Environmental Impact Assessment
And
Environmental Management Programme

for Listed Activities Associated with the Proposed Additional Infrastructure at the Universal Coal Development III (Pty) Ltd, Ubuntu Colliery, Nkangala, Mpumalanga Province

DMRE Reference Number: MP 30/5/1/1/2/10027 EM

Environmental Authorisation in Support of the Ubuntu Colliery Project

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2014 (ACT NO. 26 OF 2014) (NEM:WA) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) (MPRDA) (AS AMENDED).

Name of Applicant:	Universal Coal Development III (Proprietary) Limited
Tel no:	012 460 0805
Fax no:	086 263 1365
Physical Address:	Universal Coal Head Office, 467 Fehrsen Street, Brooklyn, Pretoria, 0181

Digby Wells and Associates (South Africa) (Pty) Ltd
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This document has been prepared by Digby Wells Environmental.

Report Type:	**Environmental Impact Assessment and Environmental Management Plan Report**
Project Name:	**Environmental Authorisation for Proposed Additional Infrastructure at the Universal Coal Development III (Pty) Ltd, Ubuntu Colliery, Nkangala, Mpumalanga Province**
Project Code:	**UCD6097**

Name	Responsibility	Signature	Date
Njabulo Mzilikazi	Compiler		April 2021
Modiegi Monaledi	Compiler		April 2021
Xan Taylor	1st Reviewer		April 2021
Barbara Wessels	2nd Reviewer and EAP sign-off		April 2021

IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process: -

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

EXECUTIVE SUMMARY

Introduction

Universal Coal Development III (Pty) Ltd (hereafter Universal Coal) secured a Mining Right (MP30/5/1/1/2/10027 MR) for the formerly known Brakfontein Colliery in 2017. The Environmental Management Plan (EMP) was also approved simultaneously. Subsequently, the Colliery name was amended in January 2019 to reflect the name change of the mine to Ubuntu Colliery. Universal Coal currently holds the following approvals, which are applicable to the Ubuntu Colliery:

- A Mining Right and an EMP issued by the Mpumalanga Department of Mineral Resources and Energy with reference number MP 30/5/1/1/2/10027 MR;
- The name change of the colliery from Brakfontein Colliery to Ubuntu Colliery on 29 January 2019; and
- A Water Use License (WUL) issued by the Department of Water and Sanitation on 22 February 2019 with license number 03/B20E/ABCGIJ/4751.

The Ubuntu Colliery is located on Portions 6, 8, 9, 10, 20, 26, 30 and the Remaining Extent of the Farm Brakfontein 264 IR. The road diversion triggers Listed Activities contemplated under the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) and thus the need for prior Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). This application focuses on the authorisation of the road diversion which is part of the proposed additional infrastructure. The rest of this additional infrastructure was not considered in the original applications requires inclusion into the EMP but does not trigger Listed Activities.

This Draft Environmental Impact Assessment Report (DEIA) has been compiled in support of the NEMA application and will also form the basis for the Final EIA and Environmental Management Programme Report (EIA/EMPr).

Note: *The Ubuntu Colliery holds a Mining Right and EMP (approved for mining). The subject of this report and application is only for the additional infrastructure.*

Project Applicant

The details of the Project Applicant are included in the table below.

Company name:	Universal Coal Development III (Proprietary) Limited (Ubuntu Colliery)
Contact person:	Peter Ntsoane
Physical address:	Universal Coal Energy Holdings South Africa (Pty) Ltd, Head Office 467 Fehrsen Street Brooklyn Pretoria 0181
Telephone:	012 460 0805
Email:	p.ntsoane@universalcoal.com

Project Overview

The activities originally approved for the Ubuntu Colliery did not include any processing infrastructure on site but to transfer the coal to Kangala Colliery for further processing (including crushing, screening and washing). This has subsequently proven to not be a feasible approach and crushing and screening is now taking place in the approved pit area. Further to onsite crushing and screening, the additional infrastructure has been constructed includes a stormwater diversion berm and water and sanitation infrastructure which are not specified Listed Activities in the EIA Regulations, 2014 (as amended). These are all within the Ubuntu Colliery Mining Right area. The diversion of a district road will be undertaken in future.

Purpose of this Report

The purpose of an EIA process is to ensure that the potential environmental and social impacts associated with the construction, operation and closure and rehabilitation phases of a project are identified, assessed and appropriately managed. There are two primary phases of an EIA process, namely the Scoping Phase and the Impact Assessment Phase. Identification of potential impacts occurs during the Scoping Phase, whilst the assessment and mitigation of those impacts occurs during the Impact Assessment Phase. The impact assessment and mitigation management are presented in this EIA and Environmental Management Programme (EIA/EMPr) Report. Various specialist studies were undertaken during the Project evaluation to inform the EIA/EMP; these include:

- Hydrology;
- Hydrogeology;
- Heritage;
- Groundwater;
- Freshwater Ecosystems (Wetland and Aquatic Biodiversity);
- Soils, Land Use and Capability; and
- Public Participation Process.

Environmental Consultants

The contact details for the independent EAP are provided in the table below.

Company name:	Digby Wells Environmental
Contact person:	Ms Njabulo Mzilikazi
Physical address:	Digby Wells House, Turnberry Office Park, 48 Grosvenor Road, Bryanston, 2191, South Africa.
Telephone:	011 789 9495
Fax:	011 069 6801
Email:	njabulo.mzilikazi@digbywells.com

Approach and Methodology for the Public Participation Process

A Public Participation Process was initiated during the Scoping Phase, which is central to the investigation of environmental and social impacts, as it is important that stakeholders who are affected by the project are given an opportunity to identify concerns and to ensure that local knowledge, needs and values are understood and taken into consideration as part of the impact assessment process. The comments from the stakeholders are included in the Comment and Response Report.

The Draft EIA/EMP has been submitted to the public for input and comments for a period of 30 days. The commenting period is from 29 April 2021 and ends on 31 May 2021. The electronic Draft EIA/EMP can be accessed and downloaded from the Digby Wells website www.digbywells.com (Public Documents) and the data-free service portal.

Due to COVID-19 Regulations, no hard copies were made available. Focus Group meetings are planned to be held during this commenting period to present the Draft EIA/EMP and obtain comments from the Interested and Affected Parties (I&APs). The Draft EIA/EMP will be updated with the comments received from the I&APs prior to submission of the Final EIA/EMP to the DMRE for consideration. Once the Department of Mineral Resources and Energy (DMRE) has made a decision, it will be communicated to all the registered I&APs.

Project Alternatives

The alternatives considered include the routing of the proposed diversion of the district road D2546 and the no-go alternative (the option of not proceeding with the Project).

Environmental Impact Summary

The EIA Report, the associated specialist studies and the public participation process were undertaken and completed in line with the legislative requirements discussed in Section 9.2 (Part A) of this report. A quantitative impact rating methodology was applied to determine the significance of the expected impacts pre-mitigation and post-mitigation. Table A provides a summary of the key impacts (of medium, moderate and major significance only) expected

during the various phases of the Project. This report lists and assesses all the potential impacts, together with the associated mitigation measures.

Table A: Summary of the Key Impacts Associated with the Activities

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Rating (Post Mitigation)
Construction	Surface preparation for infrastructure.	Soil, Land Use and Capability	• Compaction of soil and therefore increased surface runoff; • Increased wind, and water erosion on unprotected soils and consequently sedimentation as these soils are highly erodible; • Removal of vegetation and basal cover, increasing the potential loss of topsoil, organic material and decreased soil fertility; • Compaction, ponding, and changes to the natural hydrological functioning of the landscape; • Loss of usable soil as a resource for agriculture – disturbance, low fertility, erosion and compaction; and • Loss of Land Capability and agricultural land due to complete restrictions to cattle grazing (current land use). Reduced area for cattle grazing.	Medium-high (negative)	Minor (negative)
Construction	Construction of surface infrastructure.	Soil, Land Use and Capability	• Soil contamination; • Migration of contaminants into groundwater and contaminate freshwater systems; and • Loss of land use and land capability (agricultural potential).	Medium-high (negative)	Medium-high (negative)
Construction	Construction of surface infrastructure.	Wetlands	• Direct loss of wetland areas; • Habitat loss; • Loss of biodiversity; • Water contamination; and • Erosions and sedimentation of wetland areas.	Major negative	Minor (negative)
Construction	Surface preparation and construction of proposed infrastructure	Aquatics	• Land and vegetation manipulation/clearing for infrastructure in proximity to the watercourses potentially draining into the northern tributary of the Wilge River.	Moderate (negative)	Minor (negative)
Construction	Surface preparation for infrastructure	Heritage	• Direct impact to Heritage Resource H013.	Major (negative)	Moderate (positive)
Operational	Operation and maintenance of infrastructure	Soil, Land use and Capability	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water); • Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.	Medium-high (negative)	Minor (negative)
Operational	Use and maintenance of haul roads (incl. transportation of coal to washing plant).	Soil, Land use and Capability	• Compaction of soil and increased runoff potential; • Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; • Increased erosion, and consequently sedimentation; and • Soil contamination from spills and leakages.	Moderate (negative)	Minor (negative)
Operational	Operation and maintenance of infrastructure	Wetlands	• Water quality contamination and deterioration; • Habitat loss as a result of poor water quality; • Loss of biodiversity; and • Erosion and Sedimentation within the wetlands.	Moderate (negative)	Minor negative
Operational	Use and maintenance of haul roads (incl. transportation of coal to washing plant).	Wetlands	• Erosion of wetland crossings associated with the road diversion; • Accidental spills causing soil and water contamination; • Habitat loss as a result of poor water quality; • Increased Alien Invasive Plants (AIPs);	Moderate (negative)	Minor (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Rating (Post Mitigation)
			• Loss of biodiversity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition.		
Operational	• Establishment of Open Pit, Removal of Material, Stockpiling, Operation of the Plant and Construction of Surface Infrastructure.	Air Quality	• Dust generation and reduction in ambient air quality.	Major (negative)	Negligible (negative)
Decommissioning	Demolition and removal of all infrastructure (incl. transportation off site)	Soil, Land use and Capability	• Soil contamination from decommissioning of infrastructure such as the STP, WTP, depot area, offices and stockpile area; • Loss of usable soil as a resource – Erosion, sedimentation, and Compaction; and • Loss of land capability.	Medium-high (negative)	Negligible (negative)
Decommissioning	Rehabilitation (spreading of soil, revegetation, and profiling/contouring)	Soil, Land use and Capability	• Loss of usable soil as a resource – Erosion and Compaction; and • Loss of land capability; and • Positive impact to the soil, land use and land capability.	Moderate (negative)	Negligible (negative)
Decommissioning	Installation of post-closure water management infrastructure	Soil, Land use and Capability	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water); • Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.	Moderate (negative)	Negligible (negative)
Decommissioning	Demolition and removal of all infrastructure (incl. transportation off site).	Wetlands	• Water quality contamination and deterioration due to an increase in sedimentation; • Habitat loss as a result of poor water quality; • Loss of biodiversity; • Loss of wetland areas; • Soil erosion due to surface runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition.	Moderate (negative)	Minor (negative)
Decommissioning	Rehabilitation of disturbed sites close to pre-mining conditions	Surface Water	• Restoration of pre-mining streamflow regime in nearby watercourses.	Major (positive)	Major (positive)

Conclusions and Recommendations

The Ubuntu Colliery is located on Portions 6, 8, 9, 10, 20, 26, 30 and the Remaining Extent of the Farm Brakfontein 264 IR. This application focuses on the inclusion of additional infrastructure not previously considered in the original applications (i.e. Current EMP). The additional infrastructure is required for the optimisation of mining activities. The road diversion, triggering Listed Activities, is proposed while other ancillary infrastructure has been constructed.

The impact on soil is high because natural soil layers are stripped and stockpiled for later use in rehabilitation. In addition, soil fertility is impacted because stripped soil layers are usually thicker than the defined usable soil layer. The cumulative impacts may therefore have a significant effect on the soil resources and therefore impacting the land use and land capability of the Project Area. The expected impacts from the new infrastructure are of negligible significance.

Existing noise sources such as existing mining activities in the area in combination with the proposed new Project activities would have a significant cumulative impact on the ambient noise levels of the area.

The Project Area is in the Wilge River sub-catchment area, approximately 16 km south west of the town of Delmas in the Mpumalanga Province. Numerous mining operations are currently active near the Project Area where the coal processing is taking place. The alteration of vegetation and surface flow has led to the onset of erosion in the wetland areas, and this may be perpetuated further by mining and related activities within the Project Area. Mining may disturb the hydrological patterns further which could in turn lead to large scale desiccation of wetland areas and the direct loss of some of the wetland areas as a result of water flow being cut off.

An EMP and environmental monitoring programme has been developed which should be executed throughout the life of the mine. This is to ensure that adverse impacts are identified, and ongoing improvements are developed, implemented and monitored throughout the Project lifespan. Based on the assessment of the impacts associated with the Listed Activities, the road diversion and inclusion of the constructed infrastructure into the Environmental Authorisation should be authorised, provided that the mitigation measures proposed herein are strictly implemented.

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Part A: Scope of Assessment and Environmental Impact Assessment Report

1 Introduction

Universal Coal Development III (Pty) Ltd (hereafter Universal Coal) secured a Mining Right (MP30/5/1/1/2/10027 MR) for the formerly known Brakfontein Colliery in 2017. The Environmental Management Plan (EMP) was also approved simultaneously. Subsequently, the Colliery name was amended in January 2019 to reflect the name change of the mine to Ubuntu Colliery. Universal Coal currently holds the following approvals, which are applicable to the Ubuntu Colliery:

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This Draft Environmental Impact Assessment Report (DEIA) has been compiled in support of the NEMA application and will also form the basis for the Final EIA and Environmental Management Programme Report (EIA/EMPr).

Note: *The Ubuntu Colliery holds a Mining Right and EMP (approved for mining). The subject of this report and application is only for the additional infrastructure.*

2 Item 3: Project Applicant

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

Table 2-1: Contact Details of the Applicant

Name of Applicant:	Universal Coal Development III (Proprietary) Limited (Ubuntu Colliery)
Registration number (if any):	2008/009596/07
Trading name (if any):	N/A
Responsible person: ***(E.g. CEO, Director, etc.)***	Environmental Officer

Contact person:	Peter Ntsoane		
Physical address:	Universal Coal Energy Holdings South Africa (Pty) Ltd, Head Office 467 Fehrsen Street Brooklyn Pretoria 0181		
Postal address:	PO Box 2423 Brooklyn Square		
Postal code:	0075	**Cellphone:**	066 479 5698
Telephone:	012 460 0805	**Fax:**	086 263 1365
Email:	p.ntsoane@universalcoal.com		

2.1 Item 3(a)(i): Details of EAP

Digby Wells has been appointed by Universal Coal as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Authorisation Application process, as well as the associated specialist studies and the required Public Participation Process for the proposed project. The details of the EAP are contained in Table 2-2 below.

Table 2-2: Contact Details of the EAP

EAP:	Barbara Wessels
Company:	Digby Wells and Associates (South Africa) (Pty) Ltd
Contact person	Njabulo Mzilikazi
Physical address:	48 Grosvenor Road, Turnberry Office Park, Digby Wells House, Bryan
Telephone:	011 789 9495
Email:	njabulo.mzilikazi@digbywells.com

2.2 Item 3(a)(ii): Expertise of the EAP

This section provides details regarding the EAP's qualifications and experience. The EAP's Curriculum Vitae (CV) and qualifications are attached as Appendix A of this report.

2.2.1 The Qualifications of the EAP

Ms Barbara Wessels holds the following degrees/diplomas:

- BSc Geography and Environmental Management - University of Johannesburg (2005);
- Basic Principles of Ecological Rehabilitation and Mine Closure – North West University (2012); and
- Environmental Management System Internal Lead Auditor (ISO14001:2015) – ISOQAR (2019).

2.2.2 Summary of the EAP's Experience

Ms Wessels completed a BSc (Geography and Environmental Management) degree in 2005 and has been working as an environmental consultant since 2006 with a focus on the mining industry. She has compiled numerous Environmental Impact Assessment and Environmental Management Programme reports and managed the associated multi-disciplinary processes applications governed by the NEMA for both the 2010 and 2014 Regulations thereunder, the MPRDA, and the NWA. Other environmental related projects she has been involved with include fatal flaw assessments, due diligences, audits, closure cost assessments, water use licensing, waste management, aquatic assessments and biomonitoring as well as the compilation of rehabilitation plans.

3 Item 3(b): The Location of the Development Footprint of the Activity on the Approved Site as Contemplated in the Accepted Scoping Report

The Ubuntu Colliery is located within the Western margins of the Witbank Coalfields within the jurisdiction of the Victor Khanye Local Municipality (VKLM) and Nkangala District Municipality (NDM) in the Mpumalanga Province. The site is located approximately 16 km north-east of Delmas town, 14 km and 17 km north of Devon and Leandra, respectively. Table 3-1 provides further details of the Farms affected by the proposed additional infrastructure.

Refer to Table 3-2 for the Land Tenure Map (also attached in Appendix B).

Table 3-1: Property Locality Details

<table>
<tr><td>Farm Name:</td><td><table>
<tr><th>Farm Name</th><th>Farm Portion</th></tr>
<tr><td>Brakfontein 264 IR/RE</td><td>0</td></tr>
<tr><td>Brakfontein 264 IR</td><td>10</td></tr>
</table></td></tr>
<tr><td>Application Area (Ha):</td><td>52.621 ha</td></tr>
<tr><td>Magisterial District:</td><td>Nkangala District Municipality</td></tr>
</table>

Distance and direction from nearest town:	• 16 km north-east of Delmas • 14 km of Devon • and 17 km north of and Leandra
21 digit Surveyor General Code for each farm portion:	i) T0IR00000000026400000 ii) T0IR00000000026400010

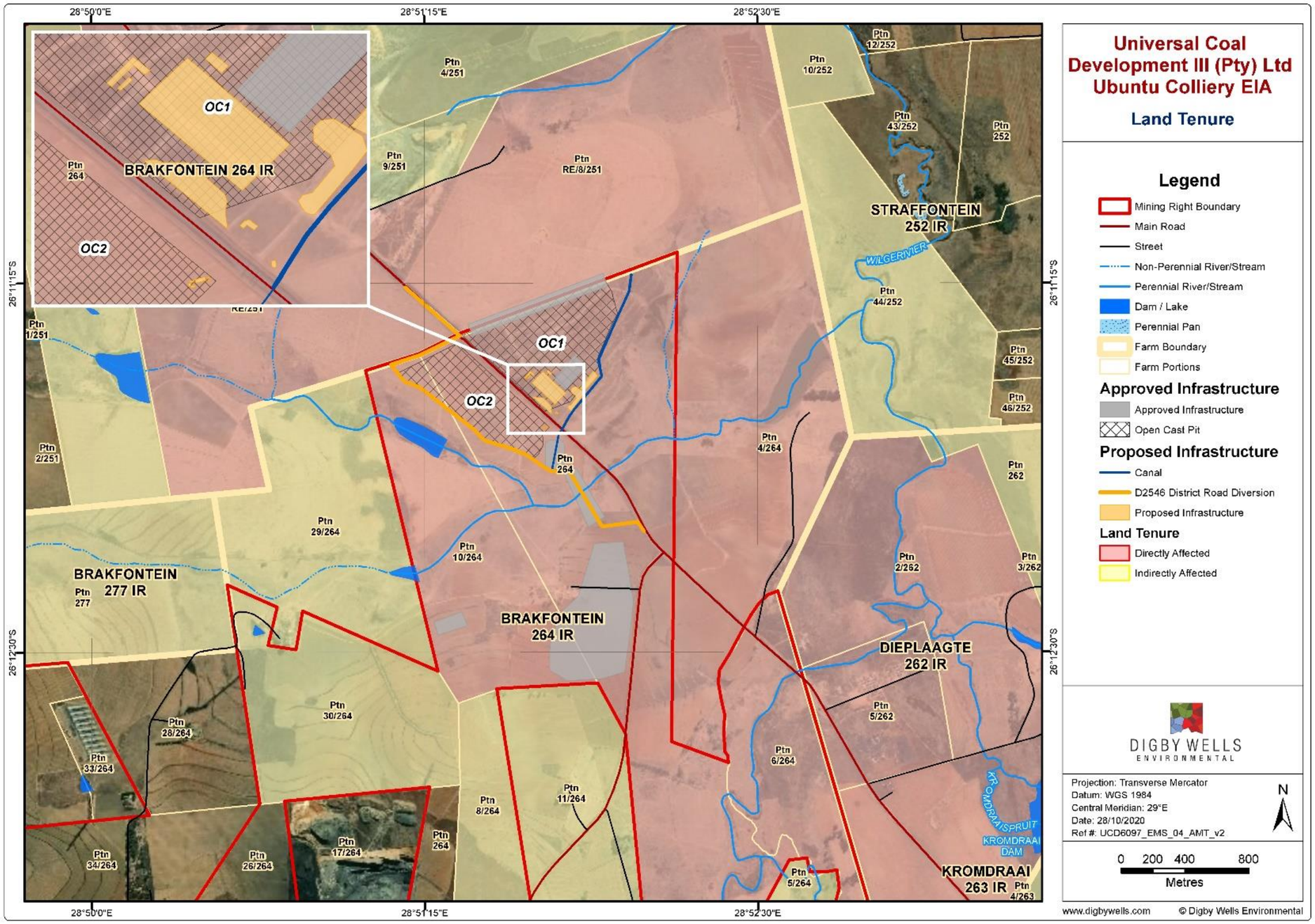


Table 3-2: Land Tenure Map

4 Item 3(c): Locality Map

Table 4-1 illustrates the regional setting of the Ubuntu Colliery Project area. The plan is also attached in Appendix B. The locality map is depicted in Table 4-2.

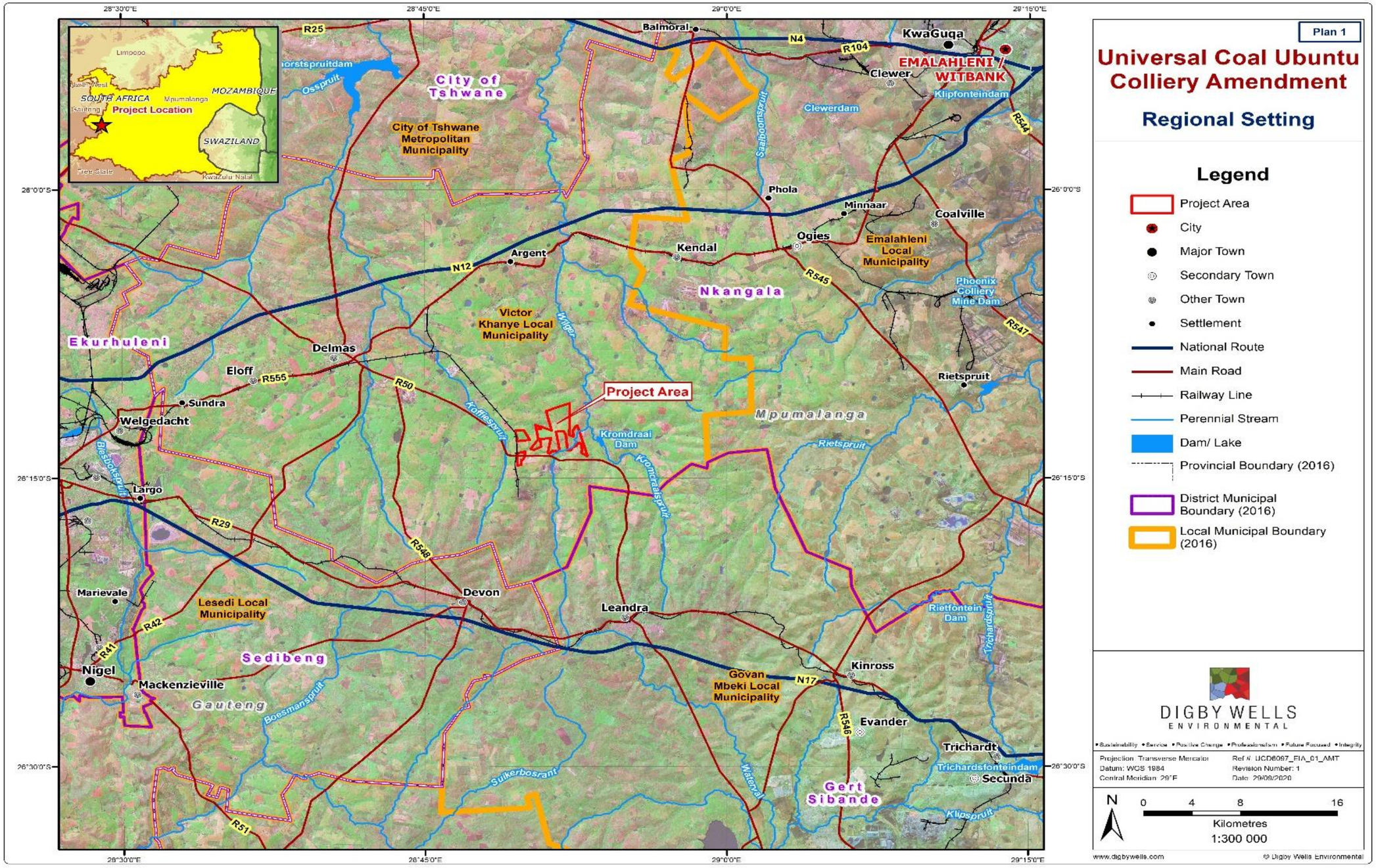


Table 4-1: Regional Setting

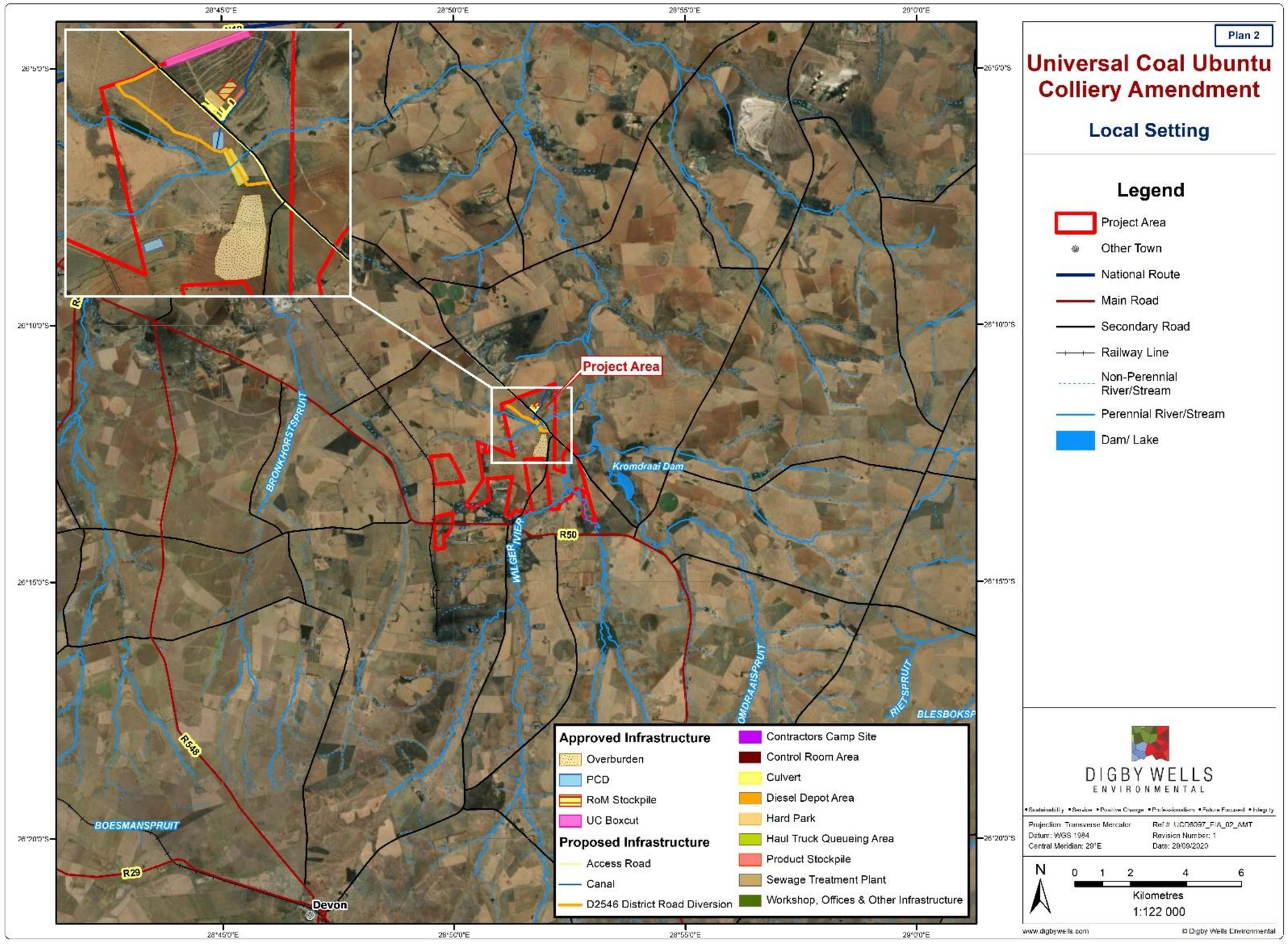


Table 4-2: Locality Map

5 Item 3(d): Description of the Scope of the Proposed Overall Activity

Ubuntu Colliery is an operational mine. The purpose of this application is to authorise the road diversion and include additional infrastructure not covered previously but present within the Mining Right Boundary. As such, the NEMA Listed Activity triggered is for the road diversion only. Section 5.1 provides a summary of the approved infrastructure, while Section 5.2 provides a description of what is required to be authorised in this application process. Section 5.3 provides the project activities, as well as the Listed and Specified activities.

The proposed infrastructure layout plans, as shown in Figure 5-1 are included in Appendix B.

5.1 Approved Infrastructure

The authorised infrastructure (as per the approved EMP) includes the following:

- Parking and offices;
- Weighbridge;
- Run of Mine (RoM) pads;
- Pollution Control Dams (PCDs);
- Opencast mining;
- Culvert;
- Mine equipment workshop and stores; and
- Wash bay facility.

The original approval did not involve any processing infrastructure on site but to transfer the coal to Kangala Colliery for further processing (including crushing, screening and washing). This has subsequently proven to not be a practical solution and crushing, and screening is now taking place in the approved pit area with a mobile crushing and screening plant.

5.2 Additional Infrastructure (The Project)

Further to on-site crushing and screening, the following additional infrastructure is required to be included in the EMP. Based on Digby Wells knowledge, all the below listed infrastructure has been established on site, except for the road diversion:

- Guard house and access control gate
- Control room
- Toilet facilities
- Haulage truck queueing area
- Hard park area
- LDV and main access road
- Heavy duty truck access road
- Storm water diversion berm/trench
- Access control and boom gate
- Topsoil safety berm

- Brake test ramp area
- Diesel depot area
- Product stockpile
- Perimeter fencing
- Crushing facilities and stockpile area
- Diversion of D2546 District road
- Lab office
- Sewage Treatment Plant (STP)
- Contractors camp site
- Water Treatment Plant (WTP)
- 45 000 litre silo tank

The following should be further noted pertaining to the above infrastructure:

- The additional infrastructure, except for the road diversion, has been established and does not trigger NEMA Listed Activities;
- The WTP will treat borehole water sourced from areas in the project footprint. The treated water will be for domestic use. The daily throughput of the WTP will be 12m^3 p/day;
- The temporary office infrastructure as well as the road, will be relocated in 2023 as mining progresses through OC1 (see Figure 5-2);
- OC 2 will be mined from the year 2024; and
- The specific designs for the diversion of district road D2546 will be confirmed. It is proposed to have a reserve of 30 m and length of 2,5 km.

