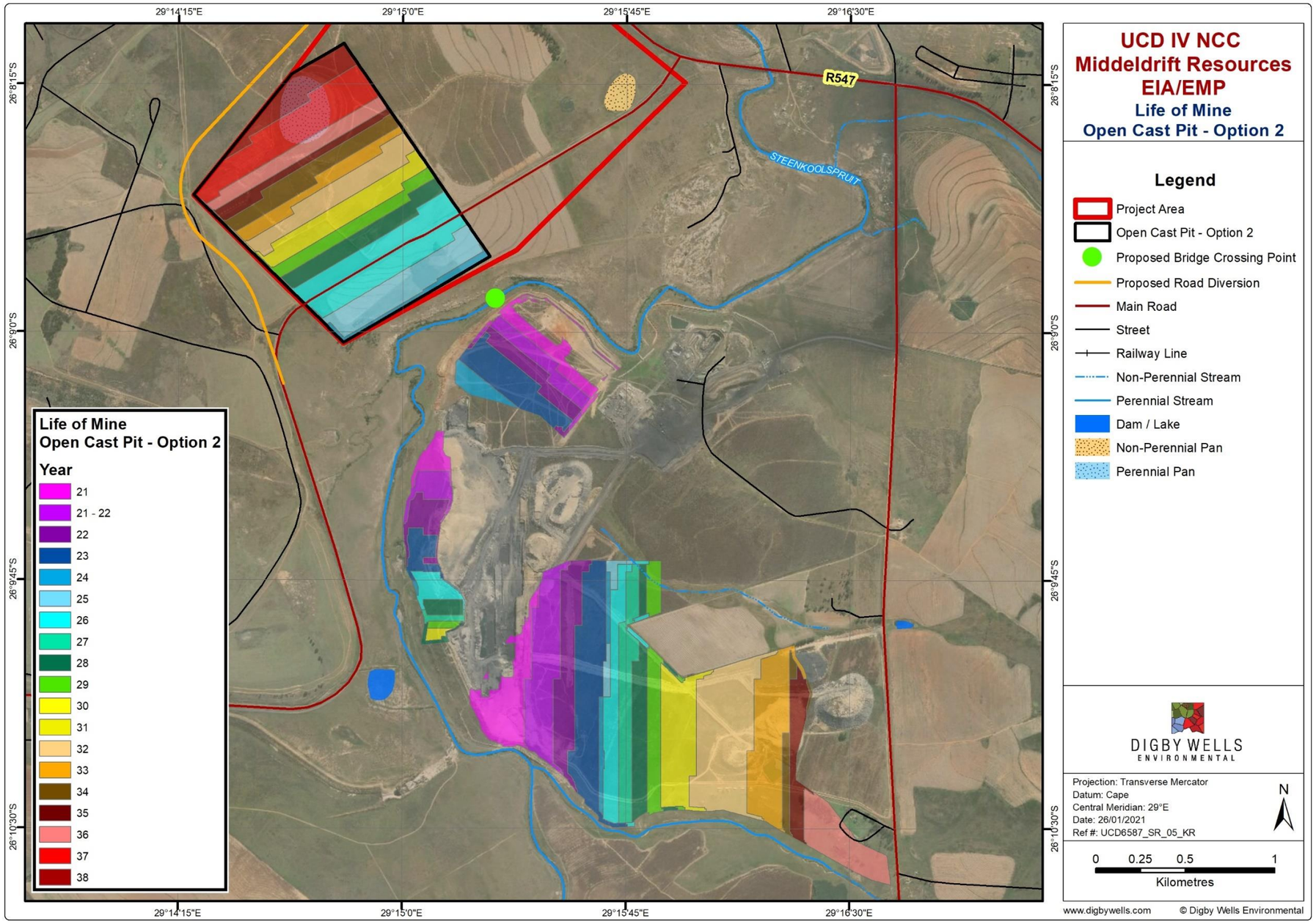


Figure 9-2: Progression of Mining Option 2

9.1.3 The "No-Go" Alternative

The no-go alternative is the option of not mining coal in the area. This option also means that all potential negative impacts associated with the proposed mine and its associated infrastructure would not occur. However, the potential benefits associated with the Project would also not occur.

Without the Middeldrift extension, NCC will need to increase the profile of the current mining areas to produce 4.5 Mt and therefore, reduce the LoM from 12 years to six years.

9.2 Item 2(h)(ii): Details of the Public Participation Process followed

During the Scoping Phase, the following core stakeholder engagement activities were undertaken according to the submitted Public Participation Plan attached in Appendix D:

- Stakeholders (including Government Departments, landowners, land occupiers, communities, Non-Governmental Organisations, agricultural organisations, Parastatals and businesses) have and will continue to be identified and captured in a stakeholder database;
- A BID and notification letter were distributed to the identified I&APs together with the placement of an advert and site notices around the Project Area;
- The Draft Scoping Report and associated documentation was made available for public comment for a period of 30 days (29 January 2021 – 1 March 2021) on a website where the report could be downloaded at no cost to the I&AP;
- One-on-one Focus Group Meetings (FGMs) with the directly affected land occupiers were held at the following locations:
    - Emalahleni Local Municipality at Emalahleni Local Municipality Main Offices: Environmental and Waste Management Department on **19 February 2021 from 10H00-11H00;**
    - Land Owners at New Clydesdale Colliery BI Boardroom on **19 February 2021 from 14H00-15H00**; and
    - Local Community at New Clydesdale Colliery BI Boardroom on **20 February from 10h00-13h00.**
- Suggestions and concerns received during the public comment period have been recorded and responded to in Table 9-2 below and included in the Public Participation Report attached in Appendix D.

Table 9-1 provides a summary of the PPP activities undertaken to date.

Table 9-1: Public Participation Scoping Phase Activities

Activity	Details
Identification of stakeholders	Stakeholder database which represent various sectors of society, including directly affected and adjacent landowners, in and around the proposed Project area.
Distribution of BID announcement letter	A BID with registration and comment form was emailed to stakeholders on **29 January 2021**. An SMS was also sent to stakeholders announcing the availability of the Draft Scoping Report.
Placing of newspaper advertisement	A newspaper advertisement was placed in the Highveld Chronicle to announce the public comment period.
Putting up of site notices	English site notices were placed in areas that are frequently visited by locals on 27 January 2021. These areas are: 1. Kriel Library; 2. Kriel Post Office; 3. Emalahleni Local Municipality and; 4. Emalahleni Post Office. *A site notice placement report and map was developed to indicate the locations of site notices in and around the Project area.*
Announcement of Draft Scoping Report	Announcement of availability of the Draft Scoping Report was emailed and sent via SMSs to stakeholders together with the formal project announcement on 29 January 2021. The Draft Scoping Report was released electronically and made available to stakeholders on the Digby Wells website (www.digbywells.com under Public Documents) and could be accessed via our data-free service portal. **Note:** Due to COVID-19 Regulations, no documents were placed at public areas. Stakeholders were sent a data-free link where they could access the reports. http://view.datafree.co/PublicDocuments/
FGMs	One-on-one FGMs were held with stakeholder as indicated below: • Emalahleni Local Municipality at Emalahleni Local Municipality Main Offices: Environmental and Waste Management Department on **19th of February 2021 from 10H00-11H00;** • Land Owners at New Clydesdale Colliery BI Boardroom on the **19th of February 2021 from 14H00-15H00**; and • Local Community at New Clydesdale Colliery BI Boardroom on the **20th Of February from 10h00-13h00**.
Obtaining comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders were captured in the Comment and Response Report (CRR).

Activity	Details
Announcement of Final Scoping Report	This report will be made available on www.digbywells.com (under Public Documents).

9.3 Item 2(h)(iii): Summary of Issues Raised by I&APs

This Comments and Response Report (CRR) has been compiled as part of the Public Participation Process (PPP) concluded for the Scoping Phase of the Environmental Authorisation (EA) Application process undertaken for the proposed inclusion of the Middeldrift Resources into the existing New Clydesdale Colliery (NCC).

The purpose of this CRR is to present the outcomes of the PPP including Focus Group Meetings held on 19 and 20 February 2021 with identified Interested and Affected Parties (I&APs); and any other feedback received from I&APs throughout the process.

The attendance registers for the FGM held on 20 February 2021 is not available however the names listed in the comments section can serve as an incomplete attendance register as the community seized the attendance register that was signed by all the attendees of the meeting due to disgruntlement about SLP issues. In addition, the recordings of the meeting will be made available upon request.

The CRR is contained in Table 9-2 below. ***Please note that herein are some comments that do not relate to the proposed Middeldrift Resource Project application and have been forwarded to NCC's relevant Human Resource: Social and Labour Plan (SLP) Department for consideration and addressing in the SLP Forum structure in place at the mine.***

Table 9-2: Comments and Responses During Scoping Phase

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF ENGAGEMENT	RESPONSE
i) Project-Specific Issues						
How far is the proposed area for mining from the nearest community?	Mr	L Mahlaule	Emalahleni Local Municipality (hereinafter ELM)	19 February 2021	Focus Group Meeting ELM Main Offices: Environmental and Waste Management Department	The area identified for the proposed mining expansion is approximately 10km away from the Thubelihle community.
What is the current zoning classification of the proposed mining area? Does the existing mine have a rezoning permit for mining? The ELM is responsible for issuing rezoning permits and this must be considered for the entire mine operations.	Mr	L Mahlaule	ELM	19 February 2021	Focus Group Meeting ELM Main Offices: Environmental and Waste Management Department	Zoning classifications will be discussed and communicated to the ELM.
The municipality requests that NCC complies with all Municipal By-Laws including the Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013) (SPLUMA).	Mr	L Mahlaule	ELM	19 February 2021	Focus Group Meeting ELM Main Offices: Environmental and Waste Management Department	Digby Wells will ensure that the applicable municipal by-laws are considered during the EA process undertaken for the project.
The cumulative impacts of the existing and proposed mine operations must be	Mr	L Mahlaule	ELM	19 February 2021	Focus Group Meeting	Thank you for the comment. Digby Wells will

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF ENGAGEMENT	RESPONSE
assessed as part of the EIA. The mitigation measures and management plans must be developed in order to protect the impacted community and the environment.					ELM Main Offices: Environmental and Waste Management Department	ensure that the cumulative impacts are addressed in the EIA.
What is the current land use of the proposed mining area?	Mr	O Riba	ELM	19 February 2021	Focus Group Meeting ELM Main Offices: Environmental and Waste Management Department	The current land use classification is agriculture.
Mr Malatji confirmed that he is not impacted by the proposed project.	Mr	Malatji	Farmer	19 February 2021	Focus Group Meeting New Clydesdale Colliery BI Boardroom	Thank you for the confirmation.
ii) Proposed Project Infrastructure						
What is the purpose of the bridge in the proposed infrastructure plan?	Mr	O Riba	ELM	19 February 2021	Focus Group Meeting ELM Main Offices: Environmental and Waste Management Department	The proposed bridge will be constructed as an alternative route to cross over the Steenkoolspruit perennial stream which will connect the existing NCC and the proposed

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF ENGAGEMENT	RESPONSE
						Middeldrift mine expansion operations.
iii) Specialist Studies						
Mr de Wet confirmed that he is not impacted by the proposed project; however is concerned about the potential increase in traffic.	Mr	C De wet	Farmer	19 February 2021	Focus Group Meeting New Clydesdale Colliery BI Boardroom	Thank you for the confirmation. Digby Wells will assess all potential impacts and findings of the specialist's studies will be presented during the EIA phase of the project. A Traffic Impact Assessment will be undertaken during the EIA Phase.
The current biodiversity in the area might be affected by the proposed mining activities. How will the impact assessment be conducted?	Mr	O Riba	ELM	19 February 2021	Focus Group Meeting ELM Main Offices: Environmental and Waste Management Department	Digby Wells will be conducting a Land Use and Land Capability study that will assess the impacts related to soil capability and agriculture. The Fauna and Flora, Aquatic and Wetland Assessment studies will assess the potential impacts on wetlands and aquatic ecosystems and biodiversity. The specialists

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF ENGAGEMENT	RESPONSE
						will be conducting field surveys and use sampling analysis methods. All samples will be taken to the laboratory for analyses. From the sampling analysis; the specialists will provide ratings as per the classifications of the different site-specific environmental aspects. All ratings will follow the specific methodology as prescribed in each specialist study in order to develop mitigation measures and management plants to limit or avoid negative impacts. The methodology is described in the Scoping Report.
iv) Auxiliary Information Requested by Commenting Authority						
The Municipality requests NCC to provide dust monitoring reports for the past 6 months for the existing mine operation.	Mr	L Mahlaule	ELM	19 February 2021	Focus Group Meeting	Air Quality monitoring reports dated July 2020 – January 2021 were

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF ENGAGEMENT	RESPONSE
					ELM Main Offices: Environmental and Waste Management Department	submitted to ELM on 18 March 2021.
The Municipality requests NCC to provide their Waste Management Plan (WMP) for the existing mine operation.	Ms	J.C Phetla	ELM	19 February 2021	Focus Group Meeting ELM Main Offices: Environmental and Waste Management Department	The Integrated Water and Waste Management Plan was submitted to ELM on 18 March 2021.
v) Public Participation						
The ELM requested a meeting with the project team on 3 August 2021 and further requested to be registered as an I&AP.	Mr	O Riba	ELM	3 February 2021	Email Correspondence	The ELM has been registered as an I&AP on the proposed project. The request for a meeting has been acknowledged as per correspondence dated 12 February 2021. Furthermore, a meeting was held at ELM Main Offices with the Environmental and Waste Management Department on the 19 February 2021.

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF ENGAGEMENT	RESPONSE
It is recommended that all project related information and advertisements be broadcasted on the local radio station, namely the Emalahleni FM in languages that are dominant in the area being IsiNdebele, Isizulu and SePedi.	Mr	L Mahlaule	ELM	19 February 2021	Focus Group Meeting ELM Main Offices: Environmental and Waste Management Department	Digby Wells has noted the request and Universal Coal have agreed to undertake this during the EIA Phase.
What was the process that was followed to inform all the affected and interested (I&APs)?	Mr	M Thwala	Bakenlagte farm	20 February 2021	Focus Group Meeting New Clydesdale Colliery BI Boardroom	I&APs were identified through the use of existing stakeholder databases as provided by Universal Coal and from Digby Wells' existing projects in the same area. These were also updated to verify that they are current. Notifications were distributed by email and Short Message Service (SMS) to inform all I&APs about the proposed project and the date for the FGMs. Electronic mail (e-mail) was also distributed.
The communities around the NCC operations request that there be	Mr	J Nkosi	Rietspruit Community	20 February 2021	Focus Group Meeting	Comment noted.

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF ENGAGEMENT	RESPONSE
meaningful engagements with Digby Wells and Universal Coal.					NCC Conference Room	
All future PPP meetings must be held at the nearest community hall to allow all impacted community members to participate meaningfully in all processes. NCC must also assist in transport arrangements so that communities can attend PPP meetings.	Mr	G Nimrod	Thubelihle Community	20 February 2021	Focus Group Meeting	NCC indicated that this will not be possible. The next PPP meetings will be held in a venue nearest to the affected community which is Thubelihle Community Hall. This will be confirmed. All public gatherings will be organised according to the National COVID-19 Regulations.
The community demanded that the following stakeholders be present at all future meetings to be held namely: 1. Officials from DMRE; 2. Nkangala District Mayor; 3. ELM Executive Mayor and Municipal Manager; 4. ELM Integrated Development Plan Manager; and 5. Chief Executive Officer of Universal Coal Development	Mr	I Malinga	Rietspruit Community	20 February 2021	Focus Group Meeting New Clydesdale Colliery BI Boardroom	The PPP meetings are conducted in accordance with the EIA Regulations, 20014 (as amended) minimum requirements. The NCC will ensure that there are representatives from the organisation that can note and/or respond to concerns raised in the PPP meetings. All I&APs are extended the invitation to

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF ENGAGEMENT	RESPONSE
						attend meetings at their accord and discretion.
The community indicated that they will not provide the signed attendance registers until their above request is actioned.	Mrs	D Skosana	Thubelihle Community	20 February 2021	Focus Group Meeting New Clydesdale Colliery BI Boardroom	This comment has been noted.
Digby Wells is being used by NCC to deceive the community. All that Digby Wells wants to do is to report back to the DMRE and say that the community has been engaged.	Mr	D Sithole	Thubelihle Community	20 February 2021	Focus Group Meeting NCC Conference Room	Digby Wells does not act on behalf NCC but are independent consultants responsible for the EA Application process and EIA. Digby Wells cannot make decisions on behalf of NCC.
Digby Wells has been conducting PPP for many mines in the area and has made false promises since 2011 to the community about mining benefits.	Mr	M Thwala	Bakenlagte Farm	20 February 2021	Focus Group Meeting NCC Conference Room	
The community is objecting the NCC mining operations. The greater community of Nkangala is under the leadership of the Ndebele Tribal Authority led by Chief Popeye Mahlangu given that no formal communication was ever established with the Tribal Authority. This shows that NCC undermines the tribal authority.	Mrs	D Skosana	Thubelihle Community	20 February 2021	Focus Group Meeting NCC Conference Room	Thank you for the comment. Digby Wells will identify the relevant traditional authority with jurisdiction within the project area. To this effect, Digby Wells will then

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF ENGAGEMENT	RESPONSE
						engage with the relevant traditional authority.
vi) Employment, Business and Skills Training Opportunities						
Please note that the following comments do not relate to the proposed Middeldrift Resource Project application and have been forwarded to NCC's relevant Human Resource: Social and Labour Plan (SLP) Department for consideration and addressing in the SLP Forum structure in place at the mine.						

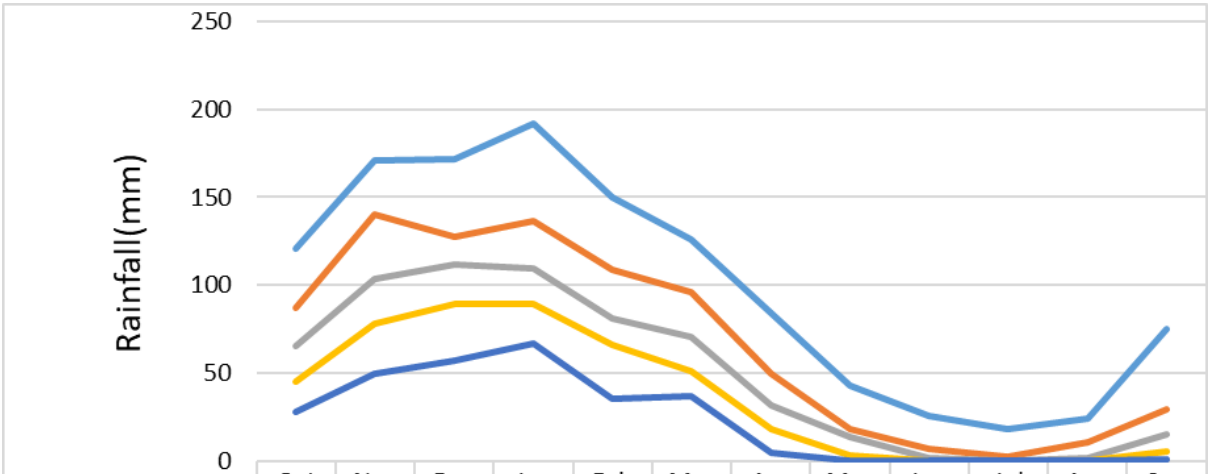
10 Item 2(i): The Environmental Attributes Associated with the Sites

This section comprises the baseline environment of the proposed Project area as assessed by the relevant specialists. This includes the features of the environment on site and land use which is expected to be affected by the proposed Project.

Digby Wells undertook desktop specialist investigations in October and November 2020 to inform the environmental baseline conditions for the Project area.

10.1 Climate

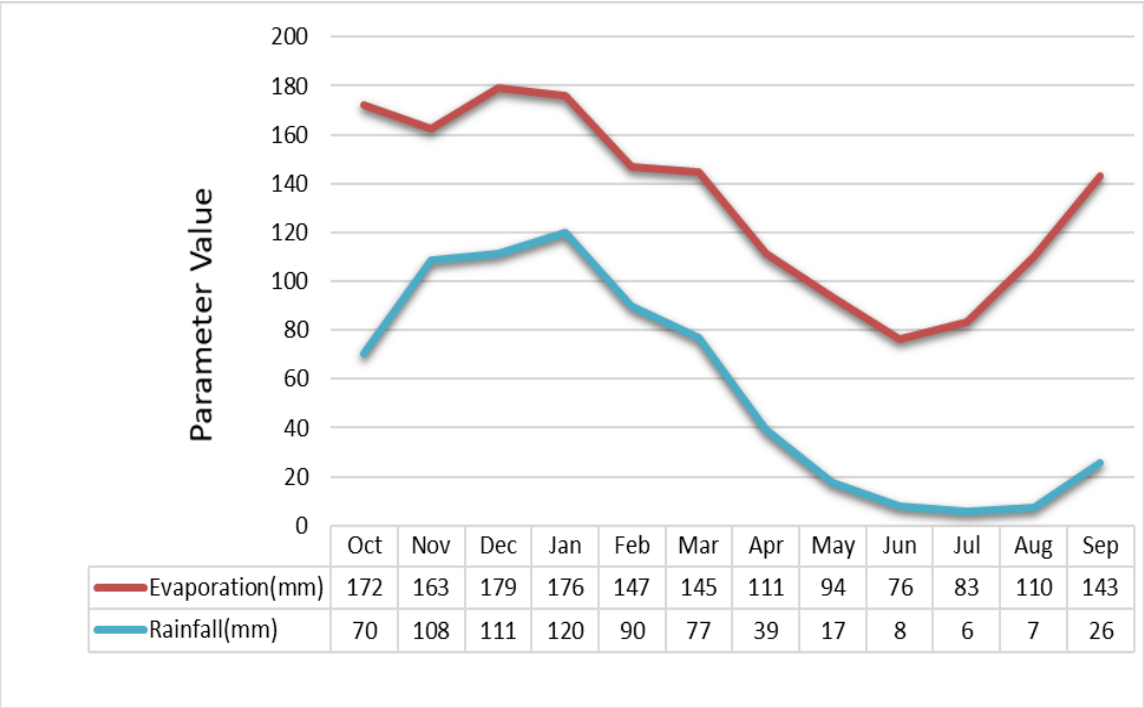
The Mean Annual Precipitation (MAP) for Quaternary Catchment B11E is estimated to be 682 mm. The NCC operations fall within the summer rainfall region of South Africa, where more than 80% of the annual rainfall occurs between the months of October to March (SRK Consulting, 2016). Figure 10-1 depicts the likely monthly distribution of rainfall in the catchment. January as the wettest month has a 90th percentile of 192 mm and 10th percentile of 67 mm, the graph also shows that the area experiences dry winters and it receives low to moderate rainfall during rainy seasons.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
90 Percentile	121	171	171	192	150	126	84	43	26	18	25	75
70 Percentile	87	140	127	136	108	96	50	19	7	3	11	29
50 Percentile	65	104	112	110	81	71	32	14	2	0	2	15
30 Percentile	45	78	89	89	66	51	18	3	0	0	0	6
10 Percentile	28	50	57	67	36	37	5	0	0	0	0	1

Figure 10-1: The Monthly Rainfall Distribution within the Quaternary Catchment B11E

The area recorded a high Mean Annual Evaporation (MAE) of 1 950 mm, which is significantly higher than the MAP. The monthly MAP and MAE is likely to be distributed as shown in Figure 10-2. Evaporation is higher during the wet seasons, therefore both rainfall and evaporation show similar trends.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Evaporation(mm)	172	163	179	176	147	145	111	94	76	83	110	143
Rainfall(mm)	70	108	111	120	90	77	39	17	8	6	7	26

Figure 10-2: Monthly Evaporation and Rainfall within the Quaternary Catchment B11E

10.2 Topography and Drainage

Middeldrift is located within the B11E quaternary catchment falling under the Olifants Water Management Area (Figure 10-3). The area is located predominantly on a topographical low within the catchment, with elevation ranging from approximately 1 529 meters above mean sea level (mamsl) to 1 574 mamsl.

Drainage within the Project Area is facilitated by the Steenkoolspruit, one of the major tributaries of the Olifants River.

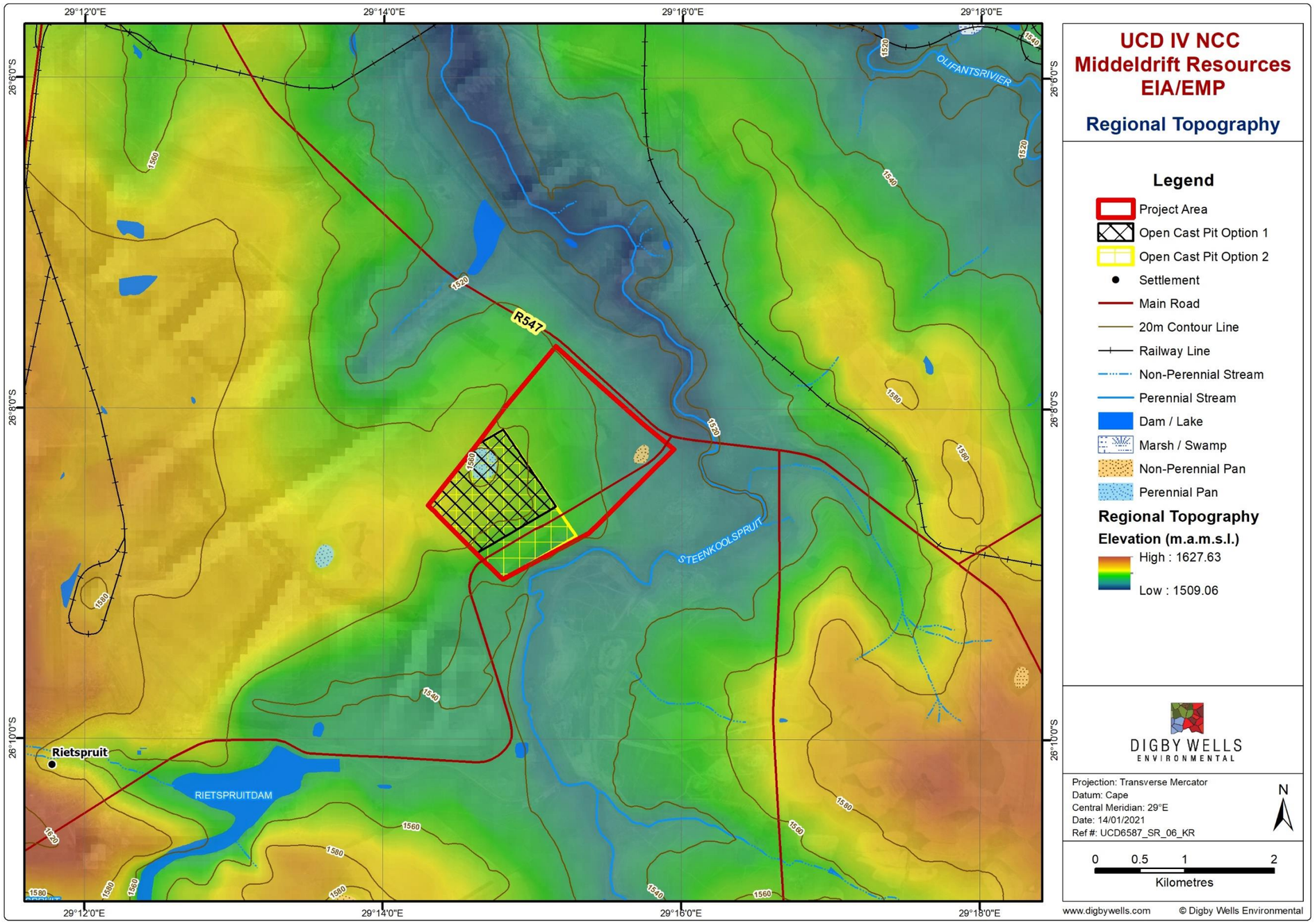


Figure 10-3: Topographic Map of the Project Area

10.3 Geology

The Project Area is located in an area underlain by formations that form part of the Dwyka and Ecca Groups, as shown in Figure 10-4.

The Project Area is located in the Witbank coalfield which is a succession of sandstone, siltstone and mudstone, containing five coal seams. The coal seams are slightly dipping to the south. The five coal seams numbered No. 1 to No. 5 from the bottom to the top. The coal is contained within a 70 m of lithology.

The distribution of the No. 3, 4 and 5 coal seams are limited by the topography, while the lower seam (No. 1 and 2) distribution is largely controlled by the pre-Karoo topography. The parting thickness between the seams is generally consistent (SRK Consulting. 2016). The coal seams present within the Project Area are expected to be similar to the seam thicknesses and depths as depicted in Figure 10-5.

The surface geology presented in Figure 10-6 indicates the site is predominantly underlain by siliciclastic rocks and this supports the description detailed above.

10.3.1 Geological Structures

Dolerite intrusions sills and feeder dykes are regionally common in the area. However, there are no significant dolerite intrusions in the Roodekop 63 IS area. The same findings were found for faulting. While regionally minor faulting is evident, no faulting was observed for the Project Area itself (SRK Consulting, 2016).