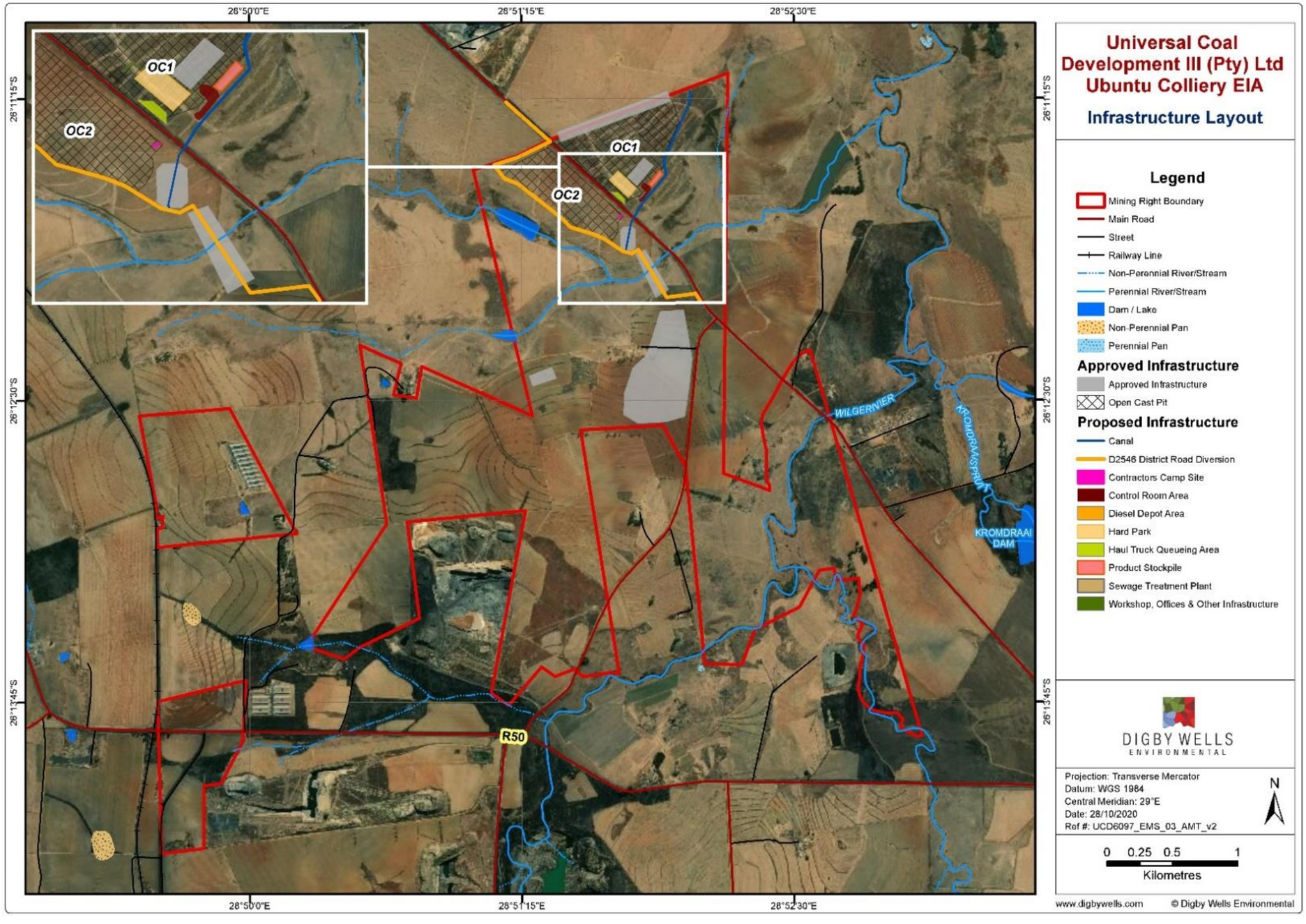


Figure 5-1: Infrastructure Layout Plan

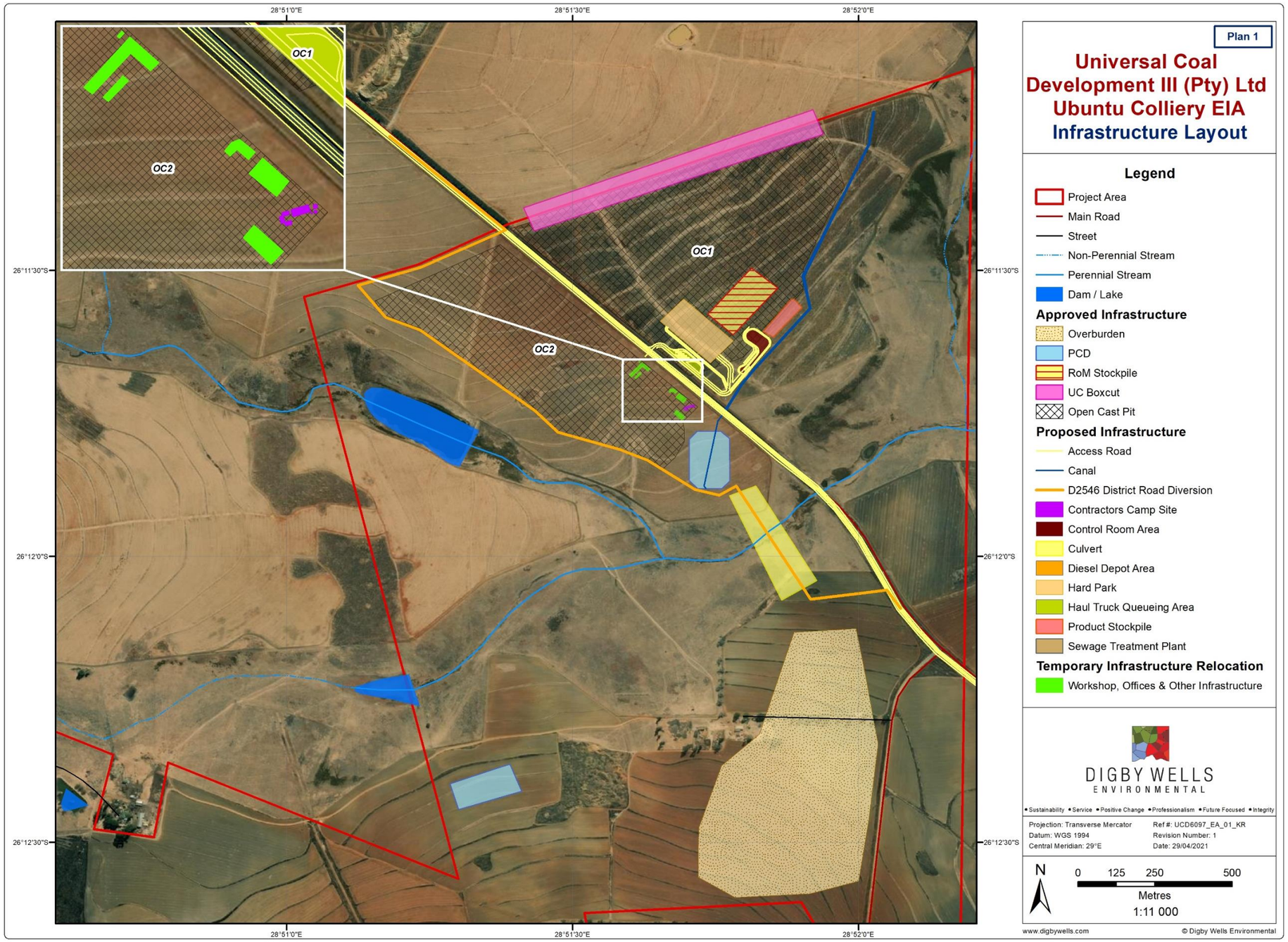


Figure 5-2: Infrastructure Layout from Year 2023

5.3 Item 3(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 NEMA EIA Regulations, 2014 (as amended). Table 5-1 details the Project activities per phase (Construction, Operational and Decommissioning Phases). Table 5-2 provides the identified Listed Activities as provided by the EIA Regulation, 2014 (as amended). As indicated in Table 5-2 below, Regulations GN R.984 will be triggered, and therefore a Scoping and Environmental Impact Reporting (S&EIR) process must be undertaken, and approval received prior to the activities being commended with.

Table 5-1: Proposed Project Activities

Phase	Activity
Construction	Surface preparation for infrastructure
	Construction of surface infrastructure
Operational	Operation and maintenance of infrastructure
	Use and maintenance of haul roads (incl. transportation of coal to washing plant)
Decommissioning	Demolition and removal of all infrastructure (incl. transportation off site)
	Rehabilitation (spreading of soil, re-vegetation and profiling/contouring)
	Installation of post-closure water management infrastructure

Table 5-2: Listed and Specified Activities

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Listing Notice 1				
Sewage treatment plant	35m^3/day	Not listed		-
Establishment of additional infrastructure including guard house and access control gate, LDV and main access road, control room, heavy duty truck access road, toilet facilities, haulage truck queueing area, access control and boom gate, hard park area, topsoil safety berm, brake test ramp area, lab office, diesel depot area, sewage treatment plant, product stockpile, contractors camp site, perimeter fencing, water treatment plant, crushing facilities and product stockpile area, 45 000 litre silo tank	**7.39 ha**	**Not listed**	**-**	**-**
Stormwater diversion berm/trench *The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—* *(i) with an internal diameter of 0,36 metres or more;*	**Diameter of trench is greater than 0.36m.**	**Not listed**	**-**	**-**
Water treatment plant	**50m^2** **Daily throughput: 12m^3**	**Not listed**	**-**	**-**
Listing Notice 2				
Road diversion and access and haul roads *27. The development of a road—* *(i) …….*	Length: 2.5 km Width: 7 m	X – 27 (iii)	GN R 984 under NEMA	-

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
(ii) ……. *(iii) with a reserve wider than 30 metres; or* *(iv) catering for more than one lane of traffic in both directions;* *but excluding a road—* *(a) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010, in which case activity 24 in Listing Notice 1 of 2014 applies;* *(b) which is 1 kilometre or shorter; or* *(c) where the entire road falls within an urban area.*	Road reserve: 32 m			

6 Item 3(e): Policy and Legislative Context

This section aims to provide a description of the policy and legislative context within which the Project is being proposed. This section has been divided into national and provincial legislation and policies, plans, guidelines and development planning frameworks and tools. Table 6-1 provides a description of the national legislation and guidelines that are considered applicable to the Project and its activities.

Table 6-1: Policy and Legislative Context

Applicable legislation and guidelines used to compile the report	Reference where applied
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 undertook 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.
National Environmental Management Act, 1998 (Act No. 107 of 1998) and EIA Regulations, 2014 (as amended) The Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA), as amended 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:	Activities associated with the mine are identified as Listed Activities in the Listing Notices (as amended) and therefore require environmental authorisation prior to being undertaken. The Environmental Authorisation Application was submitted to the DMRE on 6 November 2020.

Applicable legislation and guidelines used to compile the report	Reference where applied
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 Regulation, 2014 was published under GN R 982 on 4 December 2014 (EIA Regulations) and came into operation on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R 983 (Listing Notice No. 1), GN 984 (Listing Notice No. 2) and GN R 985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended. The EIA Regulations have been made applicable to prospecting and mining activities.	This EIA/EMP is be informed by the requirements of the NEMA and Regulations thereunder.
Mineral and Petroleum Resource Development Act. 2002 (Act No. 28 of 2002) (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.	The Applicant is the holder of a Mining Right which was granted in 2017 to mine on the Portions 6, 8, 9, 10, 20, 26, 30 and the Remaining Extent of the Farm Brakfontein 264 IR. The EIA process is undertaken to meet the requirements of the MPRDA read with the EIA Regulations, 2014 (as amended). Financial Provisioning and Closure Costs are included herein, and the report is appended hereto as Appendix L.
National Water Act, 1998 (Act No. 36 of 1998) (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.	A Water Use Licence was granted by the Department of Water and Sanitation (DWS) to Ubuntu Colliery (licence number 03/B20E/ABCGIJ/4751. It is assumed new Water Uses are required to be licenced, however, a Water Use Licence Application will be investigated at a later stage and does not form part of this Project. .

Applicable legislation and guidelines used to compile the report	Reference where applied
GN R 704 was published in June 1999 and aims 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; • 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.	
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 is appended hereto as Appendix H. The Project's activities will set out to abide by the NEM: AQA and standards set out in the NAAQS. The required mitigation measures have been included in this report.
National Dust Control Regulation 2013 The Minister of Water and Environmental Affairs, released on the 01 November 2013 the National Dust Control Regulation, in terms of Section 53, read with Section 32 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA). In the published National Dust	An Air Quality Impact Assessment is appended hereto as Appendix H. The Project's activities will set out to abide by the NEM: AQA and standards set out in the

Applicable legislation and guidelines used to compile the report	Reference where applied
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.	NAAQS. The required mitigation measures have been included in this report.
National Noise Control Regulations, R.154 of 1992 (the Noise Regulations) promulgated in terms of Section 25 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) The National Noise-Control Regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) (NCRs) form part of the Environmental Conservation Act and these Regulations apply to external noise. The NCRs differentiates 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 South African National Standards 10103:2008 (SANS) 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 NCRs must be undertaken for submission to determine the potential disturbing and nuisance noise levels associated with a particular development.	A Noise Impact Assessment has been summarised in this EIA/EMP and the report is appended hereto as Appendix I.
The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is the overarching legislation that protects and regulates the management of heritage resources in South Africa. The Act requires that Heritage Resources Agency's in this case the South African Heritage Resources	For the Scoping Phase, a Notice of Intent to Develop (NID) was submitted to SAHRA. A Heritage Impact Assessment has been undertaken and included as Appendix J.

Applicable legislation and guidelines used to compile the report	Reference where applied
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 GN R 548 (2000).	
GN R 1147 (Financial Provisioning Regulations), 2015 The Financial Provisioning Regulations 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 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. The Closure and Rehabilitation Report is attached as Appendix L and summarised in this EIA/EMP.
GN R 527 (MPRDA Regulations), 2004 Regulation 527 (GN R. 527) specifies that the EMP 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. R527 provides specific principles for mine closure including safety and health, residual and latent environmental impacts etc.	Possible mitigation measures have been provided in Section 11.1 of this report. The EMPr is provided in Part B, Sections 5 and 6 of this report.

7 Item 3(f): Need and Desirability of the Proposed Activities

Ubuntu Colliery is an established coal mine. The road diversion requiring environmental authorisation and the constructed additional infrastructure for inclusion as part of this Application is to optimise the operation, as well as to allow the continuation of mining.

8 Item 3(g): Motivation for the Preferred Development Footprint within the Approved Site as Contemplated in the Accepted Scoping Report

The placement of the majority of the infrastructure was determined by the amount of space remaining within the Mining Right boundary and to reduce the expansion footprint as far as possible to this boundary footprint.

The road diversion alignment has been considered to allow the opencast pit mining to progress across the two pits on either side.

9 Item 3(h): Full Description of the Process Followed to Reach the Proposed Preferred Alternatives within the Site

9.1 Item 3(h)(i): Details of the Development Footprint Alternatives Considered

A project alternative is defined as a possible course of action, in place of another, that would meet the same purpose and need (DEAT, 2004).

In an EIA process, project alternatives serve to determine the most effective way of meeting the objectives of that project. This is generally done through either enhancing the benefits of an activity and/or mitigating the negative impacts and risks of an activity.

Considering the application pertains to the additional infrastructure requirements at an operational mine, the alternatives are limited to the infrastructures being applied for.

9.1.1 Road and Access Routes

A road diversion is required by Universal Coal for the continuation of mining due to the proximity of the approved open pits to the existing district road, known as D2546. The approved mining area includes two open pits, OC1 and OC2, which flank either side of the D2546 route. Due to the proximity of mining and the extent of blasting, this road will need to be realigned before mining can proceed. The final designs of the road alignment shall be undertaken as a separate process however, the layout is presented as a guide that can be used.

There are two options for the road alignment which are shown in Table 9-1. The two options follow the same routing until the starting point of the culvert. Ubuntu Colliery has an approved/licenced culvert which can be utilised in the road realignment, or the routing can avoid a river crossing and join the existing D2546. The latter alternative has been presented

in light of the heritage baseline studies identifying heritage resources in the culvert crossing area.

9.1.2 The No-Go Alternative

The additional infrastructure has been constructed however, the road diversion is yet to be built. Should the road diversion not be approved, the coal resources in the location of the road would not be exploited and the Life of Mine would be reduced. These have economic implications for the Ubuntu Colliery in that less coal can be exploited from the area and less revenue and employment opportunities for the Ubuntu Colliery.

The no-go alternative also implies that all potentially negative environmental impacts associated with the new infrastructure will be avoided.

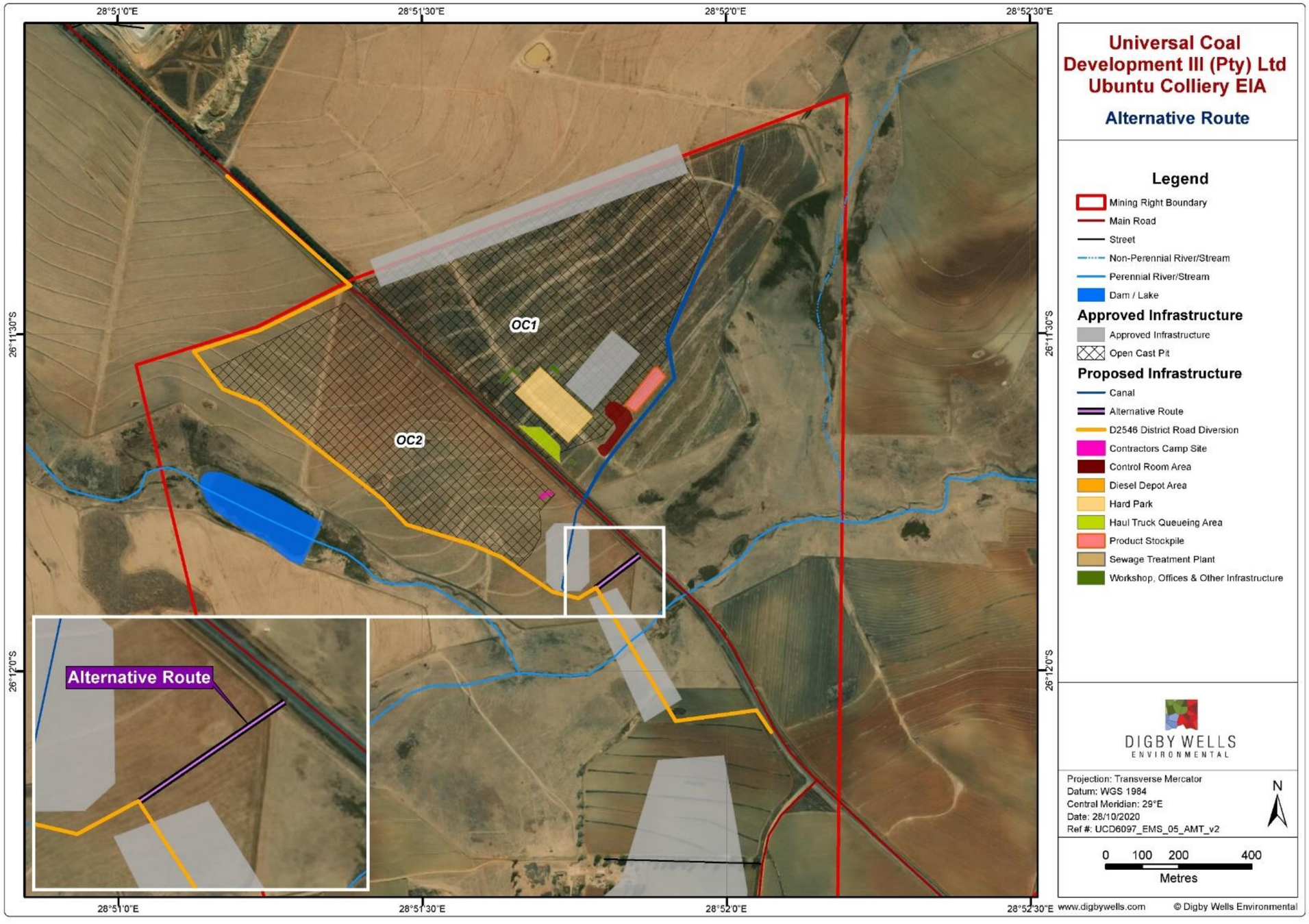


Table 9-1: Road Diversion Alternative Route for D2546

9.2 Item 3(h)(ii): Details of the Public Participation Process Followed

The public participation process was developed to ensure compliance with environmental regulatory requirements and to provide I&APs with an opportunity to evaluate the proposed Project. During this process stakeholders are able to provide inputs and to receive feedback from the environmental specialists and/or proponent.

During the public participation process, the following core activities were undertaken:

- Identification of the stakeholders and creation of database;
- Development and distribution of public participation process material;
- Stakeholder communication and consultation; and
- Recording and responding to suggestions and concerns raised during the public meetings and during the comment period.

9.2.1 Stakeholder Identification

Stakeholders for the proposed project are grouped into the following categories:

- **Government:** National, Provincial, District and Local authorities;
- **Landowners**: Directly affected and surrounding landowners;
- **Land occupiers:** Directly affected and surrounding land occupiers;
- **Communities**: Surrounding communities;
- **Non-Governmental Organisations (NGOs) and Community Based Organisations (CBOs):** Environmental and social organisations;
- **Agriculture**: Associations or organisations focussed on agricultural activities; and
- **Business**: Private business and Small and Medium and Micro Enterprises (SMMEs).

9.2.2 Public Participation Activities

Table 9-2 provides a summary of the PP activities undertaken during the Scoping Phase together with the relevant reference for proof. For a detailed description of the PPP activities undertaken to date, refer to Appendix C.

Table 9-2: Public Participation Activities

Activity	Details	Reference in Report
Identification of stakeholders	Stakeholder database which represent various sectors of society, including directly affected and adjacent landowners, in and around the proposed Project area.	**Appendix C** Stakeholder database

Activity	Details	Reference in Report
Distribution of BID and announcement letter	A BID and notification letter with Registration and Comment Form was emailed to stakeholders on **6 November 2020.**	**Appendix C** Announcement Materials
Placing of newspaper advertisement	An English advertisement was published on **6 November 2020** in the Streeknuus Gemeenskap to announce the project and availability of the Draft Scoping Report.	**Appendix C** Proof of Advertisement
Displaying site notices	English site notices were put up around the proposed project site and other public places within the vicinity of the proposed site on **5 November 2020**.	**Appendix C** Proof of Site Notices
Public Review of the Draft Scoping Report	Announcement of the availability of the DSR was made via email and SMS notifications to stakeholders together with the formal project announcement letter on Friday **6 November 2020.** The DSR was made available on http://view.datafree.co/PublicDocuments/ (under Public Documents). ***Due to the COVID-19 national lock down, the DSR was released electronically via a data free resource.*** *(30-day legislated comment period for the DSR was from **6 November 2020 to 7 December 2020**.)*	**Appendix C** Announcement Materials
Announcement of the Final Scoping Report	Final Scoping Report (FSR) was submitted to the DMRE on 6 January 2021. A notification letter for availability of the FSR was emailed to all stakeholders on the database. The FSR was also made available on http://view.datafree.co/PublicDocuments/ under Public Documents.	
Obtained comments	Comments, issues of concern and suggestions received from stakeholders were captured and responded to in the Comments and Responses Report (CRR). The CRR is appended to this report (refer to Appendix C).	**Appendix C** Comments and Response Report

9.2.3 Consultation with Stakeholders during the EIA Phase

During the Impact Assessment Phase, the following main Public Participation activities will be undertaken:

- Feedback will be provided on the findings of the specialist studies conducted and mitigation measures proposed by means of consultation with I&APs;
- Environmental reports will be made available for public comment; and
- Consultation with I&APs.

Table 9-3 provides more detail regarding the Stakeholder Engagement activities.

Table 9-3: EIA Phase Public Participation Process Activities

Activity	Details
Update of stakeholder database	The stakeholder database was updated.
Announcement of EIA	Stakeholders were contacted through SMS and email on 29 April 2021, announcing the availability of the Draft EIA Report. The Draft EIA Report is being 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/* ***(30-day comment period for the Draft EIA Report: 29 April 2021 to 31 May 2021)***
Stakeholder Meeting	Focus Group Meetings are planned to be held during May 2021. This will, however, be confirmed with stakeholders.

9.3 Item 3(h)(iii): Summary of Issues Raised by I&APs

The CRR has been compiled capturing all stakeholder comments obtained during the Scoping Phase public comment period. The CRR will be updated to include stakeholder comments provided during the EIA Phase. Comments received to date are presented in Table 9-4below.

Table 9-4: Comments and Responses Received During Scoping Phase

Date of Receipt	Method	Contributor	Organization/ Community	Comment	Response
18-Nov-20	Telephone correspondence	Victor	Farm resident (Brakfontein 264 IR Portions 26 and 34)	Indicated that he did not have time for meetings at that moment.	Noted.
18-Nov-20	Telephone correspondence	Koos Uys	Previous Farm owner of Brakfontein 264 IR Portions 9 and 26	Indicated that he would not attend any meetings and expressed that he should not be contacted again.	Noted.
25-Nov-20	Registration and Comment form received by Email correspondence	Frans Venter	Brakfontein Farm 264 IR Portion 4,29 &30	A dam exists downstream that is used for irrigation. What will be the effect on quality and runoff water?	The Surface Water Impact Assessment was undertaken during the EIA Phase and considered the impact on surface water quality and quantity that may be caused as a result of the proposed project. Risks associated with the different phases of the proposed project were identified as part of the impact assessment. The potential risks include soil erosion resulting in siltation and sedimentation of the nearby waterbodies, the flow of contaminated runoff due to hydrocarbon leaks and spillage of hazardous chemicals. Mitigation measures have been proposed to mitigate risks, including the implementation of a stormwater management plan during the EIA Phase. The stormwater management plan to be compiled will ensure that all dirty water and runoff that is generated within the mine is contained as per the government regulations on the stormwater management in mines. Furthermore, ongoing water quality monitoring will be undertaken to assess any potential impacts on water quality as a result of the proposed project. With regards to water quantity, the Scoping Phase surface water assessment estimated approximately less than 0.09% loss of the runoff-contributing catchment area in proportion to the total catchment area. This is not anticipated to result in significant reduction in the water quantity reporting downstream. On this basis, the project is not likely to have significant impacts on the downstream dam.
				Is concerned that farming activities (maize and cattle) will be affected by the mine activities and will be non-profitable.	Universal Coal have obtained ownership of the farm portions on which they will develop the infrastructure. The farm owner, Frans Venter has been compensated for the land. Additionally, farming activities will be allowed to continue on portions that will not have commenced with the establishment of the infrastructure until such a time that the construction begins. After which these need to cease.
				Indicated that there are environmental, social and heritage features located on farm Brakfontein, Portion 10 and 0	The Heritage Baseline Assessment investigated the Project Area for heritage resources and found a burial ground on Portion 4 of Brakfontein Farm 264. The additional infrastructure proposed as part of this project will not affect Portions 10 and 0. A Heritage Impact Assessment was undertaken as part of the EIA Phase (see Appendix J).
				Blasting must also be controlled and managed appropriately	Blasting will be undertaken as per the Mine Health and Safety Regulations GN R93 of 15 January 1997 promulgated under Section 98 of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996).

<table>
<tr><th>Date of Receipt</th><th>Method</th><th>Contributor</th><th>Organization/ Community</th><th>Comment</th><th>Response</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Requests clarity and more information on the road diversion of D2546 road.</td><td>The road diversion designs are undertaken as a process separate to the EIA. The purpose of this EIA is to environmentally authorise the road, however, the final designs require approval from the South African National Roads Agency Limited (SANRAL). The existing road will be decommissioned for the portion where it goes through the mining area and diverted around the pit to allow traffic to flow around the mine.</td></tr>
<tr><td rowspan="3">04-Dec-20</td><td rowspan="3">Telephone correspondence</td><td rowspan="3">Ward 7 Councillor Sikhukhune</td><td rowspan="3">Victor Khanye Local Municipality</td><td colspan="2">Digby Wells contacted the Local Municipality to request information pertaining to contact details of the relevant Ward Councillor to inform them of the project and to further assist in setting up meetings with the community. Digby Wells was informed that Councillor Sikhukhune is the relevant councillor and thus informed and engaged with him regarding the project. All information material was sent by email correspondence. The Ward Councillor verbally agreed to arrange a meeting with the affected community of which Digby Wells would also attend.

However, the Ward Councillor invited the Savannah community (which is not directly affected by the proposed project) to the focus group meeting on 4 December 2020. The name change of the Mine Colliery (from Brakfontein Colliery to Ubuntu Colliery) caused the misunderstanding of which invitations were already sent to Savannah community. The meeting with the Savannah community was cancelled the same day (4 December 2020).</td></tr>
<tr><td>Attempts by the Ward Councillor to invite the affected community, namely Brakfontein community to a focus group meeting on 5 December were made and were unsuccessful as the Community did not recognise the Ward Councillor.
The Ward Councillor then informed Digby Wells that it would not be safe for them to attend the meeting and thus it was cancelled. The Ward Councillor was of the opinion that the environment was not safe and thus requested postponement of the meeting.</td><td rowspan="2">Comment noted. Digby Wells will undertake further public consultations with the relevant communities to obtain their inputs during the EIA phase and will update the CRR accordingly. All public consultations will be arranged via the mine social team in order to align all communication channels between the Mine and the affected communities.</td></tr>
<tr><td>It should be noted that some of the members from the Brakfontein community who were consulted by the Ward Councillor expressed concern and thus were reluctant to speak to the Ward Councillor as they believed he was not representing the interest of the affected community and thus no meeting was held to date.</td></tr>
</table>

10 Item 3(i): The Environmental Attributes associated with the Development Footprint Alternatives

This section provides a summary of the baseline environment affected by the proposed project activities, type of current land uses, environmental features, and current land use, based on the infield observations and assessments undertaken by the relevant specialists.

A number of specialist studies were undertaken as part of the environmental regulatory process during the EIA phase for the proposed Project, as shown in Table 10-1 below.

Table 10-1: Specialist Reports and Associated Appendices

Specialist Study	Appendix
Soil, Land Use and Land Capability Assessment	Appendix D
Surface Water Assessment	Appendix E
Groundwater Assessment	Appendix F
Wetland and Aquatics Assessment	Appendix G
Air Quality Assessment	Appendix H
Noise Assessment	Appendix I
Heritage Assessment	Appendix J
Traffic and Transport Assessment	Appendix K
Rehabilitation and Closure Assessment	Appendix L

The subsection below provides the baseline bio-physical and socio-economic environmental conditions currently present on the Project site. The information provided in this section has been obtained from the abovementioned specialist reports.

10.1 Regional Climate and Rainfall

The Project Area is characterized by a climate that is typical of that of the Mpumalanga climatic zone characterized by warm, rainy summers and dry winters with sharp frost (South African Weather Bureau, 1986). Delmas, which is approximately 16 km away from the proposed Project Area, is generally warm and temperate with an average annual temperature of approximately 15.7°C (Climate-data.org). The climate here is classified as Subtropical highland (Cwb) by the Köppen-Geiger system (Köppen & Geiger, 1936). The mean annual rainfall is approximately 688 mm with the bulk of precipitation being experienced as showers and thunderstorms which fall mainly from October to March. Maximum rain falls occur in November, December and January. Rainstorms are often intense (up to 242 mm can occur in

one day) with severe lightning and strong winds, sometimes accompanied by hail. Annual average maximum, minimum and mean temperatures for the Project Area are shown in Figure 10-1.