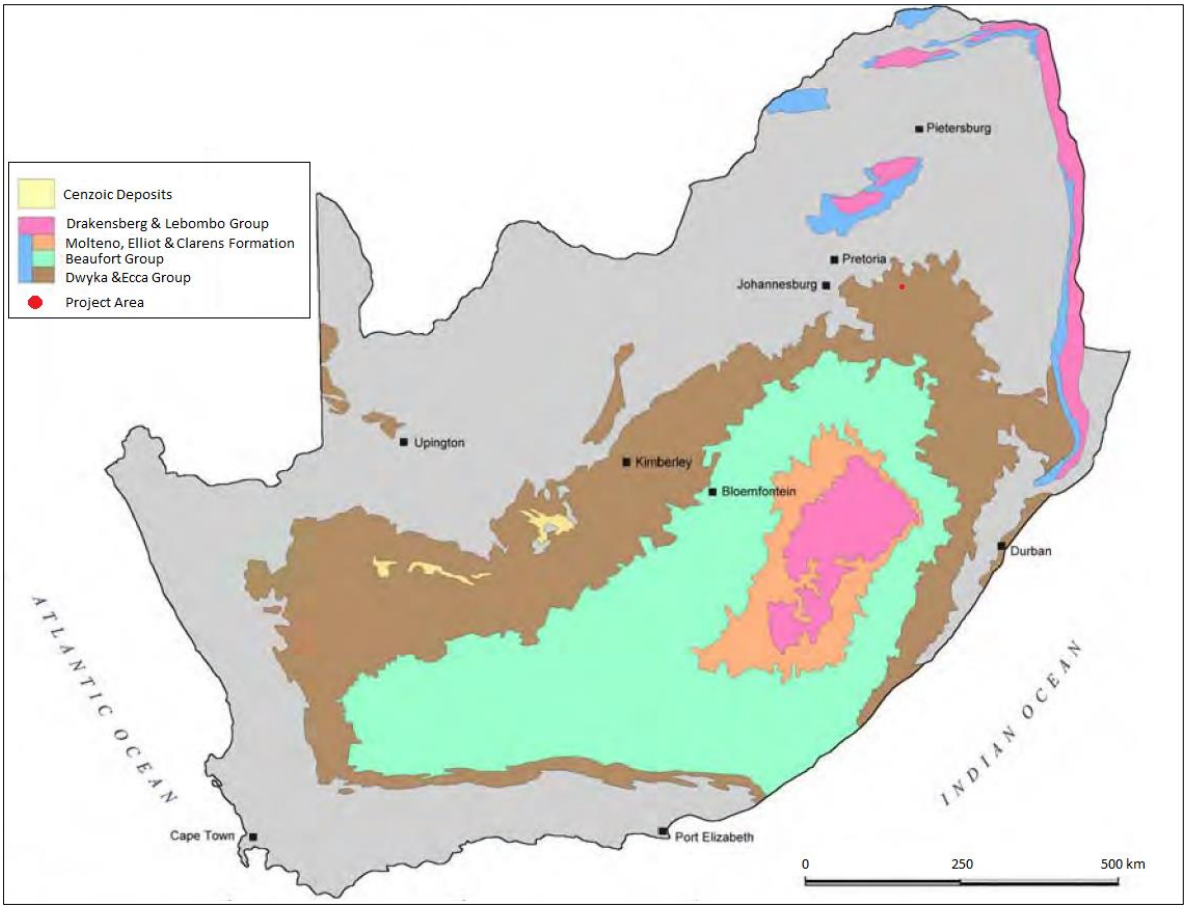


Figure 10-4: Simplified Geology of the Karoo Supergroup in South Africa (Woodford & Chevallier, 2002)

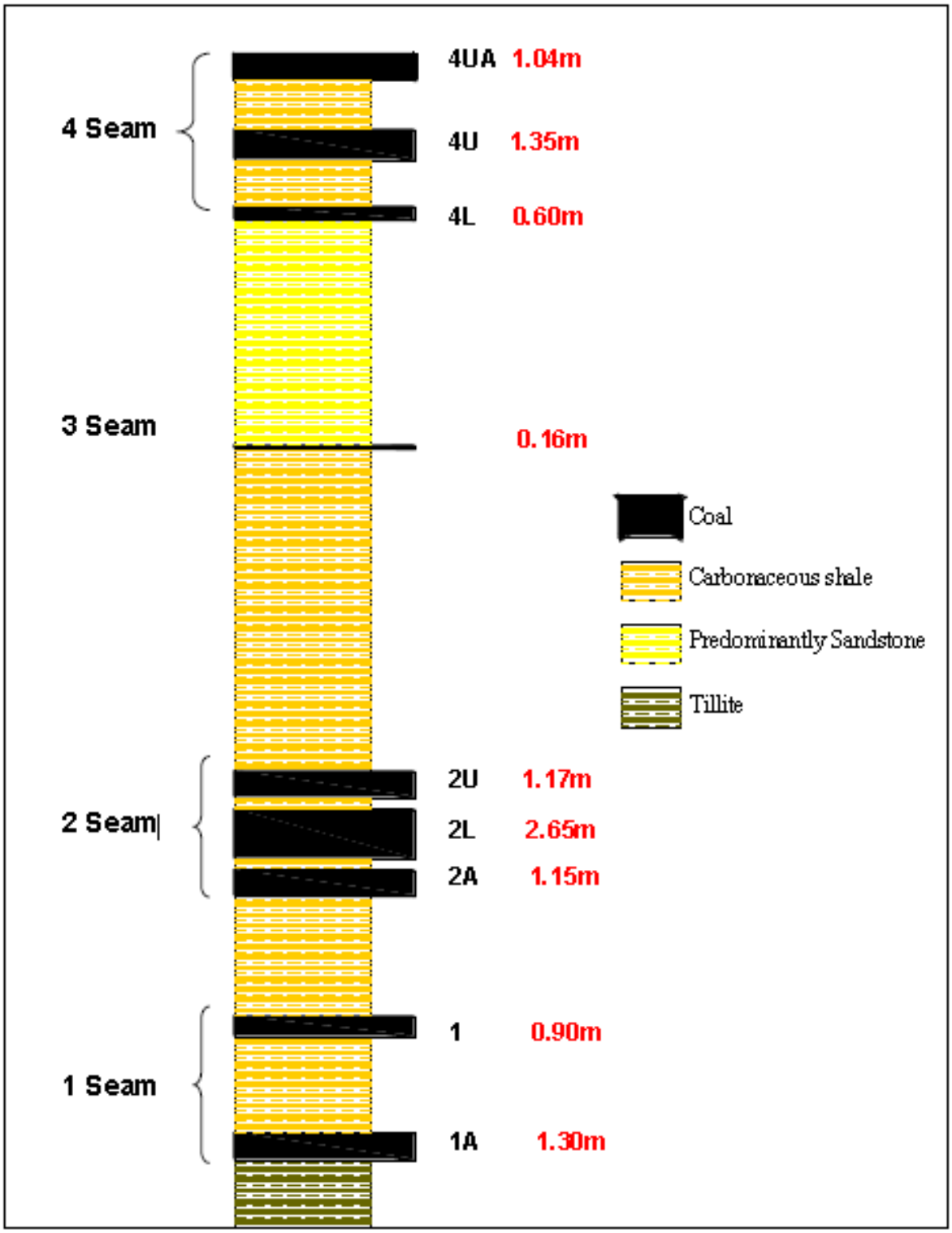


Figure 10-5: Illustration of Coal seams at Roodekop (SRK Consulting, 2016)

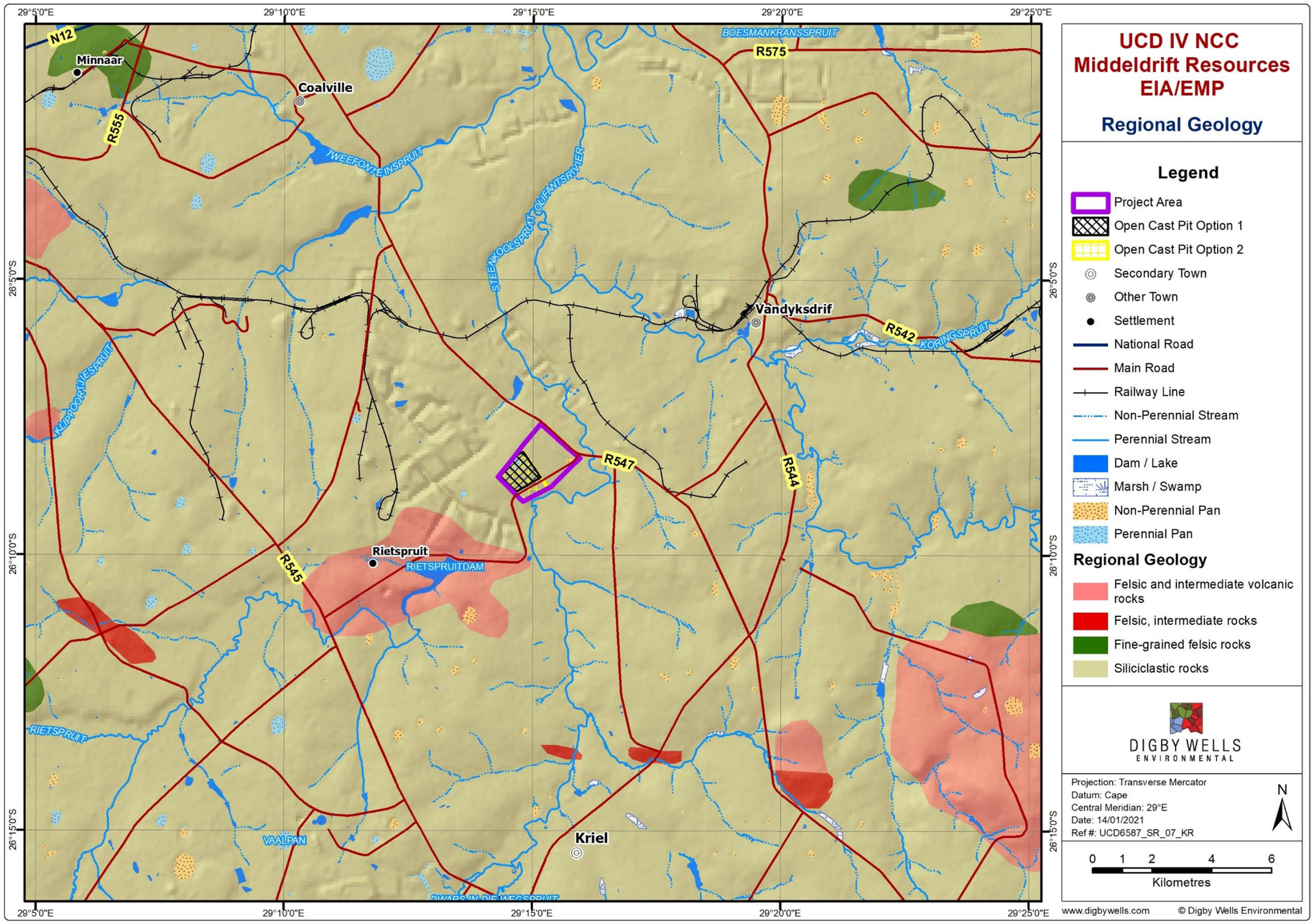


Figure 10-6: Surface Geology of the Project Area

10.4 Groundwater

This section provides a description of the hydrogeology in terms of aquifers, groundwater use, levels and quality in the Project area.

10.4.1 Local and Regional Aquifers

The aquifers at Roodekop were conceptualised by Digby Wells (2011) to be composed of four units, namely: the shallow weathered Karoo, the intermediate fractured Karoo, Dwyka tillite and the fractured igneous basement aquifer.

Shallow Weathered Aquifer

The weathered material in the shallow weathered aquifer consists mostly of decomposed and highly weathered coarse-grained sandstones, with shales and siltstones in some areas. The depth of weathering encountered during drilling was observed to be between 6 and 17 meters below ground level (mbgl). The sustainability in terms of aquifer yields of the shallow weathered aquifer is dependent on the effective recharge, which is the portion of rainfall that infiltrates through the soil and eventually reaches the saturated zone. The aquifer transmissivity of the weathered material is estimated to be between 0.5 and 1.5 m^2/day.

Fractured Aquifer

The fractured aquifer consists of an unweathered interlaminated sequence of sandstone, shale, carbonaceous shale and coal. The pores within these sediments are well cemented and generally do not allow for any significant permeation of water. The main groundwater movement within this aquifer is therefore along secondary structures such as fractures, cracks and joints. However, not all secondary structures are water bearing. The apertures of water bearing structures open to flow are relatively small and therefore have characteristic low hydraulic conductivities.

Of all the unweathered sedimentary layers as part of the fractured aquifer the coal seams often show the highest hydraulic conductivity. Aquifer tests conducted within this aquifer indicated low hydraulic conductivity.

Dwyka Tillite

The Dwyka tillite unconformably overlies the basement rocks and, where present, forms a hydraulic barrier between the overlying mining activities and the basement aquifer, due to its low hydraulic conductivity. The aquifer permeability of the Dwyka tillite is estimated between 0.0002 and 0.0148, with mean value of 0.0034 m/d (Hodgson & Krantz, 1998).

Basement Aquifer

The basement aquifer is composed of Rooiberg felsite, characterised by low yielding fractures. However, higher yields are expected in areas where pre-Karoo diabase intersects the basement aquifer. A yield of 2.5 l/s was measured at RBH5, which was drilled into a diabase intrusion, however this borehole is located outside the Project Area.

The basement aquifer is characterised by low recharge because of the overlying Dwyka tillite. Higher recharge to the basement aquifer is possible in areas where basement rocks outcrops are visible.

10.4.2 Groundwater Use / Potential Groundwater Receptors

A hydrocensus will be conducted with the aim of obtaining the baseline groundwater conditions and to identify the local groundwater users. The current groundwater users will be identified during the hydrocensus which is planned for the next phase of the Project.

10.4.3 Groundwater Levels

GCS (2014) reported monthly water level data for the period 2007 to 2014, in the Roodekop area. Based on this data a 96% correlation between groundwater levels and surface elevations was derived. Due to the similar hydrogeological setting of the entire Project Area, this correlation can be applied. Therefore, groundwater flow at the Project area is expected to generally follow topography and to flow eastwards towards the Steenkoolspruit (as presented in Figure 10-7).

10.4.4 Groundwater Quality

Water quality in and around the Project Area was obtained from available monitoring data for the period October 2014 to September 2015 for the Hydrogeological study for the Proposed Extension of the Existing Roodekop Mining Area, only the boreholes in and around the Project Area were considered. For locations that did not form part of the monitoring network, groundwater quality is defined by samples collected during the hydrocensus by Digby Wells (2011) and another hydrocensus conducted by GCS (2014). Locations are presented in Figure 10-8.

These guidelines are supplemented by domestic water quality range guidelines prepared by the then Department of Water Affairs and Forestry in 1996 and 1998. The guidelines are as follows:

- Class 0 – Ideal water quality. Water is suitable for many generations, no effects;
- Class 1 – Good water quality. Water is suitable for lifetime use, with rare cases of sub-clinical effects;
- Class 2 – Marginal water quality. Water may be used without health effects by the majority of individuals with the exception of sensitive individuals or after lifetime use;
- Class 3 – Poor water quality. Water poses a chronic health risk especially to babies, children and elderly individuals; and
- Class 4 – Unacceptable water quality. Severe acute health effects, even with short term use.

There was no chemistry data available for a Spring and BH28 (both part of the hydrocensus as conducted by GCS in 2014), as well as RK16 (part of hydrocensus survey conducted by Digby Wells in 2011).

The groundwater quality based on the most recent groundwater samples (as provided by the client) can be summarised as follows (refer to SRK 2016 for more details):

- Gw-MID 1 (2015), classified as Class 3 which is poor water quality due to elevated ammonia concentrations (4.7 mg/L);
- RK10D (2011) classified as Class 4 which is unacceptable water quality due to Total Dissolved Solids (TDS) concentration (526 mg/L);
- RK10S (2011) classified as Class 4 which is unacceptable water quality due to pH (10); and
- RBH5 (2015); classified as Class 2 which is marginal water quality due to elevated nitrate concentrations (9.98 mg/L).

The background water quality within and around the Project Area was found unsuitable for drinking according to the Department of Water Affairs and Forestry water standards. This does not pose a risk to the intended mining activities and related water uses, as a requirement for groundwater as a source of domestic use for on-site use has not been indicated to be part of the proposed activities.

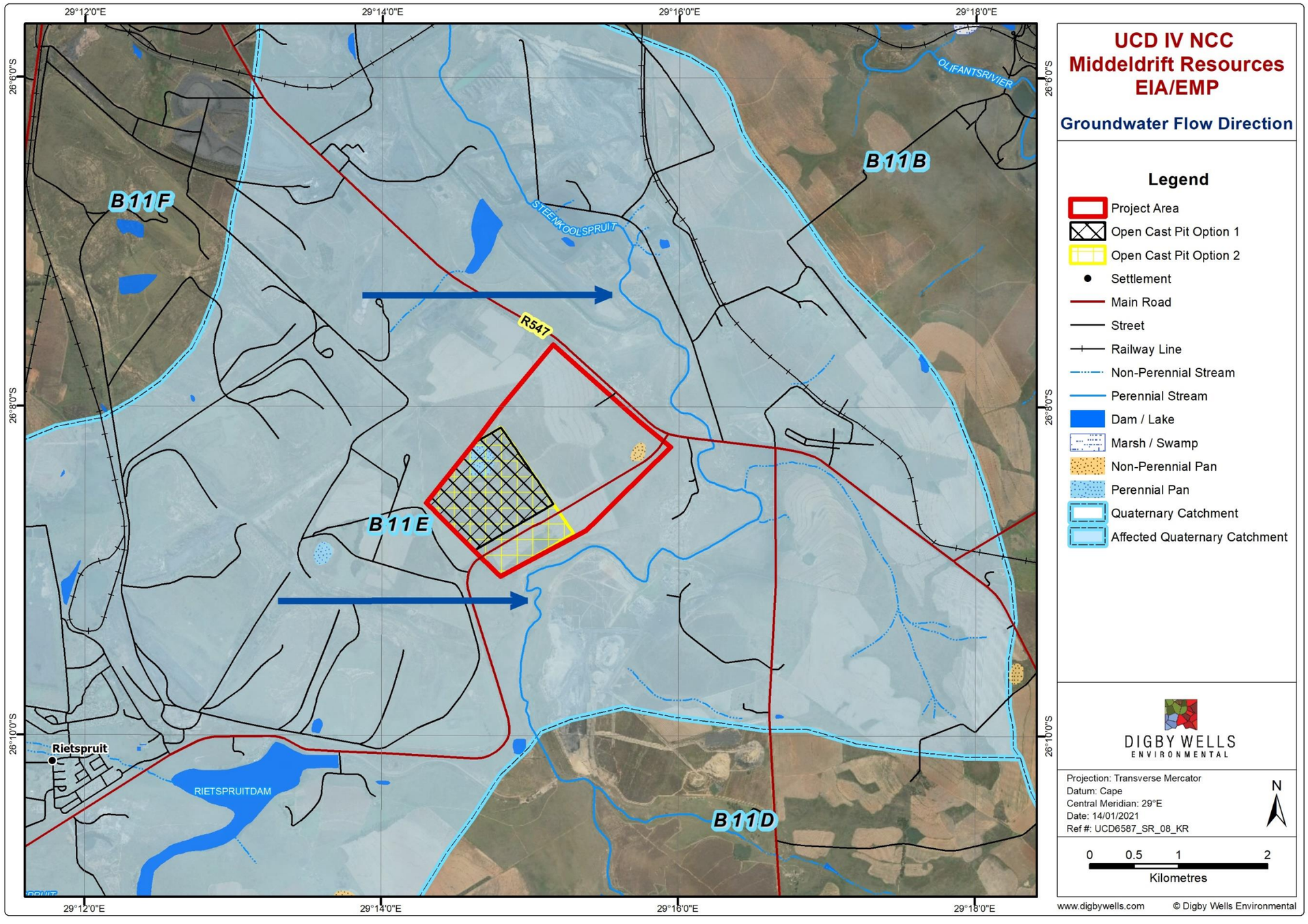


Figure 10-7: Groundwater Flow Direction in the Project Area

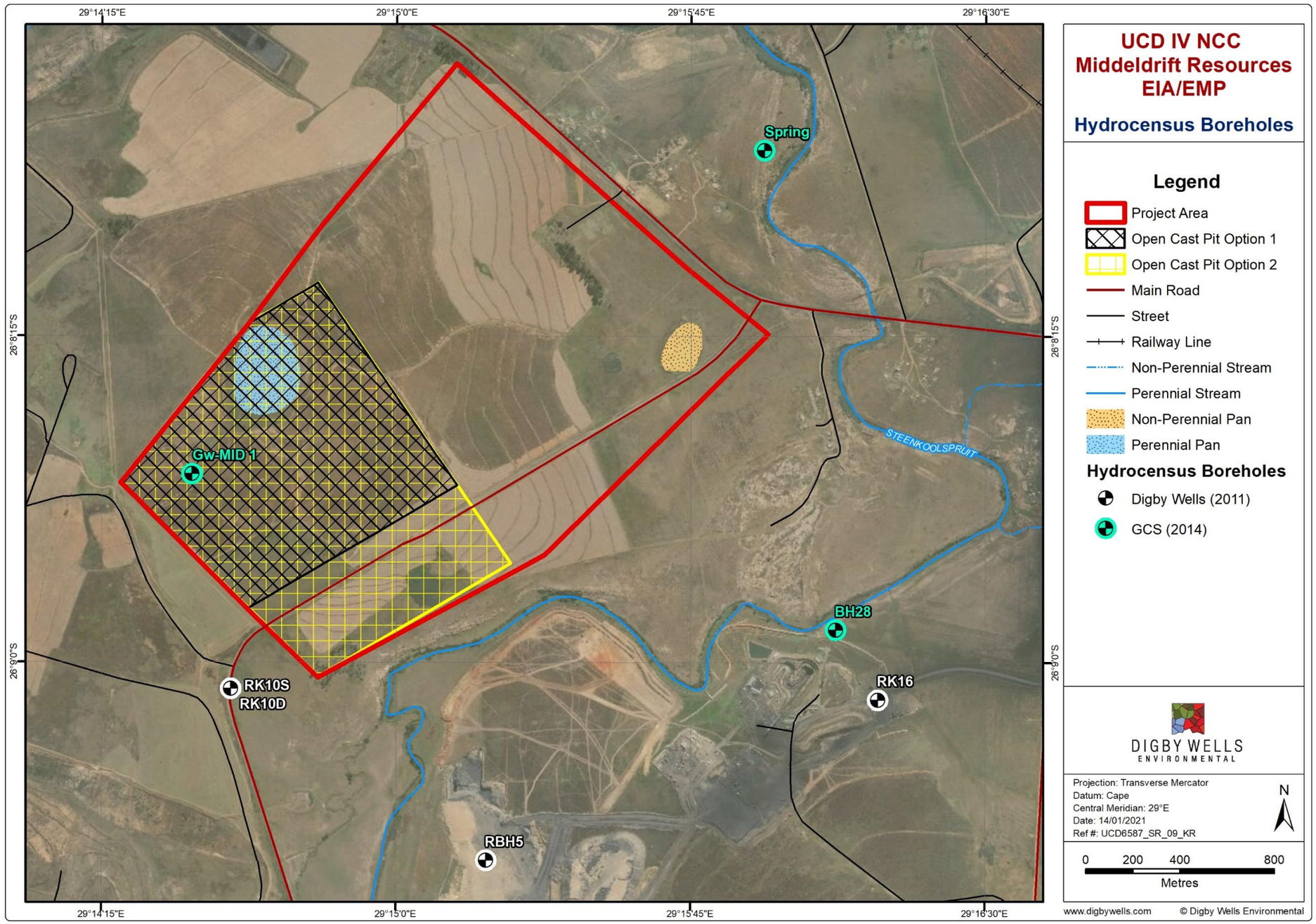


Figure 10-8: Hydrocensus of the Project Area

10.5 Hydrology (Surface Water)

The Project is located in the B11E quaternary catchment within the Olifants Water Management Area (WMA 2), which comprises of the Olifants River Catchment which is one of the major contributors of flow into the Limpopo River Basin, an international river that is shared between South Africa, Mozambique, Zimbabwe and Botswana (Figure 10-9).

The Olifants River is estimated to contribute a flow of approximately 40% to the shared river basin (USAID, 2019). It drains a total area of 737 x 103 km^2 with an elevation ranging from 0 to 2 400 mamsl (USAID, 2019). The river rises in the Highveld region of the Mpumalanga Province and flows through the Limpopo's platinum belt and the Drakensberg mountains towards the Kruger National Park where it joins the Limpopo River. Then it finally discharges into the Indian Ocean, through Mozambique. This indicates the importance of the Olifants River in sustaining livelihoods and economies in both South Africa and Mozambique.

The main tributaries of the Olifants River Catchment are the Wilge, Moses, Elands and the Ga-Selati Rivers on the right bank of the river; while the Klein Olifants, Steelpoort Rivers and Blyde River drain the left bank of the river (Gyamfi, et al., 2016). The Project Area is located close to the Steenkoolspruit which is a perennial river that confluences the Olifants River and is found in the upper Olifants River. The major water use activities found within the quaternary catchment are mining and agriculture, there are also several small man-made dams within the mines and farms (Gyamfi, et al., 2016).

Characteristic of the catchments in this area is the strong relationship between surface water and a shallow, interflow groundwater source (SRK Consulting, 2016). Deeper groundwater does not reveal direct connection to the streams in the upper reaches of these catchments. Responses to rainfall are rapid, with discharges reaching peak flows within 24 hours and dissipating within four to five days, despite the relatively flat topography (SRK Consulting, 2016).

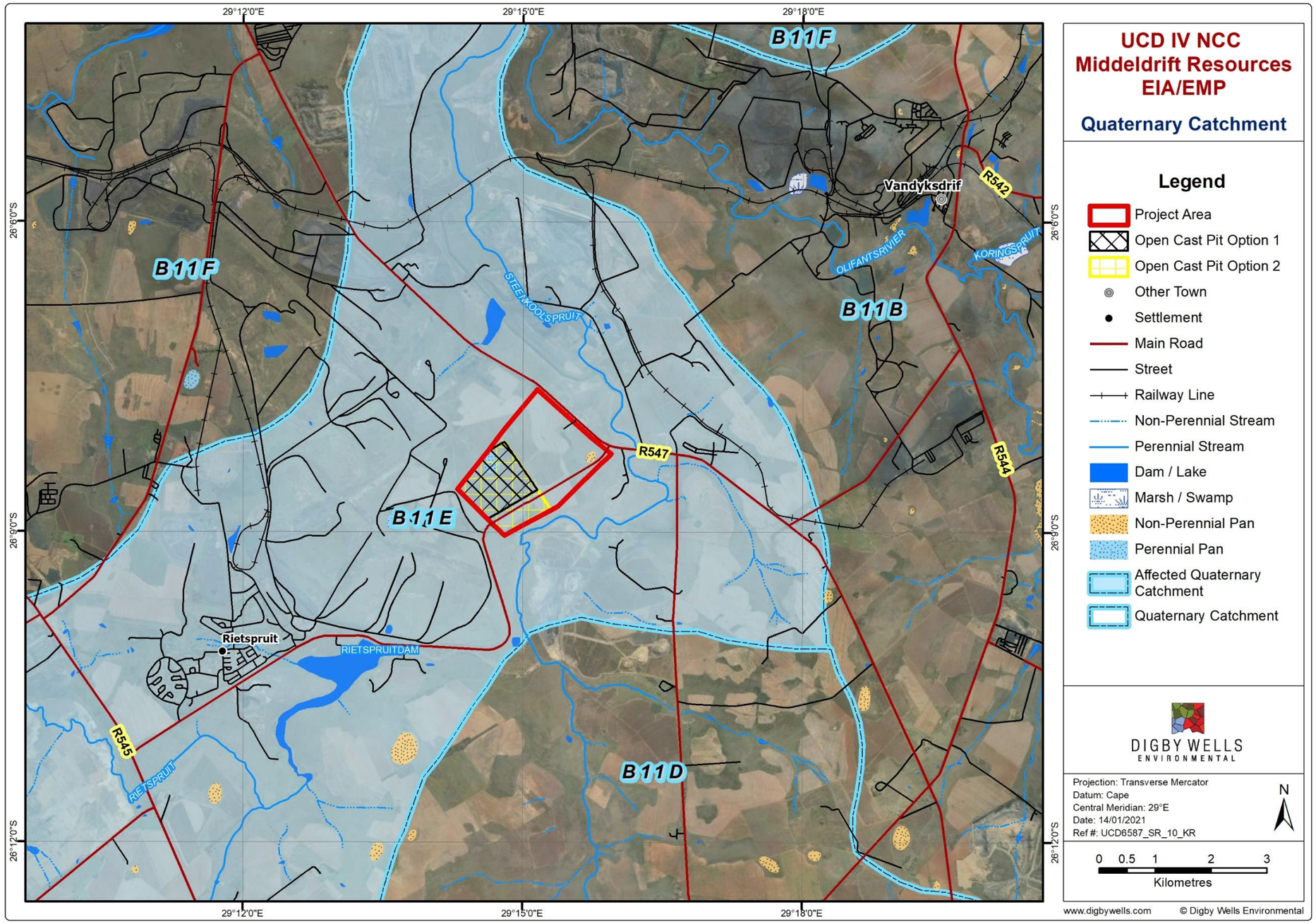


Figure 10-9: Quaternary Catchments of the Project Area

10.5.1 Baseline Water Quality

Baseline water quality sampling was undertaken by Digby Wells in 2011, while monthly sampling was undertaken by Universal Coal from 2014 to 2016 at various locations in the Steenkoolspruit and smaller tributaries in proximity to the study area (SRK Consulting, 2016).

Based on the water quality results analysed by SRK Consulting (2016), none of the water quality determinants monitored exceeded domestic water quality standards systematically, except for TDS and sulphates (SO_4) over short periods during the dry season. It was concluded that the low flows contribute to the increase in TDS and SO_4 concentrations, and thus are not likely to contribute significantly to the salinity load entering the Olifants River (SRK Consulting, 2016).

The salt loading of the Steenkoolspruit was estimated from discharge and sampled TDS concentrations (B1H021) to be approximately 23 000 tons/annum, whereas the total TDS load likely to leave the opencast mine is estimated as 62 tons/annum, which is less than 0.5% of the current total salt load in the Steenkoolspruit. The salt load discharged into the Steenkoolspruit as a result of mining at the NCC was considered minimal (SRK Consulting, 2016).

10.6 Soil, Land Use and Land Capability

The baseline Soil, Land Use and Land Capability Assessment summarises the Project Area's soil forms, land use and land capability.

10.6.1 Soil Forms and Land Types

Baseline data suggests that the land type for the Project Area is only of the Bb4 type, however the Project activities will directly impact the Bb5 land type and are therefore also described below. The main land types and dominant soil forms are briefly described below in Table 10-1 as per the Land Type Survey Staff (1972 - 2006) and illustrated in Figure 10-10.

Table 10-1: Land Type and Dominant Soil Forms

Land Type	Soil Forms	Geology	Characteristics
Bb4	• Arcadia • Avalon • Estcourt • Glencoe • Glenrosa • Hutton • Katspruit • Kroonstad • Longlands • Mispah • Rensburg • Sterkspruit • Swartland • Westleigh • Valsrivier	• Shale, sandstone, clay and conglomerate of the Ecca Group, Karoo Sequence; and • Dolerite, occasional felsitic lava of the Rooiberg Group, Transvaal Sequence.	• Dominated by moderately deep to deep well drained sandy soils on the upper slopes with soils becoming shallower down slope, increasing in clay content and becoming lower in permeability; • The Hutton and Avalon soil forms usually indicates deep, fertile soils, which are good for agriculture, whereas Mispah soil forms are only slightly permeable due to the high clay content; • Mispah and Glenrosa have low potential for agriculture due to shallow bedrock, low permeability with a high erosion hazard and a shallow rooting depth; • Upland duplex and margalitic soils are rare; and • Red soils (apedal) are not common in these areas.
Bb5	• Mispah • Hutton • Rensburg • Wasbank • Avalon • Glencoe • Swartland • Kroonstad • Longlands	• Shale, sandstone, clay, conglomerate, limestone and marl (Ecca Group); • Dolerite; and • Lava, sandstone, conglomerate, siltstone and rhyolite (Loskop Formation).	• Falls within the Plinthic Catena; • Upland duplex and margalitic soils are rare; • Red soils (apedal) are not common in these low-lying areas; and • These soils are usually high in clay content, occur in low lying areas and associated with wetlands.

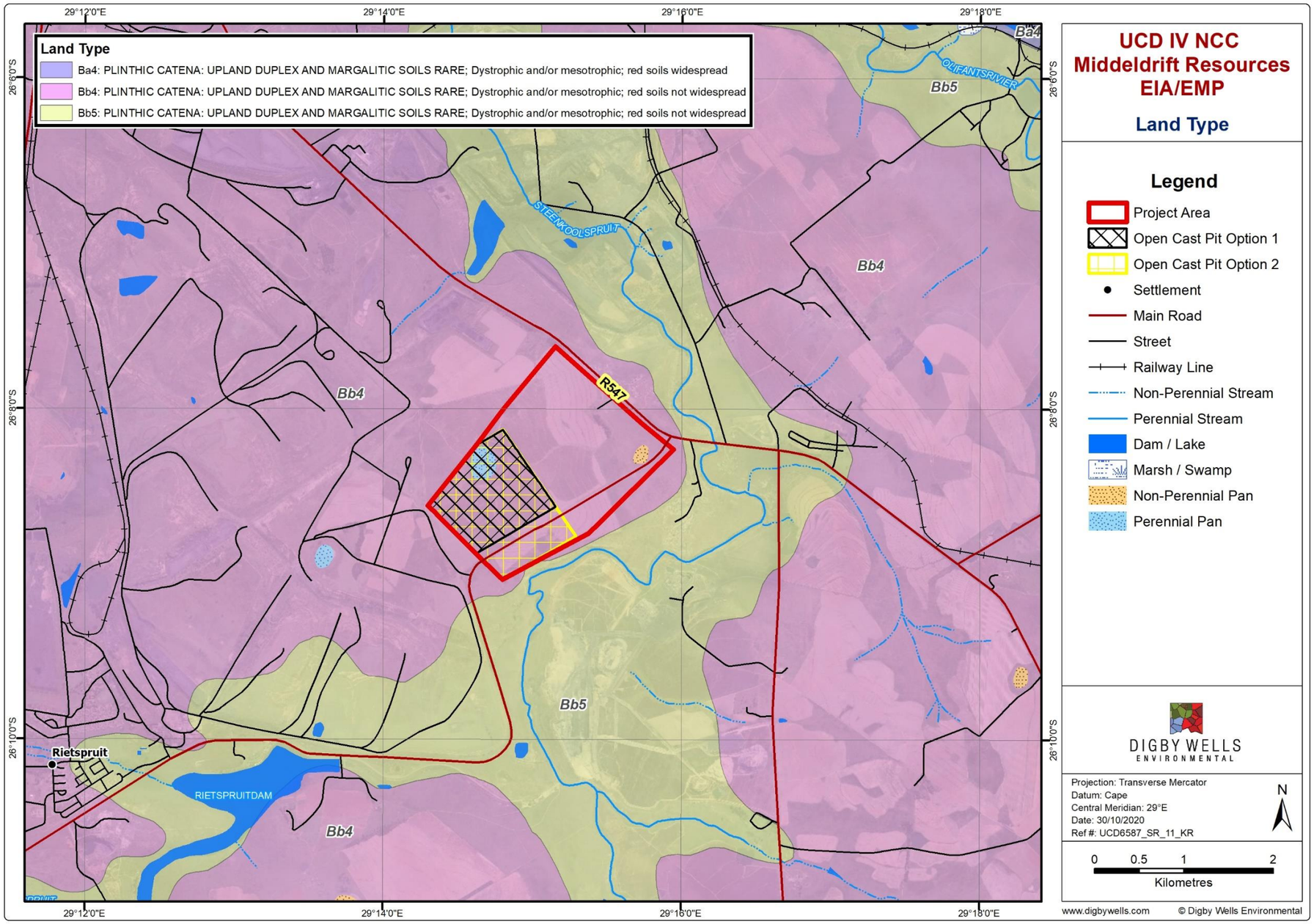


Figure 10-10: Land Type Map for the Project Area

10.6.2 Land Use

The current land use of the Project Area was identified by aerial imagery during the desktop assessment. As indicated in Figure 10-11 the land uses were described as follows:

- Predominantly:
  - Cultivated Land; and
  - Grassland.
- Minor Areas:
  - Water Area;
  - Wetland;
  - Thicket/Dense Bush;
  - Plantation/Woodlot;
  - Woodland/Open Bush; and
  - Adjacent Urban Areas.