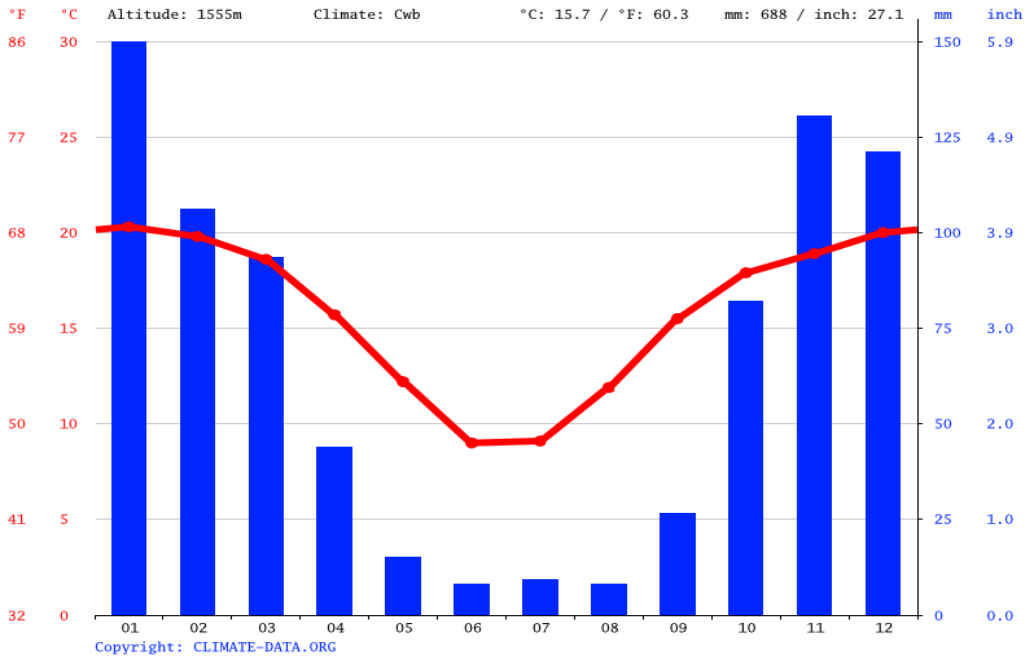


Figure 10-1: Annual Climate Trends in Delmas (Source: Climate-data.org)

10.2 Topography and Slope

The topography of the Mining Right boundary, as depicted in , ranges from high elevations on the western side of the Project Area to low lying areas in the north, east and south. The area can be described as very uneven slopes with moderate to high undulating grasslands and small depressions scattered throughout the landscape. The elevation of the Project Area ranges from 1 540 to 1 580 metres above mean sea level (m.a.m.s.l.) which equates to a range of 40 m between the lowest and highest points of elevation within the Project Area. The difference in elevation between these points gives rise to a slope percentage of between 0 and 5.5 (at isolated steeper areas). The average slope percentage for the entire Project Area is approximately 2.5 (Figure 10-3).

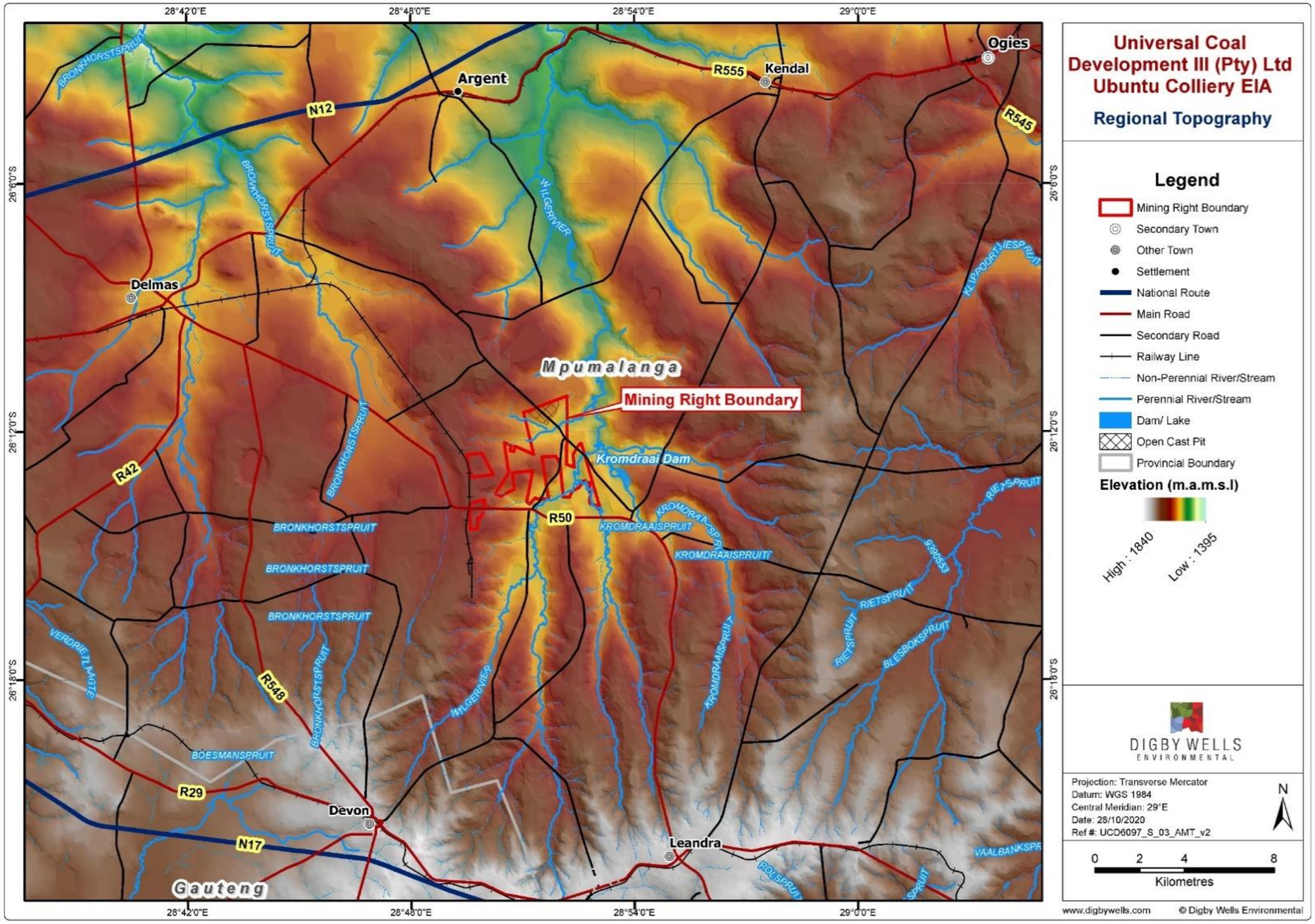


Figure 10-2: Topographical Map of the Project Area

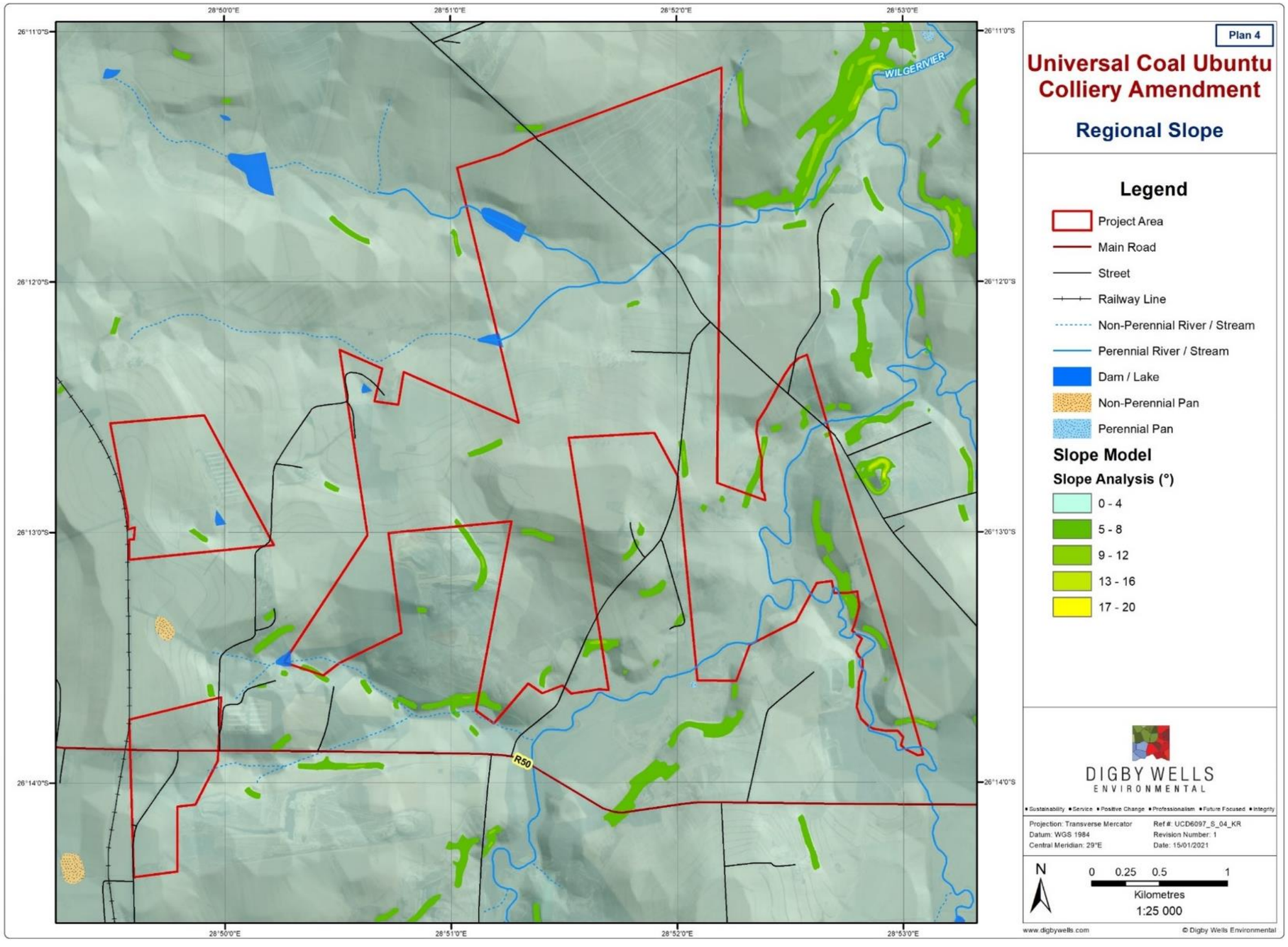


Figure 10-3: Slope of Ubuntu Colliery

10.3 Geology

The MR area is located on the western extent of the Witbank Coalfield, located within the Ecca Group of the Karoo Supergroup.

The Pre-Karoo geology underlying the Witbank Coalfield comprises of the Transvaal Supergroup lithologies and Rooiberg Group felsite. Within the Project Area, dolomite of the Malmani Subgroup (Transvaal Supergroup) was intersected below the Karoo Supergroup sequence. The Malmani Subgroup carbonate sequence developed under a tidal range of paleo-environments ranging from supra-tidal through intertidal to sub-tidal which results in a variety in chert content, intercalated shales and erosional surfaces (Johnson et al, 2006).

The coal containing Vryheid Formation was deposited directly on the uneven pre-Karoo and Dwyka Group lithologies resulting in variations in thickness of the deposit and pinching out of the formation against paleo-highs. The Dwyka Group sedimentary rocks were deposited in glacial environments and comprise predominantly of tillite. The Vryheid Formation was deposited during deltaic to fluvial events with general upward coarsening cycles comprising of shales, siltstones and sandstones. Northern sequences of the Vryheid Formation contain very coarse-grained sandstone deposited by fluvial events. Coal swamps formed in sheltered environments created by the pre-Karoo topography and glacial deposits (Johnson et al, 2006).

The Karoo Supergroup contains extensive dolerite intrusions, which represent the shallow feeder system for the flood basalt eruptions and occur as interconnected networks of dykes and sills (Duncan and Marsh, 2006). These intrusions are important geological structures for diverting and impeding groundwater flow. Sediments in contact with the intrusions become altered by contact metamorphism and are significant for their water bearing properties. A surface geology map is shown as Figure 10-4.

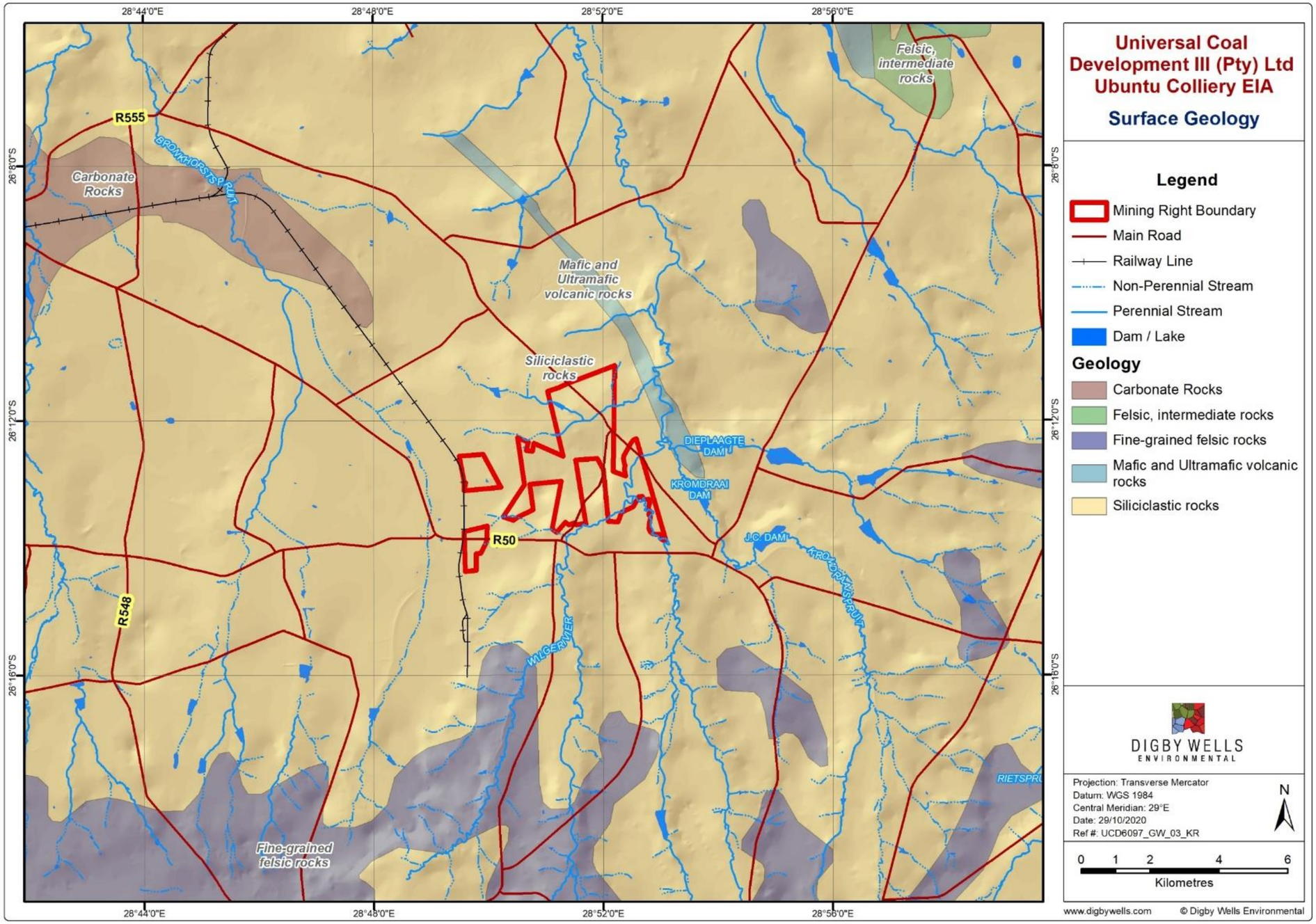


Figure 10-4: Surface Geology

10.4 Regional Vegetation

The MR area falls within the Eastern Highveld Grassland type (Mucina & Rutherford, 2012). The Grassland Biome (Mucina & Rutherford, 2012) is one of the nine South African plant Biomes and the second most bio-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. This biome is rich in flora and fauna diversity but is under threat due to rapid urbanisation and 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 (Mucina & Rutherford, 2012). The Eastern Highveld Grassland is considered "Endangered" on the National List of Threatened Terrestrial Ecosystems (Mucina & Rutherford, 2012), with only a small fraction being conserved in state owned and private reserves. The vegetation of the landscape is short, dense grassland dominated by the usual highveld grass composition (*Aristida, Digitaria, Eragrostis, Themeda, Tristachya* etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Senegalia caffra, Celtis africana, Diospyros lycioides subsp lycioides, Parinari capensis, Protea caffra, P. welwitschii and Searsia magalismontanum*) (Mucina & Rutherford, 2012). Plant species found within the Eastern Highveld Grassland are presented in Table 10-2.

Table 10-2: Plant Species Characteristic of the Eastern Highveld Grasslands

Plant Form	Species
Graminoids	*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.*
Geophytic herbs	*Gladiolus crassifolius, Haemanthus humilis subsp. hirsutus, Hypoxis rigidula* var. *pilosissima, Ledebouria ovatifolia.*
Succulent Herbs	*Aloe ecklonis.*

Plant Form	Species
Low Shrubs	*Anthospermum rigidum* subsp. *pumilum, Seriphium plumosum.*

10.5 Soils, Land Use and Land Capability

The Soil, Land Use and Land Capability Assessment undertaken during the EIA Phase is appended to this report as Appendix D. The subsections below provide a summary of the baseline findings.

10.5.1 Land Type

Existing Land Type and soil data was used to obtain generalised soil patterns and terrain types for the Project Area. Land Type data exists in the form of published 1:250 000 maps. These maps indicate delineated areas of similar climate and pedo-systems, which include areas of uniform terrain and soil patterns (Land Type Survey Staff, 1972 – 2006).

The land type data gathered suggested that the land types for the Project area are predominantly of the Ab9 type and Bb3 type (Figure 10-5). The dominant land types and soil forms as per the Land Type Survey Staff, (1972 – 2006) within the Project Area are briefly described in Table 10-3, and illustrated in Figure 10-5 below.

Table 10-3: Land Type and Dominant Soil Forms

Land Type	Soil Forms	Geology	Characteristics
Ab9	• Cartref • Clovelly • Dundee • Fernwood • Glenrosa • Hutton • Inanda • Katspruit • Kranskop • Magwa • Mispah • Nomanci • Oakleaf	• Sandstone of the Natal Group, with isolated occurrences of dolerite.	• According to the Land Type Data (1972 - 2006), 85% of the landscape is dominated by crest and mid slope landscape positions; • 65% of the dominant soils occurring in these landscape positions are deep red well drained red and yellow soils occurring in these upper landscape positions; • The soils are predominantly sandy and are apedal (non-structured) in both the A and B horizons; • Rooting depth can be limited by a clay layer underneath the yellow soils or parent rock occurring below the B soil horizon; • The A horizon is likely to contain 12-20% clay due to the influence of the dominant sandstone parent material; • The texture represents a sandy loamy textured soil; • Foot slope and valley bottom positions occupy only 15% of the landscape; • Soils present in these landscape positions are dominated by high clay content soils; and • The clay content in the A horizon can be in the order of 50-70%.

Land Type	Soil Forms	Geology	Characteristics
Bb3	• Arcadia • Avalon • Estcourt • Hutton • Glencoe • Katspruit • Kroonstad • Mispah • Longlands • Rensburg • Swartland • Valsrivier • Westleigh • Willowbrook	• Shale, sandstone, clay, conglomerate, limestone and marl of the Ecca Group; • Shale and tillite of the Dwyka Formation; • Karoo Sequence; • Dolerite; • Occasional Ventersdorp lava, Witwatersrand quartzite and slate; and • Dolomite	• Similar to Land Type Ab9, 90% of this land type consists of crest and mid slope landscape positions; • The dominant soils present in crest and mid slope positions are red and to a lesser extent yellow well drained soils; • The influence of parent rock (sandstone parent material) influenced the formation of very sandy non structured (apedal) soil; • The clay content in the A horizon is in the order of 8 – 12%. Soil texture is expected to represent a sandy loam soil; • Smaller areas in the foot slope and valley bottom positions of both the land types present in the Ubuntu Colliery Project Area might contain waterlogged high clay content soils; • These soils owing to their position in the landscape are seasonally or permanently wet; • Where lateral drainage is forced by slope steepness and the presence of underlying impermeable layers on these landscape positions, soils containing an E horizon (evidence of lateral drainage) can occur; and • The occurrence of the G and E subsoil horizons in this landscape, prove that seasonally wet conditions prevail.

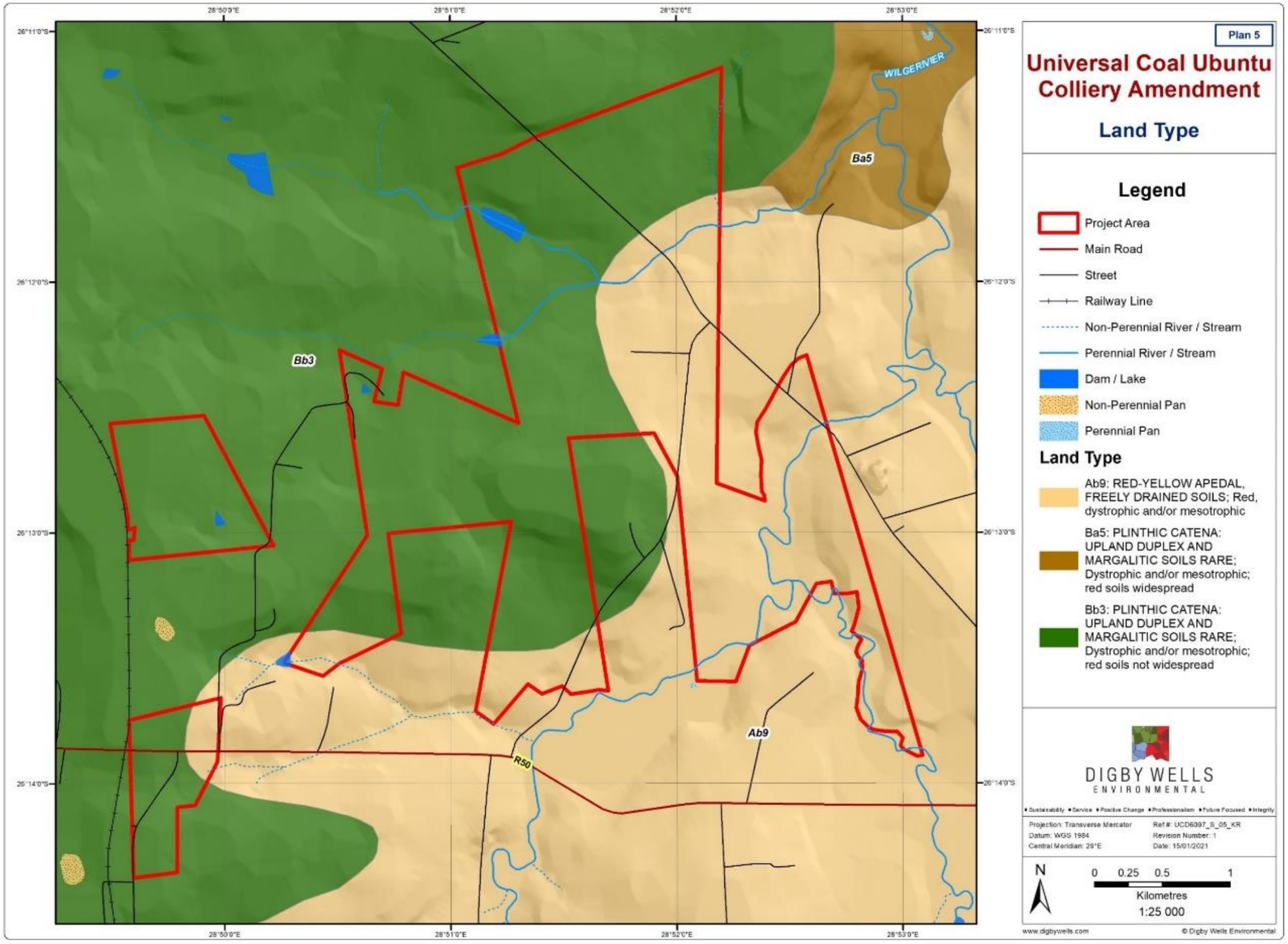


Figure 10-5: Land Types of Ubuntu Colliery

10.5.2 Soil Forms

The soil forms within the Ubuntu Project Area are described in the subsections below. Avalon, Pinedene, Clovelly, Glencoe, and Hutton soil forms dominate the Project Area.

10.5.2.1 Avalon

Avalon soils are free draining and chemically active. Manganese and iron oxides accumulate under conditions of a fluctuating water table forming localised mottles or soft iron concretions of the soft plinthic B horizon. The Avalon soils within the Project Area are associated with wetlands and are dominant in the low-lying areas and valley bottoms.

10.5.2.2 Pinedene

These soils are generally fairly deep (70 – 120 centimetre (cm)) and have a loamy-sand texture with up to 8% clay content. The soils are yellow-brown with minor drainage limitations in the upper horizons, however, usually contains very high clayey underlying material, limiting free drainage. Due to these high clay sub-horizons, drainage is limited causing waterlogging and potential for wetland formation. These soils are associated with wetlands within the Project Area.

10.5.2.3 Clovelly

Clovelly soil forms are frequently confused with Hutton soil forms as they share the same characteristics. Clovelly soil forms have a Yellow-brown Apedal B-horizon, whereas Hutton soil has a Red-apedal B-horizon. Both these soil forms have deep, sandy, well-drained characteristics. Yellow-brown Apedal B-horizons are formed from leached Red Apedal B-horizons. Yellow- Brown Apedal B-horizons are thus usually in lower-lying areas, more wet, has higher drainage than that of the red soils and are poorer in nutrients.

10.5.2.4 Glencoe

Glencoe soil forms within the Project Area were predominantly shallow and had a restricting layer in some areas at 600 mm. These soils comprise of a Yellow-brown Apedal B-horizon overlying a Hard Plinthic layer containing an accumulation of iron-, and manganese oxides. These soils together with its high clay content and restricted rooting depth prevent free drainage and lower the agricultural potential of the soils.

10.5.2.5 Hutton

Hutton soil forms are usually deep, uniformly red, sandy (apedal) soils that are well-drained, and has low organic carbon content, and cation exchange capacity (CEC) due to the low clay content. These soils developed from basic parent material (example basalt), and are in an advanced state of weathering, and leaching is indicative.

10.5.3 Land Capability

The land capability is determined by assessing the combination of soil, terrain and climate features. The dominant land capability class in the Project Area was Class II (Arable Land – Intensive Cultivation). A detailed breakdown is given below in Table 10-4.

Table 10-4: Land Capability Classification of Dalyshope Mine Area

Land Capability Class	Description	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.

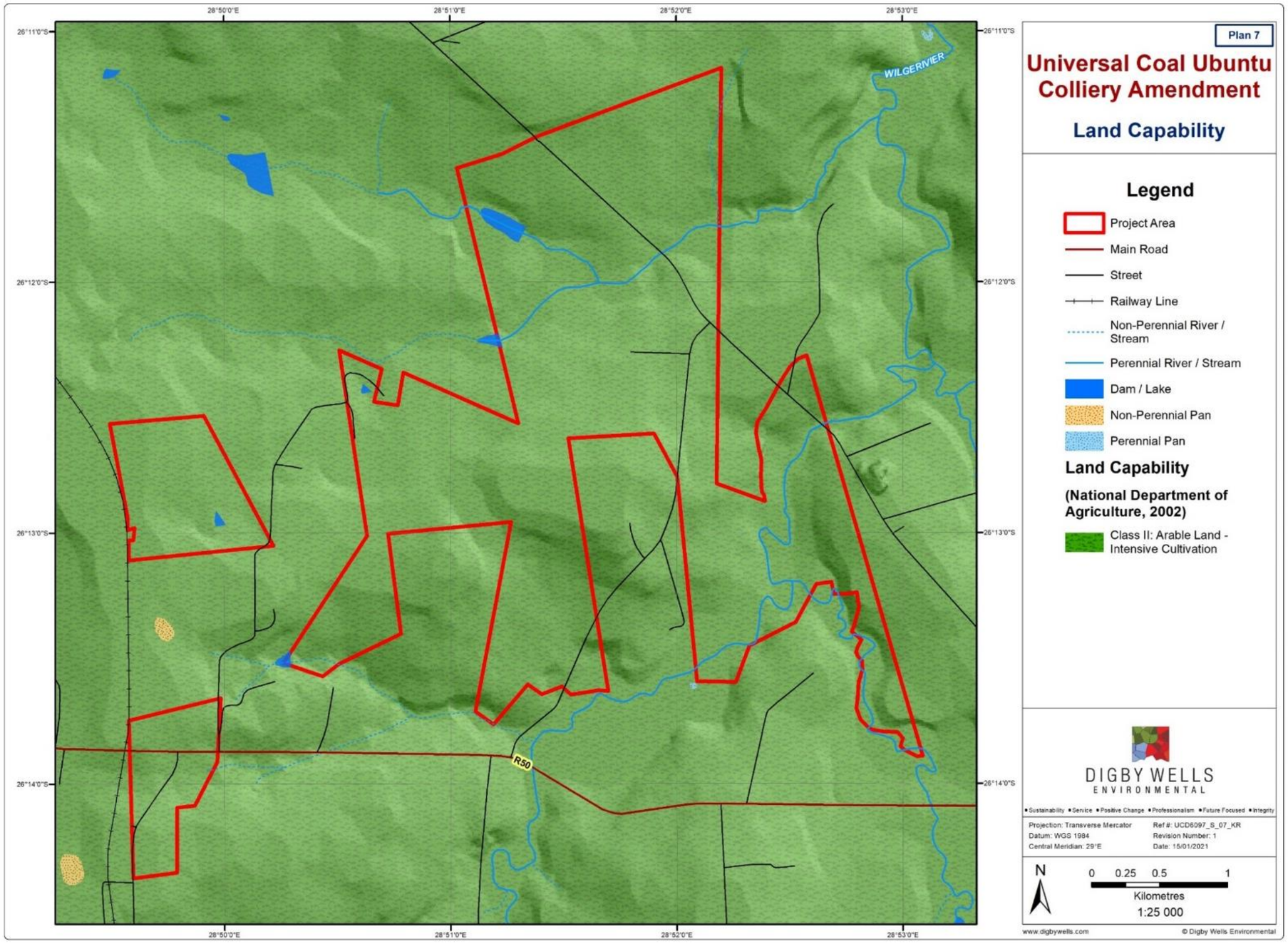


Figure 10-6: Land Capability of Ubuntu Colliery

10.5.4 Land Use

The current land use of the Ubuntu Colliery Project Area was identified by aerial imagery during the desktop assessment and was verified during an on-site inspection. The land use was described as cultivation, grassland, forest land, waterbodies, and wetlands.

The predominant present land use in the Ubuntu Colliery Project Area is arable crop production due to the presence of large areas being occupied by high potential soil. Current land use is estimated at 81% of the available land being used for arable farming. The leftover 19% of the total available farmland is un-used due to shallow soils and wetland areas. The area is well serviced by tar roads as well as farm roads.