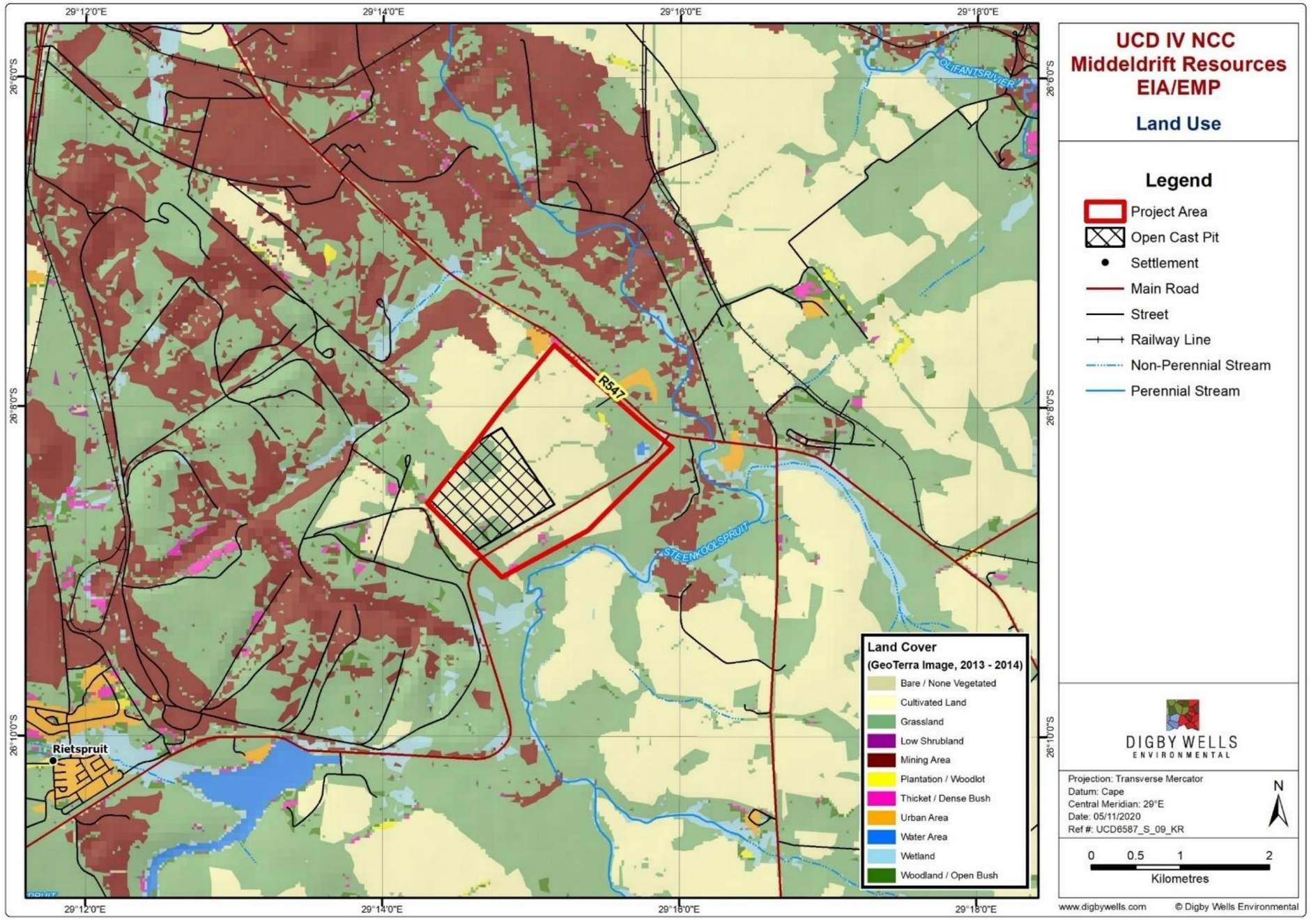


Figure 10-11: Land Use Map for the Project Area

10.6.3 Land Capability

The land capability was determined by assessing a combination of soil type, terrain and climate features. Land capability is defined as the most intensive long-term sustainable use of land under rain-fed conditions (Soil Conservation Service: U.S. Department of Agriculture, 1973; Schoeman, et al., 2000). The dominant land capability class in the Project Area was Class II (Arable Land – Intensive Cultivation) with Class IV (Arable land – Moderate Grazing) adjacent to the Project Area (Figure 10-12). A detailed breakdown for the classes is given below (Table 10-2).

Table 10-2: Land Capability Classification of the UCDIV NCC Mine Project Area

Class	Classification	Dominant Limitation Influencing the Physical Suitability for Agricultural Use
II	Arable Land – Intensive Cultivation	Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
IV	Arable land – Moderate Grazing	Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class II

Class II Land Capability has some limitations which require careful conservation practices and soil management to prevent soil deterioration and to improve the air-water balance when soils are cultivated. There are a few limitations regarding cultivation, pastures, range land, woodland or wildlife and the practices are easy to apply. The soils need more management practices than that of Class I soils and may require special soil-conserving cropping system, tillage methods and water control devices.

Deep soils on gentle to moderately steep slopes in the class are subject to erosion and may need management practices such as terracing, contour tillage, water-control devices, crop rotation, stable mulching, fertilizers, lime and strip cropping. The combination of management practices will depend on the climate, soil characteristics, slope and farming system.

The limitations can be attributed to:

- Gentle to moderately steep slopes;
- Susceptibility to wind and water erosion or moderate adverse effects to previous eroded areas;
- Less than ideal soil depth;
- Unfavourable soil structure and workability;
- Slight to moderate soil salinity or sodicity, although easily corrected but likely to occur. This implies that strong subsoil acidity might occur which is costly to correct and is likely to reoccur;

- Occasional flooding and overflow which may require artificial drainage; and
- Slight climatic limitations on soil management and cultivation practices.

Class IV

Class IV Land Capability has some severe limitations which restrict the choice of plants and require very careful management to prevent soil deterioration and to improve the air-water balance when soils are cultivated. Soils in Class IV may be used for crop production, pastures, woodlands, rangeland, or wildlife. The soils are suited for most common crops; however, production may be low in relation to inputs over a long period. Limitation factors include:

- Steep slopes;
- Severe susceptibility to water and wind erosion;
- Severe effects of historical erosion;
- Shallow soils;
- Low water-holding capacity;
- Frequent overflow accompanied by severe crop damage;
- Soil saturation, causing extensive wetness and water logging conditions;
- Severe salinity or sodium; and
- Climate is moderately adverse.

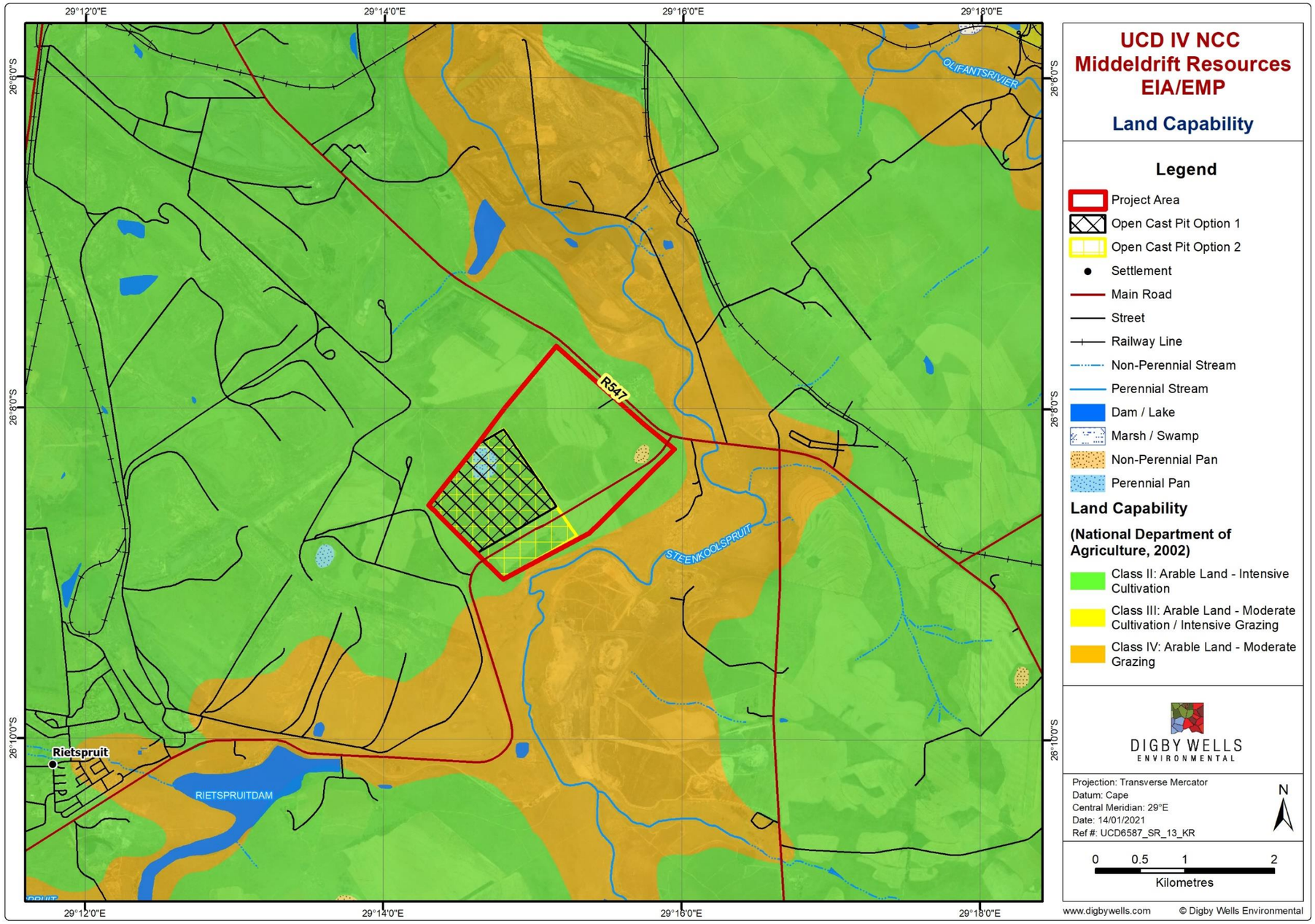


Figure 10-12: Land Capability Map for the Project Area

10.7 Flora and Fauna

This section will introduce the context of the biodiversity of the Mpumalanga Province and describe the Project Area in terms of floral and faunal species.

10.7.1 Mining and Biodiversity Guideline

The Mining and Biodiversity Guideline was developed collaboratively by South African National Biodiversity Institute (SANBI), the DEFF, the DMRE, the Chamber of Mines and the South African Mining and Biodiversity Forum (2013). The purpose of the guideline was to provide the mining sector with a manual to integrate biodiversity into the planning process thereby encouraging informed decision-making around mining development and EAs.

The aim of the guideline is to explain the value for mining companies to consider biodiversity management throughout the planning process. The guideline highlights the importance of biodiversity in managing the social, economic and environmental risk of the proposed mining Project. The country has been mapped into biodiversity priority areas including the four categories each with associated risks and implications (Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, & South African National Biodiversity Institute, 2013) (refer to Figure 10-13 and Table 10-3).

Table 10-3: Mining and Biodiversity Guideline Categories (DEA et al., 2013)

Category	Risk and Implications for Mining
Legally Protected	Mining prohibited; unless authorised by ministers of both the DEFF and DMRE.
Highest Biodiversity Importance	Highest Risk for Mining: The EIA process must confirm significance of the biodiversity features that may be a fatal flaw to the proposed Project. Specialists must provide site-specific recommendations for the application of the mitigation hierarchy that informs the decision-making processes of mining licences, water use licences and environmental authorisations. If granted, authorisations should set limits on allowed activities and specify biodiversity related management outcomes.
High Biodiversity Importance	High Risk for Mining: the EIA process must confirm the significance of the biodiversity features for the conservation of biodiversity priority areas. Significance of impacts must be discussed as mining options are possible but must be limited. Authorisations may set limits and specify biodiversity related management outcomes.
Moderate Biodiversity Importance	Moderate Risk for Mining: the EIA process must confirm the significance of the biodiversity features and the potential impacts as mining options must be limited but are possible. Authorisations may set limits and specify biodiversity related management outcomes.

The Project Area has scattered areas classified as Moderate Biodiversity Importance – Moderate Risk for Mining with an area at the edge of the north-east section classified as Highest Biodiversity Importance – Highest Risk for Mining.

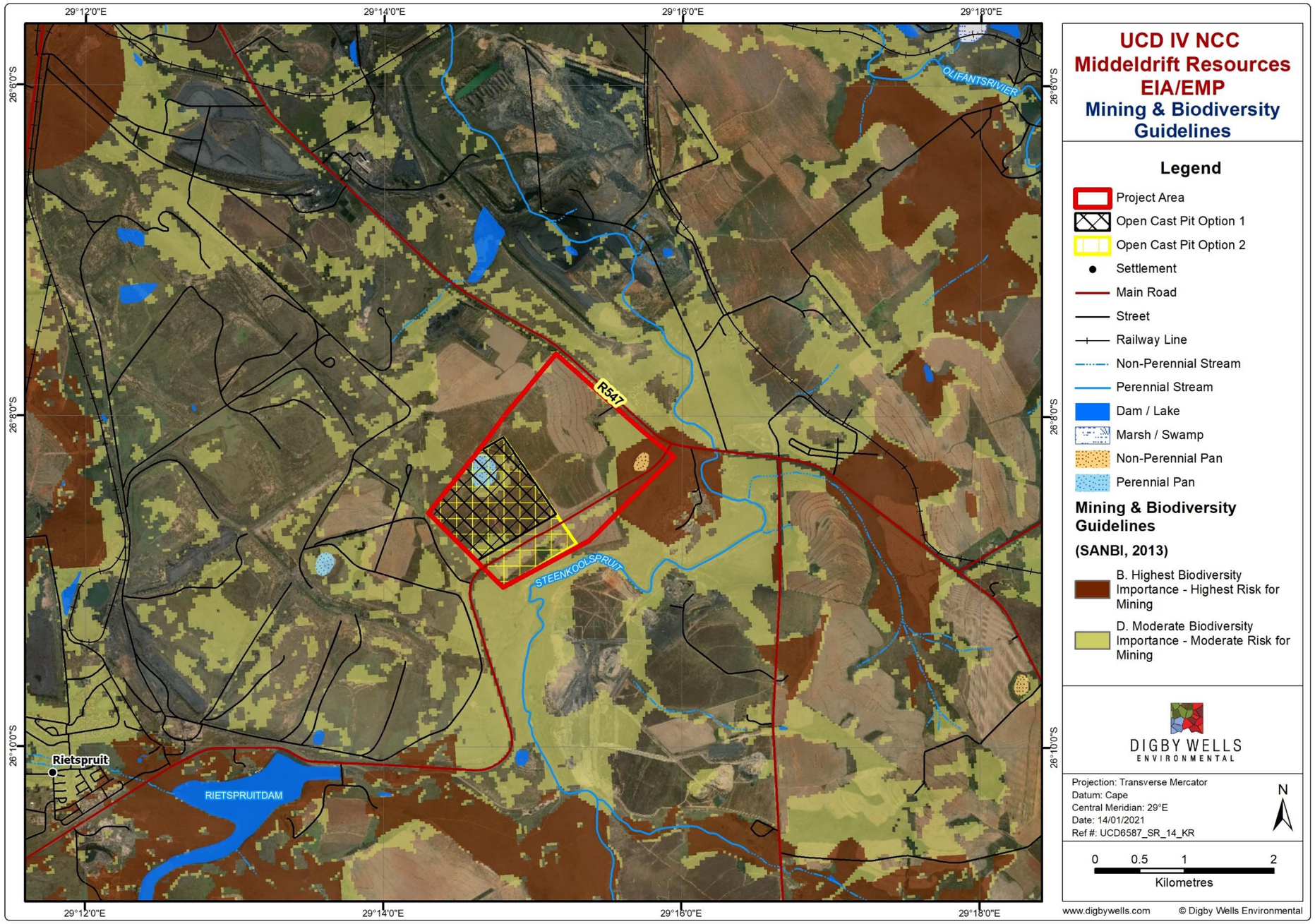


Figure 10-13: Mining and Biodiversity Guideline of the Project Area

10.7.2 Mpumalanga Biodiversity Sector Plan

The Mpumalanga Biodiversity Sector Plan (MBSP) is a spatial tool that forms part of the national biodiversity planning tools and initiatives that are provided for national legislation and policy. The MBSP was published in 2014 by the Mpumalanga Tourism and Parks Agency (MTPA) and comprises a set of maps of biodiversity priority areas accompanied by contextual information and land-use guidelines for use in land-use and development planning, environmental assessment and regulation, and natural resource management. Strategically the MBSP enables the province to:

- Implement the NEM:BA provincially and comply with requirements of the National Biodiversity Framework (NBF), 2009 and certain international conventions;
- Identify those areas of highest biodiversity that need to be considered in provincial planning initiatives; and
- Address threat of climate change (ecosystem-based adaptation).

The publication includes terrestrial and freshwater biodiversity areas that are mapped and classified in Protected Areas (PAs), CBAs, Ecological Support Areas (ESAs) or Other Natural Areas (ONAs). These categories are described in Table 10-4 below.

The Project Area consists of areas that are classified as Other Natural Areas and is in very close proximity to CBA Optimal of the MR Area, (Figure 10-14). The table below (Table 10-4) describes the map categories that are depicted in the map.

Table 10-4: Mpumalanga Biodiversity Sector Plan Categories

Map Category	Definition	Desired Management Objectives
PA	Those areas that are proclaimed as protected areas under national or provincial legislation, including gazette protected environments.	Areas that are meeting biodiversity targets and therefore must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity.

Map Category	Definition	Desired Management Objectives
CBAs	Areas that are required to meet biodiversity targets, for species, ecosystems or ecological processes. **CBA Irreplaceable:** are the most important biodiversity areas in the province, outside of the protected areas network. Irreplaceable CBAs cannot afford to suffer further loss of habitat or ecological functioning, as their remaining extent is already below biodiversity targets. **CBA Optimal:** are areas that represent the best localities that are most optimally located to meet biodiversity targets.	Must be kept in a natural state, with no further loss of habitat. Only low-impact, biodiversity-sensitive land-uses are appropriate.
ESAs	Areas that are not essential for meeting biodiversity targets but play an important role in supporting the functioning of protected areas or CBAs and for delivering ecosystem services, such as landscape and local scale corridors.	Maintain in a functional, near-natural state, but some habitat loss is acceptable. A greater range of land-uses over wider areas is appropriate, subject to an authorisation process that ensures the underlying biodiversity objectives are not compromised.
ONAs	Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions. Although they have not been prioritised for biodiversity, they are still an important part of the natural ecosystem.	An overall management objective should be to minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. These areas offer the greatest flexibility in terms of management objectives and permissible land-uses, but some authorisation may still be required for high-impact land-uses.
Heavily or Moderately Modified Areas	Areas that have been modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructural functions, even if they are never prioritised for conservation action.	Such areas offer the most flexibility regarding potential land-uses, but these should be managed in a biodiversity-sensitive manner, aiming to maximize ecological functionality and authorisation is still required for high-impact land-uses. Moderately modified areas (old lands) should be stabilised and restored where possible, especially for soil carbon and water-related functionality.

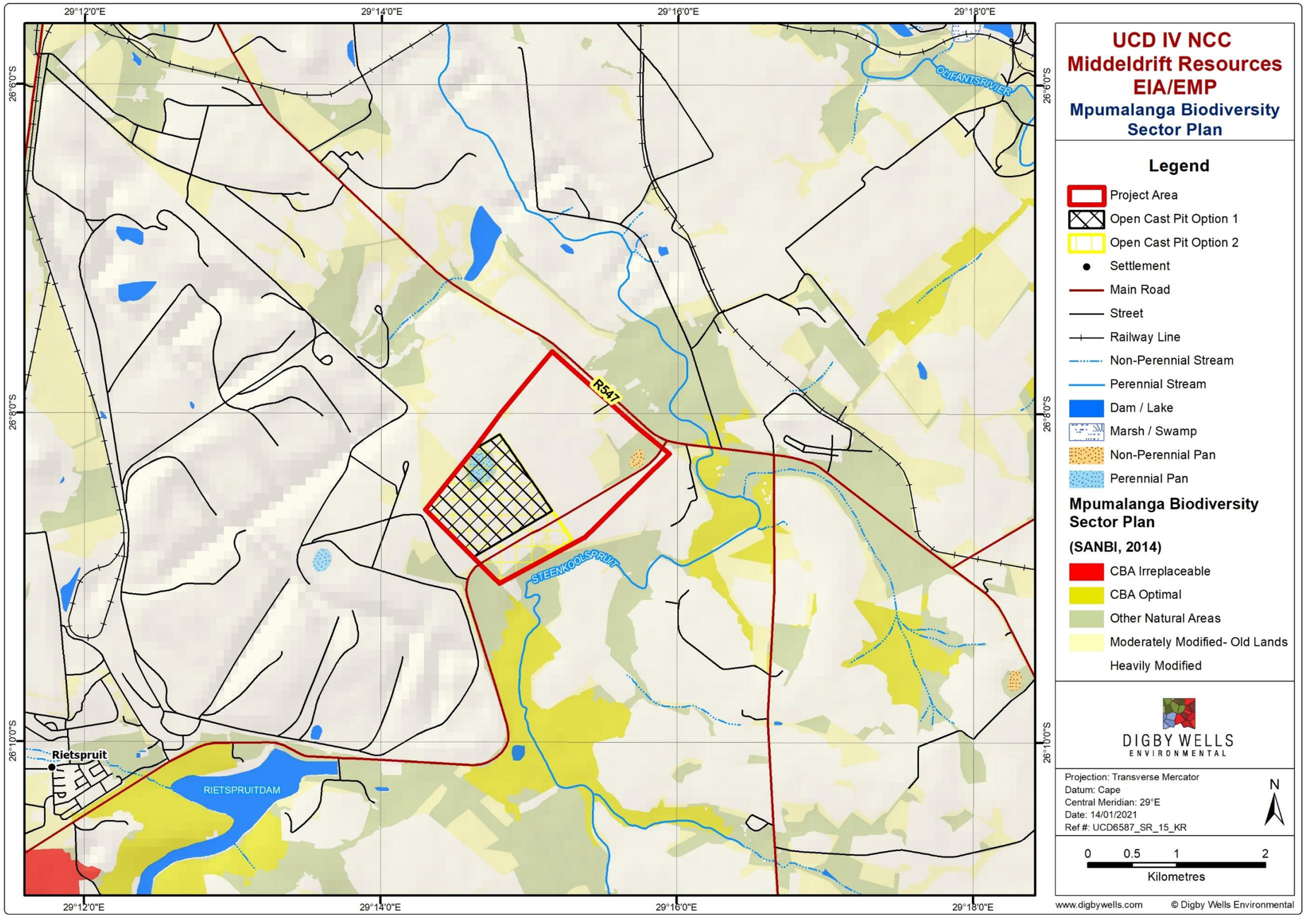


Figure 10-14: Mpumalanga Biodiversity Sector Plan for the Project Area

10.7.3 Flora

The Project Area falls within the Eastern Highveld Grassland (Gm12) vegetation type as described by Mucina & Rutherford, 2012, as seen in Figure 10-15. The Grassland Biome is one of the nine South African plant Biomes and the second most diverse biome in South Africa. The Grassland Biome is situated primarily on the central plateau of South Africa, and the inland areas of Kwa-Zulu Natal and the Eastern Cape provinces. The biome is rich in flora and fauna diversity but is under threat due to persistent agriculture, expansion of mining and industrial activities.

The Eastern Highveld Grassland is characterised by slightly to moderately undulating plains, including some low hills and pan depressions. This vegetation type is considered to be "Endangered" on the National List of Threatened Terrestrial Ecosystems and is considered approximately 55% altered. It is considered to be "poorly protected" with only 13 % of its' target percentage protected (Lötter, 2015). The primary factor responsible for this status is due to on-going cultivation activities within the area. The vegetation of the landscape is short dense grassland dominated by the usual highveld grass composition (*Aristida, Digitaria, Eragrostis, Themeda, Tristachya* etc) (Mucina & Rutherford, 2012). Table 10-5 lists the species expected to occur within this region.

Table 10-5: Flora Species Characteristics of the Eastern Highveld Grassland

Plant Form	Species
Graminoid[4]s	*Aristida aequiglumis, A. congesta, A. junciformis* subsp. *galpinii, Brachiaria serrata, Cynodon dactylon, Digitaria monodactyla, D. tricholaenoides, Elionurus muticus, Eragrostis chloromelas, E. capensis, E. curvula, E. gummiflua, E. patentissima, E. plana, E. racemosa, E. sclerantha, Heteropogon contortus, Loudetia simplex, Microchloa caffra, Monocymbium ceresiiforme, Setaria sphacelata, Sporobolus africanus, S. pectinatus, Themeda triandra, Trachypogon spicatus, Tristachya leucothrix, T. rehmannii, Alloteropsis semialata* subsp. *eckloniana, Andropogon appendiculatus, A. schirensis, Bewsia biflora, Ctenium concinnum, Diheteropogon amplectens, Harpochloa falx, Panicum natalense, Rendlia altera, Schizachyrium sanguineum, Setaria nigrirostris, Urelytrum agropyroides.*
Herbs	*Berkheya setifera, Haplocarpha scaposa, Justicia anagalloides, Pelargonium luridum, Acalypha angustata, Chamaecrista mimosoides, Dicoma anomala, Euryops gilfillanii, E. transvaalensis* subsp. *setilobus, Helichrysum aureonitens, H. caespititium, H. callicomum, H. oreophilum, H. rugulosum, Ipomoea crassipes, Pentanisia prunelloides* subsp. *latifolia, Selago densiflora, Senecio coronatus, Hilliardiella oligocephala, Wahlenbergia undulata.*

[4] **Graminoids** means grasses and grass like plants, such as sedges.

Plant Form	Species
Geophytic[5] Herbs	*Gladiolus crassifolius, Haemanthus humilis* subsp*. hirsutus, Hypoxis rigidula* var. *pilosissima, Ledebouria ovatifolia.*
Succulent Herbs	*Aloe ecklonis.*
Low Shrubs	*Anthospermum rigidum* subsp. *pumilum, Seriphium plumosum.*

The surveys conducted in 2016 (SAS, 2016), identified two prominent vegetation types (habitat units) within and adjacent to the Project Area, namely a wetland and transformed habitat unit. The wetland habitat is associated with the floodplain and main channel of the Steenkoolspruit and a valley bottom wetland. It was observed with a moderately high ecological sensitivity as the wetland provides niche habitat for a high floral diversity and acts as a migratory corridor in an area transformed by mining and agriculture. The Wetland Scoping Report (Digby Wells, 2020) has identified a Depression and Seep NFEPA Wetland within the Project Area. The transformed habitat unit was associated historical agricultural activities, altering the ecological structure of the associated Eastern Highveld Grassland. The overall ecological functionality was deemed low.

[5] **Geophytic** means a land plant that survives an unfavourable period by means of underground food-storage organs (e.g. rhizomes, tubers, and bulbs).

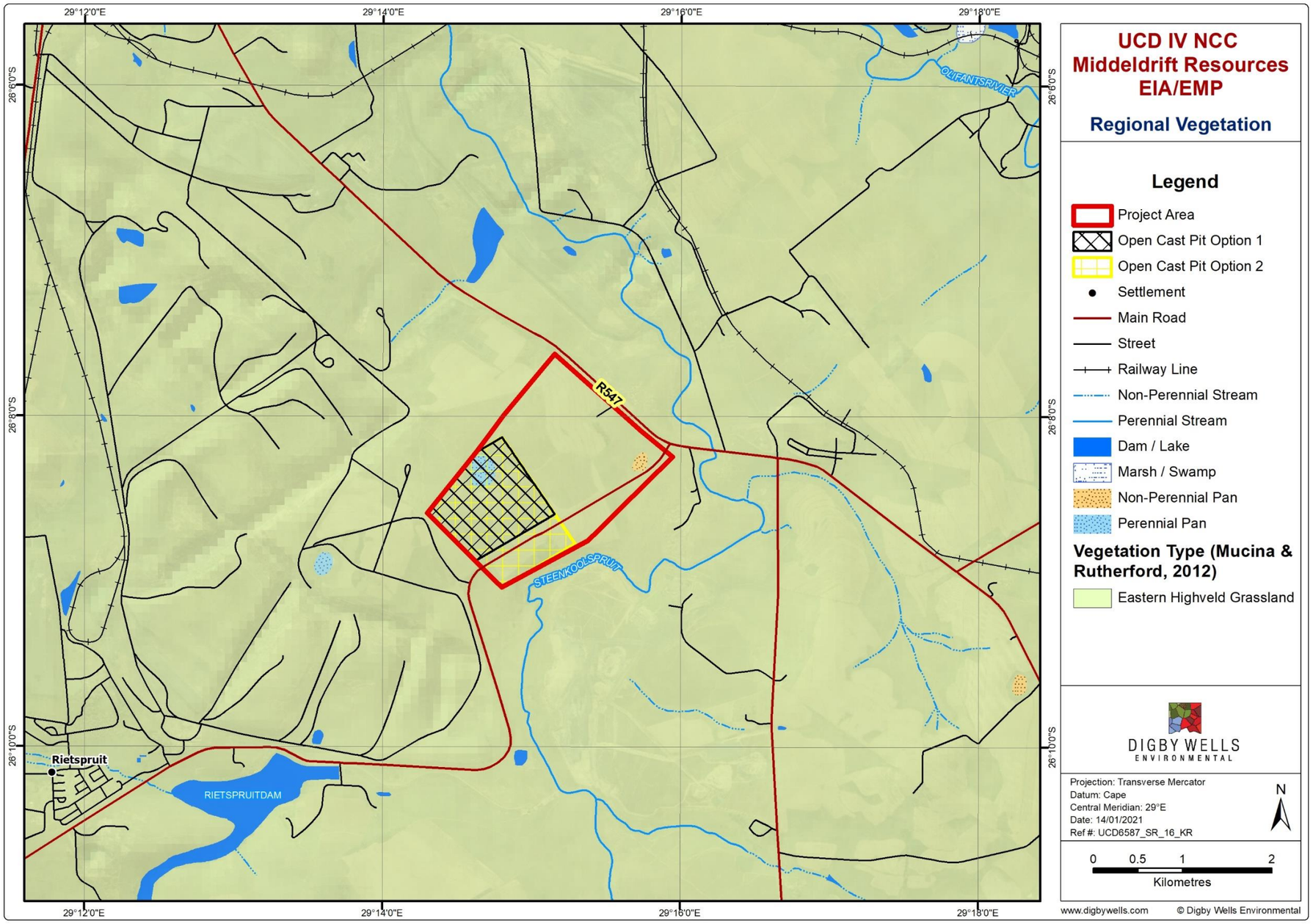


Figure 10-15: Reginal Vegetation Type of the Project Area

10.7.3.1 Species of Conservation Concern

IUCN Red Data Species

The proposed Project Area lies within two Quarter Degree Square (QDS) 2629AA and 2529AB. According to PRECIS several Red Data listed species are expected to be present within the identified QDS.

Protected Flora

The Plants of South Africa (NEWPOSA) species list was obtained from SANBI (https://newposa.sanbi.org/), it lists all the Red Data plant species officially recorded by SANBI for the South African QDS grid. In order for a flora species to be included in this list, a specimen collected in this grid must be supplied to SANBI to be verified and recorded. This list is therefore not a comprehensive list representing only those species that may occur in the aforementioned grids, but rather a guideline as to what is to be expected. Generally, the sites sampled are small portions of the whole grid and habitats suitable for certain species. It is therefore not unusual for species in the NEWPOSA list to be absent from the sampling sites.

The floral species list obtained from NEWPOSA has indicated that one Species of Conservation Concern (SCC) may occur within the Project Area, *Khadia carolinensis,* listed as Vulnerable (VU). Previous studies conducted within close proximity to the Project Area, by Scientific Aquatic Services (SAS), 2016, identified two SCC. *Crinum macowanii* (Least Concern (LC)) was encountered throughout the wetland habitats. This species is listed as *Declining* by the IUCN and is protected under the Mpumalanga Nature Conservation Act, 1998 (MNCA). Additionally, the likelyhood of occurance for *Habenaria nyikana* would be high, as they have been prevoiusly encountered in that particular region. This species is also protected under the MNCA The potential SCC that may occur in the in the Project Area are listed in Table 10-6 below.

Table 10-6:Potential Floral Species of Conservation Concern

Species	Red Data status	SA Endemic
Aloe cooperi subsp. cooperi	LC	No
Aloe reitzii var. reitzii	NT	Yes
Brachystelma minor	VU	Yes
Brachystelma stellatum	Rare	Yes
Crassula setulosa var. deminuta	NE	Yes
Crassula setulosa var. setulosa	NE	Yes
Cryptocarya transvaalensis	LC	No
Dactylis glomerata	NE	No
Dianthus zeyheri subsp. natalensis	NE	Yes
Disa alticola	VU	Yes
Disa zuluensis	EN	Yes
Eucomis autumnalis subsp. clavata	NE	No
Eucomis vandermerwei	VU	Yes
Graderia linearifolia	VU	Yes
Habenaria barbertoni	NT	Yes
Habenaria nyikana	LC	Yes
Helichrysum aureum var. argenteum	NE	Yes
Jamesbrittenia macrantha	NT	Yes
Khadia alticola	Rare	Yes
Khadia carolinensis	VU	Yes
Lydenburgia cassinoides	NT	Yes
Merwilla natalensis	NT	No
Protea parvula	NT	No
Zantedeschia pentlandii	VU	Yes

EN = Endangered, CR = Critically Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern, NYBA = Not yet been assessed

10.7.4 Fauna

This section will cover various groups of animals including mammals, birds, reptiles, amphibians and invertebrates expected in the Project Area.

10.7.4.1 Mammals

Mammals form a vital component of ecosystems. Not only are they important for nutrient cycling, habitat modification, consumers of plants and seed dispersal but they are also a considerable component of predators in healthy ecosystems.