Land use photos presented in Figure 10-7below indicate the following:

A – Cultivated land and dirt roads;

B – Cultivated land and large stands of Alien Invasive Plants (AIPs);

C – Wetlands; and

D – Cattle grazing and adjacent mining activities.

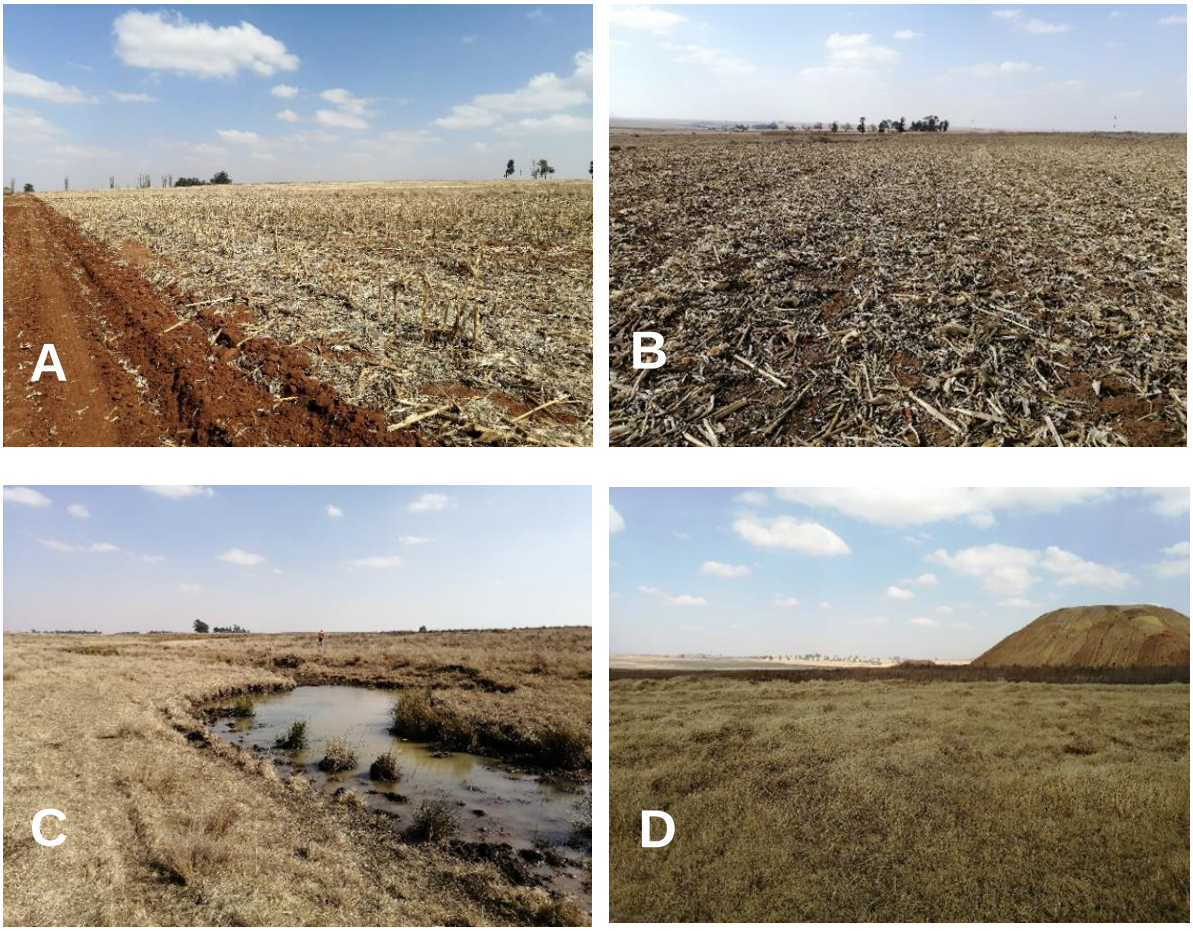


Figure 10-7: Land Use (Field survey photos)

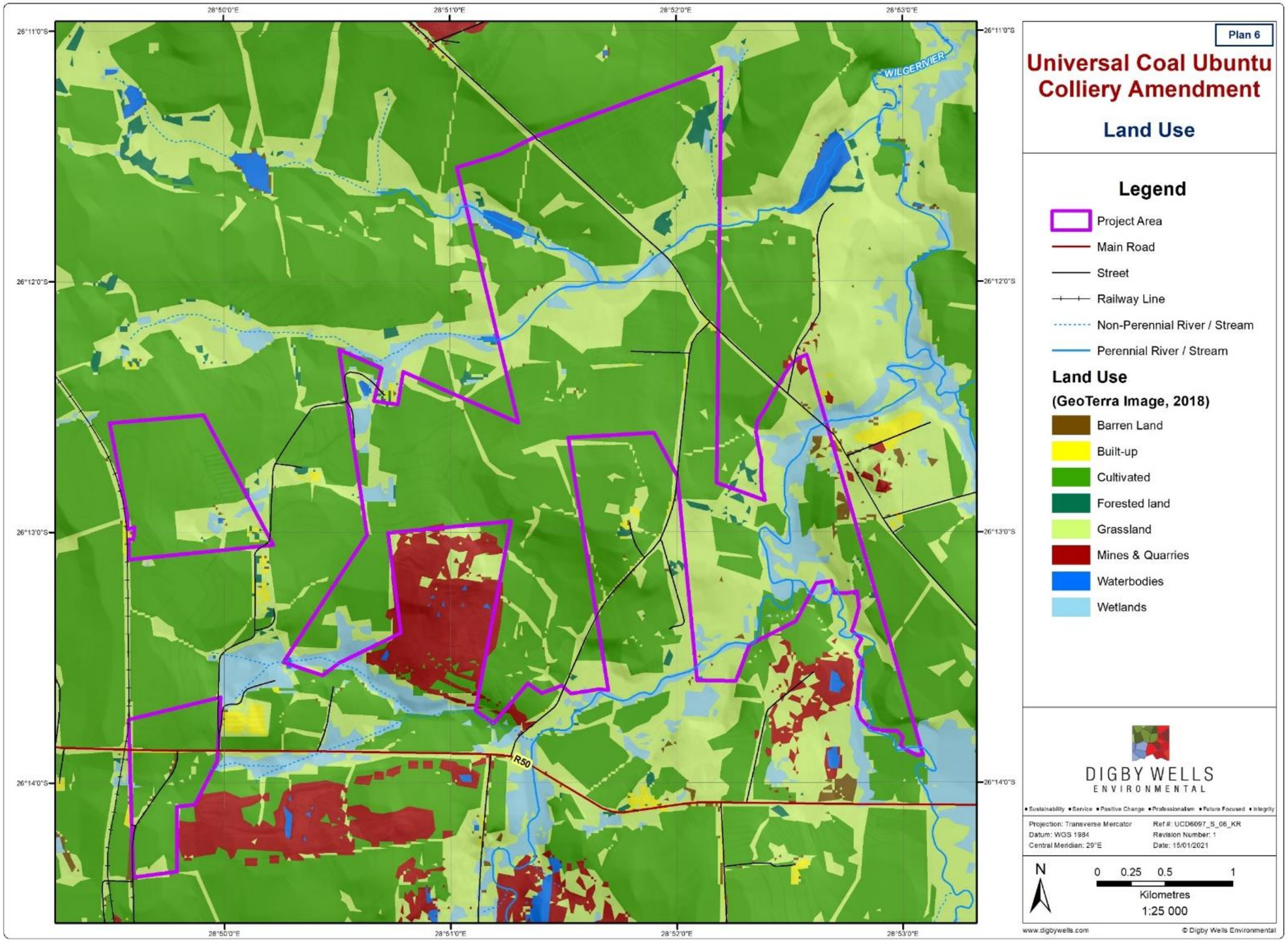


Figure 10-8: Land Use Map of Ubuntu Colliery

10.5.5 Soil Chemical and Physical Characteristics

The results of the soil analysis for six representative samples taken during the July 2020 survey are presented in Table 10-6. Previous soil results from the Soil Assessment completed by Digby Wells in 2012 are also included in the table for comparison (Digby Wells Environmental, 2012a). As a basis for interpreting the data, Soil Screening Values (SSV) and local soil fertility guidelines are presented in Table 10-5, together with the pH guidelines

Table 10-5: Soil Fertility Guidelines

Guidelines (mg per kg)			**Source**
Macro Nutrient	**Low**	**High**	
Aluminium (Al)	<10	>50	Australian Guidelines, (Department of Agriculture and Rural Affairs, 1986)
Boron (B)	<0.5	>1.5	USA Guidelines, (Allison, et al., 1954)
Calcium (Ca)	<200	>3000	South Africa Guidelines, (NEM:WA 2008)
Chlorides (Cl)	-	>12000	South Africa Guidelines, (NEM:WA 2008)
Copper (Cu)	<36.0	>190	Dutch Guidelines, (Dutch VROM, 2000)
Magnesium (Mg)	<50	>300	South Africa Guidelines, (NEM:WA 2008)
Manganese (Mn)	-	>740	South Africa Guidelines, (NEM:WA 2008)
Molybdenum (Mo)	<3.0	>200	Dutch Guidelines, (Dutch VROM, 2000)
Nickel (Ni)	-	>45	Canadian Guidelines, (CCME, 2007)
Organic Carbon (OC)	< 2 %	>3 %	South Africa Guidelines, (du Preez, Mnkeni, & van Huyssteen, 2010)
Phosphorus (P)	<5	>35	South Africa Guidelines, (NEM:WA 2008)
Potassium (K)	<40	>250	South Africa Guidelines, (NEM:WA 2008)
Sodium (Na)	<50	>200	South Africa Guidelines, (NEM:WA 2008)
Zinc (Zn)	<140	>720	Dutch Guidelines, (Dutch VROM, 2000)
Cation Exchange Capacity (CEC)	5%	25%	Australian Guidelines, (Department of Agriculture and Rural Affairs, 1986)

pH					
Very Acid	**Acid**	**Slightly Acid**	**Neutral**	**Slightly Alkaline**	**Alkaline**
<4	4.1-5.9	6-6.7	6.8-7.2	7.3-8	>8

Table 10-6: Soil Physio-Chemical Properties

Sample ID	pH (H_2O)	Organic Carbon	CEC	P (Bray1 2012; Bray 2 2020)	K	Na	Ca	Mg	S	B	Mn	Fe	Cu	Cl	Al	Mo	Zn	Ni DTPA	Sand	Silt	Clay
		%	$Cmol_c/kg$	mg/kg															%		
2012 Results																					
1 TOP	6.7	0.85	8.3	21.1	97	0.64	140	40	-	-	-	-	-	-	-	-	-	-	74	6	20
2 SUB	7			6.2	52	12.4	165	64	-	-	-	-	-	-	-	-	-	-			
3 TOP	7.22	0.51	3.98	11.3	82	0.61	219	35	-	-	-	-	-	-	-	-	-	-	80	4	16
4 SUB	6.49			5.6	46	0.33	63	28	-	-	-	-	-	-	-	-	-	-			
5 TOP	6.03	0.84	4.97	6.7	122	0.38	89	24	-	-	-	-	-	-	-	-	-	-	72	4	24
6 SUB	6.39			2.3	55	0.34	105	28	-	-	-	-	-	-	-	-	-	-			
7 TOP	5.9	1.6	9.32	3.6	310	0.42	168	47	-	-	-	-	-	-	-	-	-	-	58	8	34
8 SUB	6.68			2.1	91	0.33	161	75	-	-	-	-	-	-	-	-	-	-			
9 TOP	5.53	0.85	4.43	18.3	90	0.21	77	13	-	-	-	-	-	-	-	-	-	-	70	6	24
10 SUB	5.88			3.2	32	0.16	75	12	-	-	-	-	-	-	-	-	-	-			
11 TOP	6.3	2.46	27.96	4.7	446	83.2	714	490	-	-	-	-	-	-	-	-	-	-	42	16	42
12 SUB	6.88			3.2	256	172.5	980	682	-	-	-	-	-	-	-	-	-	-			
13 TOP	6.4	1.74	10.26	14.3	406	26.9	349	116	-	-	-	-	-	-	-	-	-	-	56	10	34
14 SUB	6.64			4.8	167	15.4	191	63	-	-	-	-	-	-	-	-	-	-			
15 TOP	6.47	0.59	5.58	6.9	69	0.69	98	40	-	-	-	-	-	-	-	-	-	-	76	4	20
16 SUB	6.93			4.1	56	0.11	198	73	-	-	-	-	-	-	-	-	-	-			
17 TOP	6.41	0.88	7.53	5.5	60	11.7	145	71	-	-	-	-	-	-	-	-	-	-	58	10	32
17 SUB	6.2			3.2	33	0.42	100	39	-	-	-	-	-	-	-	-	-	-			
2020 Results																					
S1	5.34	0.29	3.14	2	15	33	313	209	5.74	0.21	4.77	236.93	4.81	25.6	565	28.24	0.59	0.47	73	12	15
S2	6.25	0.64	4.27	17	174	13	1 153	253	9.3	0.44	183.93	41.04	6.46	13.6	809	132.66	4.47	0.36	59	14	27
S3	5.46	0.46	3.59	23	151	12	511	120	5.74	0.25	39.45	54.48	1.65	14.69	430	80.07	3.22	0.34	69	12	19
S4	5.92	0.38	3.32	70	305	11	624	142	9.78	0.33	67.96	98.67	2.19	14.49	498	106.67	13.75	0.26	76	11	13
S5	5.67	0.45	4.29	23	141	11	603	142	6.61	0.26	40.67	34.27	2.07	8.14	495	79.13	3.17	0.33	66	13	21
S6	-	0.58	4.68	4	112	29	870	198	13.87	0.28	38.14	61.18	2.54	11.2	466	51.38	1.45	0.74	58	29	13

10.6 Hydrology (Surface water)

A Surface Water Assessment was undertaken during the EIA Phase. The baseline regional hydrological setting is summarised in this section. A detailed surface water report is appended to this report (Appendix E).

10.6.1 Hydrological Setting

The proposed Project Area falls predominantly within quaternary catchment B20E while a small portion falls within quaternary catchment B20A of the Olifants Water Management Area (WMA 02) (Figure 10-9).

The MR boundary is drained by several streams draining from the south to the north. On the south east of the Project Area are two tributaries, namely the Wilge River and the Kromdraaispruit. There are a number of other non-perennial streams and inland water features within the Project Area, including the Kromdraai Dam and Dieplaagte Dam. The Wilge River eventually drains to the Olifants River further downstream which then drain into the Limpopo River through Mozambique and into the Indian Ocean. The water supply of the Wilge River is sustained by groundwater aquifers and water from its tributaries (Ecosolve Consulting, 2020).

10.6.2 Water Quality

Water quality monitoring has been on going at Ubuntu Colliery. Existing water quality data and reports were provided by Universal Coal. The data was assessed, interpreted and presented to enable the understanding of water quality status for the rivers within and around the Project Area. The surface water quality within the Ubuntu Colliery was benchmarked against the WUL Limits for the Ubuntu Colliery as stipulated in the WUL issued by the DWS with Licence No.: 03/B20E/ABCGIJ/4751 on 22 February 2019 (Table 10-7).

Table 10-7: Ubuntu Colliery WUL Limits for Surface Water Quality

Variable	Limits
pH	6.4 – 9.0
Electrical Conductivity (EC) in mS/m	100
Sulphate (SO_4) in mg/l	250 – 400
Chloride (Cl) in mg/l	73
Sodium (Na) in mg/l	140
Magnesium (Mg) in mg/l	45
Calcium (Ca) in mg/l	54
Fluoride (F) in mg/l	0.52
Nitrate (NO_3) in mg/l	7.9
Total Alkalinity ($CaCO_3$) mg/l	295

Water quality data for the third quarter of 2019 (i.e. July to September 2019) was reviewed from the surface and groundwater report that was compiled by Digby Wells Environmental (2019). Additionally, the quarterly water quality report compiled by EcoSolve Consulting at the beginning of year 2020 (i.e. January to July 2020) was reviewed as part of the baseline water quality update. The monitoring network within Ubuntu Colliery comprises of eight surface water quality monitoring points. The monitoring sites were selected in consideration of the proposed infrastructure layout with an objective to intersect both surface and groundwater prior to (upstream) and moving away from a pollution source (downstream). Table 10-8 presents the coordinates of the surface water monitoring points and Figure 10-9.

Table 10-8: Surface Water Monitoring Sites Coordinates

Sample Name	Latitude	Longitude	Description of localities
UCBSW2	-26.18335	28.94139	Sampled as UCBSW2, bridge within a wetland area. A low flow was observed
UCBSW3	-26.18359	29.06861	At the Dam
UCBSW4	-26.18343	29.03306	Downstream of dam which is situated just outside the northern part of the Ubuntu Colliery Mine
UCBSW8	-26.18350	28.93556	Downstream outside the Ubuntu Colliery Mine boundary on Wilge River. This was observed as a cattle watering point with flowing water
UCBSW10	-26.20009	28.98861	On Wilge River upstream area.
UCBSW11	-26.20019	28.93222	On Kromdraai tributary with flowing water joining Wilge River
UCBSW12	-26.22562	28.836984	Not sampled-ground water pumped to this sampling point for use at nearby chicken farm
UCBSW15	-26.20008	28.86139	Wetland near proposed strip pit mine design, stagnant water was observed

During this baseline water quality investigation, the following was noted about the water quality within Ubuntu Colliery:

- pH was mostly within the WUL Limits, except an exceedance at UCBSW8 in October 2020;
- EC was exceeded at sites UCBSW15, UCBSW11 and UCBSW2, with fluctuations within and beyond the WUL Limits throughout the monitoring period;
- Some exceedances were observed in the Ca, Mg and Na. Some exceedances in Calcium were observed at sites UCBSW11, UCBSW15 and UCBSW10 between December 2018 and November 2019. Magnesium was elevated beyond the WUL Limits at multiple sites, including sites UCBSW2, UCBSW4, UCBSW8, UCBSW10 and

UCBSW11 between April and July 2020. Sodium exceedances were observed within site UCBSW2 between June and July 2020;

- Chlorides were exceeded at sites UCBSW2 and UCBSW11 and fluctuated within and beyond the WUL Limits throughout the monitoring period;
- Sulphate was generally within the WUL Limits and was only exceeded at site UCBSW15 in November and December 2018;
- Nitrate was generally within the WUL Limits for most of the monitoring period until exceedances were observed in UCBSW2 in May 2020;
- Fluoride generally fluctuates within and beyond the WUL Limits across all the monitoring sites, with the greatest concentrations being observed at UCBSW15, followed by UCBSW2; and
- Total alkalinity was mostly within the WUL limits for all points for most of the monitoring points, except at site UCBSW11, where total alkalinity is commonly elevated beyond the WUL Limit.

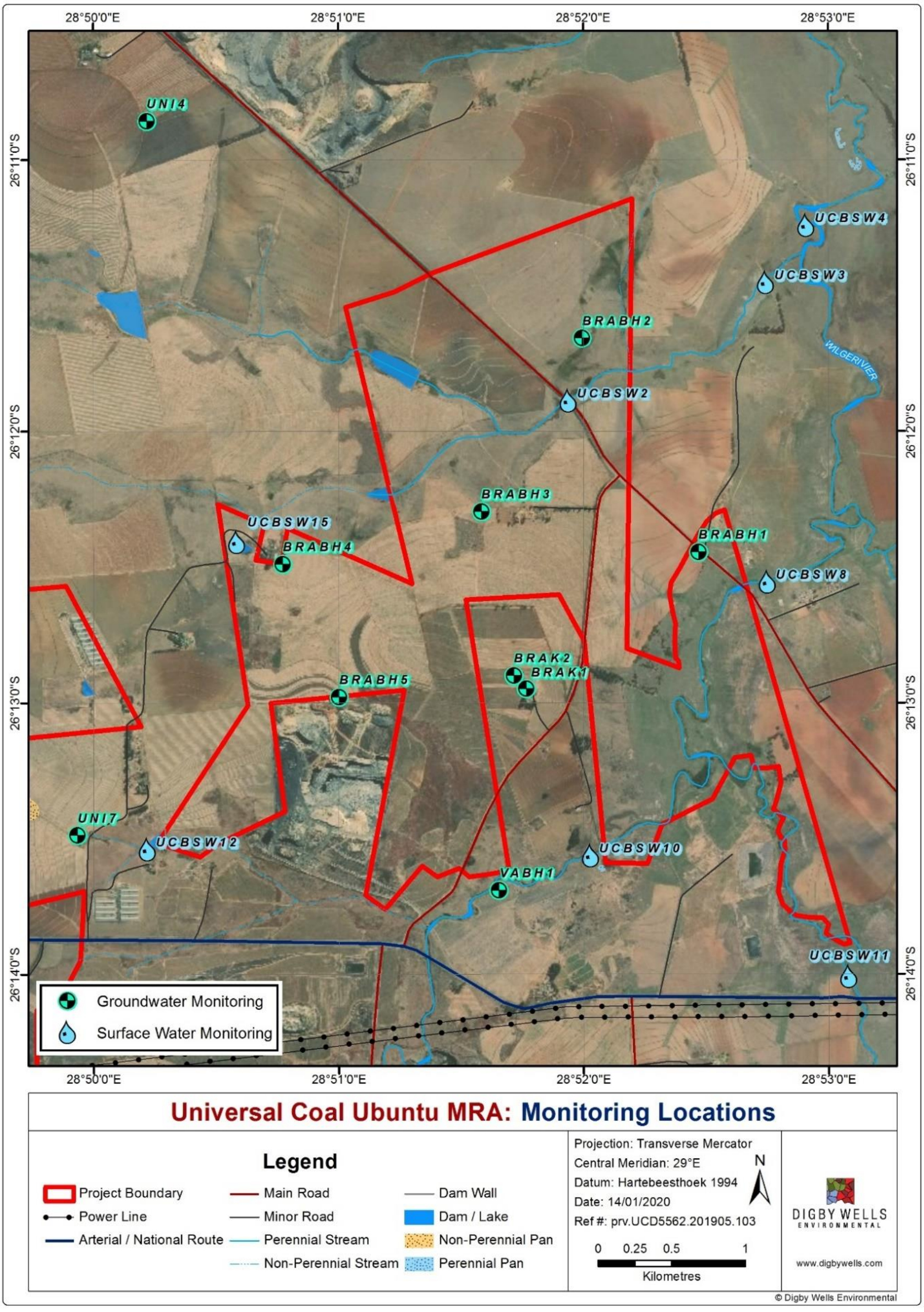


Figure 10-9: Surface Water and Groundwater Monitoring Locations

10.7 Groundwater

The Groundwater Assessment undertaken during the EIA Phase is appended to this report as Appendix F. A summary of the baseline conditions is included in the below sections.

10.7.1 Aquifers

The aquifers situated within the MR boundary are conceptualised to consist of four units, namely the shallow weathered aquifer, the intermediate fractured aquifer, the Dwyka tillite aquifer and the Malmani dolomite aquifer.

10.7.1.1 Shallow Weathered Aquifer

The weathered material in the shallow weathered aquifer consists mostly of decomposed and highly weathered coarse-grained sandstones, with shales and siltstone.

The sustainability of the shallow weathered aquifer is dependent on seasonal recharge from rainfall. The rainwater infiltrates the soil and a portion of it eventually reaches the saturated zone (effective recharge).

From the five boreholes drilled around the MR boundary the weathered aquifer ranges from 6 to 12 metres below ground level (mbgl), averaging at 9 mbgl. The aquifer transmissivity of the weathered material is estimated between 0.5 and 1.5 m²/day (Hodgson and Krantz, 1998).

10.7.1.2 Fractured Aquifer

The fractured aquifer consists of un-weathered sequences of sandstone, siltstone, shale, carbonaceous shale and coal. The pores within these sediments are too well cemented to allow any significant permeation of water. Groundwater movement therefore predominantly occurs along secondary structures such as fractures, cracks and joints within the sediments. However, not all secondary structures within the fractured aquifer are water-bearing. Of all unweathered sediments in the fractured aquifer, the coal seam often has the highest hydraulic conductivity.

10.7.1.3 Dwyka Tillite

The Dwyka tillite 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 to be between 0.0002 and 0.0148 m/d (Hodgson and Krantz, 1998). The thickness of this unit varies from 0.5 to 30 m thick averaging at 8 m.

10.7.1.4 Malmani Dolomite Aquifer

The basement aquifer comprises of Malmani dolomites, characterised as part of the chert bearing to chert poor chemically derived sediments of the Chuniespoort Group. The Chuniespoort Group dolomites represent the most important aquifer in South Africa due to the high storage and permeability characteristics of the rock type. The continuity of the dolomite aquifer is interrupted by vertical to sub-vertical geological structures such as dykes which create low permeability to impermeable compartmental barriers.

Dolomitic areas can have high recharge and significant groundwater flow characteristics (Hodgson and Krantz, 1998; and Barnard, 2000). Unlike most other formations, the groundwater gradient in dolomitic aquifers does not necessarily follow topography. More often than not, it occurs as a nearly horizontal surface indicative of a low hydraulic gradient and permeable formations (Barnard, 2000).

10.7.2 Current Groundwater Conditions

The current groundwater conditions are defined based on the Ecosolve Consulting (2020) monitoring report. These conditions are defined in terms of groundwater quality and groundwater levels. The groundwater monitoring locations are presented in Figure 10-10.

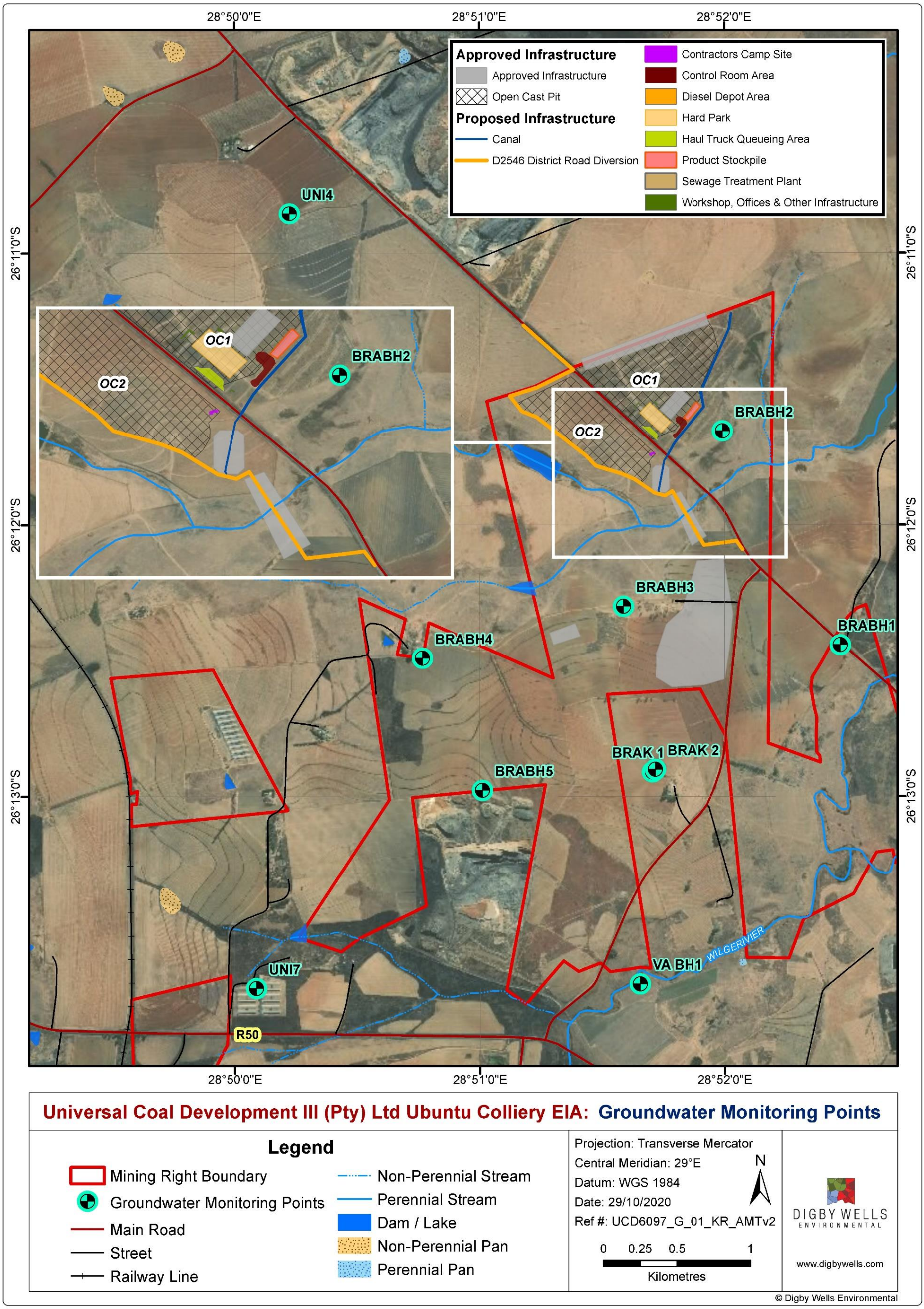


Figure 10-10: Groundwater Monitoring Locations

10.7.2.1 Groundwater Quality

Groundwater quality was benchmarked against the approved standards stipulated in the approved WUL (License number 03/B20E/ABCGIJ/4751) given in Table 10-9.

Table 10-9: WUL Standards for Groundwater Quality

Variables	Groundwater Quality Objectives
pH	6.4 – 9.0
Electrical Conductivity in mS/m (EC)	150
Total Alkalinity in mg/L	260
Chloride (Cl) in mg/L	200
Fluoride (F) in mg/L	1.56
Sulphate (SO_4) in mg/L	250 – 400
Nitrate (NO_3) in mg/L	10
Calcium (Ca) in mg/L	150
Magnesium (Mg) in mg/L	45
Sodium (Na) in mg/L	200
Potassium (K) in mg/L	140
Total Suspended Solids (TDS) in mg/L	545
Ortho-Phosphate (PO_4^{3-}) in mg/L	0.128
Iron (Fe)	0.2
Manganese (Mn)	0.11

Water quality for the MR boundary is found to be within the WUL standards (Table 10-9) at all groundwater monitoring locations (Figure 10-10), except for VABH01 in which a bicarbonate concentration of 269 mg/L slightly exceeds the WUL standard (260 mg/L). The slight exceedance is not an environmental concern, additionally, the pH is found neutral for all monitoring locations. The water quality trends for all monitoring sites are observed to be stable. Reference can be made to the Ecosolve Consulting (2020) report for in-depth details.

Groundwater is characterized according to the Piper, Durov, Scholler and Sodium Adsorption Ration (S.A.R) diagrams.

According to the Piper diagram (Figure 10-11) the groundwater found in all the monitoring locations sit within the upper left potion of the diagram, and this groundwater is classified as calcium-chloride water.

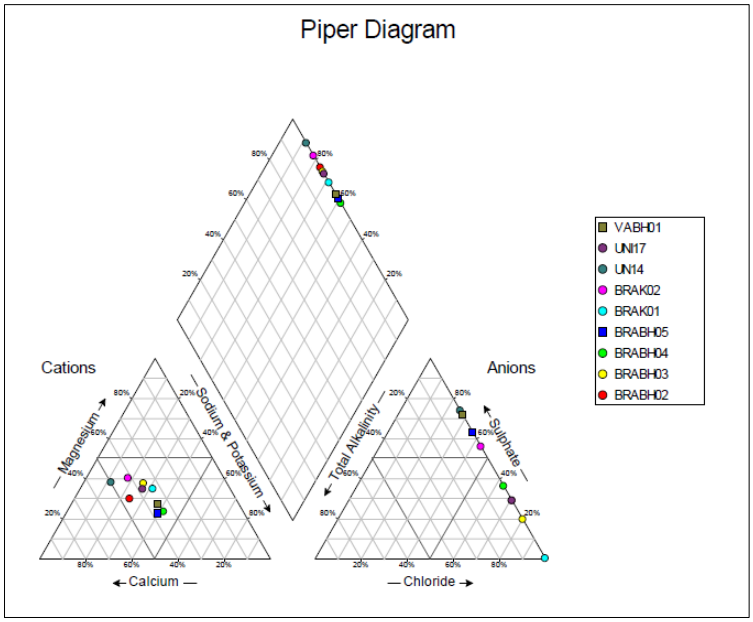


Figure 10-11: Piper Diagram

According to the Durov diagram (Figure 10-12) the groundwater found at the MR boundary is dominant in chloride congruent with the Piper Diagram interpretation, additionally a dominance in calcium/magnesium and bicarbonate is observed.

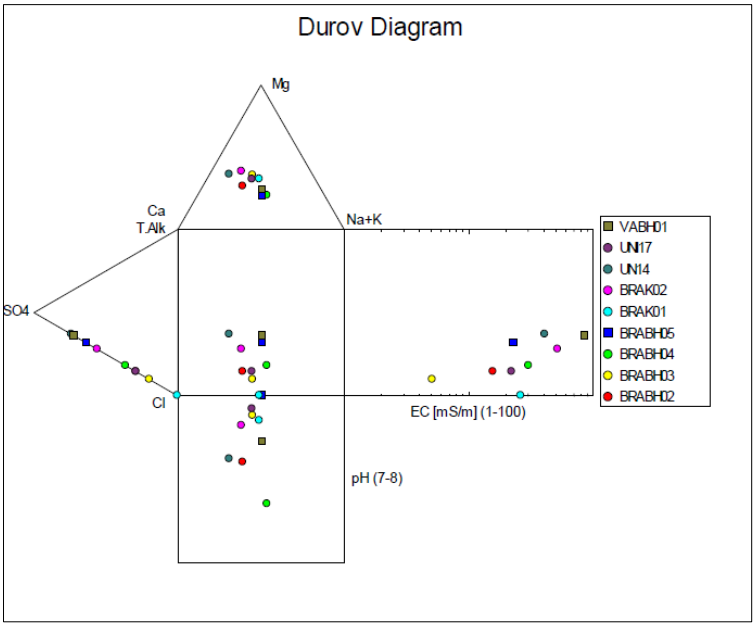


Figure 10-12: Durov Diagram

The SAR diagram is used to determine if water is suitable for irrigation uses. Water with SAR values of 18 and above will result in an excess of sodium in the soil. Water with SAR values of 10 and below is safe and suitable for irrigation. According to the S.A.R diagram (Figure 10-13), the groundwater samples have SAR values that are below 10 which is safe and suitable for irrigation.

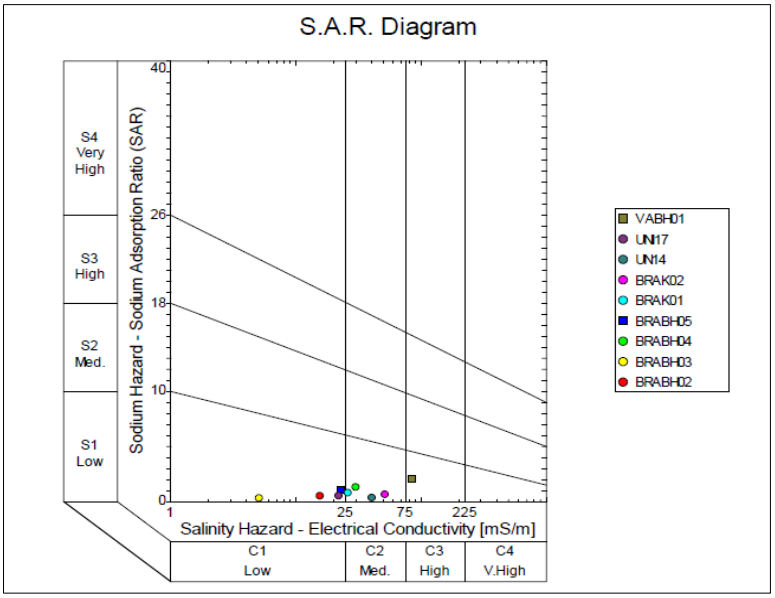


Figure 10-13: S.A.R Diagram

10.7.2.2 Groundwater Levels

The groundwater level depth ranges between 2.24 mbgl at UN17 and 47.97 mbgl at BRAK2. It is observed that the hydraulic head is higher in the southwest and lower in the northeast and the groundwater flow direction is thus derived to generally be from south-west to north-west. The flow direction of the groundwater in the study area correlates with the surface topography as depicted in Figure 10-14. Localised depression of the hydraulic head is due to groundwater abstractions for agricultural irrigations purposes.

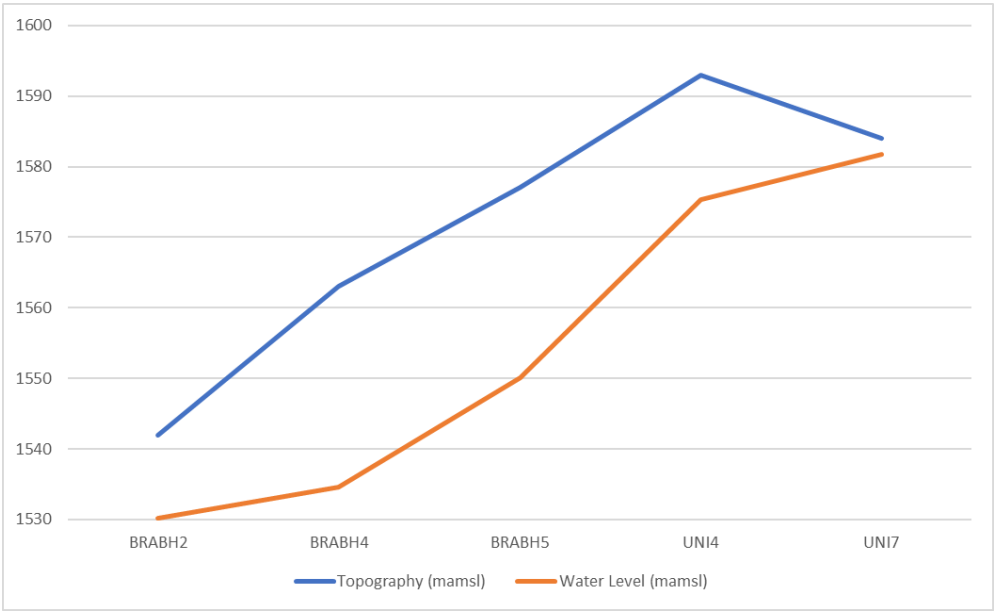


Figure 10-14: Correlation between Groundwater Level and Topography

10.8 Wetlands and Aquatics

The Wetlands and Aquatics Report is as attached in Appendix G.

10.8.1 Wetlands

10.8.1.1 Wetland Ecology Assessment

The wetlands in the study area are linked to both perched groundwater and surface water. A total of five different Hydrogeomorphic Units (HGM) types of natural wetland systems occur within the area assessed (Wetland Report, 2012). The five HGM units identified include:

- Seasonal pan wetland;
- Isolated hillslope seepage wetlands;
- Hillslope seepage wetlands connected to a watercourse;
- Valley bottom wetlands with a channel; and
- Floodplain.

The wetlands reassessed during the 2020 survey only focused on the wetlands within the new infrastructure area. It was determined that the wetland delineations from 2012 were accurate (Figure 10-15 to Figure 10-17).

The HGM include:

- Hillslope seepage wetland connected to a watercourse (north at OC1);
- Valley bottom wetlands with a channel (Channelled Valley Bottom); and
- Hillslope seep wetland (west at OC2).

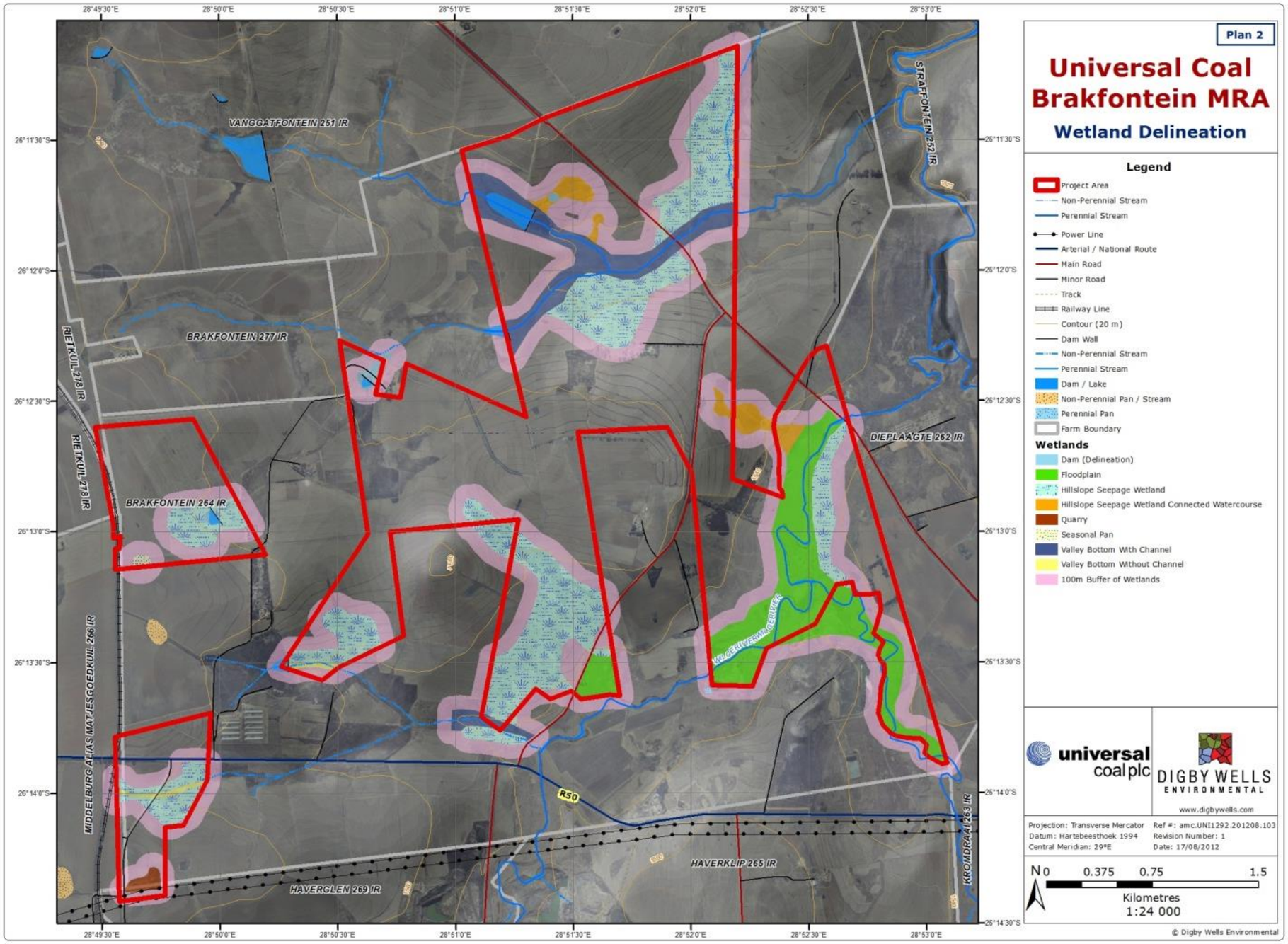


Figure 10-15: Delineated Wetlands (2012)

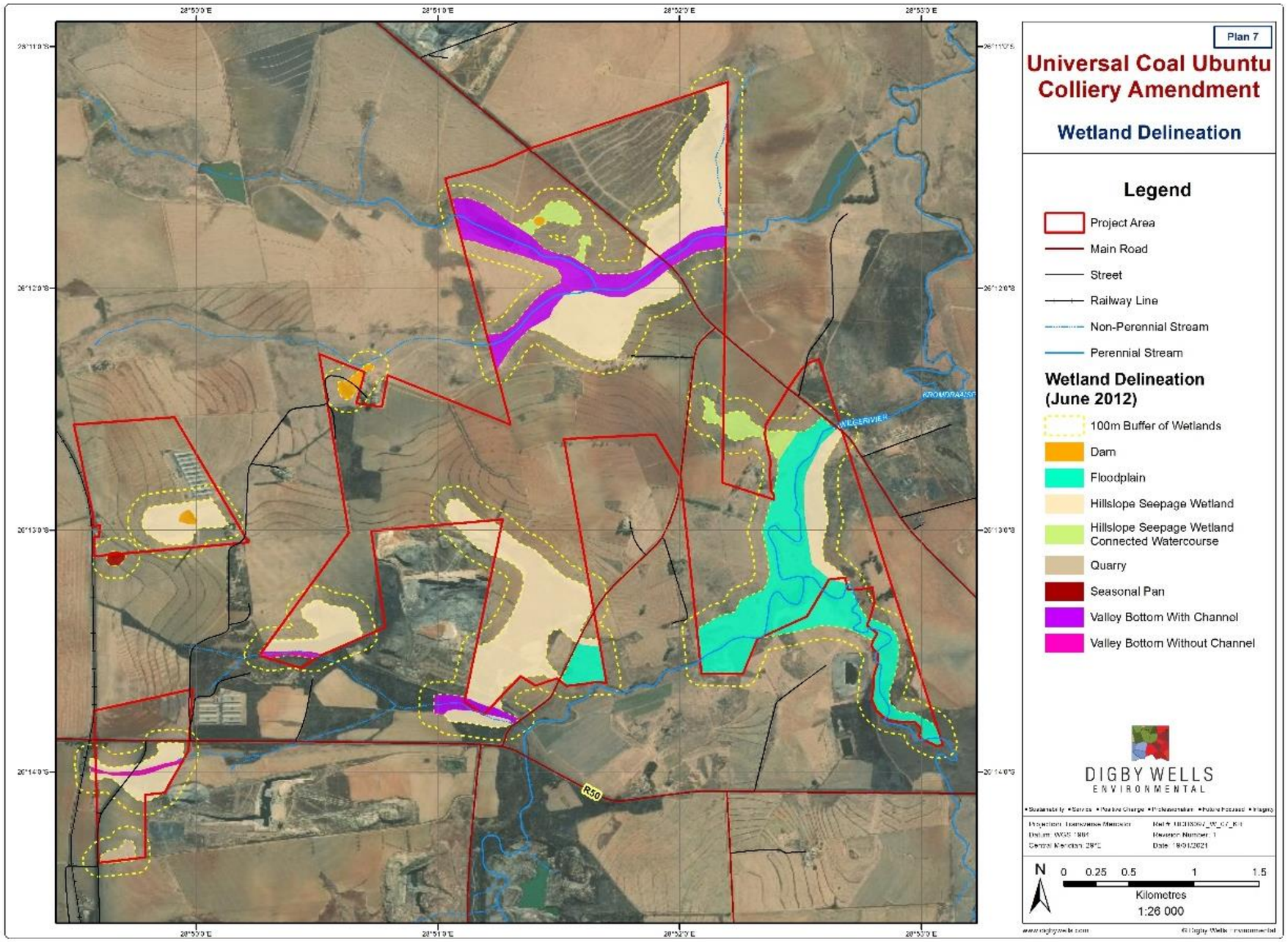


Figure 10-16: Delineated Wetlands of the MRA (2020)

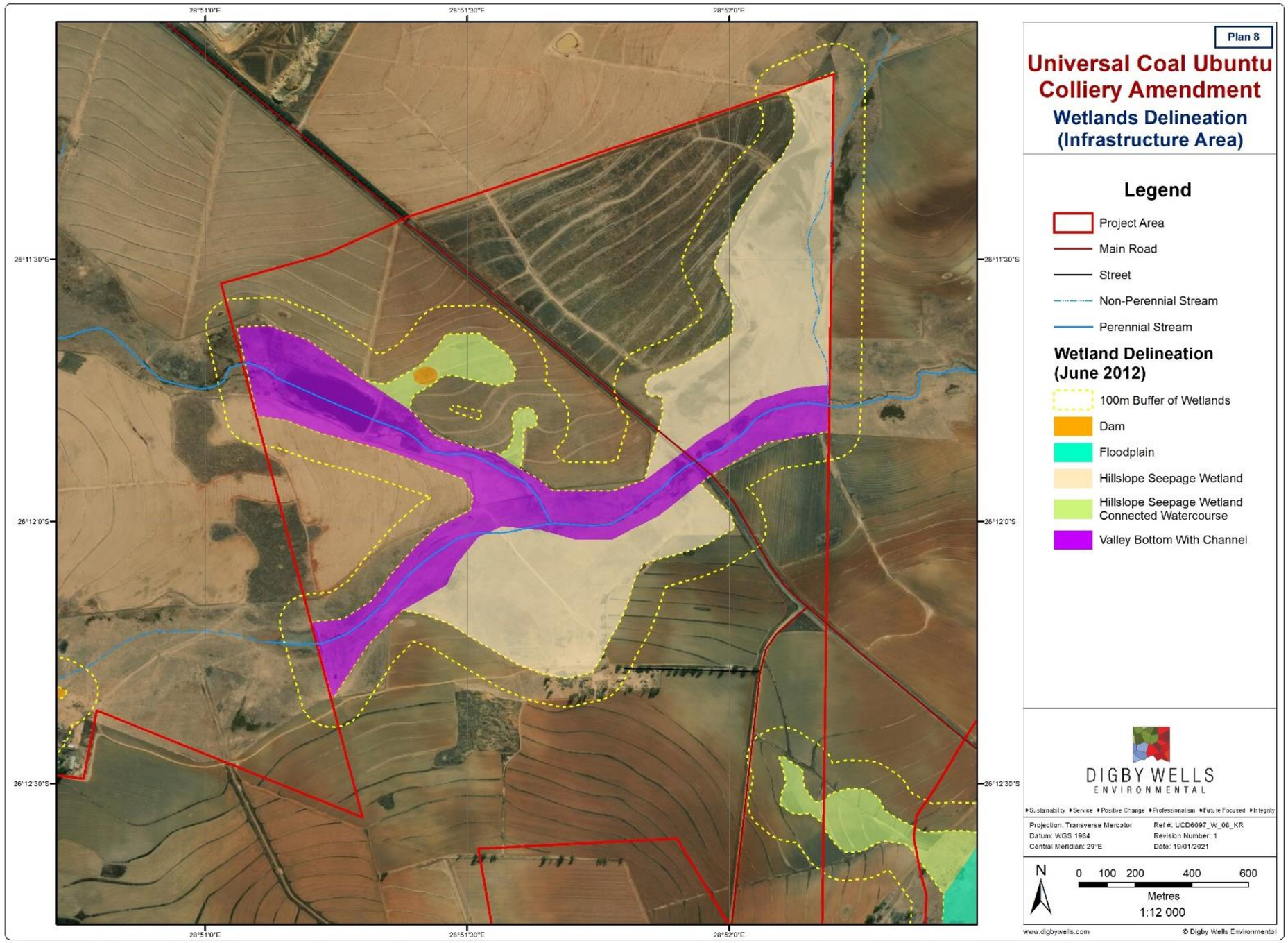


Figure 10-17: Wetland Delineations of The Project (2020)

10.8.1.2 Wetland Indicators

The wetland indicators used to delineate the wetlands are listed below:

- Terrain Unit Indicators;
- Soil Indicators; and
- Vegetation Indicators (see Appendix G).

10.8.1.3 Wetland Ecological Health Assessment

The wetland Present Ecological State (PES) of the HGM units were assessed according to their hydrology, geomorphology and vegetation functionality and health. The 2012 and 2020 results are presented in the subsections below.

10.8.1.3.1 2012 results

An overall PES rating was done for the three indicators in 2012 for all the HGM units combined. The findings are presented in Table 10-10.

Table 10-10: A summary of the WET-Health scores for the three indicator study components (2012)

Module	Impact Score	Category	Change Score	Change Symbol	Health Class
Hydrology	1.2	C	0	→	C→
Geomorphology	1.4	B	0	→	B→
Vegetation	2.7	C	0	→	C→
Overall Score	**1.7**	**C**	**0**	→	**C→**

The hydrological impacts associated with the wetland unit were considered to be negligible and as a result, the hydrology assessment identified no discernible modifications, or the modifications are of such a nature that they have no significant impact on the hydrological integrity (Category: C. Impacts which were identified and which may be impacting on the hydrology of the unit refer to typical changes in water-distribution and retention patterns within the HGM unit as a result of impeding structures. These structures include the road networks and small agricultural dams. The roads will impact on quantity and timing of flows to downstream portion of the HGM unit and the extent to which these dams or roads interrupt low and intermediate flows to downstream areas is slight. Additionally, the surface roughness of an HGM unit in its current state is moderately modified when compared with its natural state. The trajectory change for the hydrological condition of the system is likely to remain stable over the next five years.

The geomorphology of the wetland was determined to be slightly modified or natural (Category B). The effect of altered water inputs (increased flows and floodpeaks) on wetland geomorphological integrity was determined to be slight, with increases determined for both

flows and floodpeaks. These effects may be attributed to the hardening of surfaces due to the road infrastructure as well as the increase in runoff potential due to the overgrazing of the area. The trajectory change for the geomorphological condition of the system is likely to remain stable over the next five years.

The vegetation composition associated with the HGM unit appears has been moderately altered (Category C). The wetland area is characterized by the loss of wetland vegetation replaced by crop farming. Loss of wetland vegetation has taken place especially in the seepage wetland. Small scale patches that can be more readily colonized by indigenous vegetation are more likely to have at least a little indigenous vegetation present than large, contiguous cultivated patches. The trajectory change for the vegetation condition of the system is likely to remain stable over the next five years.

The overall integrity of the wetland system was determined to be natural and the current health of the system is expected to remain stable over the next five years.

10.8.1.3.2 2020 results

The HGM units were considered to have an ecological state ranging between 'Moderately Modified' and 'Greatly Modified' (Ecological Category C and E; Table 10-11). According to the integrity (health) method described by Kotze et al. (2009) a Category C wetland has undergone a moderate change in ecosystem processes including loss of natural habitats, however the natural habitat remains predominantly intact; and a Category D wetland has undergone large modifications to the natural ecosystem processes and loss of natural habitat and biota and a Category E wetland are described as the change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.

Table 10-11: Wetland Ecological Importance and Sensitivity Scores

HGM Unit	Hydrological Health Score	Geomorphological Health Score	Vegetation Health Score	Final PES	PES Category
Hillslope Seep (north at OC1)	27	4.6	17.4	7.000	**E**
Channelled Valley Bottom	10.5	2.25	15.1	3.979	**C**
Hillslope Seep (west at OC2)	19.5	2.75	16.8	5.579	**D**

The wetlands within the MR boundary are impacted by anthropogenic activities including mining and agriculture. These dominant land use activities impact the ecological, hydrological and geophysical functionality of the wetlands.

10.8.1.4 Wetland Ecological Services (WET-Ecoservices)

10.8.1.4.1 2012 results

The results from the 'Ecological Assessment of The Wetland Systems of the Brakfontein Mining Operation' (Digby Wells Environmental, 2012a) are displayed in Table 10-12.

Table 10-12: Wetland Ecological Services – 2012 Results

Ecosystem Service	Floodplain	CVB	Seep	Seasonal Pan
Flood Attenuation	2.5	2.5	2.2	1.4
Streamflow Regulation	2.2	1.8	2.4	0.8
Sediment Trapping	3.0	1.8	2.3	2.9
Phosphate Assimilation	3.0	1.6	2.6	1.4
Nitrate Assimilation	2.7	1.6	2.5	1.6
Toxicant Assimilation	3.1	1.7	2.4	1.4
Erosion Control	2.8	2.4	2.2	1.4
Carbon Storage	2.7	0.7	0.7	0.7
Biodiversity Maintenance	2.7	2.8	2.1	3.0
Water Supply	2.2	1.8	0.8	0.3
Harvestable Resources	2.8	2.0	1.8	1.2
Cultivated Foods	1.6	1.0	0.0	0.8
Cultural Value	2.0	1.0	0.1	0.0
Tourism and Recreation	1.6	0.7	0.6	0.6
Education and Research	1.0	1.3	1.3	1.3
SUM	**35.9**	**24.7**	**24**	**18.8**
Average Score	**2.4**	**1.6**	**1.6**	**1.3**
Category	**Moderately High**	**Intermediate**	**Intermediate**	**Intermediate**

No ecological services determined to be of high importance were identified for any of the wetland systems. The highest percentage of services for each HGM unit was determined to be of an intermediate importance. Services considered to be of a moderately high importance were only determined for the two valley bottom wetlands, with 40% of the services identified for systems without a channel determined to moderately high in importance.

The moderately high important ecological services identified for the hillslope seepage wetlands, floodplain and the channelled valley bottom system pertain largely to water quality enhancement services, such as sediment and phosphate trapping, as well as nitrate and

toxicant removal. This is to be expected owing to the diffuse nature of flow in such wetland units.

Both the channelled valley bottom and the floodplain units provide streamflow regulatory services which are of a moderately high importance. The flood plain system is a depositional environment with a gentle slope characterised by typical floodplain features such as ox-bow lakes, cut-off meanders, backwaters, natural levees, etc. the differences in the hydrological regime within the features of the floodplain create an environment suitable for a high species richness and therefore maintenance of biodiversity. Thus, the maintenance of biodiversity for this unit was determined to be of a moderately high importance.

Overall, all four systems provide services of varying importance which should not be considered in isolation, nor can these units be considered individually. The removal or degradation of a unit will inadvertently impose increased stresses on the remaining units.

10.8.1.4.2 2020 results

The results from the 2020 Ecological Assessment of the wetland within the MR boundary are shown in Table 10-13.

Table 10-13: Wetland Ecological Services 2020

Ecosystem Service	Hillslope Seep (north at OC1)	Channelled Valley Bottom	Hillslope Seep (west at OC2)
Flood Attenuation	1.8	2.0	1.7
Streamflow Regulation	1.3	1.5	1.3
Sediment Trapping	2.2	2.3	2.1
Phosphate Assimilation	1.9	2.0	2.0
Nitrate Assimilation	1.5	1.8	1.7
Toxicant Assimilation	2.0	2.1	2.2
Erosion Control	1.5	2.2	1.5
Carbon Storage	0.3	1.7	0.3
Biodiversity Maintenance	1.1	1.7	1.0
Water Supply	0.7	1.4	0.7
Harvestable Resources	1.2	1.2	0.8
Cultivated Foods	2.0	1.2	1.2
Cultural Value	0.0	0.0	0.0

Ecosystem Service	Hillslope Seep (north at OC1)	Channelled Valley Bottom	Hillslope Seep (west at OC2)
Tourism and Recreation	0.1	1.0	0.1
Education and Research	2.3	2.3	2.3
SUM	**20.0**	**24.2**	**19**
Average Score	**1.3**	**1.6**	**1.3**
Category	**Intermediate**	**Intermediate**	**Intermediate**

The general features of the wetlands were assessed in terms of functioning and the overall importance of each HGM unit was then determined at a landscape level.

The assessed HGM units were all determined to be of '**Intermediate**' importance. Overall, the largest ecosystem services include sediment trapping, toxicant removal, erosion control and some data exist (previous studies) for research purposes, the need for which is amplified by the surrounding agricultural and mining activities. In addition to the above-mentioned services, the wetlands were regarded as important for flood attenuations, sediment trapping, carbon storage and the maintenance of biodiversity. The channelled valley bottom (CVB) wetlands were regarded as important for the provisioning of sediment trapping (particularly those associated with mine impacts), water supply and biodiversity maintenance (those associated with agriculture impacts). The seepage wetlands were important in supplying water to dams and as a natural resource (grazing) for cattle.

10.8.1.5 Ecological Importance and Sensitivity

The Ecological Importance and Sensitivity (EIS) was not assessed during the 2012 assessment. The EIS scores for the 2020 Wetland Assessment are indicated in Table 10-14, which were regarded all as 'Moderate' EIS Categories. This indicates that the wetlands are ecologically important and sensitive, and that 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, the Wilge River and Kromdraaispruit in this case.

Table 10-14: Wetland Ecological Importance and Sensitivity Scores

HGM Unit	Ecological Importance & Sensitivity	Hydrological / Functional Importance	Direct Human Benefits	Final EIS	EIS Category
Hillslope Seep (north at OC1)	1.2	1.5	1.1	1.5	Moderate
Channelled Valley Bottom	1.7	1.9	1.2	1.9	Moderate

HGM Unit	Ecological Importance & Sensitivity	Hydrological / Functional Importance	Direct Human Benefits	Final EIS	EIS Category
Hillslope Seep (west at OC2)	1.3	1.6	0.9	1.6	Moderate

10.8.2 Aquatics

10.8.2.1 Terrestrial and freshwater Ecoregions

Ecoregions are regions characterized by a relative similarity in the type of ecosystems and ecosystem components, i.e. biotic and abiotic, aquatic and terrestrial. The MR boundary consists of the Highveld Ecoregion (Level II Ecoregion 11.02), and the Southern Temperate Highveld Freshwater Ecoregion according to Darwall et al. (2009). It is characterized by plains with a moderate to low relief and soils that are mostly coarse, sandy and shallow. Consequently, the drainage density is mostly low, but medium in some areas. There are various grassland vegetation types (with moist types present towards the east and drier types towards the west and south). Table 10-15 provides a summary of the main attributes of the Highveld Ecoregion (Kleynhans & Hill, 1999; Kleynhans, Thirion, & Moolman, 2005).

Table 10-15: Main Attributes of the Highveld Ecoregion

Main Attributes	Highveld Ecoregion
Terrain morphology: Broad division (dominant types in bold) (Primary)	Plains; Low Relief; Plains; Moderate Relief; Lowlands; Hills and Mountains; Moderate and High Relief; Open Hills; Lowlands; Mountains; Moderate to high Relief Closed Hills. Mountains; Moderate and High Relief.
Vegetation types (dominant types in bold) (Primary)	Mixed Bushveld (limited); Rocky Highveld Grassland; Dry Sandy Highveld Grassland; Dry Clay Highveld Grassland; Moist Cool Highveld Grassland; Moist Cold Highveld Grassland; North Eastern Mountain Grassland; Moist Sandy Highveld Grassland; Wet Cold Highveld Grassland (limited); Moist Clay Highveld Grassland; Patches Afromontane Forest (very limited).
Altitude (m.a.m.s.l.) (modifying)	1 100 to 2 100, 2 100 to 2 300 (very limited)
Mean Annual Precipitation (MAP) (millimetre (mm)) (Secondary)	400 to 1 000
Coefficient of Variation (% of annual precipitation)	<20 to 35
Rainfall concentration index	45 to 65

Main Attributes	Highveld Ecoregion
Rainfall seasonality	Early to late summer
Mean annual temp. (Degree Celsius (°C))	12 to 20
Mean daily max. temp. (°C): February	20 to 32
Mean daily max. temp. (°C): July	14 to 22
Mean daily min. temp. (°C): February	10 to 18
Mean daily min temp. (°C): July	-2 to 4
Median annual simulated runoff (mm) for quaternary catchment	5 to >250

10.8.2.2 Desktop Present Ecological State, Importance and Sensitivity

The PES and EIS information available for the considered aquatic ecosystems in the Department of Water and Sanitation 1:500 000 river layer (DWS, 2014) is discussed below.