The study conducted by SAS Environmental in 2016 did not encounter any mammal SCC during their site assessment however analysis of the habitat indicated that potential occurrence of Red Listed species Brown Hyena (*Parahyaena brunnea,* Near Threatened) and Cape Mole Rat (*Georychus capensis*, Endangered) may be high.

The Cape Mole Rat prefers deep, sandy soils, particularly sandy alluvial deposits along rivers and montane areas (Skinner, 2005). The species has been commonly recorded in human-modified environments, such as golf courses and gardens. However, the Cape Mole Rat is thought to be a habitat specialist that requires areas with vleis and close proximity to rivers (Bennett, 2016). Threats include the afforestation in the midlands and montane grasslands of KwaZulu-Natal and Mpumalanga whereby the soil profile is altered making it less habitable and reducing area occupancy for the Cape Mole Rat (Bennett, 2016).

The Brown Hyaena is widespread across southern Africa, but it is absent from Lesotho and Swaziland. It faces multiple threats across unprotected areas, especially in regions dominated by livestock and game ranching. It has shown an ability to survive close to urban areas, where it requires some form of land cover such as the bush covers in rocky and mountainous areas (Yarnell, 2016). The motive behind the Near Threatened conservation status for this species is due to the conflict the Brown Hyena incurs with humans. Many Brown Hyenas across South Africa reside on private lands outside protected areas where the human-animal conflict transpires. Frequent poisoning, snaring, shooting and hunting of Brown Hyena occurs in the Limpopo and North West provinces. Unrecorded mortalities as a result of snaring for bushmeat is a major cause for concern and contributes to the decline of this species.

The table below (Table 10-7) lists potential SCC that may occur within the Project Area and lists the IUCN and provincial conservation status (Mpumalanga DACE, 2003).

Table 10-7: Potential Faunal Species of Conservation Concern

Common Name	Species	MP 2003 Status	IUCN 2016 Status
Cape Mole Rat	*Georychus capensis*	EN	LC
Sclater's Golden Mole	*Chlorotalpa sclateri montana*	CR	LC
Highveld Golden Mole	*Amblysomus septentrionalis*	VU	NT
Rough-haired Golden Mole	*Chrysospalax villosus rufopallidus*	CR	VU
Rough-haired Golden Mole	*Chrysospalax villosus rufus*	EN	VU

Common Name	Species	MP 2003 Status	IUCN 2016 Status
Juliana's Golden Mole	*Neamblysomus julianae*	EN	VU
Robust Golden Mole	*Amblysomus robustus*	VU	VU
Meester's Golden Mole	*Amblysomus hottentotus meesteri*	VU	NYBA
Laminate Vlei Rat	*Otomys laminatus*	VU	LC
Peak-saddle Horseshoe Bat	*Rhinolophus blasii empusa*	EN	LC
Lesser Long-fingered Bat	*Miniopterus fraterculus*	VU	LC
Welwitsch's hairy bat	*Myotis welwitschii*	EN	LC
Short-eared Trident Bat	*Cloeotis percivali australis*	EN	LC
Aardvark	*Orycteropus afer*	NT	LC
Brown Hyena	*Parahyaena brunnea*	NT	NT
Oribi	*Ourebia ourebi*	VU	LC
African striped weasel	*Poecilogale albinucha*	NE	LC
Aardwolf	*Proteles cristatus*	NT	LC
Natal red Rock Rabbit	*Pronolagus crassicaudatus ruddi*	NT	NYBA

EN = Endangered, CR = Critically Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern, NYBA = Not yet been assessed

10.7.4.2 Avifauna (Birds)

Birds have been viewed as good ecological indicators, since their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological condition are linked to land cover. As the land cover of an area changes, so do the types of birds in that area. Land cover is directly linked to habitats within the study area. The diversity of these habitats should support many different species.

The habitat within the Project Area, namely the wetland (and pan vegetation) and the Steenkoolspruit, provide important breeding and foraging grounds for numerous bird species. The fauna and flora assessment conducted in 2016 (SAS, 2016) observed Bald Ibis (*Geronticus calvus,* VU) adjacent to the Project Area. Based on the recordings from the South African Bird Atlas Project (SABAP2), over 100 species of birds have been identified within the local pentad (QDS). These birds are comprised of bushveld and grassland species. Twelve species of the potentially occurring species have been assigned a Red Data status are listed in Table 10-8 below, along with their IUCN and provincial (Mpumalanga DACE, 2003) conservation status.

Table 10-8: Potential Avifaunal SCC that May Occur within the Project Area

Species	Common Name	MP Status	IUCN 2016 Status
Sarothrura ayresi	White Winged Flufftail	CR	CR
Heteromirafra ruddi	Rudd's Lark	CR	VU
Geronticus calvus	Bald Ibis	VU	VU
Bugeranus carunculatus	Wattled Crane	CR	VU
Anthropoides paradiseus	Blue Crane	VU	VU
Balearica reguloru	Grey Crowned Crane	VU	EN
Eupodotis caerulescens	Blue Korhaan	VU	NT
Neotis denhami	Stanley's Bustard	VU	NT
Circus ranivorus	African Marsh Harrier	VU	LC
Sagittarius serpentarius	Secretarybird	VU	VU
Tyto capensis	Grass Owl	VU	LC
Eupodotis cafra	White Bellied Korhaan	VU	LC

EN = Endangered, CR = Critically Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern, NYBA = Not yet been assessed

10.7.4.3 Reptiles

Reptiles are ectothermic (cold-blooded) meaning their internal basal temperature is influenced by their surrounding external environment, as a result, reptiles are dependent on environmental heat sources. Thus, many reptiles regulate their body temperatures by basking in the sun, or warmer surfaces (or substrates). Substrates are an important determining factor for identifying which habitats are suitable for which species of reptile.

Rocky outcrops and suitable woody vegetation would increase habitat and intern diversity of reptiles. Adjacent to the Project Area in the Diepspruit 41 IS farm, a ridge with numerous rocky outcrops is situated south to the Project Area. This portion of habitat will provide refuge for numerous reptilian species and will be a key feature during site visits.

No reptile SCC were recorded during the site assessment in 2016 (SAS, 2016). Potential reptile SCC and their associated conservation status are listed below in Table 10-9.

Table 10-9: Potential Reptile SCC that May Occur in the Project Area

Common Name	Species	MP Status	IUCN 2016 Status
Haacke's Flat Gecko	*Afroedura haackei*	EN	NYBA
Abel Erasmus Pass Flat Gecko	*Afroedura sp.*	EN	NYBA
Mariepskop Flat Gecko	*Afroedura sp.*	EN	NYBA
Rondavels Flat Gecko	*Afroedura sp.*	EN	NYBA
Natal Purple Glossed snake	*Amblyodipsas concolor*	VU	LC
Lowveld Shieldnosed Snake	*Aspidelaps scutatus intermedius*	VU	NYBA
Wolkberg Dwarf Chameleon	*Bradypodion transvaalense*	VU	LC
Sungazer/ Giant Girdled Lizard	*Cordylus giganteus*	VU	VU
Barberton Girdled Lizard	*Cordylus warren barbertonensis*	VU	NYBA
Lebombo Girdled Lizard	*Cordylus warreni warreni*	VU	NYBA
Swazi Rock Snake	*Lamprophis swazicus*	VU	NT
Transvaal Flat Lizard	*Platysaurus orientalis orientalis*	NT	NYBA
Wilhelm's Flat Lizard	*Platysaurus wilhelmi*	VU	NYBA

EN = Endangered, CR = Critically Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern, NYBA = Not yet been assessed

10.7.4.4 Amphibians

Amphibians are viewed to be good indicators of changes to the whole ecosystem as they are sensitive to changes in the aquatic and terrestrial environments (Waddle, 2006). Most species of amphibians are dependent on the aquatic environment for reproduction. Additionally, amphibians are sensitive to water quality and ultraviolet radiation because of their permeable skin (Gerlanc, 2005).

Important habitat features for amphibians include wetland clusters. These are groups of wetlands (within a 1 km buffer) that are considered to function as a unit in a landscape, allowing for important ecological processes such as migration of frogs and insects between wetlands to take place. Two pans have been identified within the Project Area and thus provide ideal habitat (among others) for the SCC Giant African Bullfrog (*Pyxicephalus adspersus*), thus this species is therefore expected to occur. This is an SCC due to the loss of habitat from negative anthropogenic activities, the Giant African Bullfrog is listed as Near Threatened (NT) in South Africa according to the IUCN.

10.7.4.5 Invertebrates

Butterflies are a good indication of the various habitats available in a specific area (Woodhall, 2005). Although many species are eurytropes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope (specific habitat requirements with populations concentrated in a small area) species which may be very specialised (Woodhall, 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and to identify. It is for this reason that Lepidoptera (moths and butterflies) will be used as the primary focus for the invertebrate survey.

One SCC that is likely to occur is the Marsh Sylph (*Metisella meninx*). This is a marsh species that requires thick clumps of grass, particularly *Leersia hexandra* (Poacea), and unpolluted environments. A marsh habitat is one of the most easily disrupted habitats and the apparent plight of this species brings it sharply into focus (Henning, 2009). Likely occurring Red Data species are listed below in Table 10-10. The specific Red Data conservation status is not always known.

Table 10-10: Potential Lepidoptera SCC that May Occur in the Project Area

Species	Common Name	MP 2015	IUCN 2016
Aloeides rossouwi	Rossouw's Copper	EN	VU
Pseudagrion coeleste	Catshead Sprite	CR	LC
Metisella meninx	Marsh Sylph	NT	NT

EN = Endangered, CR = Critically Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern, NYBA = Not yet been assessed

10.8 Wetlands

Wetlands in Mpumalanga Province have been extensively degraded and, in many cases, irreversibly modified and lost through a combination of inappropriate land-use practices, development, agriculture and mining. Wetlands represent ecosystems of high value for delivering, managing and storing good water quality for anthropological and animal use yet they are vulnerable to undesirable impacts. It is therefore in the interest of national water security that all wetlands are protected by law.

10.8.1 National Freshwater Ecosystem Priority Areas

The NFEPA project provides a collated, nationally consistent information source of wetland and river ecosystems for incorporating freshwater ecosystem and biodiversity goals into planning and decision-making processes (Nel, et al., 2011). The spatial layers (Freshwater Ecological Priority Areas (FEPAs)) include the nationally delineated wetland areas that are classified into Hydro-geomorphic (HGM) units and ranked in terms of their biodiversity importance. These layers were assessed to evaluate the importance of the wetlands.

The NFEPA project represents a multi-partner project between the Council for Scientific and Industrial Research (CSIR), SANBI, Water Research Commission (WRC), DWS, DEFF,

Worldwide Fund for Nature (WWF), South African Institute of Aquatic Biodiversity (SAIAB) and South African National Parks (SANParks). The NFEPA project provides a collated, nationally consistent information source of wetland and river ecosystems for incorporating freshwater ecosystem and biodiversity goals into planning and decision-making processes (Nel, et al., 2011).

More specifically, the NFEPA project aims to:

- Identify FEPAs to meet national biodiversity goals for freshwater ecosystems; and
- Develop a basis for enabling effective implementation of measures to protect FEPAs, including free-flowing rivers.

The first aim uses systematic biodiversity planning to identify priorities for conserving South Africa's freshwater biodiversity within the context of equitable social and economic development. The second aim is comprised of two separate components: the (i) national component aimed to align DWS and DEFF policy mechanisms and tools for managing and conserving freshwater ecosystems, while the (ii) sub-national component is aimed to use three case studies to demonstrate how NFEPA products should be implemented to influence land and water resource decision-making processes. The project further aimed to maximize synergies and alignment with other national level initiatives, including the National Biodiversity Assessment (NBA) and the Cross-Sector Policy Objectives for Inland Water Conservation (Driver, et al., 2011).

Based on a desktop-based modelled wetland condition and a combination of special features, including expert knowledge (e.g. intact peat wetlands, presence of rare plants and animals, etc.) and available spatial data on the occurrence of threatened frogs and wetland-dependent birds, each of the wetlands within the inventory were ranked in terms of their biodiversity importance and as such, Wetland FEPAs were identified in an effort to achieve biodiversity targets (Driver, et al., 2011).

Table 10-11 below indicates the criteria that were considered for the ranking of each of these wetland areas. Whilst being a valuable tool, it is important to note that the FEPAs were delineated and studied at a desktop and relatively low-resolution level. Thus, the wetlands delineated via the desktop delineations and ground-truthing work done through this study may differ from the NFEPA data layers. The NFEPA assessment does, however, hold significance from a national perspective.

Table 10-11: NFEPA Wetland Classification Ranking Criteria (Nel et al., 2011)

Criteria	Rank
Wetlands that intersect with a Ramsar site.	1

Criteria	Rank
• Wetlands within 500 m of an International Union for Conservation of Nature (IUCN) threatened frog point locality; • Wetlands within 500 m of a threatened water-bird point locality; • Wetlands (excluding dams) with most of their area within a sub-quaternary catchment that has sightings or breeding areas for threatened Wattled Cranes, Grey Crowned Cranes and Blue Cranes; • Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands of exceptional Biodiversity importance, with valid reasons documented; and • Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands that are good, intact examples from which to choose.	2
Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands of biodiversity importance, but with no valid reasons documented.	3
Wetlands (excluding dams) in A or B condition AND associated with more than three other wetlands (both riverine and non-riverine wetlands were assessed for this criterion); and Wetlands in C condition AND associated with more than three other wetlands (both riverine and non-riverine wetlands were assessed for this criterion).	4
Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing Impacted Working for Wetland sites.	5
Any other wetland (excluding dams).	6

Based on the aforementioned criteria, the Project Area comprises of a Depression (Rank 6) NFEPA Wetland, with a Floodplain NFEPA Wetland (Rank 6) being in close proximity. No River FEPAs were identified in the Project Area. Figure 10-16 and Figure 10-17 illustrates these NFEPA wetlands and River FEPAs respectively in relation to the Project Area.

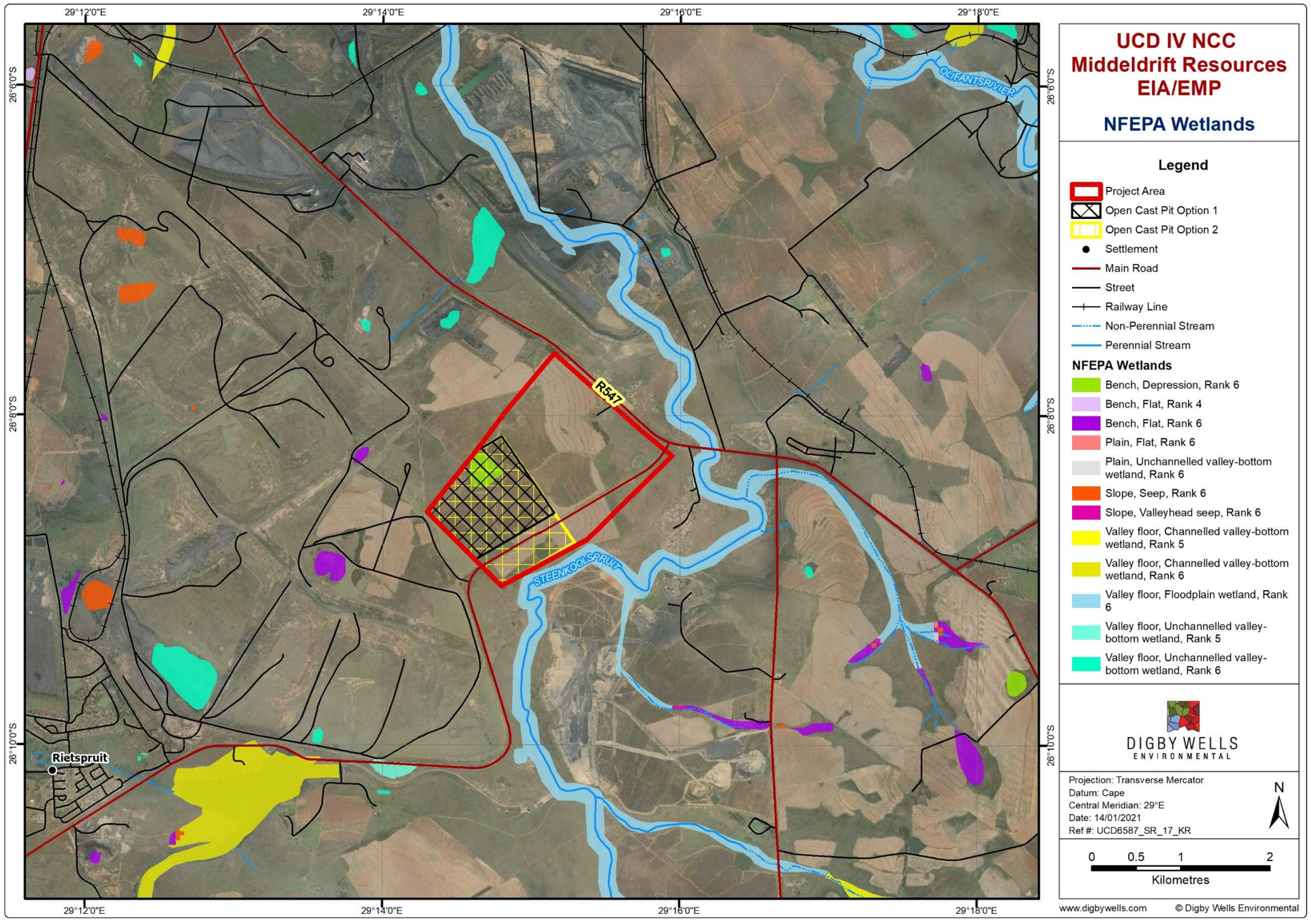


Figure 10-16: NFEPA Wetlands of the Project Area

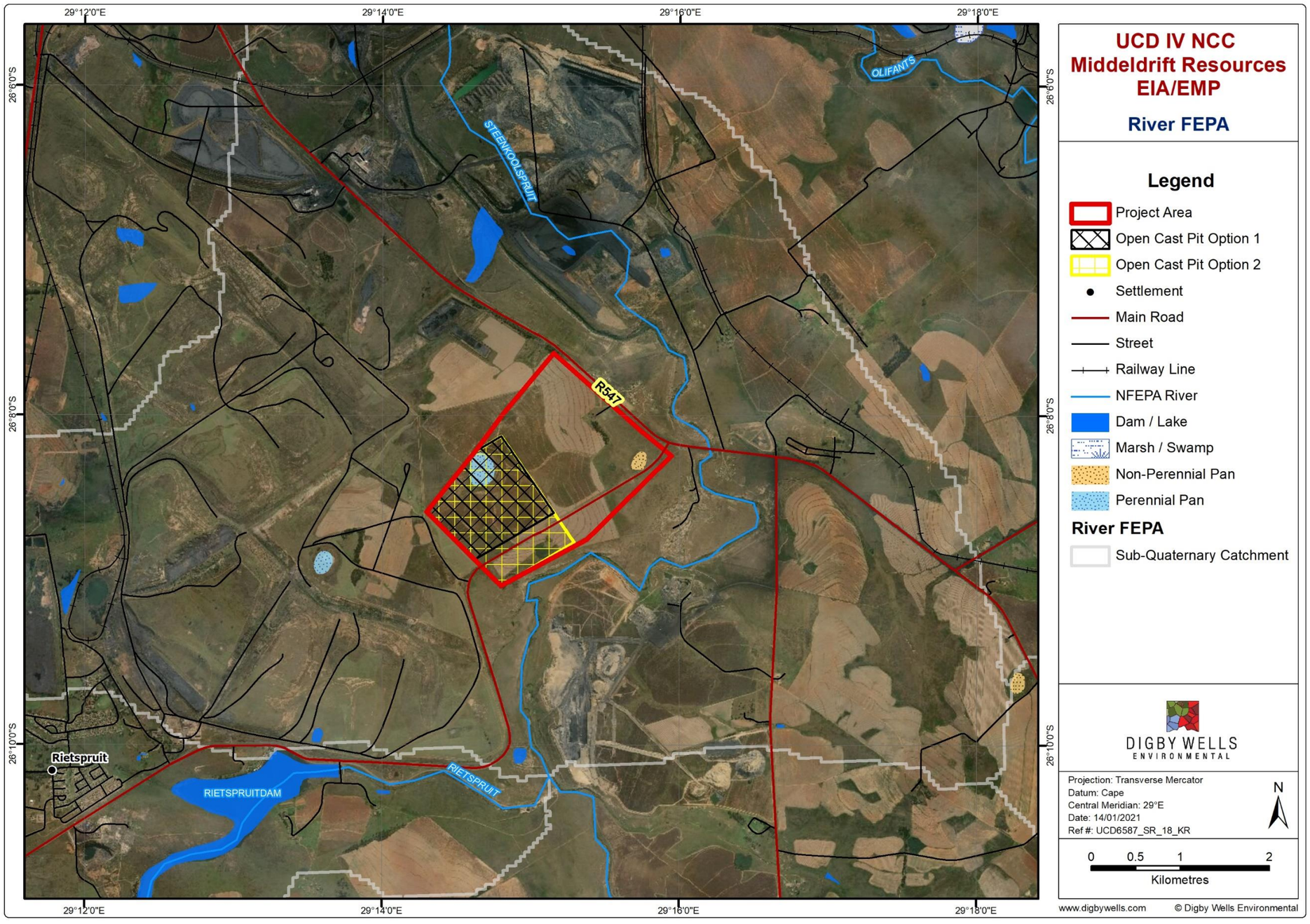


Figure 10-17: River FEPA of the Project Area

10.9 Aquatic Ecology

The following sections will briefly describe the biophysical attributes and provide a regional context for the proposed opencast mine and associated infrastructure, as well as a few insights into the desktop-based ecological conditions and the expected aquatic biota (incl. aquatic macroinvertebrate and fish) likely to be present within the study area.

It should be noted that a Specialist Aquatic Assessment was previously undertaken by Scientific Aquatic Services in 2016 for the NCC Diepspruit Mining Area (an underground mining operation) situated to the south of the proposed Project Area. Consequently, this data is still deemed to be valuable in providing supplementary information for this study at the proposed opencast mine and as such, this study will provide an update and increase the confidence of the previously conducted assessment of the ecological conditions and supported aquatic biodiversity within the study area.

10.9.1 National Freshwater Ecosystem Priority Areas

Based on the current outputs of the NFEPA project (Nel *et al.*, 2011), only a NFEPA River (the Steenkoolspruit) is associated with the Project Area and no other areas of potential concern within the sub-quaternary catchment occur (Figure 10-17).

10.9.2 Desktop Present Ecological Status, Importance and Sensitivity

Of the two Sub Quaternary Reaches (SQR's) occurring within the focus quaternary catchment, only the Steenkoolspruit B11E-01297 SQR is expected to be potentially impacted by the proposed mining activities, the Rietspruit B11E-01353 SQR, which joins the Steenkoolspruit upstream of the Project Area will therefore be excluded from the assessment. Table 10-12 outlines the desktop aquatic-related data obtained for the Steenkoolspruit B11E-01297 SQR (DWS, 2014). Figure 10-9 displays the potentially affected Quaternary Catchment A41E.

Table 10-12: Desktop Aquatic Data pertaining to the Steenkoolspruit

SQR Code/Aquatic Component	B11E-01297
Ecological Category	**D**
Category Description	Largely Modified
Ecological Importance (EI)	Moderate
Ecological Sensitivity (ES)	High

According to the desktop data obtained for the Steenkoolspruit B11E-01297 SQR (DWS, 2014), the reach appears to be in a *Largely Modified* state (i.e. Ecological Category D). Mining, residential and agricultural land uses are present in the upper reaches of the Steenkoolspruit associated with the Project Area. According to the DWS (2014), impacts associated with the these land uses include low water crossings, algal growth (eutrophication), water abstraction,

increased flows, erosion, sedimentation, vegetation removal, alien vegetation encroachment, canalisation, mine effluent discharge and run-off.

The Ecological Importance of the Steenkoolspruit SQR has been classified as “moderate”. It is expected to contain a total of 38 macroinvertebrate taxa as well as a total of six indigenous fish species.

The Ecological Sensitivity for the SQR has been classified as “High”. This, from an instream perspective, is mainly due to the large number of macroinvertebrate taxa that are have a *very high* sensitivity towards water quality and velocity modifications as well as fish species with *moderate* sensitivity towards water quality modifications and high sensitivity towards no-flow conditions.

10.9.3 Expected Aquatic Macroinvertebrates

The expected macroinvertebrate taxa for the associated Steenkoolspruit SQR are presented in Table 10-13.

Table 10-13: Expected Macroinvertebrate Taxa in the Watercourses Associated with the Proposed Open-cast Mining Area

Family Names		
Porifera	Corixidae	Elmidae
Turbellaria	Gerridae	Gyrinidae
Oligochaeta	Hydrometridae	Haliplidae
Hirudinea	Naucoridae	Hydrophilidae
Potamonautidae	Nepidae	Ceratopogonidae
Atyidae	Notonectidae	Chironomidae
Hydracarina	Pleidae	Culicidae
Baetidae > 2 sp.	Veliidae/Mesoveliidae	Muscidae
Caenidae	Ecnomidae	Simuliidae
Coenagrionidae	Hydropsychidae 1 sp.	Lymnaeidae
Aeshnidae	Hydroptilidae	Physidae
Libellulidae	Leptoceridae	Planorbinae
Belostomatidae	Dytiscidae	

Blue shading = high dependence for fast-flowing water; **Green** shading = dependence for both fast-flowing water and moderate water quality

The expected aquatic macroinvertebrate assemblage is largely composed of taxa (families) with preference for slow-flowing to moderately-flowing water and low water quality dependence, only five of the expected 38 species have preference for fast-flowing water and only three taxa are dependent on both fast-flowing water and moderate water (DWS, 2014).

No aquatic macroinvertebrate species of commercial or economic value were listed on the Threatened or Protected Species Regulations, 2007 (Government Notice R152 in Government Gazette 29657, dated 23 February 2007).

10.9.4 Expected Fish Species

The fish species expected in the reaches associated with the Project Area have been provided in Table 10-14 (DWS, 2014). Additionally, each species sensitivity ratings towards physio-chemical and no-flow conditions (DWS, 2014) have been provided for, together with their conservation statue according to the IUCN Red List of Threatened Species (2018).

Table 10-14: Expected Fish Species in the Reaches Associated with the Project Area

Fish Species	Common Name	Tolerance/Preference		Conservation Status
		Modified Water Quality	No-flow	
Clarias gariepinus	Sharptooth Catfish	1	1.7	LC
Enteromius anoplus	Chubbyhead Barb	2.6	2.3	LC
Enteromius paludinosus	Straightfin Barb	2.3	1.8	LC
Labeobarbus polylepis	Bushveld Smallscale Yellowfish	3.3	2.9	LC
Pseudocrenilabrus philander	Southern Mouthbrooder	1.4	1	LC
Tilapia sparrmanii	Banded Tilapia	1.4	0.9	LC

Tolerance: 1-2 = tolerant, 3-4 moderately tolerant; 4-5 = Intolerant; **Red** Shading = intolerant, **Green** shading = tolerant, Conservation Status: LC=Least Concern

Following a review of available collection records of fish species occurring within the watercourses associated with the study area (including records from FBIS), a total of six fish species are expected to occur within the B11AE and B11D catchments. Three of the six species are regarded as tolerant to modified water quality and no flow conditions (DWS, 2014). According to Skelton (2001), all the species are indigenous to South Africa and their conservation status is regarded as Least Concern.

10.10 Air Quality

The baseline characterisation encompasses a detailed description of the meteorology of the study area, surrounding receptors likely to be impacted, and the existing air quality in the vicinity of the proposed Project. Figure 10-18 shows the Project boundary and surrounding sensitive receptor. According to the USEPA (2016), a sensitive receptor encompasses but is not limited to “hospitals, schools, day care facilities, elderly housing and convalescent facilities. The aforementioned are locations where the occupants are more susceptible to airborne pollutants” if exposed.

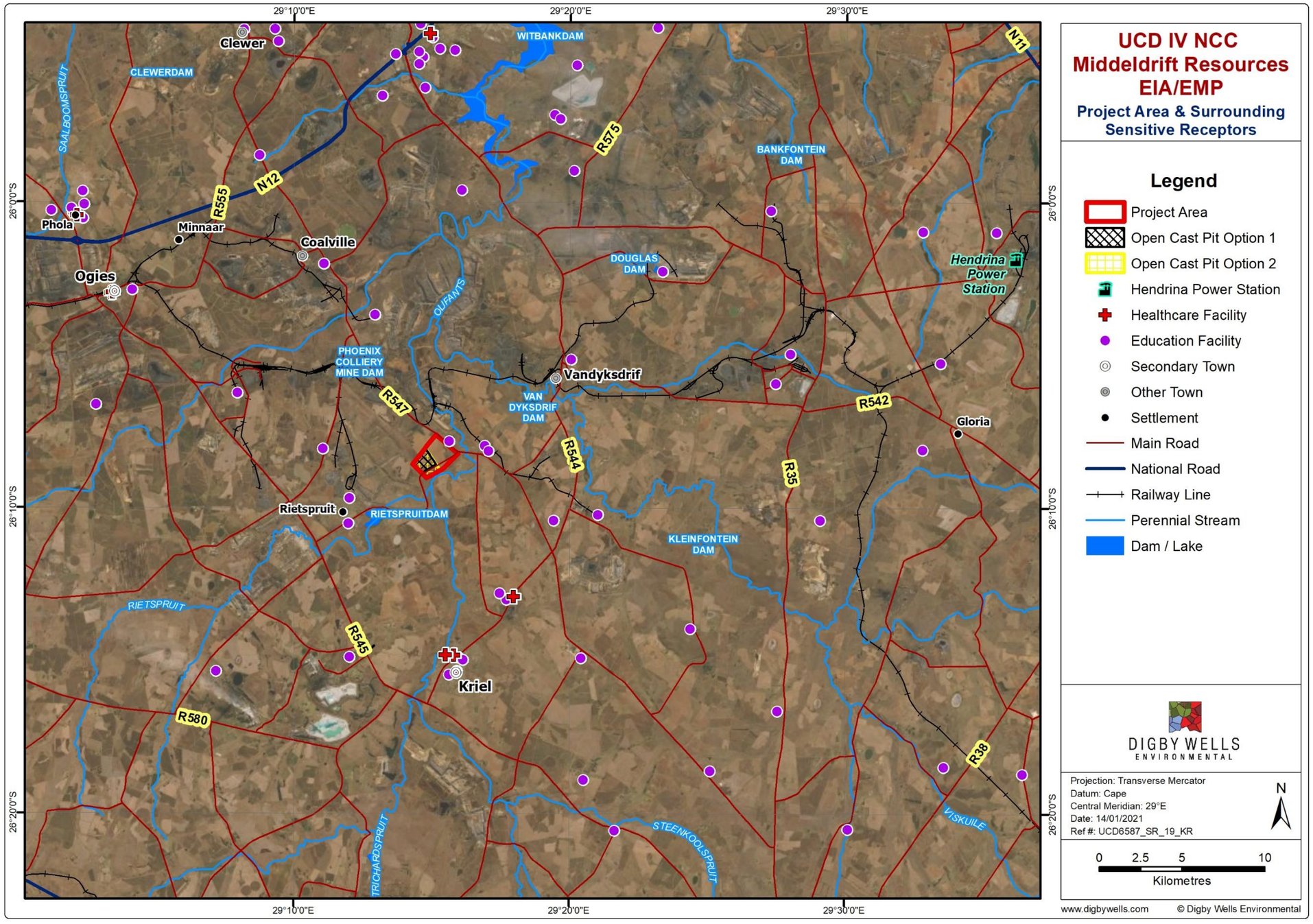


Figure 10-18: Project Area and Surrounding Sensitive Receptors

10.10.1 Existing Air Quality

Ambient air quality records measured by the South African Weather Service (SAWS) station at Greendale School, Impala Road, eMalahleni, Mpumalanga was used to assess background scenario. The ambient air quality record comprises of both particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$) and gases, such as sulphur dioxide (SO_2), nitrogen dioxide (NO_2), and carbon monoxide (CO). Data covering the period, January 2020 to November 2020 were assessed.

The dustfall network has four monitoring locations labelled DR 001 to DR 004 (Figure 10-19). The SAWS air quality monitoring station is located some 28 km north of the NCC site.