An unnamed tributary of the Wilge River (hereinafter Northern Tributary) and the Main-stem Wilge River are the main watercourses associated with the proposed Project Area. The Northern Tributary cuts through and drains the northern parts of the MR boundary Table 10-16 outlines the desktop aquatic-related data obtained for the Wilge River B20E-01383 SQR (DWS, 2014).

Table 10-16: Desktop Aquatic Data Pertaining to the Wilge River

SQR Code/Aquatic Component	B20E-01383
Ecological Category	**C**
Category Description	Moderately Modified
Ecological Importance (EI)	High
Ecological Sensitivity (ES)	High

According to the desktop data obtained for the Wilge River B20E-01383 SQR (DWS, 2014), the reach appears to be in a Moderately Modified state (i.e. Ecological Category C). Mining, game reserves and agricultural land uses are present in the upper reaches of the Wilge River associated with the MR Area. According to the DWS (2014), impacts associated with mining and agricultural activities such as roads, low-water crossings, bed stabilization, canalization, water abstraction/increased flows, irrigation, exotic vegetation, inundation, vegetation removal, erosion and sedimentation appear to be affecting the current aquatic ecology associated with the Wilge SQR (DWS, 2014).

Both EIS of the Wilge River SQR have been classified as “High”. It is expected to contain approximately 30 macroinvertebrate taxa as well as nine indigenous fish species, all of which are classified as “Least Concern (LC)” in terms of their IUCN conservation status.

10.8.2.3 Expected Macroinvertebrates

The expected macroinvertebrate taxa for the Wilge River sub-quaternary reach (SQR) of concern are presented in Table 10-17.

Table 10-17: Expected Macroinvertebrate Taxa in the Wilge River

Family names		
Oligochaeta	Belostomatidae	Dytiscidae
Hirudinea	Corixidae	Gyrinidae
Potamonautidae	Gerridae	Chironomidae
Hydracarina	Hydrometridae	Culicidae
Baetidae > 1 sp	Naucoridae	Dixidae
Caenidae	Nepidae	Muscidae
Coenagrionidae	Notonectidae	Psychodidae
Aeshnidae	Pleidae	Ancylidae
Gomphidae	Veliidae/Mesoveliidae	Lymnaeidae
Libellulidae	Lepidostomatiidae	Physidae

None of the expected macroinvertebrate taxa have a high sensitivity towards water quality and the assemblage is predominantly composed of taxa that have a very low and low sensitivity towards water quality. Thirteen taxa have a very low sensitivity and low sensitivity, respectively, towards water quality, and the remaining four taxa have a moderate sensitivity.

Based on the prevalence of agricultural fields in the adjacent land areas associated with the MR boundary, the water in the associated aquatic ecosystems is expected to be of “large” modification (DWS, 2014). This deduction is further supported by the expected macroinvertebrate assemblage.

10.8.2.4 Expected Fish Species

The fish species expected in the reaches associated with the project area have been provided for in Table 10-18 (DWS, 2014). Additionally, each species sensitivity ratings towards physio-chemical conditions (DWS, 2014) have been provided for, together with their conservation statue according to the IUCN Red List of Threatened Species.

Table 10-18: Expected Fish Species in the Reaches Associated with the Project Area

Fish Species	Common Name	Tolerance / Sensitivity	Conservation Status
Enteromius anoplus	Chubbyhead Barb	2.6	LC
Enteromius neefi	Sidespot Barb	3.4	LC
Enteromius paludinosus	Straighfin Barb	3.3	LC

Fish Species	Common Name	Tolerance / Sensitivity	Conservation Status
Clarias gariepinus	Sharptooth Catfish	1	LC
Pseudocrenilabrus philander	Southern Mouthbrooder	1.4	LC
Labeobarbus polylepis	Bushveld Smallscale Yellowfish	2.9	LC
Enteromius trimaculatus	Threespot Barb	1.8	LC
Chiloglanis pretoriae	Shortspine Suckermouth	4.5	LC
Labeo cylindricus	African Carp	3.1	LC
Tolerance: 1-2=Tolerant; >2-3=Moderately Tolerant; >3-4=Moderately Intolerant; >4-5=Intolerant Conservation Status: LC = Least Concern			

A total of nine fish species are expected to occur within the Wilge River SQR B20E-01383 (DWS, 2014). According to Skelton (2001), all the species are indigenous to South Africa. Of the nine species, only one species is regarded as intolerant towards water quality changes, three species are regarded as moderately intolerant, two are moderately – and three are tolerant towards changes in water quality.

10.9 Air Quality

The Air Quality Impact Assessment (AQIA) undertaken during the EIA Phase is appended to this report as Appendix H.

10.9.1 Receiving Environment

The Ubuntu Colliery is located in an area with mechanised cash crops farming (i.e. maize), poultry farming and mining activities as the predominant land use types across the landscape, all within a 10 km radius from the mine. Also, widely scattered farmsteads can be observed on Google Earth Imagery® in the area (Google Earth Pro V.7.3 (October 3, 2020)).

The mine is located in an area where the elevation varies between 1 530 mamsl and 1 591 mamsl from east to west.

Figure 10-18 shows the Mining Right boundary with the Project Area zoomed in and historical dust monitoring points. These monitoring points were selected as sensitive receptors. According to the USEPA (2016), a sensitive receptor encompasses but is not limited to “hospitals, schools, daycare facilities, elderly housing, and convalescent facilities. The aforementioned are locations where the occupants are more susceptible to airborne pollutants” if exposed.

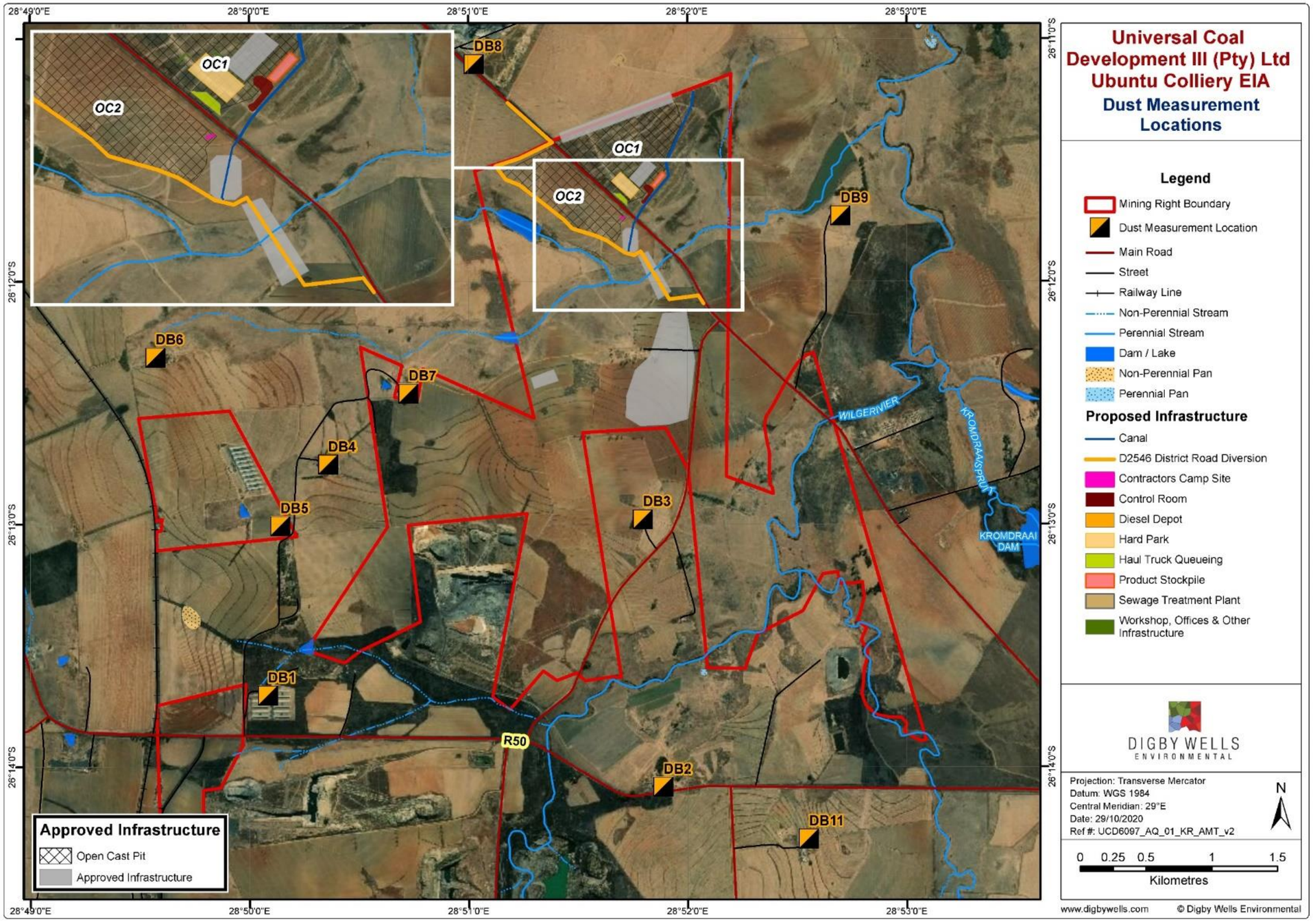


Figure 10-18: Dust Monitoring Sites

10.9.2 Wind Speed

Hourly meteorological data was analysed and used to understand the prevailing wind patterns at the Project Area. Data was used to assess the wind speed and wind direction regime on site.

The wind rose for the Project area is depicted in Figure 10-19. The prevailing winds are from the north (11%) and north northwest (11%) respectively. Secondary contributions are from the northwest (9%) and north northeast (7%).

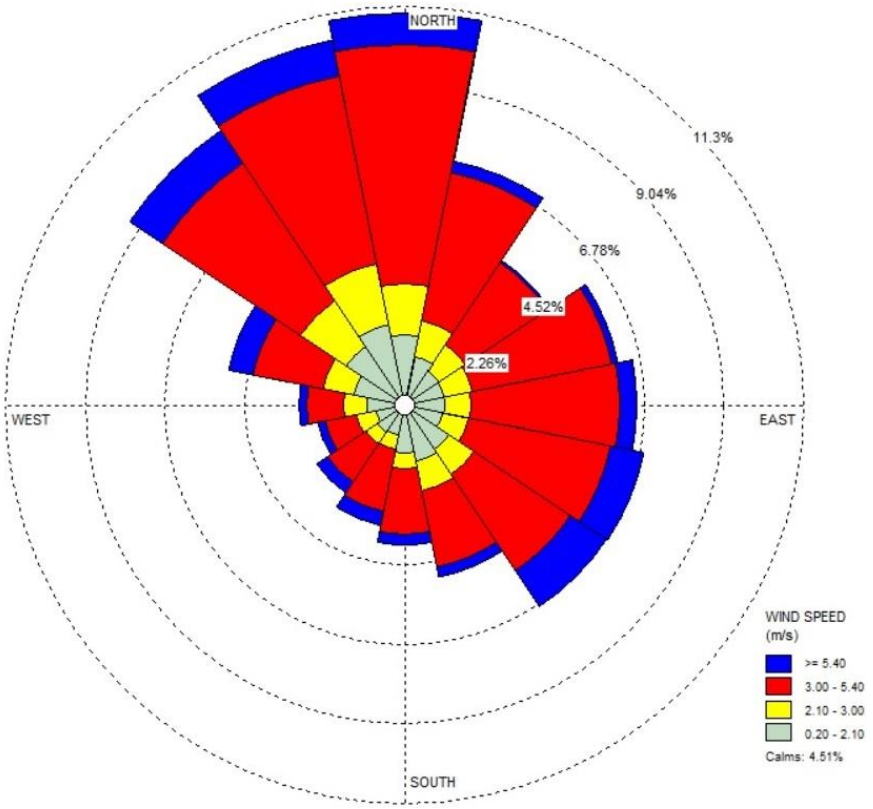


Figure 10-19: Surface Wind Rose

(Source: Lakes Environmental)

The average wind speed at the Project Area is 3.2 m/s and calm conditions (<0.5 m/s) occurred for some 4.5% of the time. Wind speed capable of causing wind erosion i.e. ≥5.4 m/s occurred for about 8.9% of the time (Figure 10-20).

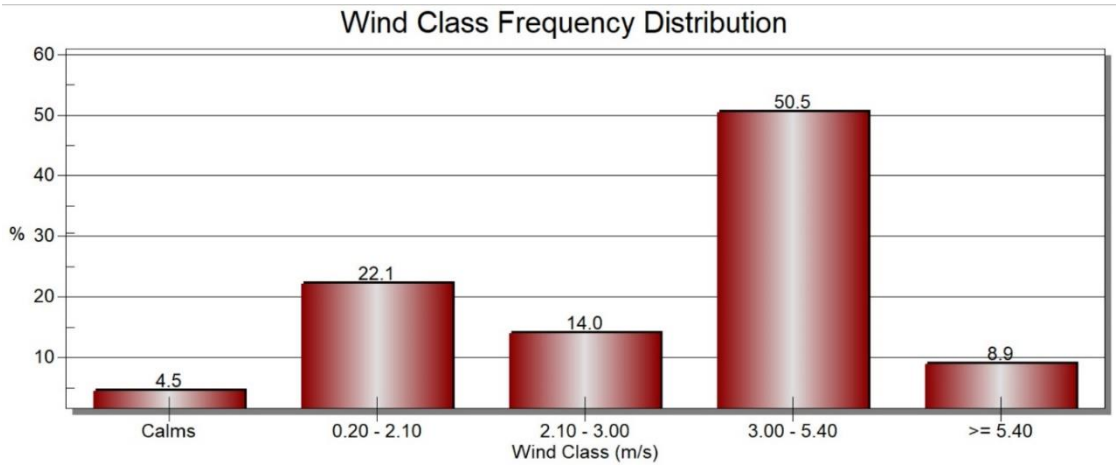


Figure 10-20: Wind Class Frequency

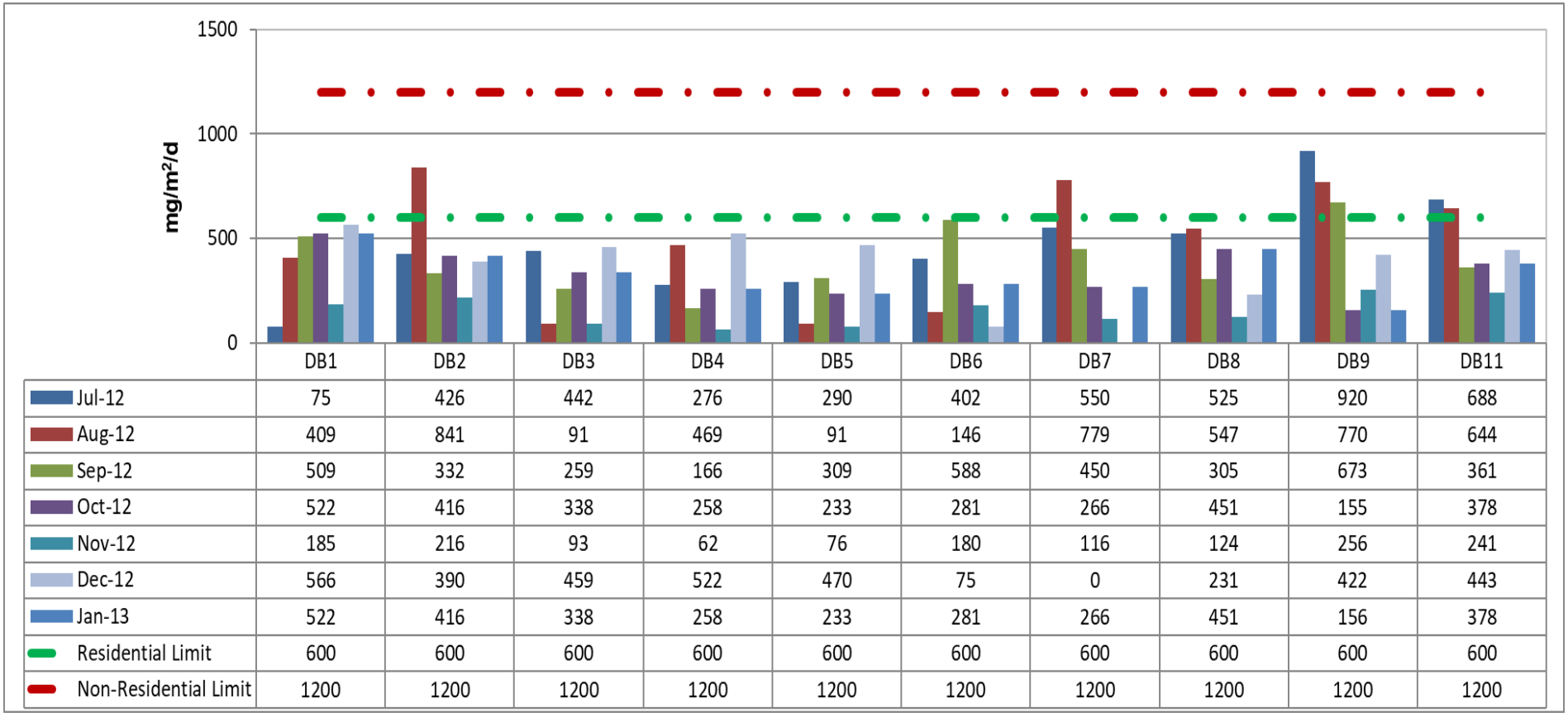
10.9.3 Assessment of Existing Air Quality

10.9.3.1 Dustfall

Archived dust deposition data collected using the American Standard Test Method (ASTM D1739) in the MR boundary was used to assess background air quality. Data for seven months, from July 2012 to January 2013 were obtained from the historical records. The graph showing the results is depicted below (Figure 10-21). Since mining has not commenced, the monitoring sites were categorised as residential. Once the Project commences, some of the monitoring locations will have to be re-categorised to non-residential (the reason being they fall within the MR boundary). The dustfall rates were compared with the South African *Dust standards* (GN R 827 of 1 November 2013) for compliance.

Based on the dustfall results, the sites where exceedances of the residential limits were measured and in sequential months (i.e. non-compliant) are discussed below in sequential order:

- DB9 (2012): the dustfall rates measured at this site were in exceedance of the residential limit of 600 mg/m^2/d in July (with **920** mg/m^{2}d), August (with **770** mg/m^{2}d), and September (with **673** mg/m^{2}d). Therefore, the site is not compliant. This was likely due to localised farming activities in the vicinity, resulting in particulates being airborne, deposited, and re-suspended; and
- DB11 (2012): the dustfall rates measured at this site were in exceedance of the residential limit of 600 mg/m^2/d in July (with **680** mg/m^{2}d) and August (with **644** mg/m^{2}d). Most likely the same reason as mentioned above may have resulted in noncompliance.



	DB1	DB2	DB3	DB4	DB5	DB6	DB7	DB8	DB9	DB11
Jul-12	75	426	442	276	290	402	550	525	920	688
Aug-12	409	841	91	469	91	146	779	547	770	644
Sep-12	509	332	259	166	309	588	450	305	673	361
Oct-12	522	416	338	258	233	281	266	451	155	378
Nov-12	185	216	93	62	76	180	116	124	256	241
Dec-12	566	390	459	522	470	75	0	231	422	443
Jan-13	522	416	338	258	233	281	266	451	156	378
Residential Limit	600	600	600	600	600	600	600	600	600	600
Non-Residential Limit	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200

Figure 10-21: Dustfall Results

10.9.3.2 Fine Particulate Matter and Gasses

The real-time monitoring of other criteria pollutants, such as particulate matter with an aerodynamic diameter of less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$), and gaseous pollutants such as sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and ozone (O_3) is yet to commence. As a result, data were not yet available to assess these pollutants.

10.10 Noise

A desktop study using historical Google Earth® Imagery confirms that the soundscape of the Project area's may have changed from 2012 when noise measurements were conducted in the area. In 2012 the MRA was characterised by farming and road networks. Since, a new mining development has been established south west of the MRA which will influence the soundscape. However, it is assumed this may not be too significant. Figure 10-22 shows the MR boundary, and infrastructure locations and noise monitoring locations.

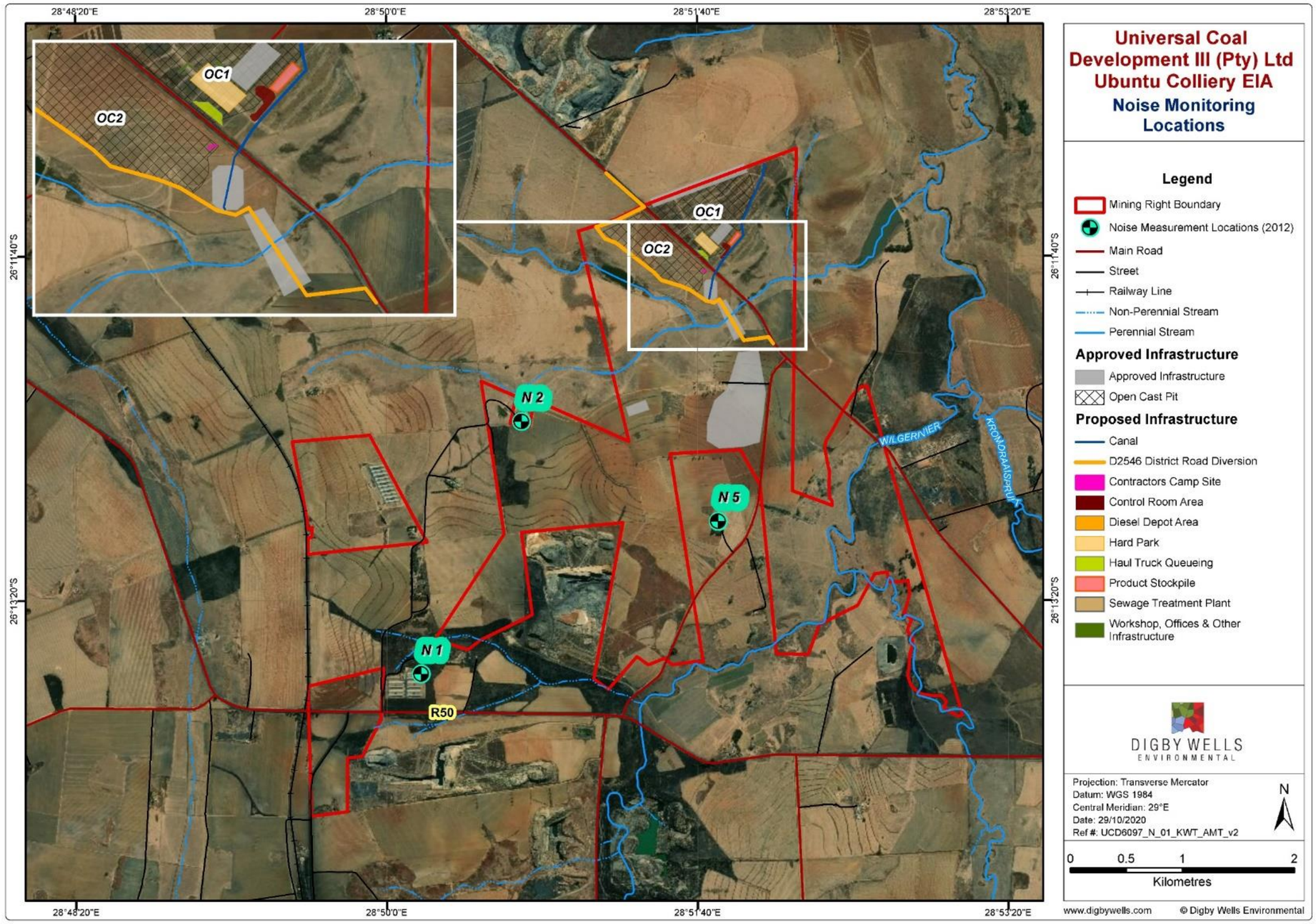


Figure 10-22: Noise Monitoring Locations at the Ubuntu Colliery

10.10.1 Existing Noise Soundscape in the Project Area

The approach followed in the data collection was aligned with the requirements of the noise control regulations as published under GN R.154 of 1992 in terms of Section 25 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) and the guidelines provided by SANS 10103:2008. According to the SANS 10103:2008, the sound pressure level is used as the measurement unit for noise levels. The acceptable rating levels according to SANS 10103:2008 for ambient noise in different districts (residential and non-residential) are presented in Table 10-19.

Table 10-19: Acceptable Rating Levels for Noise in Districts (SANS 10103, 2008)

Type of District	Equivalent continuous rating level ($L_{Reg.T}$) for noise (dBA)					
	Outdoors			Indoors, with open windows		
	Day-night	Day-time	Night-time	Day-night	Day-time	Night-time
	$L_{R,dn}$[a]	$L_{Req,d}$[b]	$L_{Req,n}$[b]	$L_{R,dn}$[a]	$L_{Req,d}$[b]	$L_{Req,n}$[b]
RESIDENTIAL DISTRICTS						
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
NON-RESIDENTIAL DISTRICTS						
d) Urban districts with some workshops, with business premises, and with main roads	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50
NOTE 1 If the measurement or calculation time interval is considerably shorter than the reference time intervals, significant deviations from the values given in the table might result.						
NOTE 2 If the spectrum of the sound contains significant low frequency components, or when an unbalanced spectrum towards the low frequencies is suspected, special precautions should be taken and specialist advice should be obtained. In this case the indoor sound levels might significantly differ from the values given in columns 5 to 7						

Type of District	Equivalent continuous rating level ($L_{Reg.T}$) for noise (dBA)					
	Outdoors			Indoors, with open windows		
	Day-night	Day-time	Night-time	Day-night	Day-time	Night-time
	$L_{R,dn}$[a]	$L_{Req,d}$[b]	$L_{Req,n}$[b]	$L_{R,dn}$[a]	$L_{Req,d}$[b]	$L_{Req,n}$[b]
NOTE 3 In districts where outdoor $L_{R,dn}$ exceeds 55 dBA, residential buildings (e.g. dormitories, hotel accommodation and residences) should preferably be treated acoustically to obtain indoor $L_{Req,T}$ values in line with those given in table 1.						
NOTE 4 For industrial districts, the $L_{R,dn}$ concept does not necessarily hold. For industries legitimately operating in an industrial district during the entire 24 h day/night cycle, LReq,d = LReq,n =70 dBA can be considered as typical and normal.						
NOTE 5 The values given in columns 2 and 5 in this table are equivalent continuous rating levels and include corrections for tonal character, impulsiveness of the noise and the time of day.						
NOTE 6 The noise from individual noise sources produced, or caused to be produced, by humans within natural quiet spaces such as nature reserves, private game farms, national parks, wilderness areas and bird sanctuaries, should not exceed a maximum Weighted sound pressure level of 50 dBA at a distance of 15 m from each individual source–.						
A - The values given in columns 2 and 5 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness of the noise and the time of day.						
B - The values given in columns 3, 4, 6 and 7 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness.						
C – $L_{Req,T}$ is the equivalent continuous A-weighted sound pressure level (LAeq,T) during a specified time interval, plus specified adjustments for tonal character, impulsiveness of the sound and the time of day.						
D – dBA 'A-weighted' is a standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.						

Baseline noise measurements were taken at noise sensitive receivers in the MRA. The baseline assessment survey was undertaken to determine the ambient noise levels at the selected monitoring locations (residential dwellings i.e. farm-houses). The list of noise measurement locations can be seen in Table 10-20.

Table 10-20: Noise Measurement Locations

Site ID	Farm/location	Category of receiver	GPS coordinates
N1	Brakfontein 264 IR (portion 24)	Rural	26°13'41.27"S 28°50'11.07"E
N2	Brakfontein 264 IR (portion 29)	Rural	26°12'27.99"S 28°50'43.39"E

Site ID	Farm/location	Category of receiver	GPS coordinates
N5	Brakfontein 264 IR (portion 11)	Rural	26°12'57.01"S 28°51'46.65"E

A Cirrus, Optimus Green, precision integrating sound level meter was used for the measurements. The instrument was field calibrated with a Cirrus, sound level calibrator.

The results of the baseline measurements are presented in Table 10-21 below. In Table 10-21, the results, as well as the rating limits according to the SANS 10103:2008 guidelines, are presented side by side. The noise level time history graph per noise measurement location can be seen in Figure 10-23 to Figure 10-25.