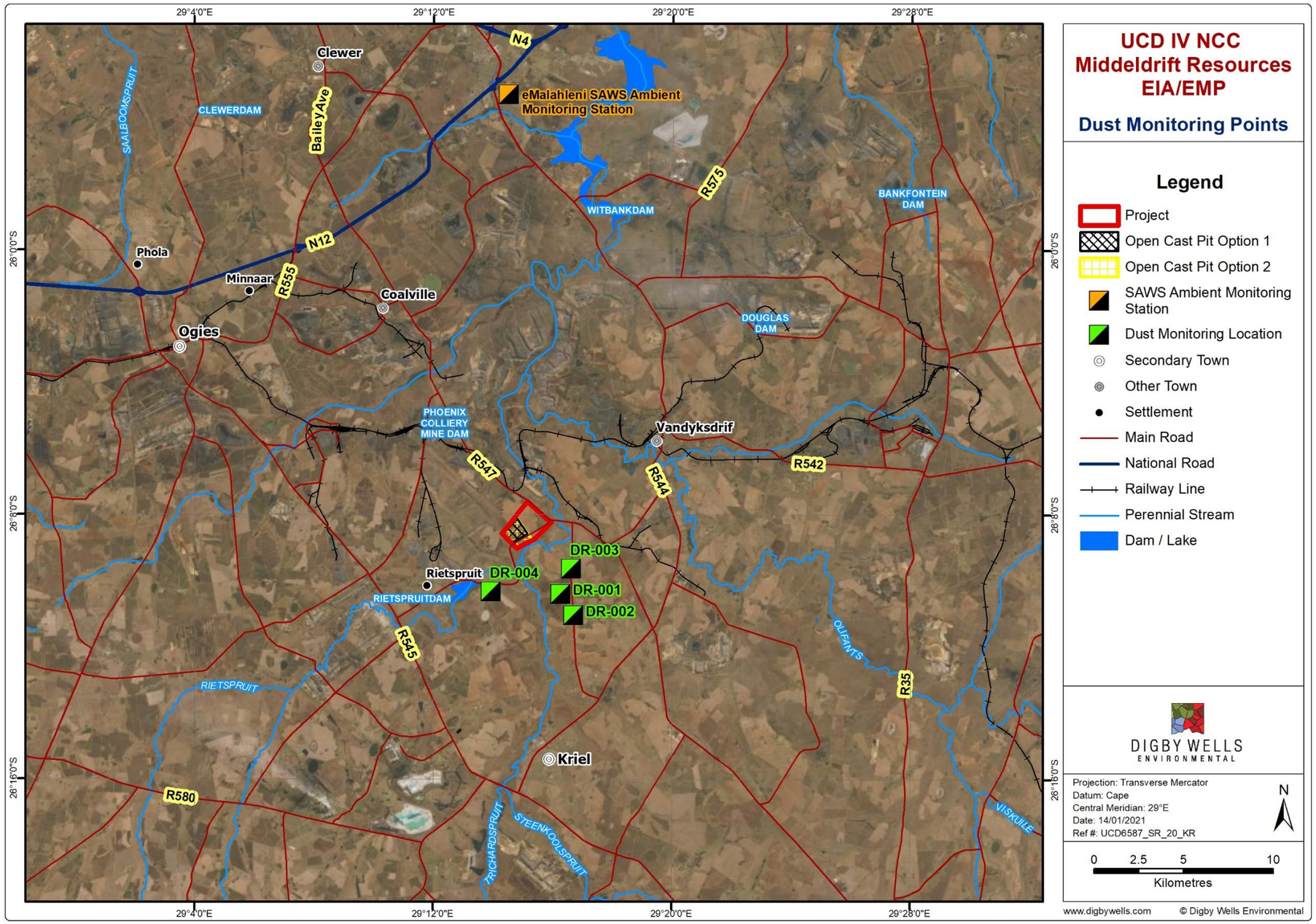


Figure 10-19: Ambient Air Quality Monitoring Points

10.10.2 Fine Particulate Matter

The ambient $PM_{2.5}$ and PM_{10} levels measured during the last one year are presented. The daily concentrations of $PM_{2.5}$ and PM_{10} measured at the SAWS station in eMalahleni are generally below the South African ambient air quality standards (red dotted line) of 40 µg/m^3 and 75 µg/m^3, respectively, except for a day or two with exceedances.

Although the SAWS station was queried to download data from 01 January 2020 to 09 November 2020 (a total of 314 days), data was only available for 110 days (35% data availability). The $PM_{2.5}$ standard was exceeded 22 times in 110 days. The 90th percentile and the maximum recorded are depicted in Table 10-15. The 90th percentile was below 9.3 µg/m^3. The highest $PM_{2.5}$ concentration recorded during the period was 43 µg/m^3.

For PM_{10} daily, the ambient levels were most of the time below the PM_{10} standard. data was only available for 76 days (24% data availability). The PM_{10} standard was exceeded 25 times in 76 days. The 90th percentile and the maximum recorded are depicted in Table 10-15. The 90th percentile was below 26.4 µg/m^3. The highest $PM_{2.5}$ concentration recorded during the period was 137 µg/m^3.

The ambient air quality results collected are summarised in Table 10-15.

Table 10-15: Summary of the Ambient Air Quality Records Measured at SAWS Station in eMalahleni, Mpumalanga

Pollutant	Averaging period	SA Standard	Ambient Level below 90th Percentile	Highest Ambient Level Measured on-site	Exceedance of the Standard
$PM_{2.5}$	24 hours	40 µg/m^3 (2)	68.4	164	22
PM_{10}	24 hours	75 µg/m^3 (1)	50.2	137	25

(1) South African Standard, Government Notice 1210, Government Gazette 32816.
(2) South African Standard, Government Notice 486, Government Gazette 35463.

10.10.3 Gaseous Pollutants

The gaseous pollutant data from the SAWS ambient air quality station such as SO_2, NO_2, and CO are discussed below. The daily SO_2 concentrations measured at the SAWS station in eMalahleni were low (the 90th percentile of the daily SO_2 levels was 27 ppb). The maximum daily concentration over the one year record considered was 63 ppb, with nine exceedances of the South African standard of 48 ppb.

Table 10-16: Summary of the Ambient Air Quality Records Measured at SAWS Station in eMalahleni, Mpumalanga Province

Pollutant	Averaging period	SA Standard	Ambient Level below 90th Percentile	Highest Ambient Level Measured on-site	Exceedance of the Standard
CO	8 hours	26 ppm (1)	1.7	4.8	0
NO_2	1 hour	106 ppb (1)	24	65	0
SO_2	24 hours	48 ppb (1)	27	63	9

(1) South African Standard, Government Notice 1210, Government Gazette 32816

The daily NO_2 concentrations measured at the SAWS station in eMalahleni were low (the 90th percentile of the hourly NO_2 levels was 24 ppb). The maximum daily concentration over the one year record considered was 65 ppb. During the period, no exceedance of the South African standard of 106 ppb was measured.

The 8-hourly CO concentrations measured at the SAWS station in eMalahleni were low (the 90th percentile of CO levels measured was 1.7 ppm). The maximum concentration measured over the period was 1.3 ppm. No exceedance of the South African standard of 26 ppm was observed.

10.10.4 Dustfall Measurements

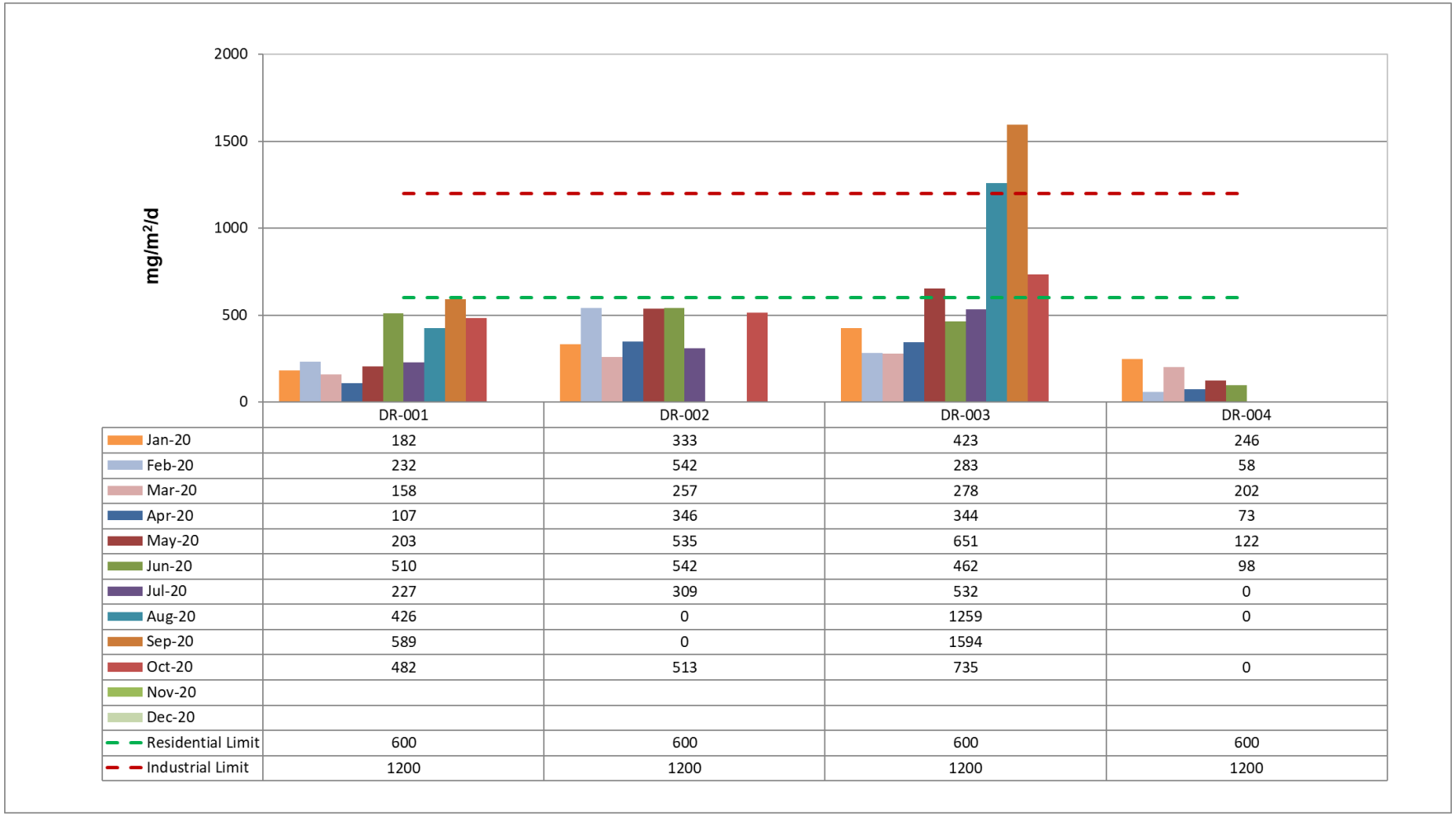
Data from a network of four dust monitoring locations operated by Rayten Engineering Solutions (Pty) Ltd (hereafter referred to as “Rayten”) was used to assess the background scenario. The data covered the period from January 2019 to October 2020. The sites were designated as DR-001, DR-002, DR-003, and DR-004, respectively. These sites were classified as non-residential, so the limit value of 1 200 mg/m^2/d applies.

With the sites classified as non-residential, no exceedance of the non-residential limit of 1 200 mg/m^2/d was recorded in 2019 (Figure 10-20).

In 2020, site DR-003 recorded two consecutive exceedances of the non-residential limit in August and September 2020 (Figure 10-21). It was assumed that a localised dust-generating event resulted in the exceedances measured.

	DR-001	DR-002	DR-003	DR-004
Jan-19	62	158	430	117
Feb-19	146	0	336	183
Mar-19	96	0	259	169
Apr-19	92	0	245	322
May-19	114	201	228	96
Jun-19	191	395	583	205
Jul-19	486	116	437	148
Aug-19	770	0	536	193
Sep-19	646	0	822	316
Sep-19	646	0	822	316
Oct-19	613	989	853	362
Nov-19	519	566	833	412
Dec-19	332	660	174	223
Residential Limit	600	600	600	600
Industrial Limit	1200	1200	1200	1200

Figure 10-20: Dustfall Measurements (Rayten, 2019)



	DR-001	DR-002	DR-003	DR-004
Jan-20	182	333	423	246
Feb-20	232	542	283	58
Mar-20	158	257	278	202
Apr-20	107	346	344	73
May-20	203	535	651	122
Jun-20	510	542	462	98
Jul-20	227	309	532	0
Aug-20	426	0	1259	0
Sep-20	589	0	1594	
Oct-20	482	513	735	0
Nov-20				
Dec-20				
Residential Limit	600	600	600	600
Industrial Limit	1200	1200	1200	1200

Figure 10-21: Dustfall Measurements (Rayten, 2020)

10.11 Heritage

This section presents a description of the cultural heritage baseline informed through secondary data only. The data collection methodology is described in Section 12.4.8.

10.11.1 Definition of Study Areas

Heritage resources do not exist in isolation to the greater natural and social environment (which includes the socio-economic, socio-political and socio-cultural aspects). To develop an applicable cultural heritage baseline for the Project, Digby Wells defined three nested study areas to be considered. These include:

- The *site-specific study area*: the farm portions extent associated with the proposed Project and proposed infrastructure, including a 500 m buffer area;
- The *local study area*: the area most likely to be influenced by any changes to heritage resources in the Project area, or where project development could cause heritage impacts. The local study area is defined as the area bounded by the local municipality and includes particular reference to the immediate surrounding properties or farms. The local study area is specifically examined to offer a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provides the local development and planning context that may contribute to cumulative impacts. The Project area is situated in the ELM; and
- The *regional study area*: the area bounded by the district municipality demarcation. In this case, the Project is located in the NDM. Where necessary, the regional study area may be extended outside the boundaries of the district municipality to include areas closest to the Project area. The aim of this is to include much wider expressions of specific types of heritage resources and historical events. The regional study area also provides the regional development and planning context that may contribute to cumulative impacts.

10.11.2 Regional Cultural Heritage Landscape

The Mpumalanga Province is underlain by valuable geological formations, both in terms of mineral and fossil wealth. Coal is formed through the compression and heat alteration of plant matter. During these processes, alteration happens to such an extent that potential plant fossil remains are no longer recognisable. The shales between the coal horizons, however, have the potential to preserve very good examples of plant fossils (Bamford, 2014; 2016). To a lesser extent, the sandstone surface outcrops may also preserve fossil plants. Coal deposits can potentially also include fossils of mammal-like reptiles and mammals, but these are rarely, if ever, preserved with plant fossils.

The greater study area forms part of the Highveld Coalfield, which extends approximately 7 000 km^2 (Johnson, et al., 2006). The regional and local study areas are predominantly underlain by the Main Karoo Basin, which comprises lithostratigraphic units associated with

the Karoo Supergroup. Table 10-17 presents a truncated geological sequence applicable to the regional study area. The specialist Palaeontological Impact Assessment (PIA) report will present the site-specific geological context and the associated palaeontological sensitivities in more detail.

The Main Karoo Basin dates to the late Carboniferous to Middle Jurassic Periods, roughly 320 to 145 million years ago (mya). Within the Karoo Supergroup are the sediments of the Ecca Group. These sediments date to the Permian Period and overlie the Dwyka Formation. These layers also include significant coal reserves and is the most palaeontologically sensitive unit of the Karoo Supergroup (Johnson, et al., 2006; Groenewald & Groenewald, 2014). The Ecca Group is well known for its wealth of plant fossils, characterised by the assemblage of *Glossopteris* fossils (a plant species defined through fossil leaves).

The Ecca Group includes three formations:

- The *Pietermaritzburg Formation*, which is of moderate palaeontological sensitivity. This formation rarely forms good outcrops and fossils are rare and difficult to find;
- The *Vryheid Formation*, which is the main coal-producing formation in South Africa. This formation has produced a number of fossils, including extensive Glossopteris fossil assemblages. Trace fossils, rare insects, possible conchostracans (bivalve crustaceans and shrimp clams, which are still extant), non-marine bivalves and fish scales. This formation is of very high palaeosensitivity; and
- The *Volksrust Formation*: a monotonous sequence of grey shale. Fossils are significant but rare and include temnospondyl amphibian remains, invertebrates and minor coal with plant remains, petrified wood and trace fossils assemblages (Groenewald & Groenewald, 2014).

The *Vryheid Formation* is the predominant geographical present in proximity to the Project area. As indicated above, this feature is known for its wealth of plant fossils. These include fossils of *Breytenia*. These fossils are extremely rare, comprising only four known instances, one of which is available for research. The other three examples were identified during site inspections for a coal mine approximately 50 km away from the Project Area.

Table 10-17: Geological Sequence and Palaeontological Sensitivity for the Local Study Area

Eon	Era	Period	Mya	Lithographic Units			Significance	Fossils
				Supergroup	Group	Formation		
Phanerozoic	Palaeozoic	Permian	300	Karoo Supergroup	Ecca Group	Volksrust	High	The Volksrust Formation comprises of trace fossils, rare temnospondyl amphibian remains, invertebrates (bivalves, insects), minor coals with plant remains, petrified wood, organic microfossils (acritarchs), and low-diversity marine to non-marine trace fossil assemblages.
						Vryheid	Very-high	Abundant plant fossils of Glossopteris and other plants. Trace fossils. The reptile Mesosaurus has been found in the southern part of the Karoo Basin. Rich fossil plant assemblages of the Permian Glossopteris flora (lycopods, rare ferns and horsetails, abundant glossopterids, cordaitaleans, conifers and ginkgoaleans), rare fossil wood, diverse palynomorphs. Abundant, low diversity trace fossils, rare insects, possible conchostracans, non-marine bivalves, fish scales.

Table 10-18 presents an overview of the broad timeframes for the major periods of the past in Mpumalanga. Figure 10-22 presents a summary of the heritage resources identified within the larger study area. The figure presents the relative abundance of these heritage resources as grouped by the periods listed in Table 10-18.

Table 10-18: Archaeological Periods in Mpumalanga

The Stone Age	Earlier Stone Age (ESA)	2 mya to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era[6])
There appears to be a gap in the record in Mpumalanga between approximately 7000 and 2000 BCE.		
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period[7]	-	1500 CE to 1850 (Behrens & Swanepoel, 2008)

Adapted from Esterhuysen & Smith (2007)

[6] Common Era (CE) refers to the same period as *Anno Domini* ("In the year of our Lord", referred to as AD): i.e. the time after the accepted year of the birth of Jesus Christ and which forms the basis of the Julian and Gregorian calendars. Years before this time are referred to as 'Before Christ' (BC) or, here, BCE (Before Common Era).

[7] The author acknowledges that in southern Africa, especially in Mpumalanga, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented and is being explored through the 500 Year Initiative (Swanepoel, et al., 2008).

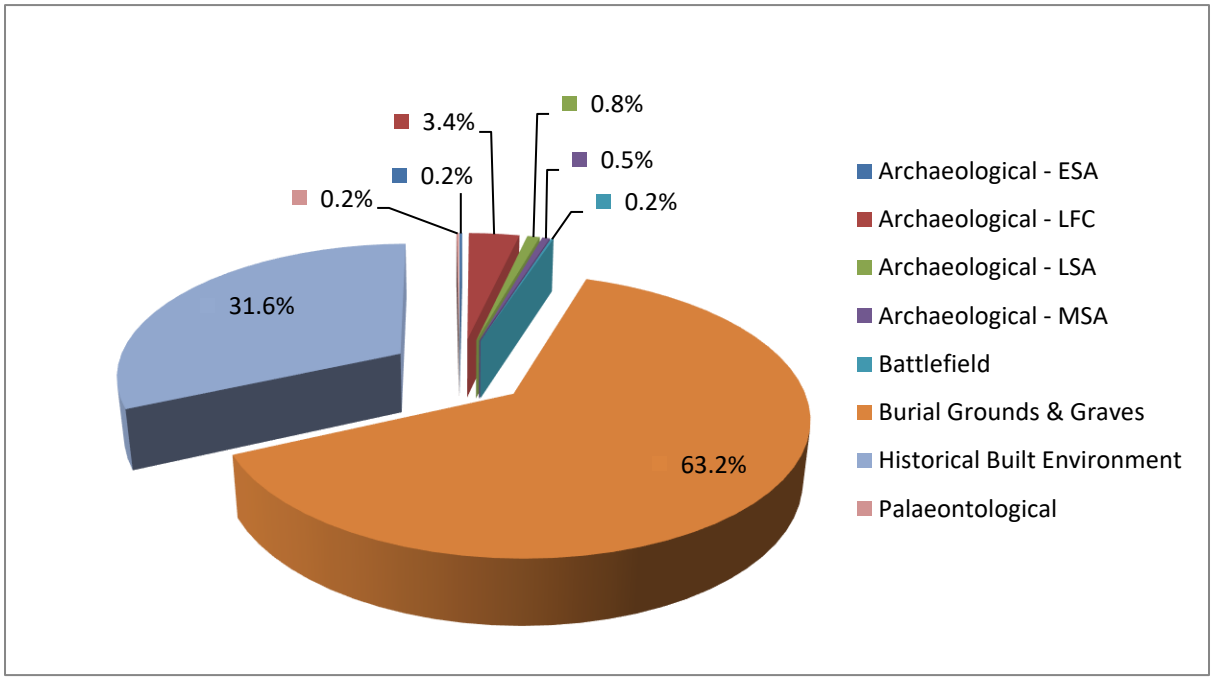


Figure 10-22: Heritage Resources identified within the Greater Study Area

In total, 589 heritage resources were identified within the regional, local and site-specific study areas. Within the areas under consideration, the predominant tangible heritage resources demonstrate affiliations with the historical period, including the historical built environment and burial grounds and graves. This notwithstanding, expressions of the Stone Age, the Farming Community Period, historical battlegrounds and palaeontological resources have also been recorded in the regional study area.

The Stone Age of southern Africa is divided into three broad phases: the ESA, MSA and LSA. These phases are defined according the various hominid species and the lithic tools and associated materials they created through time.

The ESA period occurred between 2 mya and 250 kya and comprised predominantly of large hand axes and cleavers made of coarse-grained materials (Esterhuysen & Smith, 2007). This period is associated with *Australopithecus* and early *Homo* hominid species. Within the reviewed data, one example of ESA lithics was identified, which comprised a low-density artefact scatter (Huffman, 1999). This represents 0.2% of the data set.

The MSA dates between approximately 300 kya and 20 kya. The early MSA lithic industries are characterised by high proportions of minimally modified blades, created using the Levallois technique, the use of good quality raw material and the use of bone tools, ochre and pendants (Clark, 1982; Deacon & Deacon, 1999). These tools were made and used by archaic *Homo sapiens.* The review of available data included 3 records of expressions of MSAS (0.5% of the total identified heritage resources). These include low- and medium-density surface scatters (Fourie, et al., 2000; du Piesanie & Nel, 2016b).

The LSA dates from approximately 40 kya to the historical period. LSA lithics are specialised, (i.e. specific tools each have specific uses) (Mitchell, 2002). Assemblages from this period

commonly include diagnostic tools such as scrapers and segments. Assemblages may include bone points as well. In southern Africa, the LSA is closely associated with hunter-gatherers. The San (including hunter-gatherer, Basarwa and Bathwa groups) are generally accepted as the first inhabitants of southern Africa (Makhura, 2007).

The review of available data included few expressions of the LSA (5 records or 0.8% of the total identified heritage resources). Within the regional study area, expressions of the LSA include:

- Isolated artefacts and low-density scatters of lithic accumulations (de Jong, 2006; Karodia, et al., 2013);
- A rock shelter with deposit and artefacts (Fourie, et al., 2000); and
- Rock art (du Piesanie & Nel, 2016a).

In Mpumalanga, three rock art painting traditions occur and are associated with cultural groups. These traditions are widely dispersed and include:

- Fine line painting associated with autochthonous LSA hunter-gatherer groups (Eastwood, et al., 2002);
- Finger paintings associated with the later arrival of pastoralists (Smith & Ouzman, 2004; Eastwood, et al., 2002; Smith & Zubieta, 2007); and
- Finger paintings associated with much later, possibly historic, farming communities. No expressions of this tradition are known to occur within the study area under consideration.

The San were later followed by the various peoples of the Farming Community, including ancestors of modern Sotho-Tswana and Nguni peoples (Makhura, 2007). This period correlates to the movements of Bantu-speaking agro-pastoralists moving into southern Africa. Farming Community settlements are identified through stonewalling and secondary tangible surface indicators, such as ceramics and evidence for domesticated animals, i.e. dung deposits or faunal remains.

The Farming Community Period is divided into two phases: the EFC and the LFC. No material associated with the EFC was identified within the broader study area. The LFC resources accounted for 20 (or 3.4%) of the identified heritage resources in the regional study area. The identified LFC heritage resources include:

- Structural sites, including stone walling or structural remains (ruins of homesteads or circular stone structures) (Fourie, et al., 2000; van Schalkwyk, 2007; Pelser & van Vollenhoven, 2008; Karodia, et al., 2013; Higgit, et al., 2014; Karodia & Nel, 2014); and
- Low density surface scatters; and (de Jong, 2006; Karodia, et al., 2013).

The historical period is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is largely artificial, as there is a large amount of overlap between the two.

Throughout the transitions between the LFC and the historical period (and throughout the historical period itself), migration, population growth, climatic variation and trade to the east significantly impacted the Pedi, Koni and other groups on the Mpumalanga Highveld. The rise of power blocs, including violent displacement and political centralisation, characterised this time (Makhura, 2007). Within this region, the Pedi developed a system of centralisation where subordinate communities could retain their independence in exchange for tribute in various forms. The Pedi grew to become the strongest power in the north-east, amongst the escalating conflict and intensifying violence (Delius, et al., 2014).

The Mfecane (or the Difaqane as it is known north of the Orange River) is one example of the overlap between the LFC and the historical period. These terms refer to a period of violence and unrest between approximately 1817 to 1826 AD (Landau, 2010). Many aspects of the Mfecane/Difaqane have been debated and challenged, but the traditional understanding of the period is that Mzilikazi and his Ndebele group were pushed out of their territory by the Zulu group led by Shaka. This displacement had a knock-on effect, as multiple groups were subsequently displaced to the north and the west. A drought during this time exacerbated the instability and increased the pressure on food supplies, which were already running low.

Adding to the instability and power struggles were the European settlers, traders, missionaries and travellers now moving into the interior (Landau, 2010). The Mfecane/Difaqane was characterised by unprecedented (at least within the records of the Europeans travelling within southern Africa) social and political mobilisation and violence across the Highveld as individuals sought personal and food security. As a result, the Mpumalanga Highveld was vulnerable to intrusive groups including the Swazi and the *Voortrekkers*.

Groups of Afrikaaners initiated a move from the Cape to the interior to establish an independent state in approximately 1835, in reaction to increased British liberalism and the abolishment of slavery and pass laws. The migration of these *Voortrekkers* is commonly referred to as the Great Trek (or *Groot Trek*) and it started with the first group, the Robert Schoon Party, in 1836. The first permanent settlement that was established as a result of this movement was Ohrigstad in 1845 – the *Voortrekkers* at this time were intruding into an already volatile interior and exacerbated the strife in this area, frequently skirmishing with remnant Pedi, Nduzundza Ndebele and Kopa groups (Delius & Cope, 2007; Voortrekkers, 2014).

In 1852, *Voortrekker* and British representatives signed the Sand River Convention into effect; the convention acknowledged Trekboer independence and officially established the *Zuid-Afrikaansche Republiek* (ZAR). ZAR independence allowed for land to be distributed to its citizens, though the demarcation of farms and the issuing of title deeds. The Trekboers continued their violent encounters with the smaller groups in this region, armed with their perceived right to land under the ZAR. These conflicts resulted in a Trekboer-Swazi alliance: the Swazi besieged and destroyed the Kopa and orchestrated assaults against the Ndzundza Ndebele. The Ndzundza Ndebele remained undefeated, but came to a compromise with the Trekboers where land would be leased by the Trekboers through a system of tribute (Delius & Cope, 2007; Voortrekkers, 2014).

The Trekboers (now farmers) discovered and exploited the Highveld Coalfields soon after settling in the area. The coal was initially used by the Boers as a domestic resource; however the discovery of gold in the Witwatersrand in 1886 created an enormous demand for coal (Brodie, 2008; Pistorious, 2008; 2008b). This increase in the demand for coal drove the commercial exploitation of the coal, until the industry was put on hold by the outbreak of war.

The South African War of 1899-1902 (also referred to as the Second Anglo-Boer War) officially started on October 9th, 1899. The war was the result of building tensions and conflicting political agendas between the Trekboers and the British. There are multiple notable battles associated with the South African War within the regional study area, one of which is the Battle of Bakenlaagte (October 30th, 1901). A battlefield relating to this event has been recorded within the greater study area.

Lieutenant Colonel George Benson's No. 3 Flying Column moved from the farm Syferfontein, marching north-west to the Bakenlaagte farmstead, where they intended to camp. The advance guard reached the farmstead and set up the camp, but by midday, the rear-guard had been hampered by unfavourable weather and were still some distance away from the farm. General Botha of the Boer commando and his 800 reinforcements planned to attack Benson's Column and this division of the force provided the Boers with an advantage. Outnumbered four to one, the Boers decimated the rear-guard in a gun battle that lasted just 20 minutes; but the attack did allow the main column to deploy and set up a defensive perimeter. This perimeter prevented the Boers from capturing the main column as they had envisaged, and the Boers left with what spoils they could. The British transported their 134 wounded to the entrenched camp during the night (Pakenham, 1979; Willsworth, 2006; Wessels, 2010; von der Heyde, 2013).

Other important events associated with the South African War in the broader area include:

- The Battle of Lake Chrissie (February 6th, 1901);
- Trigaardsfontein (10 December 1901),
- Klippan (18 February 1902); and
- Boschmanskop (1 April 1904) (Van Vollenhoven 2012).

Historical heritage resources associated with the early settlement of these groups in the region make up the large majority of the identified heritage resources in the area under consideration. Burial grounds and graves account for 372 records (63.2% of the identified heritage resources) and historical built environment resources account for 186 records (31.6%).

Historical resources are represented as:

- The Bakenlaagte battlefield referred to above (Van Vollenhoven, 2012a; Hardwick & du Piesanie, 2018);
- Burial grounds and graves, ranging from single burials to graveyards containing over one hundred individuals (van Schalkwyk, 1997a 1997b, 2002a, 2002b; Huffman 1999, Fourie, et al., 2000, 2012; Pistorius, 2004a, 2004b, 2008, 2011, 2012, 2013a, 2014, 2015, 2016; de Jong, 2006, 2007; Pelser & van Vollenhoven, 2008, Fourie, 2008 2009;

Birkholtz, 2011, 2013; Fourie & Hutton, 2012; Higgit, et al., 2013; Karodia, et al., 2013; Higgit, et al., 2014; Karodia & Nel, 2014; van Vollenhoven & du Bruyn, 2014; van Vollenhoven, 2012a, 2012b, 2015a, 2015b; van der Walt, 2015; du Piesanie & Nel, 2016b; Coetzee & Fivaz, 2017; Hardwick & du Piesanie, 2018); and

- Historical built environment resources, such as structural remains (stonewall structures, homesteads, farmhouses and functional structures) and structural complexes; (Huffman & Calabrese, 1996; van Schalkwyk, 1997a 1997b, 2002a, 2002b; Huffman 1999, Pistorius, 2008, 2011, 2012, 2016; de Jong, 2006, 2007; Pelser & van Vollenhoven, 2008, Fourie, 2008 2009; Fourie & Hutton, 2012; Birkholtz, 2013; Higgit, et al., 2013; Karodia, et al., 2013; Pelser, 2013; Higgit, et al., 2014; Karodia & Nel, 2014; van Vollenhoven, 2012a; 2015a, du Piesanie & Nel, 2016a; 2016b; Coetzee & Fivaz, 2017; Hardwick & du Piesanie, 2018).

11 Item 2(j): Impacts Identified

Refer to Table 11-1 overleaf for the preliminarily identified impacts per Project activity and the proposed mitigation measures.

Table 11-1: Environmental Aspects Preliminary Impacts and Mitigation Measures

Activities	Potential impacts	Mitigation type	Potential for residual risk
Groundwater			
• Removal of vegetation / topsoil for establishment of mining and linear infrastructure – Construction.	• Groundwater quality deterioration.	• Control through limiting the extent of excavation and implement management measures in place should this not be possible.	Low
• Dewatering from pit – Operation.	• Groundwater quantity deterioration.	• Modify through dewatering according to specifications by numerical model.	Medium
• Potentially contaminating stockpiles and dumps on surface – Operation.	• Groundwater quality deterioration.	• Stop through constructing storage area appropriately.	Low
• Contamination generation pit area – Post- Closure.	• Groundwater quality deterioration.	• Remedy through limiting contamination footprint during operation.	Medium
• Potential decant – Post- Closure.	• Surface water quality deterioration.	• Control through decant management.	Medium
Surface Water			
• Removal of vegetation / topsoil for establishment of mining and linear infrastructure.	• Sedimentation and siltation of adjacent water resources reducing water quality within the Steenkoolspruit River.	• Control erosion and sedimentation by establishing a stormwater management plan. • Control by limiting clearance and soil disturbance to the development footprint.	Medium
• Clearing and mining of a pan.	• The mining of a pan will lead to loss of a water source and the destruction of the ecosystem services and habitat that is provided by the pan.	• Remedy by constructing a wetland offset to try and restore some of the ecosystem services and functions in an alternative location.	High
• Construction of additional infrastructure.	• Sedimentation and siltation of adjacent water resources reducing water quality within the Steenkoolspruit River.	• Control erosion and sedimentation by establishing a stormwater management plan. • Control by limiting clearance and soil disturbance to the development footprint.	Medium
• Construction of access road and haul roads (including the construction of a bridge over the Steenkoolspruit River and the diversion of the district road).	• Alteration of channel geometry at crossings resulting in fluvial erosion and reduced flow regime.	• Remedy through re-profiling disturbed channel geometry to allow free drainage at river crossings.	Medium
• Stockpiling of soils, rock dump and discard dump establishment.	• Sedimentation and siltation of adjacent water resources reducing water quality within the Steenkoolspruit. • Potential contamination of groundwater resources as a result of leaching contaminants from the rock dump and discard dumps.	• Control erosion and sedimentation by establishing a stormwater management plan. • Control by undertaking waste classification of the material to be excavated and line the dumps if necessary, to prevent infiltration of contaminated water into the groundwater compartment.	Medium
• Maintenance of haul roads, pipelines, machinery, water, effluent and stormwater management infrastructure and stockpile areas.	• The operational machinery, transportation and storage at the mine site are potential sources of hydrocarbon and chemical spills and leakages. When not properly managed, hydrocarbon and chemical spills and leakages will be washed away with the runoff generated on site and thereby contaminate surface water resources within and in proximity to the Project Area.	• Control by bunding hydrocarbon storage facilities, use of spill kits and accredited vendors for waste disposal, training of personnel in proper hydrocarbon and chemical handling procedures.	Low

Activities	Potential impacts	Mitigation type	Potential for residual risk
• Removal of rock(blasting).	• Disruption of surface water flows may change the quantity of water reporting downstream, therefore affecting the availability of water for downstream water users	• Remedy by concurrent rehabilitation as mining progresses through reprofiling of previously disturbed landscapes.	Medium
• Concurrent rehabilitation as mining progresses.	• Restoration of free drainage and runoff yield at least to a certain extent.	• Remedy through rehabilitation plan and end landform design.	Medium
• Closure of the mine.	• Restoration of pre-mining streamflow regime in nearby watercourses as much as practically possible to benefit the post mining land use. However, it should be noted that pre-mining land use are not likely to be achieved.	• Remedy through rehabilitation plan and end landform design.	Medium
	• Contamination of soil and water resources due to the potential decant of Acid Mine Drainage (AMD) due to movement of contamination and pollution plumes due to the re-watering of the backfilled pit.	• Control by considering the findings of the hydrogeological report which will indicate whether any AMD is anticipated post closure and implementation of recommendations to mitigate or prevent AMD.	High
• Post-closure monitoring and rehabilitation.	• Post closure monitoring will allow for monitoring the effectiveness of rehabilitation and will serve as an early detection tool for contamination on water resources.	• N/A	Medium
Soils, Land Use and Land Capability			
• Removal of vegetation/topsoil for establishment of mining and linear infrastructure.	• Decrease in soil depth and area for agricultural activities; • Soil erosion caused by wind and water movement over the exposed soil surface; • Increasing sedimentation within the lower lying areas; and • Loss of soil fertility.	• Control through design, management, maintenance and mitigation of topsoil stockpiles; and • Remedy through concurrent rehabilitation and monitoring.	High
• Construction, operation and maintenance of additional infrastructure, such as haul roads	• Soil compaction, low vegetation growth, high runoff potential, increased erosion; and • Land capability of the soils will decrease as well as changing the land use from agricultural practices to mining activities. Should the area not be rehabilitated to pre-mining land capability after mining operations, the land capability may be reduced to wilderness.	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	Medium
• Construction of access road and haul roads.	• Soil compaction, low vegetation growth, high runoff potential and increased erosion.	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	High
• Stockpiling of soils, rock dump and discard dump establishment.	• Major disturbance to the functionality and productivity of the soil which may result in a loss of topsoil, erosion, organic material depletion (fertility) in the topsoil; • Erosion and sedimentation of stockpiles, impacting the low-lying areas such as wetlands and vegetation; and • Water contamination.	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation, re-vegetation and monitoring.	High
• Maintenance of haul roads, pipelines, machinery, water, effluent and stormwater management infrastructure and stockpile areas.	• Hydrocarbon leaks from vehicles and machinery or hazardous materials such as oil and fuel spills; • Loss of utilisable soil as a resource; and • Erosion, soil contamination, compaction, loss of land capability and land use.	• Control through design, management, maintenance and mitigation; • Remedy through cleaning all spills up immediately, and removal of contaminated soils; and • Remediate using commercially available emergency clean up kits.	Medium

Activities	Potential impacts	Mitigation type	Potential for residual risk
• Removal of rock (blasting).	• Destruction of soil profiles and loss agricultural soils and land capability; • Land capability change from agriculture to mining; • Major disturbance to the functionality and productivity of the soil which may result in a loss of topsoil, erosion, organic material depletion (fertility) in the topsoil; • Hydrocarbon leaks from vehicles and machinery or hazardous materials such as oil and fuel spills; and • Soil contamination.	• Control through design, management, maintenance and mitigation; and • Remedy through cleaning all spills up immediately, and removal of contaminated soils.	High
• Concurrent rehabilitation as mining progresses.	• Rehabilitation of the disturbed mined areas causes mechanical compaction and soil contamination; • The impacts will be negative and mostly of a permanent nature. The disturbance of the soil layers will be a problem, even after the area has been rehabilitated; • Recovery of the soil quality is dependent on the quality of rehabilitation; and • Fertility may be improved through soil amelioration, but soil depth and compaction are not easily alleviated.	• Control through design, management, maintenance and mitigation; • Remedy through continuous monitoring and maintenance; and • Control through restricting vehicles in the newly rehabilitated areas and maintenance on vehicles.	Low
• Demolition and removal of infrastructure.	• Disturbance of soils, and subsequent erosion by wind, and water; • Increased vehicle movement in the area, increasing soil compaction, and runoff potential; • Potential spillage of hydrocarbons such as oils, fuels, and grease, thus contamination of the soils; • Unexpected changes in the depth, and the nature of the soil; and • Ponding of water, and creation of drainage channels.	• Control through maintenance and monitoring to ensure no erosion, incision and canalisation takes place; • Control through implementation of erosion berms downstream of areas to be re-profiled and contoured to prevent gully formation; • Remedy erosion by immediate action and included as part of an ongoing rehabilitation plan; and • Remediate all soils compacted as a result of rehabilitation activities by ripping/scarifying (<300 mm) and re-profile.	Medium
• Post-closure monitoring and rehabilitation.	• Exposure of soils, and subsequent compaction, erosion, and sedimentation; • Soil compaction, and increased runoff potential due to vehicle movement during rehabilitation programs; • Loss of organic material, and vegetation cover; and • Potential spillage of hydrocarbons such as oils, fuels, and grease, thus contamination of soil.	• Control waste or discard that may be have occurred by classifying it and dispose of in an appropriate landfill facility; • Control through monitoring the rehabilitation, and mitigation; and • Control through a rehabilitation and monitoring plan for at least three (3) years after decommissioning to ensure no unexpected, and undulated impacts on the environment, Soil, Land Use, and Land Capability.	Low
• Closure of the opencast mine.	• Possible subsidence; and • Possible decanting and soil and water contamination.	• Control through design, management, maintenance and mitigation; and • Remedy through rehabilitation and monitoring.	High
Flora and Fauna			
• Removal of vegetation / topsoil for establishment of mining and linear infrastructure.	• Loss of plant communities; • Loss of general biodiversity; • Loss of habitat; • Fragmentation and degradation to the ecosystem; and • Loss of floral and faunal SCC.	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	High

Activities	Potential impacts	Mitigation type	Potential for residual risk
• Construction of access road, haul roads. and additional infrastructure.	• Loss of floral diversity; • Alien Invasive Plant proliferation; • Increase in dust pollution; • Compaction of soils; and • Increase in faunal casualties.	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	High
• Stockpiling of soils, rock dump and discard dump establishment.	• Compaction of soils; • Low vegetation growth; and • Increased run off and erosion;	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	Medium
• Maintenance of haul roads, pipelines, machinery, water, effluent and stormwater management infrastructure and stockpile areas.	• Hazardous spills can occur that lead to contamination of the surrounding area; • Increased erosion potential; and • Continual habitat fragmentation.	• Control through design, management, maintenance and mitigation; and • Remediate using commercially available emergency clean up kits.	Medium
• Removal of rock (blasting).	• Habitat removal; and • Increased faunal casualties.	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	Medium
• Demolition and removal of infrastructure.	• Loss of biodiversity and sensitive fauna and flora; and • Loss of habitat integrity and ecosystem services.	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	High
Wetlands			
• Site clearing, including the removal of vegetation and topsoil.	• Habitat fragmentation; • Spread of alien and invasive species; • Soil disturbance and/or compaction; • Increased incidence of erosion; • Sedimentation from erosion; • Potential water quality deterioration; and • Disturbance to avifauna and other fauna utilising the freshwater resources thus resulting in an overall loss of biodiversity.	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	High
• Stripping topsoil and soft overburden; Loading, hauling and stockpiling.	• Increased potential for erosion, sedimentation and deposition impacts; • Loss of water quality; and • Loss of habitat and biodiversity.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	Medium
• Construction of mine related infrastructure including roads and a bridge over the Steenkoolspruit to access the Middeldrift resources (excluding pits).	• Fragmentation of the wetland resources as a result of road crossings; • Loss of water quality by hydrocarbon/coal spills from vehicles on the road and bridge; • Loss of wetland habitat (soils and vegetation) due to both direct and indirect impacts; • Erosion and sedimentation from the crossing; • Potential loss of wetland ecosystems or part thereof; and • Loss of ecological services at the local and catchment scale.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	Medium

Activities	Potential impacts	Mitigation type	Potential for residual risk
• Construction of open pit in wetland and aquatic areas; including the construction of open pit upslope of wetland and aquatic areas (Steenkoolspruit etc.).	• **Complete loss of wetland habitat (pan);** • Loss of habitat connectivity; • Loss of water quality; • Increased erosion and sedimentation potential; • Potential impacts as a result of sedimentation; • Loss of water supply; • Impacts to natural flow regimes; • Potential loss of water quality further downstream; • Loss of biodiversity; and • Alterations to water distribution and volume.	• No mitigation potential for this activity.	High
• Use and maintenance of haul roads for the transportation of coal.	• Fragmentation of the wetland resources as a result of road crossings; • Contamination of wetland resources; • Impacts to water quality as a result of spills; • Compaction of soils; • Loss of habitat and biodiversity; • Increased potential for sheet runoff from paved/cleared surfaces; and • Increased potential for erosion.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	Medium
• Operational pit activities, including excavation and dewatering.	• Erosion and sedimentation; • Impacts to the water quality of the groundwater, local and downstream resources; • Potential loss of water supply from adjacent soils; • Surface water runoff, ultimately resulting in a loss of catchment yield; • Dewatering activities are likely to result in the loss of water supply to the wetland systems present and in turn, moisture stress to the surrounding riparian and wetland vegetation; and • Disturbed soils may give rise to the spread and proliferation of alien and invasive species.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	High
• Rehabilitation of site and dismantling of infrastructure.	• Erosion onset; • Sedimentation; and • Establishment of alien plants.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	Medium
• Rehabilitation, including spreading of soil, re-vegetation and profiling or contouring.	• Improper infilling and profiling, resulting in the creation of preferential flow paths and thus increasing the potential for erosion; • Improper rehabilitation of compacted soils, resulting in poor vegetation cover; and • Increased potential for the spread; and establishment of alien and invasive species.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	Low
• Potential post-mining decant into freshwater resources.	• Loss of habitat integrity and ecosystem services such as toxicant removal and water for human use; • Loss of water quality to downstream freshwater resources; and • Loss of biodiversity and sensitive fauna and flora.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	High

Activities	Potential impacts	Mitigation type	Potential for residual risk
Aquatic Ecology			
• Site clearing, including the removal of vegetation and topsoil	• Spread of alien and invasive species; • Change in hydrology; • Increased incidence of erosion; • Sedimentation from erosion; • Potential water quality deterioration; and • Loss of biodiversity.	• Control through: • Preventing clearing of extensive areas not part of the footprint area; • Demarcating non-directly affected freshwater resources; • Monitoring freshwater resources during the construction phase; • Management and monitoring of alien and invasive plant species; and • Carrying out the Storm Water Management Plan.	Medium
• Construction of mine related infrastructure including access and haul roads; diesel storage and explosives magazine; topsoil stockpiling	• Increased incidence of erosion; • Sedimentation from erosion; • Potential water quality deterioration as a result of diesel spills; and • Loss of biodiversity.	• Control through: • The construction of clean and dirty water separation systems; • Implementing a soil management programme; • Implementing an alien vegetation management programme; • installation of erosion berms; • Allowing only essential personnel within the buffer areas for all freshwater features; • Demarcating all areas of increased ecological sensitivity; • Restricting construction activities to the drier months; • Disallowing the dumping of material within freshwater resources; • Inspecting vehicles for leaks regularly; • Re-fuelling on a sealed surface area away from aquatic areas; and • Providing appropriate sanitary facilities. • Remedy through: • Actively re-vegetating disturbed areas; • Installing vegetation covers on all topsoil stockpiles; and • Cleaning up leaks immediately.	Medium
• Construction of open pit in aquatic areas including removal of rock (blasting); water use and storage; storage and handling of hazardous products including fuel, explosives, oil and waste.	• Increased erosion potential; • Potential impacts as a result of sedimentation; • Loss of water supply; • Impacts to natural flow regimes; • Potential loss of water quality further downstream; • Loss of biodiversity; and • Alterations to water distribution and volume.	• Control through: • A soil management programme; • Restricting construction activities to the drier months; and • Disallowing the dumping of material within freshwater resources.	High

Activities	Potential impacts	Mitigation type	Potential for residual risk
• Stripping topsoil and soft overburden; loading, hauling and stockpiling	• Increased potential for erosion, sedimentation and deposition impacts; • Loss of water quality; and • Loss of habitat and biodiversity.	• Control through: • Preventing clearing of extensive areas not part of the footprint area; • Demarcation as no-go zones; • Monitoring freshwater resources; • Implementing a soil management programme; • Installation of erosion berms; • Implementing an alien vegetation management programme; • Installing vegetation covers on all topsoil stockpiles; • Disallowing the dumping of material within freshwater resources; • inspecting vehicles for leaks regularly; • Re-fuelling on a sealed surface area; and • Providing appropriate sanitary facilities. • Remedy through: • Actively re-vegetating disturbed areas; and • Cleaning up oil spills immediately	Low
• Use and maintenance of haul roads for the transportation of coal	• Fragmentation of the freshwater resources as a result of road crossings; • Contamination of freshwater resources; • Impacts to water quality as a result of spills; • Loss of habitat and biodiversity; • Increased potential for sheet runoff from paved/cleared surfaces; • Increased potential for erosion.	Control through: • Installation of erosion berms; • Demarcating all “No-Go” areas; • Disallowing vehicles or heavy machinery within any aquatic areas; • Inspecting vehicles for leaks regularly; and • Re-fuelling on a sealed surface area. Remedy through: • Cleaning up leaks immediately; and • Revegetating observed erosion.	Low
• Operational pit activities, including excavation and dewatering	• Erosion and sedimentation; • Impacts to the water quality of the groundwater, local and downstream resources; • Surface water runoff, ultimately resulting in a loss of catchment yield; • Disturbed soils may give rise to the spread and proliferation of alien and invasive species	Control through: • Implementing a soil management programme; • Demarcating all “No-Go” areas; • Disallowing the dumping of material within any freshwater resources; • Managing and maintaining the sewage treatment plant; • Inspecting vehicles for leaks regularly; • Re-fuelling on a sealed surface; and • Providing appropriate sanitary facilities. Remedy through: • Backfilling pit areas; and • Cleaning up leaks immediately.	Low

Activities	Potential impacts	Mitigation type	Potential for residual risk
• Rehabilitation of site and dismantling of infrastructure	• Erosion onset; • Sedimentation; and • Establishment of alien plants.	Control through: • Demarcating “No-Go” zones; • Implementing and maintaining an alien vegetation management programme; • Inspecting vehicles for leaks regularly; • Re-fuelling on a sealed surface area; • Providing appropriate sanitary facilities; and • Removing all waste to an appropriate waste facility. Remedy through: • Cleaning up leaks immediately; and • Actively re-vegetating disturbed areas after decommissioning.	Low
• Rehabilitation, including spreading of soil, re-vegetation and profiling or contouring	• Erosion and sedimentation; • Increased potential for the spread and establishment of alien and invasive species; and • Surface water runoff, ultimately resulting in a loss of catchment yield.	Control through: • Installation of erosion berms; • Disallowing vehicles or heavy machinery to drive within designated no-go areas; • Inspecting vehicles for leaks regularly; and • Re-fuelling on a sealed surface area. Remedy through: • Revegetating; • Implementing and maintaining an alien vegetation management programme; and • Remedy through cleaning up leaks immediately.	Low
• Post-mining decant into freshwater resources	• Loss of habitat integrity and ecosystem services such as toxicant removal and water for human use; • Loss of water quality to downstream freshwater resources; and • Loss of biodiversity and sensitive fauna and flora.	Control through • Considering passive water treatment options. Remedy through • through treating and post-mining decant prior to release into the environment.	Low
Air Quality			
• Removal of vegetation/Removal of topsoil/Establishment of mining and linear infrastructure • Construction of additional infrastructure, • Construction of access road and haul roads • Stockpiling of soils, rock dump, and discard dump establishment.	• Poor air quality due to airborne dust from activities associated with this phase and the release of gaseous pollutants from off-road machinery	• Minimise the area of disturbance at all times; • Where necessary, wetting agents, dust suppressants, or binders will be applied to the exposed areas (including excavated material and open areas); • Speed limits will be adhered to at all times. Mine vehicles to be fitted with a GPS that alerts management when a vehicle is going over the speed limit; • Construction should be conducted in phases; and • The drop heights when tipping and loading materials will be minimised as far as practicable.	Low

Activities	Potential impacts	Mitigation type	Potential for residual risk
• Infrastructure area containing stockpile areas • Maintenance of haul roads, management infrastructure, and stockpile areas. • Removal of rock(blasting) • Concurrent rehabilitation as mining progresses	• Poor air quality due to airborne dust and the release of gaseous pollutants due to activities associated with this phase	• Minimise the area of disturbance at all times; • Where necessary, wetting agents, dust suppressants or binders will be applied to the exposed areas (including excavated material and open areas); • Speed limits will be adhered to at all times. Mine vehicles to be fitted with a GPS that alerts management when a vehicle is going over the speed limit; and • The drop heights when tipping and loading materials will be minimised as far as practicable.	High
• Demolition and removal of infrastructure • Post-closure monitoring and rehabilitation • Closure of the mine	• Poor air quality due to airborne dust and the release of gaseous pollutants due to activities associated with this phase	• Minimise the area of disturbance at all times; • Where necessary, wetting agents, dust suppressants, or binders will be applied to the exposed areas (including excavated material and open areas); • Speed limits will be adhered to at all times. Mine vehicles to be fitted with a GPS that alerts management when a vehicle is going over the speed limit; • The drop heights when tipping and loading materials will be minimised as far as practicable; and • Monitoring of criteria air quality pollutants to ascertain the effectiveness of the mitigation measures in place.	Low
Cultural Heritage			
• Establishment of opencast pit and surface infrastructure.	• Damage to or destruction of heritage resources generally protected under Sections 34, 35 and 36 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) (i.e. previously unidentified historical structures, archaeological and fossiliferous material or burial grounds and graves respectively)	• Reactive – mitigate impacts.	Low to Medium
		• Proactive - avoid	Low

11.1 Item 2(g)(vi): Methodology Used in Determining the Significance of the Environmental Impacts

The impact assessment methodology that will be utilised during the EIA Phase (as well by the relevant specialists) for the Project consists of two phases namely impact identification and impact significance rating.

Impacts and risks have been identified based on a description of the activities to be undertaken. Once impacts have been identified, a numerical environmental significance rating process will be undertaken that utilises the probability of an event occurring and the severity of the impact as factors to determine the significance of a particular environmental impact.

The severity of an impact is determined by taking the spatial extent, the duration and the severity of the impacts into consideration. The probability of an impact is then determined by the frequency at which the activity takes place or is likely to take place and by how often the type of impact in question has taken place in similar circumstances.

Following the identification and significance ratings of potential impacts, mitigation and management measures were incorporated into the EMPr.

Details of the impact assessment methodology used to determine the significance of physical, bio-physical and socio-economic impacts are provided below.

The significance rating process follows the established impact/risk assessment formula:

Significance = Consequence x Probability x Nature

Where

Consequence = Intensity + Extent + Duration

And

Probability = Likelihood of an impact occurring

And

Nature = Positive (+1) or negative (-1) impact

Note: In the formula for calculating consequence, the type of impact is multiplied by +1 for positive impacts and -1 for negative impacts

The matrix calculates the rating out of 147, whereby intensity, extent, duration and probability are each rated out of seven as indicated in Table 11-3. The weight assigned to the various parameters is then multiplied by +1 for positive and -1 for negative impacts.

Impacts are rated prior to mitigation and again after consideration of the mitigation has been applied; post-mitigation is referred to as the residual impact. The significance of an impact is determined and categorised into one of seven categories (The descriptions of the significance ratings are presented in Table 11-4).

It is important to note that the pre-mitigation rating takes into consideration the activity as proposed, (i.e., there may already be some mitigation included in the engineering design). If the specialist determines the potential impact is still too high, additional mitigation measures are proposed.

Table 11-2: Impact Assessment Parameter Ratings

Rating	Intensity/Replaceability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
7	Irreplaceable loss or damage to biological or physical resources or **highly** sensitive environments. Irreplaceable damage to **highly sensitive** cultural/social resources.	Noticeable, on-going natural and / or social benefits which have improved the overall conditions of the baseline.	International The effect will occur across international borders.	Permanent: The impact is irreversible, even with management, and will remain after the life of the project.	Definite: There are sound scientific reasons to expect that the impact will definitely occur. >80% probability.
6	Irreplaceable loss or damage to biological or physical resources or **moderate to highly** sensitive environments. Irreplaceable damage to cultural/social resources of **moderate to highly** sensitivity.	Great improvement to the overall conditions of a large percentage of the baseline.	National Will affect the entire country.	Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management.	Almost certain / Highly probable: It is most likely that the impact will occur. <80% probability.

Rating	Intensity/Replaceability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
5	Serious loss and/or damage to physical or biological resources or **highly** sensitive environments, limiting ecosystem function. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread benefits to local communities and natural features of the landscape.	Province/ Region Will affect the entire province or region.	Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Likely: The impact may occur. <65% probability.
4	Serious loss and/or damage to physical or biological resources or **moderately** sensitive environments, limiting ecosystem function. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense natural and / or social benefits to some elements of the baseline.	Municipal Area Will affect the whole municipal area.	Long term: 6-15 years and impact can be reversed with management.	Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.

Rating	Intensity/Replaceability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
3	Moderate loss and/or damage to biological or physical resources of **low to moderately** sensitive environments and, limiting ecosystem function. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	Local Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	Unlikely: Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.
2	**Minor loss and/or effects** to biological or physical resources or low sensitive environments, not affecting ecosystem functioning. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by a small percentage of the baseline.	Limited Limited to the site and its immediate surroundings.	Short term: Less than 1 year and is reversible.	Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.

Rating	Intensity/Replaceability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
1	**Minimal to no loss** and/or effect to biological or physical resources, not affecting ecosystem functioning. Minimal social impacts, low-level repairable damage to commonplace structures.	Some low-level natural and / or social benefits felt by a very small percentage of the baseline.	Very limited/Isolated Limited to specific isolated parts of the site.	Immediate: Less than 1 month and is completely reversible without management.	Highly unlikely / None: Expected never to happen. <1% probability.

Table 11-3: Probability / Consequence Matrix

Significance																																						
-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Consequence																																						

Table 11-4: Significance Rating Description

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change	Major (positive) (+)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and / or social) environment	Moderate (positive) (+)
36 to 72	A positive impact. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive) (+)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive) (+)
-3 to -35	An acceptable negative impact for which mitigation is desirable. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and / or social environment	Negligible (negative) (-)
-36 to -72	A minor negative impact requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and / or social environment	Minor (negative) (-)
-73 to -108	A moderate negative impact may prevent the implementation of the project. These impacts would be considered as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe changes.	Moderate (negative) (-)
-109 to -147	A major negative impact may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts are likely to be irreversible and/or irreplaceable.	Major (negative) (-)

11.2 Item 2(g)(vii): The Positive and Negative Impacts that the Proposed Activity and Alternatives will have on the Environment and the Community that may be Affected

All potential negative and positive impacts will be identified, ranked and mitigation measures prescribed during the EIA phase.

11.3 Item 2(g)(viii): The Possible Mitigation Measures that Could be Applied and the Level of Risk

Possible mitigation measures that could be applied to risks regarding the site layout will be considered and discussed as part of the EIA Phase. The infrastructure layout plan will be designed to limit, prevent and avoid potential environmental and social impacts. The layout plan will also take into consideration the comments received form I&APs during the PPP as well as the findings of the specialist investigations as part of the EIA Phase. The proposed mitigation measures for the assumed risks (to be confirmed during the EIA Phase) are also listed in Table 11-1.

11.4 Item 2(g)(ix): The Outcome of the Site Selection Matrix

The final layout plan will be confirmed during the EIA Phase and included in the EIA Report. However, the site selection is based on the position of the coal resource and therefore, only infrastructure layout will be finalised during the EIA Phase.

11.5 Item 2(g)(x): Motivation where No Alternatives Sites were Considered

The alternatives considered in this report include the mining method and the “No-Go” alternative. Refer to section 9.1 above.

11.6 Item 2(g)(xi): Statement Motivating the Preferred Alternatives and Site

The location of the Project is determined by the location of the coal resource. It has been identified by Universal Coal to secure continuation of mining once their NCC Resource is depleted as well as continue supplying coal to Eskom.

12 Item 2(k): Plan of Study for the EIA Process

The purpose of the EIA phase is to investigate the potential negative and positive impacts of a proposed project activity on the environment. The potential impacts will then be quantified to assess the significance that an impact may pose on the receiving environment. Refer to Section 12.4 for the Specialists Impact Assessment methodology proposed for the EIA Phase.

The objectives of the EIA process are to:

- Ensure that the potential biophysical, socio-economic and potential traffic impacts of the proposed Project are taken into consideration during the decision-making process;
- Ensure that the Project activities undertaken do not have a substantial detrimental impact on the environment by presenting management and mitigation measures that will avoid and/or reduce those impacts;
- Ensure that I&APs are informed about the proposed Project and the PPP to be followed;

- Ensure that I&APs are given an opportunity to raise concerns; and
- Provide a process aimed at enabling authorities to make an informed decision, especially in respect of their obligation to take environmental and social considerations into account when making those decisions.

12.1 Item 2(k)(i): Description of the Alternatives Considered and Assessed

The alternatives including the “No-Go” alternatives considered and assessed are presented in Section 9.1 above. These will be further investigated during the EIA phase.

12.2 Item 2(k)(ii): Description of Aspects to be Assessed as Part of the EIA Process

The EIA Phase will assess the overall aspects affected by the proposed Project in relation to Listed Project activities. The identified listed and specified Activities for the Project are included in Section 5.1 and the affected environmental aspects, which will also form part of the EIA Phase are contained in Section 12.3 below.

12.3 Item 2(k)(iii): Aspects to be Assessed by Specialists

The following Specialist Impact Assessments will be undertaken as part of the EIA Phase:

- Groundwater Impact Assessment;
- Surface Water Impact Assessment;
- Soil, Land Use and Land Capability;
- Hydropedology study;
- Fauna and Flora Impact Assessment;
- Wetlands Impact Assessment;
- Aquatic Ecology Impact Assessment;
- Air Quality Impact Assessment;
- Heritage Impact Assessment;
- Geochemical Assessment;
- Traffic Impact Assessment;
- Closure and Rehabilitation; and
- PPP.

12.4 Item 2(k)(iv): Description of the Proposed Method of Assessing the Environmental Aspects

The full Impact Assessment methodology is included in Section 11.1 above and the methodology to be used by the relevant specialists is described below. Once the impacts are identified, Digby Wells' rating system that takes into consideration the intensity, duration, spatial scale and probability will be used to determine the significance of the identified impacts.

12.4.1 Groundwater

The proposed Plan of Study for the hydrogeological assessment will incorporate the following:

- A hydrocensus will be conducted with the aim of obtaining the baseline groundwater conditions (groundwater levels and groundwater quality obtained from 10 water samples) and to identify the local groundwater users;
- Aquifer characterisation which is undertaken to determine the hydrodynamics of the local aquifer as this will determine the aquifer responses from mining activities. This investigation will incorporate geophysical survey aimed to identify the borehole drilling locations, the drilling of four boreholes and aquifer testing of the boreholes;
- Geochemical Assessment and Waste Characterisation will be conducted based on the results obtained from eight material samples. Geochemical and waste classification will be undertaken in line with the NEM: WA. As a standard, X-Ray Fluorescence (XRF), X-Ray Diffraction (XRD), sulphur speciation, Acid Base Accounting (ABA) and Net Acid Generation (NAG) tests will be performed. Aqua regia acid digestion will also be performed for each sample to determine the total concentration (TC) as detailed in the NEM:WA guidelines to be compared and classified against the total concentration threshold (TCT). Leachate tests will be done to simulate the heavy metal and anion leachate potential of sampled material that is disposed on the facilities, with the solution type and pH determined based on guidelines or the expected conditions on site. These tests will simulate and evaluate the potential of any heavy metal or ion contamination from the waste material that will be produced;
- Conceptual Modelling: A conceptual model will be developed for the mine; the model aims to describe the groundwater environment in terms of the source-pathway-receptor dynamics;
- Numerical Modelling: This task will entail developing a numerical model based on the conceptual model and data collected during the desktop review and field investigations. The conceptual model will be encoded into the numerical model. The model will be calibrated to the latest water levels (steady state), as well as historic water level monitoring if available (transient). Once calibrated, the model will be utilised to run the required scenarios to determine the likely impacts associated with the project activities. The scenario modelling will cover the operational phase and a period of 100 years post closure; and

- Groundwater Impact Assessment: An impact assessment will be provided based on the outcome of the numerical model with recommended mitigation measures that may be required to address the groundwater impacts associated with the Project. A groundwater risk assessment will be conducted based on the potential impacts identified during the numerical modelling.

12.4.2 Surface Water

The detailed surface water impact assessment will include:

- Definition of potential surface water impacts that could result from the proposed project and its associated activities. Once the impacts are identified, a rating system that takes into account the intensity, duration, spatial scale and probability of impacts will be used to determine the significance of the identified impacts;
- Recommendation of mitigation measures to prevent and/or minimise identified potential surface water impacts over the life of project; and
- Development of a monitoring program that will be used as a tool to detect any surface water impacts and to ensure implementation of mitigation measures.

This Section provides the scope of work and methodology that will be undertaken during the EIA Phase of this project.

12.4.2.1 Site Assessment

A site visit will be undertaken to physically assess and verify the hydrological characteristics of the affected area and the surrounds. Any relevant data and information required for the study will be discussed and/or collected from the client during the site visit. Surface water samples will be collected from the Steenkoolspruit upstream and downstream of the project site in order to determine upstream and downstream water quality for the site.

12.4.2.2 Surface Water Quality Assessment

The water quality for the surface water resources around the proposed mine site will be assessed and interpreted to provide and/or update the baseline condition of the water resources. Collected samples will be sent for chemical analysis at a SANAS accredited laboratory. Water quality baseline conditions will be evaluated and described based on the laboratory results of collected surface water samples. The data will be benchmarked against relevant water quality guidelines depending on the surrounding water users.

12.4.2.3 Floodlines Delineation

Floodlines modelling will be conducted for the Steenkoolspruit which is close to the Project Area boundary. The following will be undertaken for floodlines modelling:

- Catchment delineations will be conducted in Global Mapper 21 using a digital Elevation Model (DEM) derived from topographic data;

- Peak flows will be calculated for the 1:50-year and 1:100-year flood events. The Rational Method (Alternative 3), Standard Design Flood (SDF) and the Midgley and Pitman (MIPI) method will be used to calculate the peak flows (SANRAL, 2013); and
- Floodlines modelling and post-processing will be undertaken prior to mapping in ArcGIS 10.3.

12.4.2.4 Stormwater Management Plan Update

A Stormwater Management Plan (SWMP) will be compiled in accordance with the GN R704 best practice guidelines to include:

- Separation of clean and dirty areas or catchments;
- Storm water catchment delineations;
- Modelling runoff rates and runoff volumes resulting from the 1:50-year design rainfall event; and
- Conceptual placement and sizing of storm water structures including channels, berms and pollution control dams (PCDs).

The Personal Computer Stormwater Management Model program will be utilised for stormflow modelling and for conceptual sizing of infrastructure such as drain/channels and PCDs.

12.4.2.5 Water Balance Update

In line with the DWS's best practice guidelines, a clear definition and understanding of the boundaries of the water system and layout of the water circuits are required to develop the water balance for a mine. The water management boundaries are defined according to the mine processes and these are subdivided into water demand, water sources and water storage.

The water balance will be based on the water Process Flow Diagram (PFD) that will be developed in consultation with Universal Coal. The PFD describes a concept water reticulation system indicating the sources, transfer of water within the system and the sinks or losses. An excel based static based water balance will be developed as part EIA phase and hydrological inputs such as rainfall, runoff and evaporation will be calculated. Where information gaps are identified, assumptions will be made.

12.4.3 Soils, Land Capability and Use

This section describes the methodology after the completion of the Scoping Phase that will be used in the compilation of the Soil, Land Use and Land Capability Impact Assessment Report, as indicated in Figure 12-1.