Table 10-21: Results of the Baseline Noise Measurements

Sample ID	SANS 10103:2008 rating limit					
	Type of district	**Period**	**Acceptable rating level dBA**	**$L_{Aeq,T}$ dBA**	**Maximum/Minimum dBA**	**Date**
N1	Rural	Daytime	45	45	77 / 35	02/07/2012
		Night time	35	47	70 / 37	02/07/2012
N2	Rural	Daytime	45	49	81 / 18	03/07/2012
		Night time	35	34	66 / 21	03/07/2012
N5	Rural	Daytime	45	51	102 / 29	06/07/2012
		Night time	35	53	91 / 29	06/07/2012
	Indicates current $L_{Aeq,T}$ levels above either the daytime rating limit or the night time rating limit					

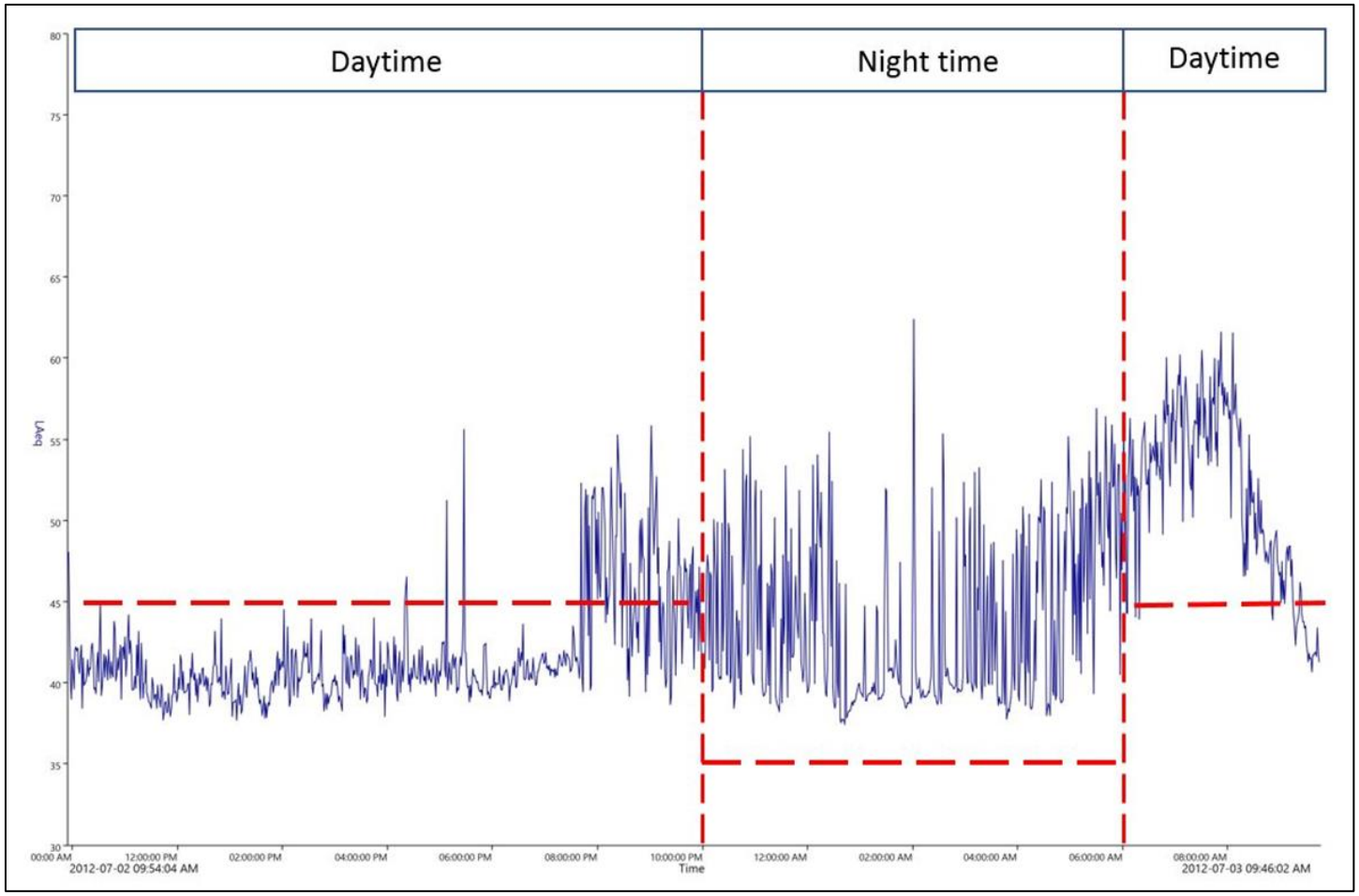


Figure 10-23: Noise Time Series Graph for N1

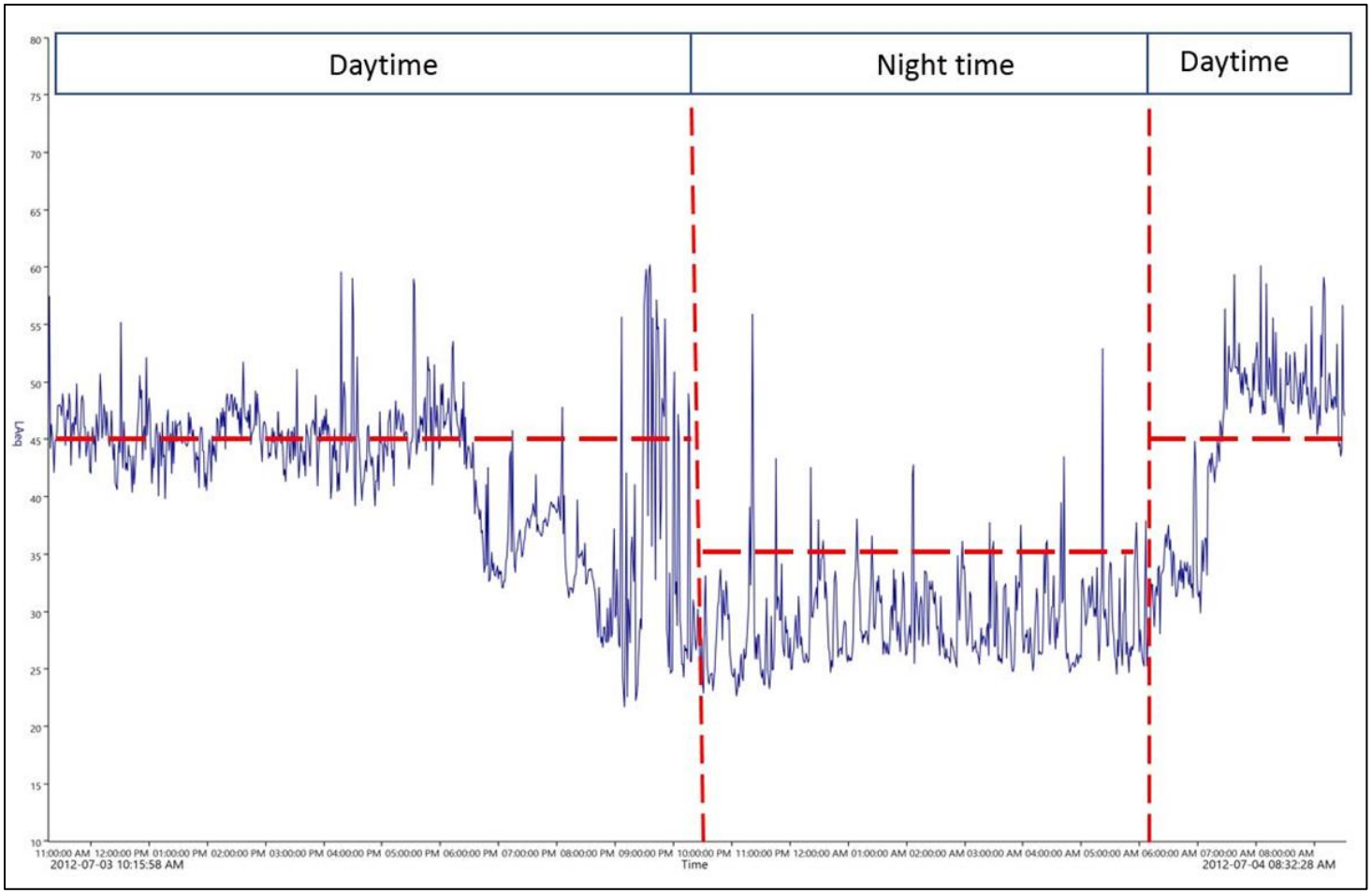


Figure 10-24: Noise Time Series Graph for N2

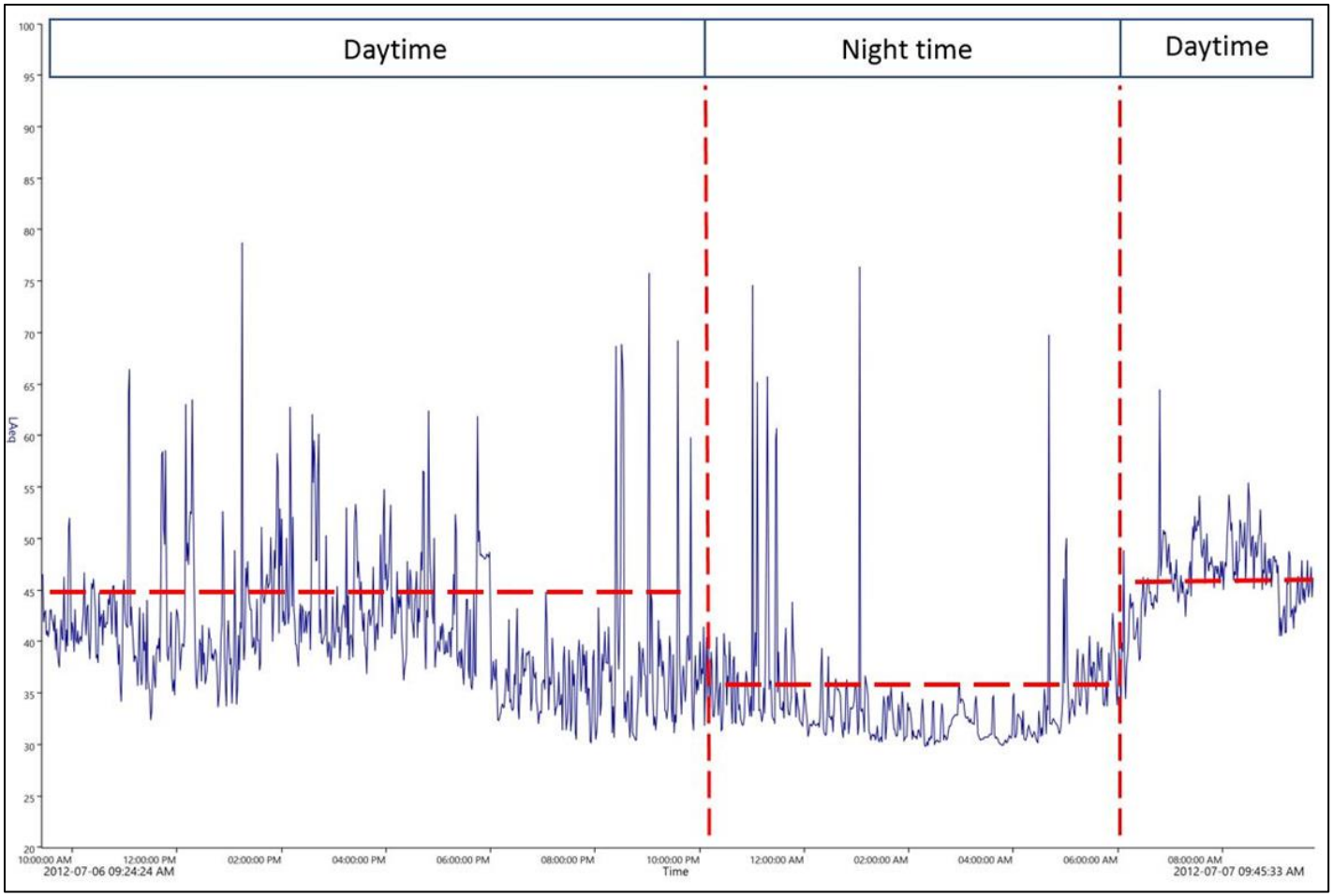


Figure 10-25: Noise Time Series Graph for N5

10.10.1.1 Day-Time Results

The average daytime ambient noise level is 48 dBA. The daytime noise levels at the different measurement locations indicate that the ambient daytime level at measurement points N2 and N5 were above the SANS guidelines maximum limit rating of 45 dBA allowable for outdoor ambient noise in rural districts. The main noise sources in the area during daytime are the audible and continuous mining activities to the north of the Project Area, continuous birdsong, coupled with intermittent sound from domestic animals (dogs) and vehicular activity on the R50 road.

10.10.1.2 Night-Time Results

The average night-time ambient noise level is 45 dBA. The night-time noise levels at the different measurement locations indicate that the ambient night-time level at monitoring points N1 and N5 were above and N2 was below the SANS guidelines rating levels of 35 dBA allowable for outdoor ambient noise in rural districts. The main noise sources influencing the night-time sound levels at the various measurement locations were the continuous mining activities to the north of the Project Area, coupled with intermittent noise from domestic animals (dogs) and vehicular activity on the R50 road.

A summary of the noise sources that were audible during the baseline survey, which were contributors to the background soundscape are depicted in Table 10-22.

Table 10-22: Noise Sources During Baseline Measurements

Noise source description			
Day	**Noise Type**	**Night**	**Noise Type**
Birdsong	Continuous	Domestic animals (dogs)	Intermittent
Domestic animals (dogs)	Intermittent	Mining activities to the north of measurement location N2	Continuous
Vehicular activity on the R50	Intermittent	Vehicular activity on the R50	Intermittent
Mining activities to the north of measurement location N2	Continuous	-	-

10.11 Social Setting

The Project is located within Ward 7 the VKLM of the NDM in the Mpumalanga Province. This section presents a summary of the demographic statistics relevant to the potential socio-economic benefit derived from the Project, informed by data collected during the 2016 Community Survey (Statistics South Africa, 2011). Wazimap (Wazimap, 2017) has adjusted these data to conform with the updated ward and municipality boundaries which were altered ahead of the 2016 Municipal Elections (Open Up, 2017). These data are supplemented by information included in the Integrated Development Plan (IDP) for the VKLM (2020).

As of the 2011 Census, Mpumalanga province had a population of 4 039 939, which accounts for approximately 7.8% of the national population (Wazimap, 2017). The province includes three district municipalities, of which the NDM is neither the largest nor the smallest in terms of population. The district included 1 308 129 residents (32.4% of the population of the province). NDM is itself divided into six local municipalities. VKLM is the second smallest of the local municipalities in terms of population, which included 75 453 people in 2011 (5.8% of the population in the NDM).

The VLKM includes nine wards. Ward 7 includes a population of 10 230 people (VKLM, 2020). The ward is mostly rural, but does include some settled areas, including the outskirts of Delmas. The area is characterised by agriculture, including cultivation of crops, and mining (predominantly coal).

Unemployment is a challenge within the regional area. Table 10-23 presents an overview of the employment status of the populations within the regional study area.

Table 10-23: Employment Status of the Populations within the Regional Area

Employment Statistics (Census 2011)	Ward 7		VKLM		NDM	
	No.	%	No.	%	No.	%
Total Population	10 230	-	75 453	-	1 308 129	-
Working Age (18-64)	6 331	61.9	46 646	61.8	796 693	60.9
Employed	3 244	31.7	21 843	28.9	355 478	27.2
Discouraged Work Seeker	272	2.7	2 477	3.3	42 554	3.3
Unemployed	850	8.3	8 573	11.4	152 250	11.6
Other not economically active	2 485	24.3	17 712	23.5	319 641	24.4

Adapted from Wazimap (Wazimap, 2017)

The unemployment level within the VKLM decreased between 2011 and 2015 from 28.2% to 21.6% (VKLM, 2020). As per the IDP, the VKLM expected further decreases in the unemployment rate as a result of additional employment opportunities expected from the mining sector. Employment within the mining sector showed growth although it was not the largest contributor of employment in the period covered in the VKLM IDP. These sectors were the Trade, Agriculture and Community Services sectors employing 18.7%, 18.2% and 14.3% of the workforce respectively.

10.12 Heritage

The Heritage Impact Assessment (HIA) undertaken during the EIA Phase is appended to this report as Appendix J.

Digby Wells undertook a pre-disturbance survey of the MRA during June 2012 in support of the Heritage Resources Management (HRM) process (Higgitt & Nel, 2012). The HRM process was undertaken as a component of the previous EIA process. Table 10-24 presents a summary of the heritage resources identified during the pre-disturbance survey.

Table 10-24: Heritage Resources identified within the MR Area

Heritage Resource	Description
H001	A farm complex including historical and more modern components. The complex is occupied and utilised. The complex includes a residence, workshops, sheds and cemented stonewalled cattle enclosures. A segment of stonewalling with wagon wheels is present on the perimeter of the *werf*, which may indicate an old entrance to the complex.
H002	A burial ground including 43 individual graves, orientated east-west and in at least four rows. Of these graves, eleven had headstones and nine had dressings. The headstones were either granite or cement and the dressings were cement. The graves with legible headstones belong to the Mokoena and Mbotou families and legible dates range from 1971 to 1985. The burial ground is not fenced.
H003	A burial ground including 14 individual graves. Dressings present in the burial ground include cement headstones, stone and brick borders, cement and granite dressings with granite headstones. The graves with legible headstones belong to the Mahlangu and Masielela families and legible dates range from 1989 to 2000. The burial ground is not fenced.
H004	An ash midden surrounded by dense grass cover. The midden includes burnt bone and fragments of glazed ceramics.
H005	A burial ground including 62 individual graves. Of these graves, 40 have headstones comprising granite, stone and cement. The graves with legible headstones belong to the Mahamba, Mashela, Mazibu, Mokwena, Mthethwa, Ntuli, Sibiya, Skaosa and Tsele families. Legible dates range from 1949 to 2000. The burial ground is not fenced.
H006	A dilapidated mud brick structure, measuring approximately 6 m by 3 m. Traces of blue plaster were observed on the walls of the structure. There were additional mud brick structures present at this point and two middens were identified next to the main structure. Green glass fragments, modern bricks, fragments of glazed ceramics, burnt bone, batteries and a rubber shoe were present in the middens. This site might represent a historic or past labour cottage and may be associated with H005, which is located 100 m away.

Heritage Resource	Description
H007	Two cylindrical brick towers, approximately 8 m high. These towers are capped with cement and there is no visible entrance or opening. A foundation and some remaining walls are adjacent to the towers.
H008	A burial ground including 11 individual graves. Of these graves, five have headstones comprising granite and cement graves. Seven of the graves are shaped as caskets, which have been placed side by side. Six of these graves are smaller and the one is larger. The graves with legible headstones belong to the Hartzenburg, Kotze and Vorster families. Legible dates range from 1932 to 1978. The burial ground is fenced off.
H009	Remains of a small structure with two rooms. This may be a storage room or a pen for animals and it may be associated with H010 (approximately 100 m away). The structure does not have a roof and glass and metal remains were present.
H010	This site includes two adjacent structures. The larger structure is approximately 30 m by 15 m wide and includes an entrance hall and room to the left of the entrance. The smaller structure measured approximately 15 m by 10 m. These structures were constructed from modern bricks with cement plaster. An additional structure made from mud bricks with cement plaster was located near the entrance to the larger structure. The mud brick structure measured approximately 4 m by 3 m. Fragments of glass, metal and building rubble were present on this site.
H011	A structure measuring approximately 30 m by 20 m. The structure was built from stonewalling and a combination of daga and cement mortar and was divided into three rooms by thick mud walls. A brick and cement structure was located 10 m from the main structure. This may have been a water tower but there was no water tank present.
H012	A burial ground including an unknown number of individual graves (the grave was identified by a different specialist and was not recorded by the heritage specialist). Nine graves had cement headstones. The burial ground is not fenced and is associated with H011.

10.12.1 Results from the Pre-disturbance Survey

Shannon Hardwick undertook a more recent pre-disturbance survey of the site-specific study area on 08 and 09 July 2020. This survey focused on areas covered by proposed infrastructure not investigated in the previous surveys and was predominantly pedestrian, with vehicular travel amongst areas under investigation.

All surveys undertaken were non-intrusive (i.e. no sampling was undertaken) and the aim of the surveys was to:

- Visually record the current state of the cultural landscape; and
- Record a representative sample of the visible, tangible heritage resources present within the development footprint area, site-specific study area and greater study area.

During the pre-disturbance survey undertaken for the current HRM process, one additional heritage resource was identified. Table 10-25 includes a summary of this heritage resource and Figure 10-26 includes photographs. Figure 10-27 includes the results of the pre-disturbance survey.

Table 10-25: Heritage Resources identified within the MRA

Heritage Resource	Description
H013	A burial ground including six visible individual graves. Of these graves, two have cement headstones. One of these headstones is no longer legible and the others are partially legible. The date is illegible. The other graves are marked by stone piles with upright stones serving as headstones. The burial ground is unfenced and is located in a void in an agricultural field.

Figure 10-26: Results of the Pre-disturbance Survey showing Newly Identified Heritage Resources

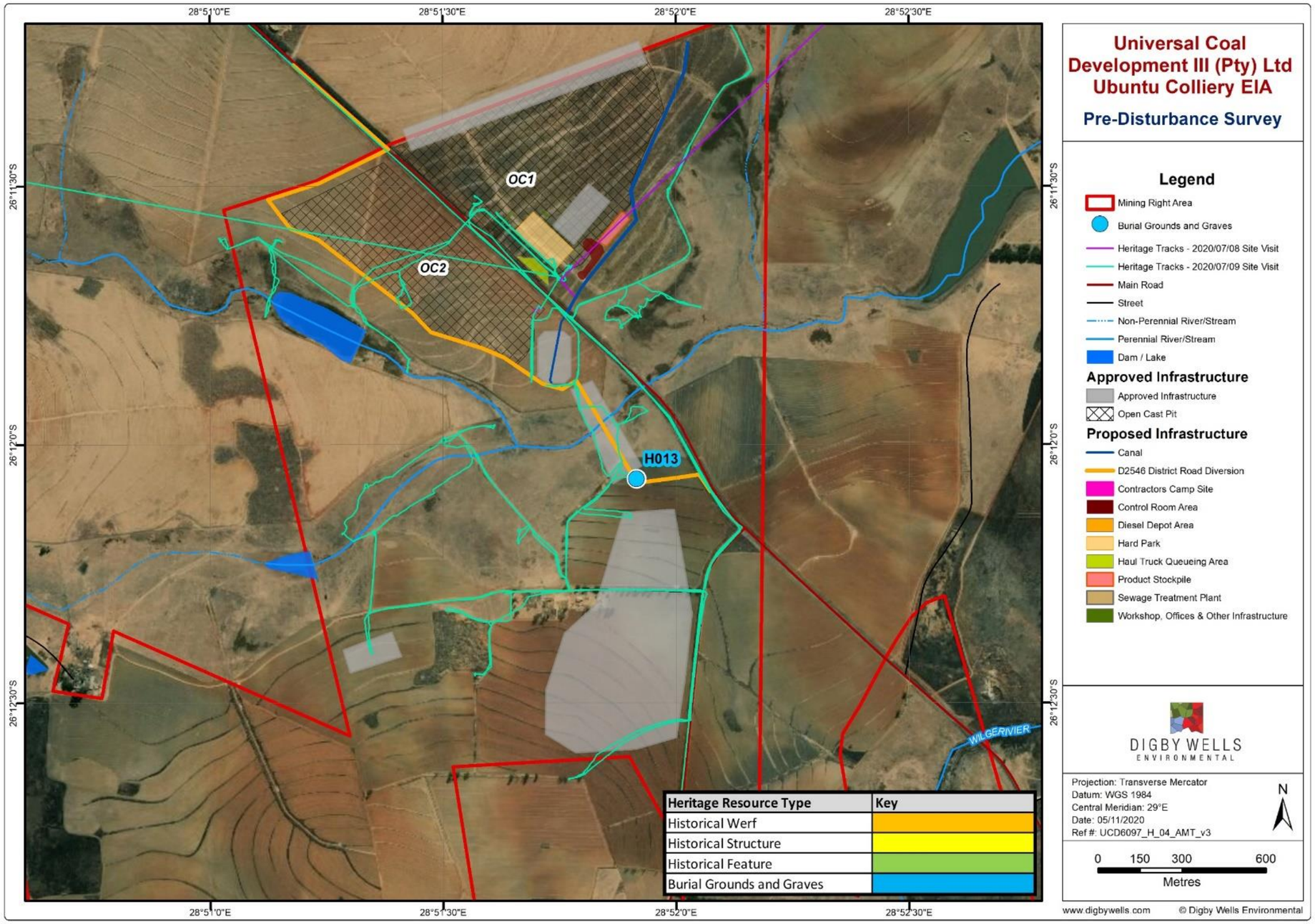


Figure 10-27: Results of the Pre-disturbance Survey

10.13 Traffic

The Traffic Impact Assessment (TIA) was conducted by EDL Engineers (Pty) Ltd and is attached to this report as Appendix K. The study was undertaken to investigate the expected peak hour traffic generated by the proposed mining development on Brakfontein 264-IR and to quantify, as well as evaluate its impact on the existing road network and the diversion of the district road D2543.

10.13.1 Surrounding Road Network

The following roads and streets are relevant to the study area:

- **District Road D2543:** This road functions as a Rural Distributor (Class 3) road and falls under the jurisdiction of Mpumalanga Department of Public Works, Roads and Transport (MDPWRT). This road is a single carriageway road with no median and one lane in each direction. Manually undertaken traffic counts indicate that this road carries traffic volumes of between 20 and 100 Vehicles per hour (vph) per direction during the weekday morning (AM) and afternoon (PM) peak hours.
- **District Road D1147:** This road functions as a Rural Collector (Class 4) road and falls under the jurisdiction of MDPWRT. This road is a short district road linking road D2543 and the R50 to the southwest. This road has a 'Stop' condition with D2543 having the right-of-way. D1147 is a surfaced (premix) road and carries less than 100vph during the weekday peak hours in both directions.
- **District Road D1274:** This road functions as a Rural Collector (Class 4) road and falls under the jurisdiction of MDPWRT. This road is a short rural district road linking road D2543 and the R50 the southeast. This road turns into gravel less than 100m from the D2543 and carries less than 50 vph per direction.
- Other Roads: Further away the R555 to the northwest functions as a rural district distributor (class 2) road linking the N12 (and towns such as Ogies and Delmas) with the R50 and is located more than 15 km from the proposed site access on Road D2543. This road is outside the study area. The D686 located about 6km to the southeast is a district distributor road linking the R50 and R555.

10.13.2 Future Road Network

No new roads or alignment changes are planned for the study area other than the proposed diversion of the D2543. The diversion of District Road D2543 is approximately 2.35 km long, have a lane width of 3.5 m (7 m wide in total), minimum horizontal curves of 240 m and a design speed of 80km/h.

10.13.3 Proposed Site Access

The proposed development is planned to comprise of one access point (D2543 access).

10.13.4 Existing Traffic Flows

Given the type and extent of the proposed development, the study area was defined to include two key intersections as required by COTO TMH and was analysed using SIDRA. Weekday Morning and Weekday Afternoon Traffic Counts were therefore carried out during the Weekday Morning (AM) and Weekday Afternoon (PM) commuter peak periods, in late January 2021, at the following identified intersections:

- D2543 & D1274; and
- D2543 & D1147.

The existing Weekday Morning (AM) and Weekday Afternoon (PM) peak hour traffic volumes at the above-mentioned key intersections are summarised in Figure 10-28. As the traffic counts were undertaken during the adjusted Level 3 of the Covid-19 Lockdown in January, a 20% positive adjustment to the traffic count volumes are deemed necessary as the peak hour traffic volumes have not returned to normal levels for the mining operations in the area.

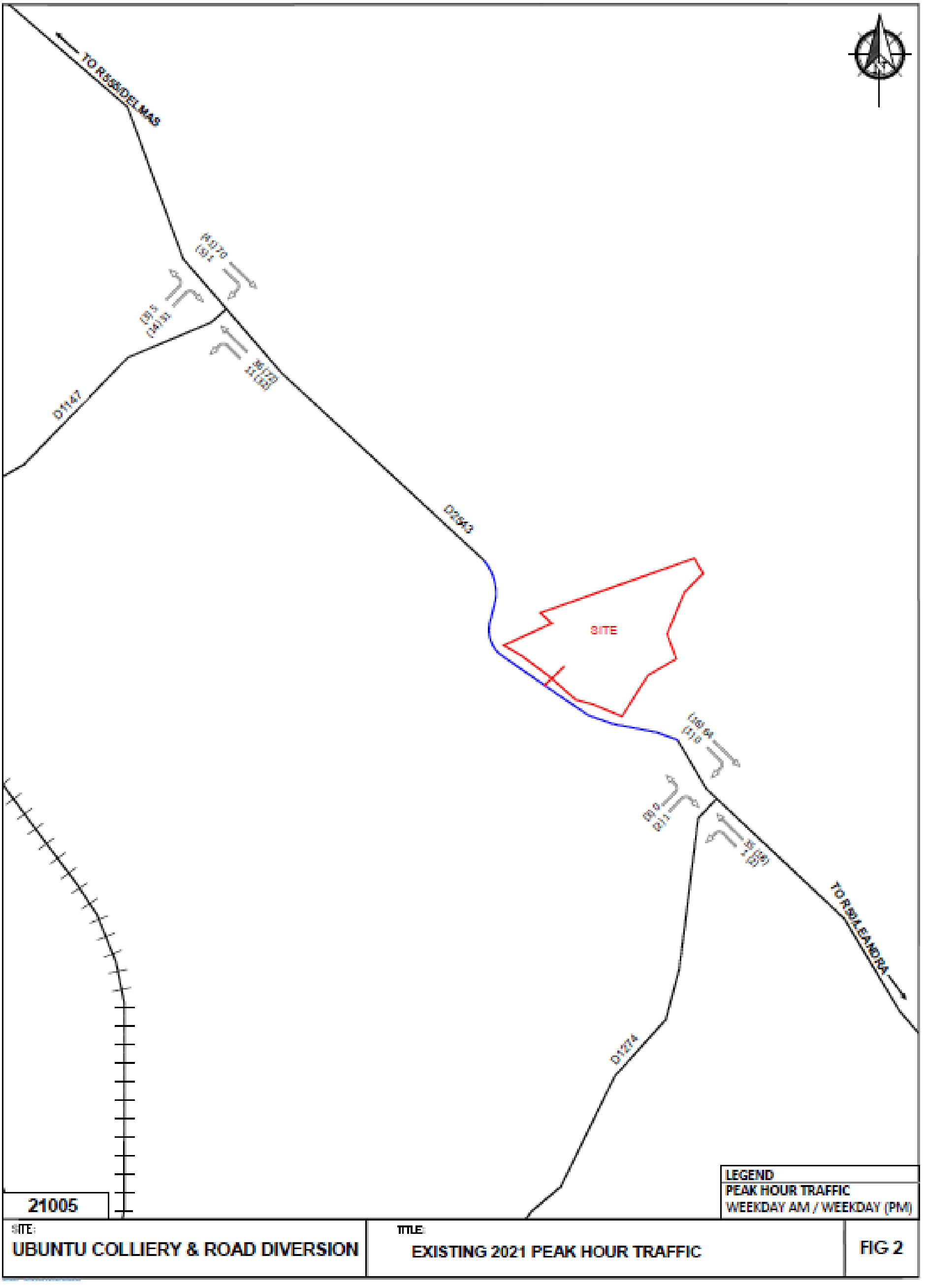


Figure 10-28: Existing 2021 Peak Hour Traffic

11 Item 3(j): Impacts and Risks Identified Including the Nature, Significance, Consequence, Extent, Duration and Probability of the Impacts

This section aims to rate the significance of the identified potential impacts pre-mitigation and post-mitigation. The potential impacts identified in this section are a result of both the environment in which the Project activity takes place, as well as the activity itself. The identification of potential impacts is performed by determining the potential source, possible pathways and receptors. In essence, the potential for any change to a resource or receptor (i.e. environmental aspect) brought about by the presence of a Project component or by a Project-related activity has been identified as a potential impact.

The potential impacts are discussed per environmental feature/ aspect and according to each phase of the Project i.e. the construction, operational and decommissioning/ post closure Phases. The significance, probability and duration of these potential impacts have been assessed based on the detailed specialist studies undertaken on the sensitivity of the receiving environment. The main Project activities to take place during the construction, operational and decommissioning phases may pose potential impacts on the receiving environment and are described in Table 5-1 above.

11.1 Impacts and Mitigations per Project Phase

The potential impacts that were identified for the construction, operational and decommissioning phases, are discussed in Table 11-2. The impact matrix abbreviations used in Table 11-2 are provided in Table 11-1 below.