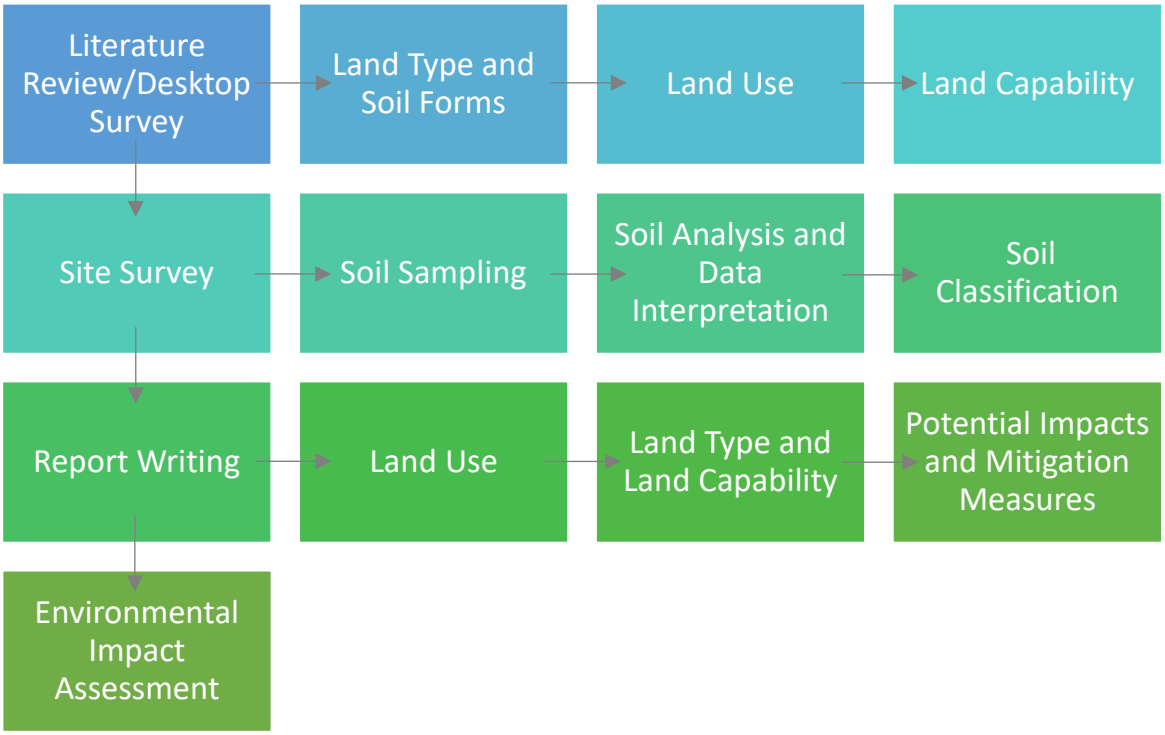


Figure 12-1: Soil, Land Use and Land Capability Assessment and Report Process

12.4.3.1 Soil Classification

A soil assessment on the Project Area will be conducted during a field visit. The site will be traversed by vehicle and on foot. A hand soil auger will be used to determine the soil type and depth. Soils will be investigated using a Bucket and Cradle auger to a maximum depth of 1.2 m or to the first restricting layer. Survey positions will be recorded as waypoints using a handheld Global Positioning System (GPS). Other features such as existing open trenches and diggings will be used to determine soil form and depth. Mapping unit boundaries will be determined by changes in topography with subsidiary indications from vegetation and parent material.

The soils will be classified using the Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991). The following attributes will be included at each observation:

- Topography, aspect and slope;
- Soil form and family;
- Soil depth;
- Estimated soil texture;
- Soil structure, coarse fragments, calcareousness;
- Underlying material; and
- Vegetation.

12.4.3.2 Soil Physical and Chemical Analysis

In accordance with the methodology given in the Handbook of Standard Soil Testing Methods for Advisory Purposes (Soil Science Society of South Africa, 1990), samples will be analysed for soil fertility and soil texture. Not more than seven representative soil samples will be collected during the site visit for soil chemical and physical analysis at a South African National Accreditation System (SANAS) accredited laboratory. Only three of the samples will be tested for heavy metals and potential harmful elements as the area is Greenfields, however, could be impacted by agricultural activities as well as upstream mining activities.

12.4.3.3 Land Use

The current land use was identified by aerial imagery during the desktop assessment of the Scoping Phase and will be verified by on-site inspection during the EIA phase. The maps indicate delineated areas of similar land use (Land Type Survey Staff, 1972 - 2006). Land use categories are split into:

- Plantations;
- Natural;
- Waterbodies;
- Mines;
- Urban built-up; and
- Agriculture.

12.4.3.4 Land Capability

Land capability and suitability (agricultural potential) mapping which highlights the capability (what could be practiced) of the various soils identified at a site, and the suitability (what should be practiced considering various restrictions), respectively, were undertaken for the Project Area at desktop level and will be ground verified during the site visit for the EIA phase.

Land capability mapping is based on identifying soil forms during the site visit. The land capability mapping involves dividing land into one of eight potential classes (Table 12-1) of soil capability, whereby Classes I-IV represent arable land and Classes V-VIII represent non-arable land according to the guidelines (Soil Conservation Service: U.S. Department of Agriculture, 1973; Schoeman, et al., 2000).

Table 12-1: Land Capability Classes

Class	Increased Intensity of Use									Land Capability Groups	W - Wildlife F - Forestry LG - Light Grazing MG - Moderate Grazing IG - Intensive Grazing LC - Light Cultivation MC - Moderate Cultivation IC - Intensive Cultivation VIC - Very Intensive Cultivation
I	W	F	LG	MG	IG	LC	MC	IC	VIC	Arable Land	
II	W	F	LG	MG	IG	LC	MC	IC	-		
III	W	F	LG	MG	IG	LC	MC	-	-		
IV	W	F	LG	MG	IG	LC	-	-	-		
V	W	-	LG	MG	-	-	-	-	-	Grazing Land	
VI	W	F	LG	MG	-	-	-	-	-		
VII	W	F	LG	-	-	-	-	-	-	Wildlife	
VIII	W	-	-	-	-	-	-	-	-		

12.4.3.5 Land Suitability

Soil agricultural potential or suitability mapping will be determined by considering the soil forms, land capability classes, soil chemistry results, the hydrology of the site and the current land use. The process involves allocating terrain factors (such as slope) and soil factors (such as depth, texture, internal drainage and mechanical limitations (which affect soil-water processes) which define soil forms, to an area of land. The soil chemistry, which includes pH, cation and anion concentrations as well as nitrogen compositions, which are affected by the site hydrology, will be considered in determining the final suitability of the soil. The suitability guidelines according to the U.S. Department of Agriculture (1973) and Schoeman et al., (2000) will be used to determine the Land Capability.

The soil impacts will be assessed based on the impact's magnitude as well as the receiving environment's sensitivity, resulting in an impact significance rating which identifies the most important impacts that require management.

12.4.4 Fauna and Flora

This section describes the methodology to be employed for the Faunal and Floral Impact Assessment.

12.4.4.1 Flora

The primary objective of the EIA level study from a floral perspective is to characterise the vegetation in the study area by conducting an in-depth vegetation survey and to identify potential impacts of the proposed project. Plant species present on the site will be identified and listed. The presence of the following plants will be established with:

- Those with Red Data status (individual co-ordinates will be taken);
- Those with Medicinal uses; and

- Those declared Alien Invasive Plants (AIPs).

This will allow for the classification of the different vegetation units present. Species composition and habitat diversity will be assessed. The identification of these units will lead to the recognition of potentially important habitat types for discussion in the faunal survey. Potential areas of importance (sensitive areas), such as those areas where Red Data species of both flora and fauna could occur, will be identified, assessed and marked. This study will indicate the extent and distribution of potential Red Data habitat and the probability that Red Data species actually occur in these habitats.

The impacts of the construction and operation of the proposed mine on the vegetation will be investigated and discussed. This will include the impacts on the presence of certain important species as well as the impacts on habitat diversity. The influence on the ecosystems in the area and their interactions will be assessed and discussed. This will include an assessment of ecosystem services.

This Scoping Report comprises some initial observations of the site, as well as a desktop study of the site and the impacts that are likely to occur. The EIA level specialist report will define the vegetation communities (including habitats), species found on site and the sensitivity of each vegetation community found on site with reference to the proposed mining operation in order to identify and assess impacts and where possible, prescribe mitigation measures.

12.4.4.2 Fauna

The presence of mammals, birds, reptiles, amphibians and terrestrial invertebrates will be investigated during the site survey to be undertaken with particular emphasis on those with Red Data status. The presence of these species will be correlated to the vegetation units (habitats) classified during the floral survey. The influence of habitat diversity on species composition will be investigated. The surveys will assess the potential Red Data habitats and indicate the probability that Red Data species actually occur in these habitats. Below describes the current method of sampling for each category of species.

Mammal sampling methods include Sherman traps that are used to sample small mammals. Additionally, any signs of animals or animal scats and spoor will be recorded within the study area. Camera traps will be used to capture any large mammals. Both the Sherman and camera traps are placed and baited where signs of animal movement are present, they will be set for a minimum of three days.

Birds are sampled using sampling points and line transects that are conducted via walks or drives. Opportunistic sightings will be recorded with focus on nests and calls. Point sampling is done at one or several points for a predetermined length of time each day during the sampling method.

Reptiles are sampled using pitfall traps together with active searches such as turning over rocks, looking in trees and termite mounds. Opportunistic sightings are recorded. Amphibians are sampled in the same manner as reptiles, with regular walks around pans during night surveys with focus on calls within the study area.

Only certain invertebrate groups will be sampled and used as indicators, as doing a full invertebrate survey is extremely time-consuming. Butterflies are used as an invertebrate indicator and are caught with an insect net. Spiders are used as an indicator (many are nationally protected). Spider sampling is done by active searching for burrows along transects and identification is achieved by luring the spider out of its burrow (if required and if possible). Each butterfly and spider will be identified to at least family level and where possible to genus and species level.

The impacts of the construction and operation of the proposed mine on the animal life will be investigated and discussed. This will include the impacts on the presence of certain important species as well as the impacts relating to habitat diversity. The influence on the animal life in the ecosystems and their interactions will be assessed and discussed.

12.4.5 Wetlands

This section describes the methodology after the completion of the Scoping Phase that will be used in the compilation of the Wetland EIA Report.

12.4.5.1 The Wetland Identification and Classification

The wetland delineations will be verified according to the accepted methodology from the Department of Water and Sanitation 'A practical field procedure for identification and delineation of wetlands and riparian areas' (Department of Water Affairs and Forestry, 2005) as well as the "Updated manual for identification and delineation of wetlands and riparian areas" (Department of Water Affairs and Forestry, 2008). These methodologies use the:

- **Terrain Unit Indicator**: Identifies those parts of the landscape where wetlands are more likely to occur;
- **Soil Form Indicator**: Identifies the soil forms, which are associated with prolonged and frequent saturation;
- **Soil Wetness Indicator**: Identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- **Vegetation Indicator**: Identifies hydrophilic vegetation associated with frequently saturated soils.

12.4.5.2 Wetland Ecological Health Assessment

According to Macfarlane et al. (2009; 2020), the health of a wetland can be defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition. A Level 1B WET-Health assessment will be done on the wetlands in accordance with the method described by Macfarlane et al., (2020) to determine the integrity (health) of the characterised HGM units for the wetlands associated with the Project Area. A Present Ecological State (PES) analysis will be conducted to establish baseline integrity (health) for the associated wetlands. The health assessment attempts to evaluate the hydrological, geomorphological and vegetation and water quality health in four separate modules to attempt

to estimate similarity to or deviation from natural conditions. An overall health score of the wetland will then be calculated.

Central to WET-Health is the characterisation of HGM units, which have been defined based on geomorphic setting (e.g. hillslope or valley-bottom; whether drainage is open or closed), water source (surface water dominated, or sub-surface water dominated) and pattern of water flow through the wetland unit (diffusely or channelled) as described above.

The overall approach is to quantify the impacts on wetland health and then to convert the impact scores to a PES score. This takes the form of assessing the spatial extent of the impact of individual activities and then separately assessing the intensity of the impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The impact scores and PES categories are provided in Table 12-2 (Macfarlane, Kotze, & Ellery, 2009; Macfarlane, Ollis, & Kotze, 2020).

Table 12-2: Impact Scores and Present Ecological State Categories (WET-Health; Macfarlane et al., 2009 and 2020)

Impact Category	Description	Combined Impact Score	PES Category
None	Unmodified, natural.	0-0.9	A
Small	Largely natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota has taken place.	1-1.9	B
Moderate	Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact.	2-3.9	C
Large	Largely modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4-5.9	D
Serious	The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.	6-7.9	E
Critical	Modifications have reached a critical level and ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8-10	F

As is the case with the PES, future threats to the state of the wetland may arise from activities in the catchment upstream of the unit, within the wetland itself or from processes downstream of the wetland. In each of the individual sections for hydrology, geomorphology, vegetation and water quality, five potential situations exist depending upon the direction and likely extent of change (Table 12-3) (Macfarlane, Kotze, & Ellery, 2009; Macfarlane, Ollis, & Kotze, 2020).

Table 12-3: Trajectory of Change Classes and Scores Used to Evaluate Likely Future Changes to the Present State of the Wetland

Change Class	Description	HGM change score	Symbol
Substantial Improvement	State is likely to improve substantially over the next 5 years.	2	↑↑
Slight Improvement	State is likely to improve slightly over the next 5 years.	1	↑
Remain Stable	State is likely to remain stable over the next 5 years.	0	→
Slight Deterioration	State is likely to deteriorate slightly over the next 5 years.	-1	↓
Substantial Deterioration	State is expected to deteriorate substantially over the next 5 years.	-2	↓↓

Once all HGM Units have been assessed, a summary of health for the wetland as a whole needs to be calculated. This is achieved by calculating a combined score for each component by area-weighting the scores calculated for each HGM Unit. Recording the health assessments for the hydrology, geomorphology, vegetation and water quality components provide a summary of impacts, Present State, Trajectory of Change and Health for individual HGM Units and for the entire wetland.

12.4.5.3 Wetland Ecological Services

The importance of a water resource in ecological, social or economic terms, acts as a modifying or motivating determinant in the selection of the management class (Department of Water Affairs and Forestry, 1999). The assessment of the ecosystem services supplied by the identified wetlands will be conducted according to the guidelines as described by Kotze et al., (2020). An assessment will be undertaken that examines and rates the following services according to their degree of importance and the degree to which the service is provided:

- Flood attenuation;
- Stream flow regulation;
- Sediment trapping;
- Phosphate trapping;
- Nitrate removal;
- Toxicant removal;
- Erosion control;
- Carbon storage;
- Maintenance of biodiversity;
- Water supply for human use;
- Natural resources;

- Cultivated foods;
- Cultural significance;
- Tourism and recreation; and
- Education and research.

The characteristics will be used to quantitatively determine the value and, by extension, sensitivity of the wetlands. Each characteristic will be scored to give the likelihood that the service is being provided. The scores for each service will then be averaged to give an overall score to the wetland (Table 12-4).

Table 12-4: Classes for Determining the Likely Extent to Which a Benefit is Being Supplied

Score	Rating of the Likely Extent to Which the Benefit is Being Supplied
<0.5	Low
0.6-1.2	Moderately Low
1.3-2	Intermediate
2.1-3	Moderately High
>3	High

12.4.5.4 Ecological Importance and Sensitivity

The Ecological Importance and Sensitivity (EIS) tool was derived to assess the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred. The purpose of assessing importance and sensitivity of water resources is to be able to identify those systems that provide higher than average ecosystem services, biodiversity support functions or are especially sensitive to impacts. Water resources with higher ecological importance may require managing such water resources in a better condition than the present to ensure the continued provision of ecosystem benefits in the long term. The methodology outlined by DWAF (1999) and updated in Kotze and Rountree (Kotze, Ellery, Macfarlane, & Jewitt, 2012; Rountree, Malan, & Weston, 2013), will be used for this study.

In this method there are three suites of importance criteria; namely:

- **Ecological Importance and Sensitivity:** incorporating the traditionally examined criteria used in EIS assessments of other water resources by DWS and thus enabling consistent assessment approaches across water resource types;
- **Hydro-functional Importance:** which considers water quality, flood attenuation and sediment trapping ecosystem services that the wetland may provide; and
- **Importance in Terms of Basic Human Benefits:** this suite of criteria considers the subsistence uses and cultural benefits of the wetland system.

These determinants are assessed for the wetlands on a scale of 0 to 4, where 0 indicates no importance and 4 indicates very high importance. It is recommended that the highest of these

three suites of scores be used to determine the overall Importance and Sensitivity category of the wetland system, as defined in Table 12-5.

Table 12-5: Interpretation of Overall EIS Scores for Biotic and Habitat Determinants

Ecological Importance and Sensitivity Category (EIS)	Range of Median
Very High Systems that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these systems is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers.	>3 and <=4
High Systems that are ecologically important and sensitive. The biodiversity of these systems may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.	>2 and <=3
Moderate Systems that are ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	>1 and <=2
Low/Marginal Systems that are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.	>0 and <=1

12.4.6 Aquatics

Descriptions of the various approaches for the determination of the aquatic ecology baseline are detailed in the respective sections below.

12.4.6.1 Water Quality

Selected *in situ* water quality variables will be measured using water quality meters manufactured by YSI, namely the EcoSense EC300A, EcoSense ODO200 and EcoSense pH100A handheld meters. Temperature, pH, electrical conductivity and dissolved oxygen will be recorded prior to additional biological sampling.

12.4.6.2 Habitat Quality

The availability and diversity of aquatic habitat is important to consider in assessments due to the reliance and adaptations of aquatic biota to specific habitats types (Barbour *et al.*, 1998; Barbour *et al*., 2013). Habitat quality and availability assessments are usually conducted alongside biological assessments that utilise fish and macroinvertebrates. Aquatic habitat will be assessed through visual observations on each river system considered.

12.4.6.3 Index for Habitat Integrity

The Index for Habitat integrity (IHI) (Version 2, Kleynhans, C.J., *pers. comm.*, 2015) aims to assess the number and severity of anthropogenic perturbations along a river/stream/wetland and the potential inflictions of damage toward the habitat integrity of the system (Dallas, 2005). Various abiotic (e.g. water abstraction, weirs, dams, pollution, dumping of rubble, etc.) and biotic (e.g. presence of alien plants and aquatic animals, etc.) factors are assessed, which represent some of the most important and easily quantifiable, anthropogenic impacts upon the system (Table 12-6).

As per the original IHI approach (Kleynhans, 1996), the instream and riparian components will each be analysed separately to yield two separate ecological conditions (i.e. Instream and Riparian components). However, it should be noted that the data for the riparian area is primarily interpreted in terms of the potential impact upon the instream component and as a result, may be skewed by a potentially deteriorated instream condition.

While the recently upgraded index (i.e. IHI-96-2; Dr C. J. Kleynhans, *pers. comm.*, 2015) replaces the aforementioned comprehensive and expensive IHI assessment model developed by Kleynhans (1996), it is important to note that the IHI-96-2 does not replace the IHI model developed by Kleynhans *et al*., (2008), which is recommended in instances where an abundance of data is available (e.g. intermediate and comprehensive Reserve Determinations). Accordingly, the IHI-96-2 model is typically applied in cases where a relatively few number of river reaches need to be assessed, the budget and time provisions are limited, and/or any detailed available information is lacking (i.e. rapid Reserve Determinations and for REMP/RHP purposes).

Table 12-6: Descriptions of Criteria used to Assess Habitat Integrity

Factors	Relevance
Water abstraction	Direct impact upon habitat type, abundance and size. Also impacted in flow, bed, channel and water quality characteristics. Riparian vegetation may be influenced by a decrease in the supply of water.
Flow modification	Consequence of abstraction or regulation by impoundments. Changes in the temporal and spatial characteristics of flow can have an impact on habitat attributes such as an increase in duration of low flow season, resulting in low availability of certain habitat types or water at the start of the breeding, flowering or growing season.
Bed modification	Regarded as the result of increased input of sediment from the catchment or a decrease in the ability of the river to transport sediment. Indirect indications of sedimentation are stream bank and catchment erosion. Purposeful alteration of the stream bed, e.g. the removal of rapids for navigation is also included.
Channel modification	May be the result of a change in flow, which may alter channel characteristics causing a change in marginal instream and riparian habitat. Purposeful channel modification to improve drainage is also included

Factors	Relevance
Water quality modification	Originates from point and diffuse sources. Measured directly, or agricultural activities, human settlements and industrial activities may indicate the likelihood of modification. Aggravated by a decrease in the volume of water during low or no flow conditions.
Inundation	Destruction of riffle, rapid and riparian zone habitat. Obstruction to the movement of aquatic fauna and influences water quality and the movement of sediments.
Alien/Exotic macrophytes	Alteration of habitat by obstruction of flow and may influence water quality. Dependent upon the species involved and scale of infestation.
Alien/Exotic aquatic fauna	The disturbance of the stream bottom during feeding may influence the water quality and increase turbidity. Dependent upon the species involved and their abundance
Solid waste disposal	A direct anthropogenic impact which may alter habitat structurally. Also a general indication of the misuse and mismanagement of the river.
Vegetation removal	Impairment of the buffer the vegetation forms to the movement of sediment and other catchment runoff products into the river. Refers to physical removal for farming, firewood and overgrazing.
Exotic vegetation encroachment	Excludes natural vegetation due to vigorous growth, causing bank instability and decreasing the buffering function of the riparian zone. Allochtonous organic matter input will also be changed. Riparian zone habitat diversity is also reduced
Bank erosion	Decrease in bank stability will cause sedimentation and possible collapse of the river bank resulting in a loss or modification of both instream and riparian habitats. Increased erosion can be the result of natural vegetation removal, overgrazing or exotic vegetation encroachment.

In accordance with the magnitude of the impact created by the abovementioned criteria, the assessment of the severity of the modifications was based on six descriptive categories ranging between a rating of 0 (no impact), 1 to 5 (small impact), 6 to 10 (moderate impact), 11 to 15 (large impact), 16 to 20 (serious impact) and 21 to 25 (critical impact; Table 12-7). Based on available knowledge of the site and/or adjacent catchment, a confidence level (high, medium, low) was assigned to each of the scored metrics.

Table 12-7: Descriptive of Scoring Guidelines for the Assessment of Modifications to Habitat Integrity

Impact Category	Description	Score
None	No discernible impact or the factor is located in such a way that it has no impact on habitat quality diversity, size and variability.	0

Impact Category	Description	Score
Small	The modification is limited to a very few localities and the impact on habitat quality, diversity, size and variability is also very small.	1 - 5
Moderate	The modification is present at a small number of localities and the impact on habitat quality, diversity, size and variability is also limited.	6 - 10
Large	The modification is generally present with a clearly detrimental impact on habitat quality, diversity, size and variability. Large areas are, however, not influenced	11 - 15
Serious	The modification is frequently present and the habitat quality, diversity, size and variability of almost the whole of the defined section are affected. Only small areas are not influenced.	16 - 20
Critical	The modification is present overall with a high intensity; the habitat quality, diversity, size and variability in almost the whole of the defined section are detrimentally influenced.	21 - 25

Given the subjective nature of the scoring procedure utilised within the general approach to habitat integrity assessment (including IHI-96-2), the most recent version of the IHI application (Kleynhans *et al*., 2008) and the Model Photo Guides (Kleynhans, Louw, & Graham, 2008) were used to calibrate the severity of the scoring system. It should be noted that the assessment will be limited to observed and/or suspected impacts present within the immediate vicinity of the delineated assessment units, as determined through the use of aerial photography (e.g. Google Earth) and observations made at each of the assessed sampling points during the field survey. However, in cases where major upstream impacts (e.g. construction of a dam, major water abstraction, etc.) are confirmed, potential impacts within relevant sections will be considered and accounted for within the application of the method.

Each of the allocated scores will then moderated by a weighting system (Table 12-8), which is based on the relative threat of the impact to the habitat integrity of the riverine system. The total score for each impact is equal to the assigned score multiplied by the weight of that impact. The estimated impacts (assigned score / maximum score [25] X allocated weighting) of all criteria are then summed together, expressed as a percentage and then subtracted from 100 to determine the Present Ecological State score (PES; or Ecological Category) for the instream and riparian components, respectively.

Table 12-8: Criteria and Weightings used to Assess Habitat Integrity

Instream Criteria	Weight	Riparian Zone Criteria	Weight
Water abstraction	14	Indigenous vegetation removal	13
Flow modification	13	Exotic vegetation encroachment	12
Bed modification	13	Bank erosion	14
Channel modification	13	Channel modification	12

Instream Criteria	Weight	Riparian Zone Criteria	Weight
Water quality modification	14	Water abstraction	13
Inundation	10	Inundation	11
Alien/Exotic macrophytes	9	Flow modification	12
Alien/Exotic aquatic fauna	8	Water quality	13
Solid waste disposal	6		
TOTAL	100	TOTAL	100

However, in cases where selected instream component criteria (i.e. water abstraction, flow, bed and channel modification, water quality and inundation) and/or any of the riparian component criteria exceeded ratings of large, serious or critical, an additional negative weight was applied. The aim of this is to accommodate the possible cumulative effect (and integrated) negative effects of such impacts (Kemper, 1999). The following rules were applied in this respect:

- Impact = Large, lower the integrity state by 33% of the weight for each criterion with such a rating;
- Impact = Serious, lower the integrity state by 67% of the weight for each criterion with such a rating; and
- Impact = Critical, lower the integrity state by 100% of the weight for each criterion with such a rating.

Subsequently, the negative weights will be added for both facets of the assessment and the total additional negative weight subtracted from the provisionally determined integrity to arrive at a final habitat integrity estimate (Kemper, 1999). The eventual total scores for the instream and riparian zone components are then used to place the habitat integrity in a specific habitat integrity ecological category (Table 12-9).

Table 12-9: Ecological Categories for the Habitat Integrity scores

Ecological Category	Description	Score (% of Total)
A	Unmodified, natural.	90 - 100
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	80 - 89
C	Moderately modified. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.	60 - 79
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	40 - 59

Ecological Category	Description	Score (% of Total)
E	The loss of natural habitat, biota and basic ecosystem functions is extensive.	20 - 39
F	Modifications have reached a critical level and there has been an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.	0 - 19

12.4.6.4 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, which includes:

- Integrated Habitat Assessment System;
- South African Scoring System Version 5 (SASS5); and
- Macroinvertebrate Response Assessment Index (MIRAI).

12.4.6.5 Ichthyofaunal Assessment

Fish is a very important river health indicator whereby their responses to environmental change can be measured utilising the Fish Response Assessment Index (Kleynhans 1999; Kleynhans *et al*., 2005) through sampling.

Fish sampling will be conducted by means of electroshocking as well as the use of cast nets at applicable sites with sufficient water depth. Conventional angling techniques will also be utilised if applicable. All fish captured will be identified and counted in the field and released alive at the point of capture. Fish species will be identified using the “Complete Guide to the Freshwater Fishes of Southern Africa” (Skelton, 2001).

12.4.6.6 Fish Response Assessment Index

The number of recorded fish species from sampling and their Frequency of Occurrence (FROC) will be used to supplement data in the Fish Response Assessment Index (FRAI). The information gained using the FRAI provides an indication of the PES of the river based on the fish assemblage structures observed. This allows for the determination of potential driver/changes to the aquatic ecosystem of concern based on fish species expected in the system in comparison to actual species present.

12.4.7 Air Quality

12.4.7.1 Emission Inventory

The establishment of an emissions inventory based on the proposed Project and related activities will be conducted to provide input parameters for the AERMOD dispersion modelling during the impact assessment phase.

12.4.7.2 Air Quality Dispersion Modelling

The United States Environmental Protection Agency's Preferred/Recommended Models: AERMOD modelling system will be utilised to simulate all emission scenarios for the different pollutants. The model simulation will assess the emissions from the various sources within the mine boundary and determine the potential contributions from the mine to the ambient air quality of the area. The results will be contour plots (maps) representing the zone of influence.

The predicted zone of influence for each pollutant simulated will be used to assess operational phase impacts and, in some instances, cumulative impacts of the operation on the ambient air quality as it applies to the South African Air Quality standards for compliance.

12.4.8 Cultural Heritage

12.4.8.1 Secondary Data Collection Methodology

Data collection informs the cultural heritage baseline profile of the study area under consideration. Data was collected through a desktop literature review, which comprised the South African Heritage Resources Information System (SAHRIS) database as well as online electronic journal articles, reference books and select internet sources.

12.4.8.2 Historical Layering

Historical layering is a process whereby diverse cartographic sources from various time periods are layered chronologically using Geographic Information Systems (GIS). The rationale behind historical layering is threefold, as it:

- Enables a virtual representation of changes in the land use of a particular area over time;
- Provides relative dates based on the presence or absence of visible features; and
- Identified potential locations where heritage resources may exist within an area.

12.4.8.3 Primary Data Collection

Digby Wells did not undertake the in-field assessments to inform the baseline description. This will be undertaken in the Impact Assessment phase and will include the following in-field assessments:

- A pre-disturbance survey aimed at identifying physical heritage resources that may be present within the site-specific area to inform the Heritage Impact Assessment (HIA); and
- A site inspection aimed at identifying outcrops of potentially fossil-bearing rock and paleontologically-sensitive layers to inform the PIA report.

Depending on the conditions on site, these surveys may be a combination of vehicular and pedestrian surveys and will be non-intrusive (i.e. no samples will be taken). Digby Wells will record the tracks of the survey and any heritage resources identified in the field as waypoints through a handheld GPS device. These results will be mapped as plans to be included in the final HIA report.

12.4.8.4 Site Naming Convention

Heritage resources identified by Digby Wells during the field survey are prefixed by the SAHRIS case identification generated for this Project. Information on the relevant period or feature code and site number follows (e.g. 11829/BGG-001). The site name may be shortened on plans or figures to the period/feature code and site number (e.g. BGG-001). Table 12-10 presents a list of the relevant period and feature codes.

Table 12-10: Relevant NHRA Section Codes

Feature or Period Code	Reference
S.34	Historical Built Environment
S.35	Archaeological or palaeontological resource
S.36	Burial grounds and graves

Heritage resources identified through secondary data collection are prefixed by the relevant SAHRIS case or map identification number (*where applicable*) and the original site name as used by the author of that assessment (e.g. 1668/Site 1).

12.5 Item 2(k)(v): Description of Proposed Method of Assessing Duration and Significance

The Impact Assessment methodology is contained in Table 11-4 above. For cumulative analysis, the following will be considered:

- Existing operations in the areas that could contribute, inter alia, to air pollution, groundwater contamination, surface water contamination, noise and wetland loss;
- Potential of blast impacts on surrounding historical resources, communities and mining operations;
- AMD is considered a factor in the general Project area, and will further considered in the EIA phase;
- Other contributions to surface water pollution; and

- Loss of heritage resources.

12.6 Item 2(k)(vi): An Indication of the Stages at which the Competent Authority will be Consulted

The competent authority for this Project is the DMRE who will be informed throughout the EA Application process. The DMRE has also been identified as a Key Stakeholder and will be provided all notifications provided to I&APs, throughout the process. The DMRE will also be invited to attend a site inspection. The following proposed project dates apply to the Project Schedule:

- Submission of the EA Application Form and Draft Scoping Report to DMRE: 27 January 2021;
- Submission of the Draft Scoping Report for Public Review: Commencing 29 January 2021;
- Submission of the Final Scoping Report to DMRE: 19 March 2021;
- Assumed submission of the Draft EIA: June/July 2021; and
- Assumed submission of Final EIA: September/October 2021.

12.7 Item 2(k)(vii): Details of the Public Participation Process to be Followed during the EIA Process

Stakeholder comments gathered during the Scoping Phase and outcomes from the public consultations will be closely considered for further PPP activities and inclusion for specialist studies (where applicable). The main emphasis of stakeholder consultations as part of this phase will be to share results of the specialist impact studies completed and the associated suggested mitigation measures and recommendations.

It is anticipated that the Stakeholder Engagement process to be implemented for the EIA Phase will be similar to the process undertaken for the Scoping Phase. The premise of activities is to adhere to various legislative requirements for the PPP and that a single, integrated process is followed. This will limit stakeholder fatigue and ensure that stakeholders are presented with a single view of the Project. The public shall be consulted during the EIA Phase to present the findings of the EIA process.

It must be noted that cognisance of the current South African Lockdown Regulations and COVID-19 pandemic shall be adhered to during all Public Participation Activities. A Public Participation Plan has been formulated for this Project and attached as Appendix D.

12.8 Item 2(k)(viii): Tasks which will be Undertaken as part of the EIA Process

The following tasks will be undertaken during the EIA phase:

- Further define the project activities;

- Further assess the project alternatives based on technical, economic, social and environmental criteria;
- Supplement the legal review of the project;
- Undertake detailed specialist investigations;
- Identification of possible fatal flaws;
- Assess potential impacts using the methodology provided herein;
- Provide detailed and feasible mitigation and management measures in an EMPr; and
- Public participation activities, including public and key stakeholder meetings.

12.9 Item 2(k)(ix): 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

Table 11-1 provides the proposed project activities, potential impact associated with each activity and proposed preliminary mitigation and residual risk, per environmental aspects.

13 Item 2(l): Other Information Required by the Competent Authority

In accordance with the provisions of Regulation 23(3) of the EIA Regulations, 2014 (as amended) the EIA should include all information required as set out in Appendix 3 and in terms of Regulation 23(4) the EMPr should contain all information required as set out in Appendix4. The Competent Authority has not requested any other information. The EIA Report must include the following:

- Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae;
- A plan, which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale;
- A description of the scope of the proposed activity;
- A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
- 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;
- A full PPP including a CRR in the EIA report;
- Impact Assessment, including methodology, of the necessary environmental aspects, including the nature, significance, extent, duration and probability of the impacts occurring, positive and negative impacts, including mitigation and monitoring measures;

- An assessment of the proposed alternatives;
- A complete EMPr;
- An impact statement from the EAP, specific information the Competent Authority may require, and conditions for approval; and
- An EAP oath regarding the correctness of information provided in the report.

13.1 Impact on the Socio-Economic Conditions of Any Directly Affected Person

The positive impacts of the proposed Project can be summarised as follows:

Mining of the Middeldrift Resources will extend the LoM of the NCC. Thus, positive impacts relate to the securing of jobs and business opportunities. Employment as well as the procurement of goods and services will contribute to the overall socio-economic profile of the region.

Furthermore, coal will continue to be supplied to Eskom for electricity generation which contributes to the national electricity grid.

The negative impacts of the proposed Project can be summarised as follows:

The Project will impact on surrounding landowners who utilise their farms for various agricultural activities from which they source their income and maintain their livelihoods. Also, the negative impacts are associated with population influx as job seekers move into the area. The population influx may result in increased demand on health and emergency services, conflict and xenophobia between residents and job seekers, increase in crime and other social issues.

13.2 Impact on any National Estate referred to in Section 3(2) of the National Heritage Resources Act

A full HIA will be undertaken during the EIA Phase in compliance with Section 38 of the NHRA. Any resources identified on site will be recorded, labelled and the appropriate mitigations applied.

14 Other Matters Required in terms of Sections 24(4)(a) and (b) of the Act

Section 24(4)(b)(i) of the NEMA provides that an investigation must be undertaken of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity. Refer to Section 9.1 for alternatives assessed. Refer to section 10.11 above for the cultural heritage baseline.

15 Undertaking Regarding Correctness of Information

I, Njabulo Mzilikazi, 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:	January 2021

16 Undertaking Regarding Level of Agreement

I, Njabulo Mzilikazi, 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:	19 January 2021

17 References

Alexander, G., & John, M. (2007). A Guide to the Reptiles of Southern Africa. Cape Town: Struik.

Available at: http://award.org.za/wp/wp-content/uploads/2019/01/The-Olifants-River-Catchment-User-Guide.pdf

Available at: http://www.voortrekker-history.co.za/index.php#.VOBq3a8cTIU [Accessed 25 October 2017].

Bamford, M., 2014. Best Practice for Palaeotontological Chance Finds: Proposed Extention into adjacent Block 4 reserve of Syferfontein Mine (Sasol), Mpumalanga, Unpublished report: Prepared for Sasol Mining (Pty) Ltd.

Bamford, M., 2016. Environmental Authorisation for the proposed Imvula Mine: Palaeontological Impact Assessment addendum to the Heritage Impact Assessment, Unpublished Report: Prepared for Digby Wells Environmental.

Barbour, M. T., Gerritsen, J., Snyder, B. D., & Stribling, J. B. (2013). Water: Bioassessment Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish -Second Edition Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinve. EPA 841-B-

99-002. U.S. Enviromental Protection Agency; Office of Water, Washington, D.C., 1989, 1–340. http://water.epa.gov/scitech/monitoring/rsl/bioassessment/index.cfm

Barbour, M. T., Gerritsen, J., Snyder, B. D., & Stribling, J. B. (1998). Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers.

Behrens, J. & Swanepoel, N., 2008. Historical archaeologies of southern Africa: precedents and prospects. In: N. Swanepoel, A. Esterhuysen & P. Bonner, eds. Five Hundred Years Rediscovered: South African precedents and prospects. Johannesburg: Wits University Press, pp. 23-39.

Bennett, N. J. (2016). A conservation assessment of Georychus capensis. SANBI and Endangered Wildlife Trust, 1-6.

Birdlife International. (2020, November 08). Retrieved from DataZone Birdlife International: http://datazone.birdlife.org/site/factsheet/steenkampsberg-iba-south-africa

Birkholtz, P., 2011. Proposed development of the Kriel Ash Dam Facility: Kriel (Ga-Nala), Emalahleni Local Municipality, Mpumalanga Province, PGS Heritage & Grave Relocation Consultants: Unpublished report prepared for Aurecon. SAHRIS ID: 466.

Birkholtz, P., 2013. Proposed coal mining on sections of the Farms Blesbokfontein 31 IS, Klippoortje 32 IS, Nooitgedacht 37 IS, Blesbokfontein 38 IS, Hartebeesfontein 39 IS, Roodepoort 40 IS, Frischgewaagd 60 IS and Vierfontein 61 IS, Emalahleni Local Municipality, Mpumalanga, PGS Heritage & Grave Relocations Consultants: Unpublished report prepared for Xstrata Coal (Pty) Ltd. SAHRIS ID: 2261.

Brodie, N., 2008. The Joburg Book: A guide to the city's history, people and places. Johannesburg: Sharp Sharp Media.

Campbell, S., Mielke, P., & Götz, A. (2016). Geothermal energy from the Main Karoo Basin? New insights from borehole KWV-1 (Eastern Cape, South Africa). Geothermal Energy.

Clark, J., 1982. The cultures of the Middle Palaeolithic/Middle Stone Age. In: J. Clark, ed. The Cambridge History of Africa, Volume 1: From the Earliest Times to c. 500 BC. Cambridge: Cambridge University Press, pp. 248-341.

Climate-data.org. (n.d.). Climate-data.org. Retrieved from Climate-data.org: https://en.climate-data.org/

Climate-data.org. (n.d.). Climate-data.org. Retrieved from Climate-data.org: https://en.climate-data.org/africa/south-africa/mpumalanga/hendrina-26815/#climate-graph

Coetzee, F. P. & Fivaz, H., 2017. Cutural Heritage Impact Assessment: Phase 1 Investigation for a proposed Extension of Pit 1 and Pipeline from Dorstfontein West to Dorstfontein East and the disposal of Discard into the Opencast Pit, northeast of Kriel, Mpumalanga, Francois P Coetzee: Unpublished report prepared for Exxaro Coal (Pty) Ltd and SRK Consulting (South Africa) (Pty) Ltd. SAHRIS Case ID 11743.

Dallas, H. F. (2005). River Health Programme : Site Characterisation Field-Manual and Field-Data Sheets. March, 28.

Darwall, W. R. T., Smith, K. G., Tweddle, D., & Skelton, P. (2009). The status and distribution of freshwater biodiversity in southern Africa.

Darwell, W., Smith, K., Tweddle, D., & Skelton, P. (2009). The status and distribution of freshwater biodiversity in southern Africa. Gland, Switzerland: IUCN and Grahamstown, South Africa: SAIAB.

de Jong, R. C., 2006. Archaeological and Heritage Assessment Report Version 3: Optimum Mine EMP Amendment, North of Hendrina, Mpumalanga, Cultmatrix cc: Unpublished report prepared for Jones & Wagener. SAHRIS ID: 01121.

de Jong, R., 2007. Archaeological and Heritage Impact Assessment Report: proposed new Goedgevonden Colliery expansion project on the Farms Goedgevonden 10 IS, Zaaiwater 11 IS and Kleinzuikerboschplaat 5 IS near Ogies, Emalahleni Local Municipality, Mpumalanga, Cultmatrix CC: Unpublished report. SAHRIS ID: 01123.

Deacon, H. & Deacon, J., 1999. Human Beginnings in South Africa. Cape Town: David Phillip.

Delius, P. & Cope, R., 2007. Hard-fought frontiers: 1845 - 1883. In: Mpumalanga: History and Heritage.. Pietermaritzburg: University of KwaZulu-Natal Press, pp. 137-199.

Delius, P., Maggs, T. & Schoeman, A., 2014. Forgotten World: The Stone-Walled Settlements of the Mpumalanga Escarpment. First ed. Johannesburg: Wits University Press.

Department of Agriculture. (1983). Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). Government Notice No. R. 1048.

Department of Environmental Affairs, D. o. (2013). Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.

Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, & South African National Biodiversity Institute. (2013). Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.

Department of Water Affairs and Forestry. (1999). South African Version 1.0 of Resource Directed Measures for Protection of Water Resources.

Department of Water Affairs and Forestry. (2005). A practical field procedure for the identification and delineation of wetlands and riparian areas. Pretoria: DWAF.

Department of Water Affairs and Forestry. (2008). Updated manual for identification and delineation of wetlands and riparian areas. Pretoria: DWAF.

Department of Water Affairs and Forestry. (2011). Groundwater dictionary (2nd edition). . Retrieved from http://www.dwaf.gov.za/Groundwater/Groundwater Dictionary.aspx

Department of Water Affairs. (2013). National Water Resource Strategy 2. NWRS AND DWS.

Dickens, C. W. S., & Graham, P. M. (2002). The South African Scoring System (SASS) Version 5 rapid bioassessment method for rivers. African Journal of Aquatic Science, 27, 1–10.

Digby Wells, 2011. Groundwater Numerical Model Universal coal PLC

Driver, A., Nel, J., Snaddon, K., Murray, K., Roux, D., & Hill, L. (2011). Implementation Manual for Freshwater Ecosystem Priority Areas. Draft Report for the Water Research Commission. Retrieved from http://www.wrc.org.za/Knowledge Hub D

du Piesanie, J. & Nel, J., 2016a. Proposed Development of an Underground Coal Mine and Associated Infrastructure near Hendrina, Mpumalanga, Digby Wells Environmental: Unpublished report prepared for Umcebo Mining (Pty) Ltd. SAHRIS ID: 9404.

du Piesanie, J. & Nel, J., 2016b. Environmental Authorisation for the Proposed Imvula Coal Mine: Heritage Impact Assessment Report, Digby Wells Environmental: Unpublished report prepared for Ixia Coal (Pty) Ltd. SAHRIS ID: 8831.

DWE. (2014). An Aquatic Ecological State Assessment For The Proposed Dalyshope Coal Mine, Anglo American Coal Pty (Ltd).

DWS. (2014). A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa.

Eastwood, E., Van Schalkwyk, J. & Smith, B., 2002. Archaeological and rock art survey of the Makgabeng Plateau, Limpopo Basin. The Digging Stick, 19(1), pp. 1-3.

Esterhuysen, A. & Smith, J., 2007. Stories in stone. In: P. Delius, ed. Mpumalanga: History and Heritage: reclaiming the past, defining the future. Pietermaritzburg: University of KwaZulu-Natal Press, pp. 41-67.

Fourie, W. & Hutton, M., 2012. Ramp 9 Expansion Project, Lilliput 83 IT, Breyten, Mpumalanga, PGS Heritage and Grave Relocation Consultants: Unpublished report prepared for Tselentis Colliery. SAHRIS ID: 138.

Fourie, W., 2008. Zondagsfontein substation, telecommunication tower and 2X7.5km 132kV powerling, Ogies, Mpumalanga Province, Matakoma ARM (Heritage Contracts Unit): Unpublished report prepared for Wandima Environmental Services.

Fourie, W., 2009. Heritage Assessment: the Kwagga North Project, Optimum Coal, Arnot, Mpumalanga, Professional Grave Solutions - Heritage Unit: Unpublished report prepared for Consecion Creek Consulting.

Fourie, W., Steyn, H. & Hutton, M., 2012. ATCOM East Expansion of the Impunzi Colliery, on Portions of the Farms Steenkoolspruit 18 IS, Van Dyksdrift 19 IS and Kromfontein 30 IS, Emalahleni, Mpumalanga Province, PGS Professional Heritage and Grave Relocation Consultants: Unpubllished report prepared for Jones and Wagener Consulting Engineers. SAHRIS Case ID 6391.

Fourie, W., Steyn, H., Birkholtz, P. & Salomon, A., 2000. Phase 1 Archaeological Survey of the Impunzi Division of Duiker Mining - Witbank/Ogies Area, Matakoma & CRM Africa: Unpublished report. SAHRIS ID: 01164.

Gerber, A., & Gabriel, M. J. M. (2002). Aquatic Invertebrates of South African Rivers: Field Guide. Institute for Water Quality Studies. Department of Water Affairs and Forestry.

Gerlanc, N. M. (2005). Habitat origin and changes in water chemistry influence developemnt of Westren Chorus Frogs. Journal of Herpatology 39(2), 254-265.

Groenewald, G. & Groenewald, D., 2014. Palaeontological Heritage of Mpumalanga, Unpublished report: SAHRA Palaeotechnical Report.

Gyamfi, C., Ndambuki, J. & Salim, R., 2016. Hydrological Responses to Land Use/Cover Changes in the Olifants Basin, South Africa. Water.

Hardwick, S. & du Piesanie, J., 2018. Heritage Impact Assessment: Heritage Resources Management Process for the Exxaro Matla Mine, Digby Wells Environmental: Unpublished report prepared for Exxaro Coal Mpumalamga (Pty) Ltd. SAHRIS Case ID 11829.

Headwaters Water and Environmental Consultants. (2018). Consolidated Integrated Water & Waste Management Plan (IWWMP) for New Clydesdale Colliery, Mpumalanga Province.

Henning, G. A. (2009). South African Red Data Book: butterflies. SANBI Biodiversity Series 13.

Higgit, N., du Piesanie, J. & Nel, J., 2013. Heritage Statement for ATCOM and Tweefontein Dragline Relocation Project, Digby Wells Environmental: Unpublished report prepared for Jones and Wagener Consulting Civil Engineers. SAHRIS ID: 3020.

Higgit, N., Karodia Khan, S., du Piesanie, J. & Nel, J., 2014. Environmental Impact Assessment for the Weltevreden Open Cast Coal Mine, Weltevreden 381 JT, Belfast, Mpumalanga: Heritage Impact Assessment, Digby Wells Environmental: Unpublished report prepared for Northern Coal (Pty) Ltd. SAHRIS ID: 5472.

Huffman, T. N. & Calabrese, J. A., 1996. Archaeological survey of Dorstfontein Coal Mines, Archaeological Resources Management: Unpublished report.

Huffman, T., 1999. Archaeological Survey for the Rossouw Dam, Middelburg, Archaeological Resources Management: Unpublished report prepared for Strategic Environmental Focus. SAHRIS Map ID 2895.

Johnson, M. R., Anhauesser, C. R. & Thomas, R. J., 2006. The Geology of South Africa. 2009 Reprint (with minor corrections) ed. Johannesburg: Council for Geosciences.

Karodia, S. & Nel, J., 2014. Heritage Statement for the Basic Assessment undertaken for a Powerline Upgrade, Syferfontein Mine, Secunda, Mpumalanga Province, Digby Wells Environmental: Unpublished report prepared for Sasol Mining (Pty) Ltd. SAHRIS ID: 4919.

Karodia, S., Higgit, N., du Piesanie, J. & Nel, J., 2013. Heritage Impact Assessment for the Harwar Colliery, 2630AA and 2630AC, Mpumalanga Province, Digby Wells Environmental: Unpublished report prepared for Msobo Coal (Pty) Ltd. Case ID 1724.

Kemper, N. (1999). Intermediate Habitat Integrity Assessment. In Resource Directed Measures for Protection of Water Resources, Volume 3: River Ecosystems, Version 1.0. Department of Water Affairs and Forestry.

Kleynhans, C. J. (1996). A qualitative procedure for the assessment of the habitat integrity status of Luvuvhu River (Limpopo system, South Africa). Journal of Aquatic Health, 5(1), 41–54. https://doi.org/10.1007/BF00691728

Kleynhans, C. J. (1999). The development of a fish index to assess the biological integrity of South African rivers. Water SA, 25(3), 265–278.

Kleynhans, C. J., Louw, M. D., & Graham, M. (2008). River Ecoclassification: Manual for Ecostatus Determination (Version 2). Module G: Index of Habitat Integrity. Section 1: Technical Manual. (WRC Report No. TT 377/08.). Water Research Commission.

Kleynhans, C. J., Louw, M. D., & Moolman, J. (2008). River Ecoclassification: Manual for Ecostatus Determination (Version 2). Module D: Volume 2 - Reference frequency of occurrence of fish species in South Africa (WRC Report No. TT 331/08.). Water Research Commission.

Kleynhans, C., & Hill, L. (1999). Determination of Resource Quality Objectives for Habitat Integrity. RDM Riv_AppR23-Version1.0. Institute of Water Quality Studies. . Pretoria, South Africa: Department of Water Affairs and Forestry.

Kleynhans, C., Thirion, C., & Moolman, J. (2005). A Level 1 River Ecoregion classification System for South Africa, Lesotho and Swaziland. Water.

Kleynhans, C., Thirion, C., & Moolman, J. (2005). A Level I River Ecoregion classification System for South Africa, Lesotho and Swaziland. In Water.

Köppen, W., & Geiger, R. (1936). Handbuch der klimatologie. Berlin.

Köppen, W., & Geiger, R. (1936). Handbuch der klimatologie. Berlin.

Kotze, D., & Ellery, W. (2009). WET-Outcome Evaluate: an evaluation of the rehabilitation outcomes at six wetland sites in South Africa. Pretoria: WRC: TT 343/09.

Kotze, D., & Marneweck, G. (1999). Guidelnes for delineating the wetland boundary and zones within a wetland under the South African Water Act.

Kotze, D., Ellery, W., Macfarlane, D., & Jewitt, G. (2012). A rapid assessment for coupling anthropogenic stressors and wetland ecological condition. Ecological Indicators.

Kotze, D., Macfarlane, D., & Edwards, R. (2020). WET-EcoServices (Version 2): A technique for rapidly assessing ecosystem services supplied by wetlands and riparian areas. WRC Project K5/2737.

Kotze, D., Marneweck, G., Batchelor, A., Lindley, D., & Collins, N. (2007). Wetland-Ecoservices: A rapid assessment procedure for describing wetland benefits. Pretoria: WRC: TT339/08.

Land Type Survey Staff. (1972 - 2006). Land Types of South Africa: Digital Map (1:250 000) and Soil Inventory Databases. . Pretoria: Agricultural Research Council - Institue for Soil, Climate and Water.

Landau, P. S., 2010. Popular Politics in the History of South Africa, 1400-1948. Cambridge: Cambridge University Press.

Lötter, M. C. (2015). Technical Reort for the Mpumalanga Biodiversity Sector Plan - MBSP. Nelspruit: Mpumalanga Tourism & Parks Agency.

Macfarlane, D., Kotze, D., & Ellery, W. (2009). WET-Health: A technique for rapidly assessing wetland health (TT 340/09). WRC Report.

Macfarlane, D., Ollis, D., & Kotze, D. (2020). WET-Health (Version 2.0): A Refined Suite of Tools for Assessing the Present Ecological State of Wetland Systems. WRC Report No. TT 820/20.

Makhura, T., 2007. Early Inhabitants. In: Mpumalanga: History and Heritage.. Pietermaritzburg: The University of KwaZulu-Natal Press, pp. 91-135.

McMillan, P. H. (1998). An Integrated Habitat Assessment System (IHAS v2) for the Rapid Biological Assessment of Rivers and Streams (CSIR Research Report No. ENV-P-I 98132). Water Resources Management Programme, Council for Scientific and Industrial Research.

Mitchell, P., 2002. The Archaeology of Southern Africa. Cambridge: Cambridge University Press.

Mpumalanga DACE. (2003). Mpumalanga State of the Environment Report. Nelspruit: Department of Agriculture, Conservation and Environment.

Mucina, L., & Rutherford, M. C. (2012). The Vegetation of South Africa, Lesotho and Swaziland. Pretoria: South African National Biodiversity Institute.

Nel, J., Murray, K., Maherry, A., Petersen, C., Roux, D., Driver, A., . . . Nienaber, S. (2011). Technical Report for the National Freshwater Priority Areas project. WRC: 1801/2/11.

Ollis, D. J., Boucher, C., Dallas, H. F., & Esler, K. J. (2006). Preliminary testing of the Integrated Habitat Assessment System (IHAS) for aquatic macroinvertebrates. African Journal of Aquatic Science, 31(1), 1–14.

Pakenham, T., 1979. The Boer War. Johannesburg: Johnathon Ball Publishers.

Pelser, A. J. & van Vollenhoven, A. C., 2008. A Report on a Cultural Respurces Survey on the farms Kleinkopje 15 IS and Steenkoolspruit 18 IS, Douglas Collieries, Emahlaleni District, Mpumalanga Province, Archaetnos Culture & Cultural Resource Consultants: Unpublished report prepared for DMO Projects, BHP Billiton, Energy Coals SA. SAHRIS ID: 02179.

Pelser, A. J., 2013a. A Revision of Phase 1 HIA for the Proposed Wonderfontein Colliery near Belfast in Mpumalanga, Apelser Archaeological Consulting: Unpublished report prepared for Usimbithi Mining (Pty) Ltd. SAHRIS ID: 1487.

Pistorious, J., 2008. Phase 1 Heritage Impact Assessment (HIA) Study for the Total Coal South Africa's (TCSA) Proposed New Expansion of the Dorsfontein Coal Mine (DCM) near Kriel on the Eastern Highveld in the Mpumalanga Province of South Africa,, Pretoria: Unpublished report prepared for Total Coal Ground Water Consulting Services.

Pistorius, J. C. C., 2004a. A Heritage Impact Assessment (HIA) study for the Proposed New Optimim Colliery on the farm Schoonoord 164 IS in the Mpumalanga Province of South Africa, Dr Julius CC Pistorius: Unpublished report prepared for African EPA. SAHRIS ID: 00687.

Pistorius, J. C. C., 2008. A Phase 1 Heritage Impact Assessment (HIA) study for the Total Coal South Africa's (TCSA) proposed new expansion of the Dorsfontein Coal Mine (DCM) near Kriel on the Eastern Highveld in the Mpumalanga Province of South Africa, Dr Julius CC Pistorius: Unpublished report prepared for Total Coal and Groundwater Consulting Services. SAHRIS ID: 01718.

Pistorius, J. C. C., 2011. A Phase 1 Heritage Impact Assessment (HIA) Study for the Consolidated Environmental Management Programme Report (Consolidated EMPr) for Arnot Coal on the Eastern Highveld in the Mpumalanga Province, Dr Julius CC Pistorius: Unpublished report prepared for Golder Associates Africa (Pty) Ltd and Exxaro Arnot Coal. SAHRIS ID: 6251.

Pistorius, J. C. C., 2012. A Phase 1 Heritage Impact Assessment (HIA) Study for a Proposed 600 MW Power Plant and Associated Infrastructure for KiPower (Pty) Ltd near Delmas on the Eastern Highveld in the Mpumalanga Province of South Africa, Dr Julius CC Pistorius: Unpublished Report prepared for Jones & Wagener Consulting Civil Engineers (Pty) Ltd and Kuyasa Mining. Case ID 174.

Pistorius, J. C., 2004c. A Phase 1 Heritage Impact Assessment (HIA) Study for a Portion of Portion 4 of the Farm Valyspruit 132 KT south of Dullstroom in the Mpumalanga Province of South Africa, Dr Julius CC Pistorius: Unpublished report prepared for Landscape Dynamics. SAHRIS ID: 00648.

Pistorius, J., 2004b. A Heritage Impact Assessment (HIA) Study for the EMP Ammendment for Douglas Colliery in the Mpumalanga Province of South Africa, Dr Julius C.C. Pistorius: Unpublished report prepared for Pulled Howard and De Lange. SAHRIS ID: 01153.

Pistorius, J., 2008b. Phase 1 Heritage Impact Assessment (HIA) Study for Sasols proposed new shaft complex on Strybult 542 and for the North Block on the Eastern Highveld in the Mpumalanga Province of South Africa,, Pretoria: Unpublished Report prepared for Clean Stream Environmental and Sasol Secunda.

Pistorius, J., 2014. A Phase 1 Heritage Impact Assessment (HIA) study for Anglo Operations Limited Greenside Colliery's new discard facility near Emalahleni on the eastern

Highveld in the Mpumalanga Province, Dr Julius C.C. Pistorius: Unpublished report prepared for Shangoni Management Services (Pty) Ltd. SAHRIS ID: 4249.

Pistorius, J., 2015. A Phase 1 Heritage Impact Assessment (HIA) study for the South 32 CSA proposed extension of opencast operations and associated closure of a section of the D253 provincial road at the Klipfontein Section of the Middelburg Mine, Mpumalanga, Dr Julius C.C. Pistorius: Unpublished report prepared for Jones & Wagener Engineering & Environmental Consultants. SAHRIS ID: 6492.

Pistorius, J., 2016. A Phase 1 Heritage Impact Assessment (HIA) study for the proposed Kipower 400kV Loop-in and Loop-out transmission lines to connect the Kipower independent power station with the national grid on the eastern Highveld in the Mpumalanga Province, Dr Julius C.C. Pistorius: Unpublished report prepared for Jones & Wagener Environmental and Engineering Consultants. SAHRIS ID: 9599.

Ravi S; Zobeck TM; Over TM; Okin GS; D'Odorico P (2006) On the effect of moisture bonding forces in air-dry soils on threshold frictional velocity of wind erosion. Sedimentology, 53, 597-609

Rayten Environmental and Engineering Consultant (2020) Air Quality Monitoring, Universal Coal – New Clydesdale Colliery (NCC) Thermal Coal Development Project, Technical Report - Project No: RES-UCR-190117.

Rountree, M., Malan, H., & Weston, B. (2013). Manual for the Rapid Ecological Reserve Determination of Inland Wetlands (Version 2.0).

SABAP2. (2020, November 12). South African bird Atlas Project 2. Retrieved from South African bird Atlas Project 2: http://sabap2.birdmap.africa/coverage/pentad/2605_2910

SANRAL, 2013. Drainage Manual Application Guide-6th Edition, Pretoria: The South Africa National Roads Agency.

SAS. (2016). FAUNAL, FLORAL, AQUATIC AND WETLAND ECOLOGICAL ASSESSMENT AS PART OF THE ENVIRONMENTAL ASSESSMENT AND AUTHORISATION PROCESS FOR THE PROPOSED EXTENSION OF THE ROODEKOP MINING AREA (THE NCC PROJECT), ON THE FARM DIEPSPRUIT, FARM NO 41 IS, MPUMALANGA PROVINC. Scientific Aquatic Sciences.

Schoeman, J., van der Walt, M., Monnik, K., Thackrah, A., Malherbe, J., & Le Roux, R. (2000). The Development and Application of Land Capability Classification System for South Africa, Pretoria: ARC - ISCW Report No. GW/A/2000/57: ARC - Institute for Soil, Climate and Water.

Skinner, J. &. (2005). The Mammals of the Southern African Subregion. Cambridge University Press.

Smith, B. & Ouzman, S., 2004. Taking Stock: identifying Khoekhoen Herder Rock Art in southern Africa. Current Anthropology, 45(4), pp. 499-526.

Smith, B. & Zubieta, L., 2007. The power of ancient art. In: P. Delius, ed. Mpumalanga: History and Heritage. Pietermaritzburg: University of KwaZulu-Natal Press, pp. 69-90.

Soil Classification Working Group. (1991). Soil Classification: A Taxonomic System for South Africa. Pretoria: Soil and Irrigation Research Institute, Department of Agricultural Development.

Soil Conservation Service: U.S. Department of Agriculture. (1973). Land-Capability Classification. Agriculture Handbook No. 210.

Soil Science Society of South Africa. (1990). Handbook of standard soil testing methods for advisory purposes. Pretoria.

South African National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (2009). National Ambient Air Quality Standards for PM10, Government Notice 1210, Government Gazette 32816 of 24th December 2009.

South African National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (2012). National Ambient Air Quality Standards for PM2.5, Government Notice (486), Government Gazette (35463) of 29th June 2012.

South African Weather Bureau. (1986). Climate of South Africa. In D. o. Weather Bureau, Climate Statistics up to 1984. WB40. Pretoria.

SRK Consulting. (2016). Consolidation of the existing EMPRs and the extension of the existing Roodekop Mining Area at the New Clydesdale Colliery, Mpumalanga Province: Final EIA/EMPR.

Thirion, C. (2008). River Ecoclassification: Manual for Ecostatus Determination (Version 2). Module E: Volume 1 – Macroinvertebrate Response Assessment Index (MIRAI). (WRC Report No. TT 332/08.). Water Research Commission.

Thirion, C. A., Mocke, A., & Woest, R. (1995). Biological monitoring of streams and rivers using SASS4 - A User's Manual. Internal Report No. N 000/00REQ/1195. Department of Water Affairs and Forestry - Resource Quality Services.

USAID, 2019. Olifants River Cathcment User's Guide. [Online]

USEPA (2016) Revision of Emission Factors for AP-42. Chapter 13: Miscellaneous Source. Section 13.2.4: Aggregate Handling And Storage Piles (Fugitive Dust Sources). http://www.epa.gov/ttn/chief/ap42/index.html. Accessed 2 June.

Van der Walt, S., 2015. Intended relocation of the remains of 104 graves that are older than 60 years from the farms Klipplaat 14 IS and Boschmansfontein 12 IS, Mpumalanga, PGS Heritage and Grave Relocation Consultants: Letter submitted to the South African Heritage Resources Agency.

van Schalkwyk, J., 1997a. A Survey of Cultural Resources in the Pit 5 and 6 Mining Areas, Kriel Colliery, Kriel Distruct, Mpumalanga Province, National Cultural History Museum: Unpublished report prepared for Kriel Colliery. SAHRIS ID: 00654.

van Schalkwyk, J., 1997b. A Survey of Cultural Resources in the Proposed Kleinfontein Mining Area, Mpumalanga Province, National Cultural History Museum: Unpublished report prepared for Amcoal: Goedehoop Colliery. SAHRIS ID: 02418.

van Schalkwyk, J., 2002. A survey of cultural resources for the Zondagsfontein Mining Development, Witbank District, Mpumalanga Province, National Cultural History Museum: Unpublished report prepared for Oryx Environmental. SAHRIS ID: 00710.

van Schalkwyk, J., 2002b. A survey of cultural resources in the proposed Klipspruit Mining Area, Witbank District, Mpumalanga, National Cultural History Museum: Unpublished report prepared for Oryx Environmental. SAHRIS ID: 01165.

van Schalkwyk, J., 2003c. A survey of cultural resources in the Khutala Colliery Block A Mining Area, Witbank District, Mpumalanga Province, National Cultural History Museum: Unpublished report prepared for Khutala Colliery. SAHRIS ID: 00711.

van Schalkwyk, J., 2007. Heritage Impact Scoping Report for the Planned Hendrina-Marathon Powerline, Mpumalanga Province, National Cultural History Museum: Unpublished report prepared for Strategic Environmental Focus. SAHRIS ID: 01179.

van Vollenhoven, A. C. & du Bruyn, C., 2014. A Report on a Cultural Heritage Impact Assessment for the Proposed Isibonelo Colliery Block Z Opencast Mine, close to Kriel, Mpumalanga Province, Archaetnos Culture & Cultural Resource Consultants: Unpublished report prepared for WSP Environmental (Pty) Ltd. SAHRIS ID: 5914.

van Vollenhoven, A. C. & Pelser, A. J., 2011. Report on the Heritage Impact Assessment for the Proposed Development at the Exxaro Eerstelingfontein NDC Coal Mine near Belfast in Mpumalanga Province, Archaetnos Culture and Cultural Resource Consultants: Unpublished report prepared for WSP Environmental (Pty) Ltd. SAHRIS ID: 6357.

Van Vollenhoven, A., 2012a. A report on the Heritage Impact Assessment related to the Exxaro Matla Project near Kriel in the Mpumalanga Province, Archaetnos Culture & Cultural Resource Consultants: Unpublished report prepared for GCS. SAHRIS ID: 102.

van Vollenhoven, A., 2012b. A report on a Heritage Impact Assessment for the proposed Beneficiation Plant at Kriel Colliery, Mpumalanga Province, Archaetnos Culture and Cultural Resource Consultants: Unpublished report prepared for SRK. SAHRIS ID: 166.

van Vollenhoven, A., 2015a. A report on a Cultural Heritage Impact Assessment for the proposed Hope No. 4 Seam Mining Project, clode to Kriel, Mpumalanga Province, Archaetnos Culture and Cultural Resource Consultants: Unpublished report prepared for Geivicon. SAHRIS ID: 8410.

van Vollenhoven, A., 2015b. A report on an Archaeological Heritage Impact Assessment for the proposed Kudu-Halfgewonnen South Traction 88kV LILO Eskom Line and Kromklip Tee-Van Dyks Tee, Mpumalanga Province, Archaetnos Culture and Cultural Resources Consultants: Unpublished report prepared for Texture Environmental Consultants. SAHRIS ID: 7332.

von der Heyde, N., 2013. Field Guide to the Battlefields of South Africa. Cape Town: Random House Struik.

Voortrekkers, T., 2014. The Great Trek - South Africa 1835 - 1845.. [Online]

Waddle, J. H. (2006). Use of amphibians as ecosystem indicator species. Dissertation. University of Florida.

Water Research Commission (WRC). 2015. Water Resources of South Africa Study Report WR2012. Pretoria: Water Research Commission.

Wessels, A., 2010. The Anglo-Boer War 1889-1902: White Man's War, Black Man's War, Traumatic War.. Stellenbosch: African Sun Media.

Willsworth, C., 2006. Bakenlaagte - the Story. Durban: Just Done Productions.

Woodhall, S. (2005). Field Guide to Butterflies of South Africa. Cape Town: Struik Publisher.

Yarnell, R. R.-C. (2016). A conservation assessment of Parahyaena brunnea. The Red List of Mammals of South Africa.

DIGBY WELLS
ENVIRONMENTAL

Appendix A: Existing Mining Rights

DIGBY WELLS
ENVIRONMENTAL

Appendix B: EAP's CV and Qualifications

Appendix C: Plans

Plan 1: Land Tenure Map

Plan 2: Regional Setting

Plan 3: Locality Map

Plan 4: Infrastructure Layout Plan

Plan 5: Life of Mine

DIGBY WELLS
ENVIRONMENTAL

Appendix D: Public Participation Chapter