Table 11-1: Impact Matrix Abbreviations

Abbreviation	Definition
D	Duration
E	Extent
I	Intensity
P	Probability
S	Significance

Table 11-2: Impact Assessment associated with the Construction, Operational and Decommissioning Phases

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
Construction	Surface preparation for infrastructure.	Soil, Land Use and Capability	• Compaction of soil and therefore increased surface runoff; • Increased wind, and water erosion on unprotected soils and consequently sedimentation as these soils are highly erodible; • Removal of vegetation and basal cover, increasing the potential loss of topsoil, organic material and decreased soil fertility; • Compaction, ponding, and changes to the natural hydrological functioning of the landscape; • Loss of usable soil as a resource for agriculture – disturbance, low fertility, erosion and compaction; and • Loss of Land Capability and agricultural land due to complete restrictions to cattle grazing (current land use). Reduced area for cattle grazing.	7	1	4	7	84	Medium-high (negative)	• If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • The topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks; • Plan site clearance and alteration activities for the dry season (May to October); • Restrict extent of disturbance within the Ubuntu Colliery Project Area and minimise activity within designated areas of disturbance; • Minimise the period of exposure of soil surfaces through dedicated planning; • Stripping operations should only be executed when soil moisture content will minimise the risk of compaction (during dry season); • Aim to minimise (or even cease) workings on windy days; • During stockpiling, preferably use the ‘end-tipping’ method to keep the stockpiled soils loose; • Ensure stockpiles are placed on a free draining location to limit erosion loss and waterlogging; • Limit stockpile height – a safe height can be regarded as the height at which material can be placed without repeated traffic over already placed material; and • Soil surface (only where top soil is partially removed) can be loosened via tillage/ripping.	5	1	4	7	70	Minor (negative)
Construction	Construction of surface infrastructure.	Soil, Land Use and Capability	• Complete removal of the soil and change in land capability during the construction of the open-cast pit; • Soil contamination;	7	4	4	7	105	Medium-high (negative)	• Ensure proper storm water management designs are in place; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place;	6	1	4	7	77	Medium-high (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
			• Migration of contaminants into groundwater and contaminate freshwater systems; and • Loss of land use and land capability (agricultural potential).							• If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • If any spillage occurs, clean up and remediate immediately; • Spill containment and clean up kits should be available onsite and clean-up from any spill must be in place and executed at the time of a spillage with appropriate disposal as necessary; • Stabilise sides with vegetation and erosion berms to prevent head-cut erosion and loss of soil; and • Implement post-mitigation monitoring to ensure the well-functioning of the road diversion and canal. This should include a AIPs plan.						
Construction	Site preparation including vegetation clearance and excavations.	Surface Water	• Sedimentation and siltation of nearby watercourses.	5	4	3	6	72	Minor (negative)	• If possible, construction activities must be prioritised to the dry months of the year (May to September) to limit mobilisation of sediments, dust generation and mobilisation hazardous substances from construction vehicles used during construction phase; • Dust suppression on the haul roads and other cleared areas must be undertaken on regular basis to prevent or limit dust generation; • Hydrocarbon and hazardous waste storage facilities must be appropriately bunded to ensure that leakages can be contained. Spill kits should be in place and construction workers should be trained in the use of spill kits to contain and immediately clean up any leakages or spills; • Vehicles should regularly be maintained as per a developed maintenance program. Vehicles should also be inspected daily before use to ensure there are no leakages; • Drip trays must be used to capture any oil leakages. Servicing of vehicles and machinery should be undertaken at designated hard park areas. Any used oil should be disposed of by accredited contractors; and	2	2	2	3	18	Negligible (negative)
Construction	Handling of hydrocarbons and other chemicals; Loading, hauling and transportation of product coal.	Surface Water	• Surface water contamination leading to deterioration of water quality.	5	4	3	5	60	Minor (negative)		5	2	2	2	18	Negligible (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										• Ensuring implementation of a stormwater management plan to prevent the mixing of clean and dirty water.						
Construction	• Site clearance and topsoil removal and limited excavations; and • Potential small-scale dewatering (if required).	Groundwater	• Potentially increased risk to the groundwater should spillage events occur and introduce contaminants into the groundwater environment; and • Lowering of the local water levels.	Construction activities are expected to mainly take place above the groundwater table. However, if required, localised groundwater abstraction and subsequent lowering of the water table should be kept to a minimum. However, water level recovery is expected to occur within the construction phase, with no residual impacts expected during the operational phase.												
Construction	Surface preparation for infrastructure.	Wetlands	• Direct loss of wetland areas; • Loss of biodiversity; • Erosion and sedimentation of wetland areas; • Water quality contamination and deterioration; and • Habitat loss due to poor water quality.	7	4	7	7	126	Major (negative)	• Establishment of at least a 100 m buffer zone around the remaining wetlands to protect wetland areas from the proposed developments. This would require that development occur further than 100 m from a delineated wetland area; • Revegetate the area as soon as possible to prevent erosion, sedimentation and habitat loss within the wetlands; • Restrict access to the remaining wetlands; • Place sediment trapping berms on the boundary of the 100 m buffer or end of development; • Do an offset calculation to determine the impacts and total amount of wetland habitat loss to understand the amount of wetlands to be offset; and • Develop a Wetland Offset Strategy, Rehabilitation Plan and a Monitoring Plan for the wetlands.	7	3	5	7	105	Moderate (negative)
Construction	Construction of surface infrastructure.	Wetlands	• Direct loss of wetland areas; • Habitat loss; • Loss of biodiversity; • Water contamination; and • Erosions and sedimentation of wetland areas.	7	4	7	7	126	Major negative	• Establishment of at least a 100 m buffer zone around the remaining wetlands to protect wetland areas from the proposed developments within the Project area. This would require that development occur further than 100 m from a delineated wetland area; • Ensure well-functioning culverts at the road crossing and wetland crossings to ensure free flow;	6	3	5	5	70	Minor (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										• Reseed and vegetate the wetlands with wetland vegetation after construction to prevent erosion and sedimentation; • Prevent access to the remaining wetlands; • Place sediment trapping berms on the boundary of the 100 m buffer or end of development; • Do an offset calculation to determine the impacts and total amount of wetland habitat loss to understand the amount of wetlands to be offset; and • The development of a Wetland Offset Strategy and Rehabilitation plan for the wetlands in the Project Area.						
Construction	Surface preparation and construction of proposed infrastructure	Aquatics	• Land and vegetation manipulation/clearing for infrastructure in proximity to the watercourses potentially draining into the northern tributary of the Wilge River.	5	4	-4	6	78	Moderate (negative)	• Construction activities must maintain a 100 m buffer zone from watercourses; • Limit vegetation removal to the infrastructure footprint area only. Where removed or damaged, vegetation areas (riparian or aquatic related) should be revegetated as soon as possible; • Bare land surfaces downstream of construction activities must be vegetated to limit erosion from the expected increase in surface runoff from infrastructure; • Environmentally friendly barrier systems, such as silt nets or, in severe cases, use trenches downstream from construction sites to limit erosion and possibly trap contaminated runoff from construction; • Storm water must be diverted from construction activities and managed in such a manner to disperse runoff and prevent the concentration of storm water flow; • Water used at construction sites should be utilised in such a manner that it is kept on site and not allowed to run freely into nearby watercourses (i.e. use of a PCD); • Construction chemicals, such as paints and hydrocarbons, should be used in an environmentally safe manner with correct storage as per	5	3	-3	5	55	Minor (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										each chemical's specific storage descriptions; • All vehicles must be frequently inspected for leaks; • No material may be dumped or stockpiled within any rivers, drainage lines in the vicinity of the proposed establishment of new infrastructure; • All waste must be removed and transported to appropriate waste facilities; and • High rainfall periods (usually November to March) should be avoided during construction to possibly avoid increased surface runoff in attempt to limit erosion and the entering of external material (i.e. contaminants and/or dissolved solids) into associated aquatic systems.						
Construction	Physical construction of infrastructure over natural aquatic ecosystems	Aquatics	• Vegetation removal for site access and potential hydrological disturbance of associated watercourses.	6	4	-6	6	96	Moderate (negative)	• Mitigation measures detailed for the site and vegetation clearing impact should be applied to areas leading up to the watercourse crossing points. However, the infrastructure construction over a watercourse needs additional attention due to the proximity of the activity to the aquatic ecosystems; • The design as well as the physical construction of roads should not alter the natural hydrology and connectivity of the watercourses in any way (i.e. damming or creating barriers); • Any infrastructure proposed to be in contact with the substrate/channel bottom should allow for the free flow of water and material. If hard surfaces are going to be used as foundation or if culverts are going to be installed, their base should not be noticeable above the natural channel bottom to maintain connectivity; and • Monitoring of the crossing points should also form part of the management actions to ensure correct flow occurs through the crossing point, especially during the wet season.	6	2	-2	3	30	Negligible (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
Construction	Site Clearing, Construction of Surface Infrastructure and Topsoil Stockpiling.	Air Quality	• Reduction in ambient air quality.	1	2	2	6	30	Negligible (negative)	• Application of a dust suppressant on the haul roads and exposed areas; • Limit activity to non-windy days (wind speed less than 5.4 m/s); • Set maximum speed limits on haul roads and have these limits enforced; • The area of disturbance must be kept to a minimum at all times and no unnecessary clearing, digging or scraping must occur, especially on windy days; • The drop heights when loading onto trucks and at tipping points should be minimised; • The enclosure of crushers; and • Application of fogging system at the crusher.					12	Negligible (negative)
Construction	Construction phase activities.	Noise	• Noise will emanate from the machinery and vehicles operating during the construction activities.	2	2	2	3	18	Negligible (negative)	• Construction activities should be restricted to daylight hours (06:00 – 18:00); • Construction machinery and vehicles should be switched off when not in use; • Construction vehicles should have buzzer type reverse alarms (producing band-limited white noise) installed, rather than the conventional beeping type reverse alarms (which produce a tonal sound); • Vehicles to be serviced as per their design requirements to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and • Regulate vehicle speeds on the access and haul roads.					12	Negligible (negative)
Construction	Surface preparation for infrastructure	Heritage	• Direct impact to Heritage Resource H013.	7	7	-7	6	126	Major (negative)	• The project related mitigation must aim to amend the project design to avoid the potential negative impact to the heritage resource. Where it is determined that the negative impact may not manifest, the heritage resource must be incorporated into an HSMP for implementation. Should Universal Coal have an HSMP, H013 must be incorporated into the existing HSMP and be subject to the same requirements encapsulated therein.	6	1	5	1	72	Moderate (positive)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										• Where Project redesign and in situ conservation is not feasible based on the current mining operations and location of the mineral resources, heritage related mitigations must be employed. Heritage related mitigations will need to be undertaken in accordance with the requirements of the NHRA and NHRA Regulation, 2000 (GN R 548) will be required. Such mitigations may include a Burial Grounds and Graves Consultation (BGGC) to assess whether a GRP (which must be undertaken in accordance with Section 36 of the NHRA and Chapter IX and XI of the NHRA Regulations) is feasible. • An alternative Project design has been considered. Digby Wells assumes that Project design is the preferred alternative, and the post-mitigation impact assessment considers this mitigation strategy.						
Operational	Operation and maintenance of infrastructure	Soil, Land use and Capability	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water); • Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.	7	3	5	7	105	Medium-high (negative)	• Re-vegetate cleared areas and stockpiles to avoid wind and water erosion losses; • Preserve looseness of stockpiled soil by executing fertilisation and seeding operations by hand; • Soil stockpiles should be monitored for fertility via sampling and testing; • Monitoring of the condition of all unpaved roads is necessary due to the high rainfall and potential water runoff and erosion of the soils present in the Ubuntu Colliery Project Area. Water runoff from compacted road surfaces may cause erosion of road shoulders degrading the road surface. Weekly inspections need to be carried out of all unpaved roads especially during the rainy season. • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • A Topsoil Management Plan (TMP) must be prepared to demonstrate how topsoil will be preserved in a condition	7	2	3	5	60	Minor (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										as near as possible to its pre-mining condition to allow successful mine rehabilitation (Statham, 2014); • Long term stockpiles should be revegetated to minimise loss of soil quality. This will minimise AIPs, maintain soil organic matter levels, maintain soil structure, and microbial activity; and • Soil pollution monitoring should be conducted at selected locations on the project site to detect any high levels of pollutants.						
Operational	Use and maintenance of haul roads (incl. transportation of coal to washing plant).	Soil, Land use and Capability	• Compaction of soil and increased runoff potential; • Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; • Increased erosion, and consequently sedimentation; • Soil contamination from spills and leakages.	5	5	4	6	84	Moderate (negative)	• Only the designated access routes are to be used to reduce any unnecessary compaction; • Compacted areas are to be ripped to loosen the soil structure. • Operations vehicles and equipment should be serviced regularly; • Service and parking areas must be paved; • Operation vehicles should remain on designated and prepared compacted gravel roads; • Spill containment and clean up kits should be available onsite and clean-up from any spill must be in place and executed at the time of a spillage with appropriate disposal as necessary; • Fuel and heavy hydrocarbon products storage on site should be secured by bunded facilities; and • It is advisable to develop a soil monitoring plan and implement it after construction through collecting and analysis of soil samples within the MOP area.	5	5	3	4	64	Minor (negative)
Operational	Operational activities (Runoff from the dirty water areas)	Surface Water	• Surface water contamination by runoff from dirty water areas.	3	5	4	5	60	Minor (negative)	• Runoff from dirty areas should be directed to the storm water management infrastructure and should not be allowed to flow into the natural environment, unless DWS discharge authorisation and compliance with relevant discharge standards as stipulated in the NWA is obtained;	2	2	2	2	18	Negligible (negative)
Operational	Hydrocarbons and chemicals spillages and leakages from equipment, moving haulage trucks and machinery.	Surface Water	• Surface water contamination by hydrocarbon waste and deterioration of water quality.	5	4	3	6	72	Minor (negative)		5	2	2	2	18	Negligible (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										• The existing water quality monitoring program should be conducted for the life of mine and for a few years post closure for ongoing monitoring of water resources within and in close proximity to the project area to allow detection of any contamination arising from mine activities; • The management of general and other forms of waste must ensure collection and disposal into clearly marked skip bins that can be collected by approved contractors for disposal to appropriate disposal sites; • The overall housekeeping and storm water system management (including the maintenance of berms, de-silting of dams and conveyance channels and clean-up of leaks) must be maintained throughout the life of mine; • The hydrocarbon and chemical storage areas and facilities must be located on hard-standing area (paved or concrete surface that is impermeable), roofed and bunded in accordance with SANS1200 specifications. This will prevent mobilisation of leaked hazardous substances; and • Training of mine personnel and contractors in proper hydrocarbon and chemical waste handling procedures is recommended.						
Operational	Storage or stockpiling of potentially contaminating fluid or material within surface infrastructure	Groundwater	• Potential groundwater contamination if the various potential sources infiltrate into the groundwater environment.	The following actions are recommended: • The infrastructure listed below should be lined: • STP; • Product Stockpile; • WTP; and • Crushing facilities and stockpile area; • Hydrocarbons and hazardous materials must be stored in bunded areas (diesel depot area). If a considerable amount of fluid is accidentally spilled, the contaminated soil should be collected and disposed at an acceptable waste facility. The excavation should be backfilled with good quality soil.												
Operational	Operation and maintenance of infrastructure	Wetlands	• Water quality contamination and deterioration;	7	5	5	7	119	Moderate (negative)	• Restrict access to all remaining wetlands with at least a 100 m buffer; • Maintain and monitor wetland functionality;	5	3	4	6	72	Minor negative

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
			• Habitat loss as a result of poor water quality; • Loss of biodiversity; and • Erosion and Sedimentation within the wetlands							• Clean up spillages of coal, oils, lubricants and hydrocarbons immediately, where large spills have occurred, remove the impacted soils and remediate immediately; • It is recommended that no new river/stream crossing be erected, there are several crossings within the site that can be improved for better wetland functionality and operational functionality and this will include the insertion of culverts; • Construct sediment trapping berms on edges of the roads; • Establish vegetation on berms and edges of the road to minimise the risk of erosion; • Where possible, create a preferential flow of runoff and wastewater directed towards the PCD; • Monitor the roads monthly to identify and rectify any areas that have begun to erode and where water may be flowing towards wetland areas; and • It is recommended that all mitigation measures recommended by the Digby Wells Groundwater Report for the Ubuntu Coal Mine Project be followed to prevent dewatering of wetlands.						
Operational	Use and maintenance of haul roads (incl. transportation of coal to washing plant).	Wetlands	• Erosion of wetland crossings associated with the road diversion; • Accidental spills causing soil and water contamination; • Habitat loss as a result of poor water quality; • Increased Alien Invasive Plants (AIPs); • Loss of biodiversity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition.	6	3	7	6	96	Moderate (negative)	• Implement quarterly monitoring of the wetland health and functionality and rehabilitation recommendations at the wetland crossings associated with the road diversion as well as downstream of the WTP, STP and wash plant; • Access roads must be maintained and monitored to prevent erosion, head-cut erosion, sedimentation, increased AIPs and loss of wetland habitat and functionality; and • Clean up spillages of coal, oils, lubricants and hydrocarbons immediately, where large spills have occurred, remove the impacted soils and remediate immediately.	6	3	3	4	48	Minor (negative)
Operational	Operation and maintenance of infrastructure. Use and	Aquatics	• Uncontrolled contaminated runoff of stormwater or water	5	4	-5	5	70	Minor (negative)	• Runoff from dirty areas should be directed to the storm water management infrastructure (drains	5	1	-1	3	21	Negligible (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
	maintenance of haul roads (incl. transportation of coal to washing plant).		generated from the mining operations from or through the surface infrastructure leading to water quality and habitat deterioration of watercourses.							and PCDs) and should not be allowed to flow into the surrounding environment, unless DWS discharge authorisation and compliance with relevant discharge standards as stipulated in the NWA is obtained; • Channelled water should not be dispersed in a concentrated manner. Baffles should be incorporated into artificial drainage lines/channels around the surface infrastructure to decrease the kinetic energy of water as it flows into the natural environment; • Bare surfaces downstream from the developments where silt traps are not an option should be vegetated in order to attempt to limit erosion and runoff that might be carrying contaminants; • Careful monitoring of the areas where dust suppression is proposed should be undertaken regularly. Areas concentrating water runoff should be addressed and not allowed to flow freely into associated watercourses; and • Monitoring of the associated northern tributary of the Wilge (including infrastructure at the river crossing) and the main stem Wilge River reach should be done by an aquatic specialist in order to determine potential impacts where after new mitigation actions should be implemented as per the specialist's recommendations.						
Operational	• Establishment of Open Pit, Removal of Material, Stockpiling, Operation of the Plant and Construction of Surface Infrastructure.	Air Quality	• Dust generation and reduction in ambient air quality.	5	3	5	6	78	Major (negative)	• Application of dust suppressant on the haul roads and exposed areas; • Limit activity to non-windy days (wind speed less than 5.4 m/s); • Set maximum speed limits on haul roads and have these limits enforced; • The area of disturbance must be kept to a minimum at all times and no unnecessary clearing, digging or scraping must occur, especially on windy days;	5	2	2	4	36	Negligible (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										• Enclosure of the crusher and screening circuit, fitted with dust suppression spays; and • The drop heights when loading onto trucks and at tipping points should be minimised.						
Operational	• Operational phase activities	Noise	• Noise will emanate from the machinery and vehicles operating during the operational activities.	5	4	2	4	44	Minor (negative)	• Machinery and vehicles should be switched off when not in use; • Construction vehicles should be have buzzer type reverse alarms (producing band-limited white noise), rather than the conventional beeping type reverse alarms (which produce a tonal sound); • Vehicles to be serviced as per their design requirements to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and • Regulate vehicle speeds on the access and haul roads.	5	3	1	3	21	Negligible (negative)
Operational	Operation and maintenance of infrastructure; and Use and maintenance of haul roads (incl. transportation of coal to washing plant).	Heritage	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure.													
Decommissioning	Demolition and removal of all infrastructure (incl. transportation off site)	Soil, Land use and Capability	• Soil contamination from decommissioning of infrastructure such as the STP, WTP, depot area, offices and stockpile area; • Loss of usable soil as a resource – Erosion, sedimentation, and Compaction; and • Loss of land capability.	7	3	57		105	Medium-high (negative)	• Demolition and removal of infrastructure should be restricted to the dry season (May to October); • Opencast mine areas must be reshaped, and the soil replaced. Subsoil first then topsoil; • Total soil thickness must at least be 1 m (including 0.3 m topsoil) for the arable areas and 0.35 m (topsoil) for grazing land; • Minimize the period of exposure of soil surfaces through dedicated planning; • Foundation excavations should be filled, fertilised and re-vegetated using local vegetation; • Ensure proper storm water management designs are in place and should be kept in place until all infrastructure is removed. Where	7	1	3	3	33	Negligible (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										infrastructure will remain, stormwater and culverts should be maintained and monitored for erosion and AIPs; • Continue with Concurrent Rehabilitation, and implement land rehabilitation measures; • Address compacted areas by deep ripping to loosen the soil, and revegetate the area as soon as possible; • Only designated access routes are to be used to reduce any unnecessary compaction; • The backfilled, reprofiled landscape should be top soiled and revegetated to allow free drainage close to the pre-mining conditions; • Inventory of hazardous waste materials stored on-site should be compiled and arrange complete removal; and • During the decommissioning of infrastructure such as the STP, WTP, depot area, offices and stockpile area, the contaminated material should be removed. The contaminated material should be disposed of at a registered landfill site.						
Decommissioning	Rehabilitation (spreading of soil, revegetation, and profiling/contouring)	Soil, Land use and Capability	• Loss of usable soil as a resource – Erosion and Compaction; and • Loss of Land capability; and • Positive impact to the soil, land use and land capability.	7	1	3	7	77	Moderate (negative)	• Continue with Concurrent Rehabilitation, and implement land rehabilitation measures; • Address compacted areas by deep ripping to loosen the soil, and revegetate the area as soon as possible; • Inventory of hazardous waste materials stored on-site should be compiled, and arrange complete removal; • Ensure proper stormwater management designs are in place to ensure no excessive run-off or pooling occurs; • Only designated access routes are to be used to reduce any unnecessary compaction; and • The backfilled, reprofiled landscape should be top soiled and revegetated	7	1	3	3	33	Negligible (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										to allow free drainage close to the pre-mining conditions.						
Decommissioning	Installation of post-closure water management infrastructure	Soil, Land use and Capability	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water); • Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.	7	1	3	7	77	Moderate (negative)	• Revegetate cleared areas to avoid wind and water erosion losses; • Monitoring of the condition of all unpaved roads is necessary due to the high rainfall and potential water runoff and erosion of the soils present in the Ubuntu Colliery Project Area; • Water runoff from compacted road surfaces may cause erosion of road shoulders degrading the road surface. Weekly inspections need to be carried out of all unpaved roads especially during the rainy season. • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • Soil pollution monitoring should be conducted at selected locations on the project site to detect any high levels of pollutants; • Continue with Concurrent Rehabilitation, and implement land rehabilitation measures; • Address compacted areas by deep ripping to loosen the soil, and revegetate the area as soon as possible; and • Ensure proper stormwater management designs are in place to ensure no excessive run-off or pooling occurs.	7	1	3	3	33	Negligible (negative)
Decommissioning	Demolition of mine infrastructure (workshops, haul roads, processing plant etc.) Disturbance of soils and erosion by overland flow	Surface Water	• Sedimentation and siltation of nearby watercourses and deterioration of water quality.	2	4	3	7	63	Minor (negative)	• Restore the topography to pre-mining conditions as much as is practically possible by backfilling, removing stockpiles and restore the slope gradient and angle of the site; • Immediate revegetation of cleared areas; • Where practical, decommissioning activities should be prioritized during dry months of the year (May to September); • Movement of demolition machinery and vehicles should be restricted to	2	2	2	2	12	Negligible (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										• designated access roads to minimise the extent of soil disturbance; • Use of accredited contractors for removal or demolition of infrastructure during decommissioning is recommended; this will reduce the risk of waste generation and accidental spillages; and • Ensure that the infrastructure (pipelines, fuel storage areas, pumps) are first emptied of all residual material before decommissioning.						
Decommissioning	Rehabilitation of disturbed sites close to pre-mining conditions	Surface Water	• Restoration of pre-mining streamflow regime in nearby watercourses.	7	4	5	7	112	Major (positive)	No mitigation required.					112	1Major (positive)
Decommissioning	Demolition and or removal of all infrastructure and rehabilitation of the disturbed areas.	Groundwater	• Removal of potential contamination sources.	No management actions are required.												
Decommissioning	Demolition and removal of all infrastructure (incl. transportation off site).	Wetlands	• Water quality contamination and deterioration due to an increase in sedimentation; • Habitat loss as a result of poor water quality; • Loss of biodiversity; • Loss of wetland areas; • Soil erosion due to surface runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition.	6	6	4	5	80	Moderate (negative)	• The road diversion should be permanent and not removed; • The water/sewage treatment plant may have uses post-closure for the surrounding community, this should be considered before removal; • Once trenches have been backfilled and infrastructure removed, vegetation should be established on the exposed soil surfaces to minimise the risk of erosion and sedimentation into the wetland areas; • During the rehabilitation, temporary sediment trapping berms should be erected to prevent any sediment arising from rehabilitation activities washing into wetland areas; • As far as possible, conduct decommissioning work of infrastructure during the dry season and re-seeding in the wet-season; • Clean up spillages of coal, oils, lubricants and hydrocarbons immediately, where large spills have occurred, remove the impacted soils and remediate immediately; and	2	2	4	5	40	Minor (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										• Continue with a wetland monitoring and rehabilitation plan beyond life of mine until final closure.						
Decommissioning	Rehabilitation (spreading of soil, revegetation, and profiling/contouring)	Wetlands	• Erosion due to exposed areas to wind and surface water runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity of the wetlands; • Change in habitat and potential change in species composition; and • Increased AIPs.	3	2	4	5	45	Minor (negative)	• Landscape and vegetate the exposed areas as soon as possible to prevent erosion and sedimentation within the wetlands; • Shaping of landscape should be performed in a manner the will water to drain freely towards wetland areas; • Avoid creating narrow preferential flow paths as the this could lead to erosion; and • As far as possible, conduct decommissioning of infrastructure work during the dry season and re-seeding in the wet season.	2	2	3	5	35	Negligible (negative)
Decommissioning	Installation of post-closure water management infrastructure	Wetlands	• Soil and water contamination from decant and spillage from WTP and STP; • Increased runoff and changes to the wetland functionality; • AIPs proliferation due to changes to the natural landscape, soils and wetlands; • Erosion and sedimentation in wetlands; and • Changes to the habitat, wetland functionality and biodiversity.	3	2	4	5	45	Minor (negative)	• The water management system will only be installed once the dirty areas have been cleaned and it is deemed there is no risk of water contamination; • Once trenches have been backfilled and infrastructure removed, vegetation should be established on the exposed soil surfaces to minimise the risk of erosion; • During the construction, temporary sediment trapping berms should be erected to prevent any sediment arising from rehabilitation activities washing into wetland areas; and • Implement a monitoring plan beyond life of mine or until final closure.	2	2	3	4	28	Negligible (negative)
Decommissioning	Physical removal of surface infrastructure and rehabilitation activities near and within drainage lines	Aquatics	• Water quality and habitat deterioration of watercourses in contact with heavy machinery and receiving runoff from surface workings.	3	4	-5	5	60	Minor (negative)	• High rainfall periods should be avoided during decommissioning; • Removed or damaged vegetation areas should be revegetated; • Storm water must be diverted from decommissioning activities; • Water used during decommissioning should be kept onsite and not be allowed to freely flow into nearby watercourses; • Stored mine-affected water should be treated before decommissioning of	3	1	-1	3	15	Negligible (negative)

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
										• any mine-related water retention areas, such as PCDs; • Land reprofiling should be done during the dry season to allow for attempts to restore the morphology of the hillslope wetlands prior to rainfall/flow events; • Ensure the revegetation activities use appropriate indigenous plant species.						
Decommissioning	Demolition and Removal of Infrastructure and Rehabilitation	Air Quality	• Dust generation and reduction in ambient air quality.	3	2	2	6	42	Major (negative)	• Application of dust suppressant on the haul roads and exposed areas; • Limit activity to non-windy days (wind speed less than 5.4 m/s); • Set maximum speed limits on haul roads and have these limits enforced; • The area of disturbance must be kept to a minimum at all times and no unnecessary clearing, digging or scraping must occur, especially on windy days; • The drop heights when loading onto trucks and at tipping points should be minimised • Rehabilitation of disturbed land to allow for vegetation growth.	3	1	1	4	20	Negligible (negative)
Decommissioning	Decommissioning phase activities	Noise	• Noise will emanate from the machinery and vehicles operating during the construction activities.	2	2	2	3	21	Negligible (negative)	• Restrict decommissioning activities to daylight hours (06:00 – 18:00); • Regularly service decommissioning related machines and vehicles to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; • Construction vehicles should have buzzer type reverse alarms (producing band-limited white noise) installed, rather than the conventional beeping type reverse alarms (which produce a tonal sound); • Regulate speed limits on access roads; and • Switch off equipment when not in use.					12	Negligible (negative)
Decommissioning	Demolition and removal of all infrastructure (incl. transportation off site); Rehabilitation (spreading of soil, re-vegetation and	Heritage	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure. Should any infrastructure intended for demolition increase in age to older than 60 years during the Project lifecycle, the structure must be considered a heritage structure. Any alterations to these structures will be subject to a NHRA Section 34 permit application process.													

Phase	Activity	Aspect	Impacts	D	E	I	P	S	Rating (Pre-Mitigation)	Mitigation Measures	D	E	I	P	S	Rating (Post Mitigation)
	profiling/contouring); and Installation of post-closure water management infrastructure															

11.2 Traffic Impacts

The SIDRA 9 engineering software was used to determine the expected traffic impact of the proposed road diversion. The analyses considered the D2543 and D1274, D2543 and D1147 as well as D2543 and Access intersections.

The following section summarises the results of the impact assessment.

11.2.1 D2543 & D1274:

The intersection of D2543 & D1274 currently operates at a worst-case Level of Service (LOS) A with an average delay of 5.7 seconds. With the implementation of the proposed development and the diversion as well as the additional estimated 5-year traffic growth, this intersection will have a worst-case Level of Service of (LOS) A, with a longer average delay of 6.0 seconds. The intersection will still operate at acceptable conditions (good Levels of Service and Ave. Delays) and therefore no upgrades are proposed at this intersection for the proposed development.

11.2.2 D2543 & D1147:

The intersection of D2543 & D1147 currently operates at a worst-case Level of Service (LOS) A with an average delay of 8.9 seconds. With the implementation of the proposed development and the diversion as well as the additional estimated 5-year traffic growth, this intersection will have a worst-case Level of Service of (LOS) A, with a longer average delay of 9.6 seconds. The intersection will still operate at acceptable conditions (good Levels of Service and Ave. Delays) and therefore no upgrades are proposed at this intersection for the proposed development.

11.2.3 D2543 & Access:

With the implementation of the proposed development and the additional estimated 5-year traffic growth traffic, the access will have a worst-case Level of Service of (LOS) A with an average delay of 10.0 seconds. This access will operate at acceptable conditions (good Levels of Service and Ave. Delays) and therefore suitable for the proposed development.

11.3 Cumulative Impacts

The importance of identifying and assessing cumulative impacts is that the whole is often greater than the sum of its parts. This implies that the total effect of multiple stressors or change processes acting simultaneously on a system may be greater than the sum of their effects when acting in isolation. The cumulative impacts considered by the relevant specialists are discussed per environmental aspect, below.

11.3.1 Soil, Land Use and Land Capability

Cumulative impacts on soil resources were viewed in the light of similar mining or related operations within the catchment that contribute similar or related pollutants to soil resources within or downstream of the Project Area.

Soil quality deteriorates during stockpiling and replacement of these soil materials into soil profiles during rehabilitation cannot imitate pre-mining soil quality properties. Depth however can be imitated but the combined soil quality deterioration and resultant compaction by the machines used in rehabilitation, leads to a net loss of land capability. A change in land capability then forces a change in land use.

The impact on soil is high because natural soil layers are stripped and stockpiled for later use in rehabilitation. In addition, soil fertility is impacted because stripped soil layers are usually thicker than the defined usable soil layer. The usable soil layer is the layer where most plant roots are found and is generally 0.3 m thick.

Mining and associated activities impacting the soil resources include changes to the physico-chemical properties of the soil. Impacts include:

- Geomorphological changes to the natural soils and landscape;
- Loss of habitat, vegetation and growth medium;
- Erosion, destruction of agricultural land, loss of topsoil and organic material;
- Sedimentation and pollution of water courses (wetlands);
- Soil contamination through acid and sulphate, mine impacted water (decant water) and heavy metals; and
- Soil contamination potentially could create large problems for the downstream land users, such as cattle drinking water and human consumption.

The cumulative impacts may therefore have a significant effect on the soil resources and therefore impacting the land use and land capability of the Project Area. Contaminated soil will directly impact the water quality and quantity as well as vegetation of the area.

11.3.2 Wetlands and Aquatics

The Project Area is in the Wilge River sub-catchment area, approximately 16 km south west of the town of Delmas in the Mpumalanga Province. Numerous mining operations are currently active near the Project Area where the coal processing will take place.

The majority of South Africa's water resources are under severe pressure. Owing to the extent of mining operations within proximity to the Project Area, the severity of the cumulative impact is considered to be severe should no mitigation methods be considered.

The land uses within and surrounding the Project Area have contributed to losses of wetland areas and continued impacts on the remaining areas. The alteration of the vegetation due to crop cultivation and cattle grazing that has led to overgrazing, the contamination of water resources as a result of industrial process and increased surface inflows, have all contributed to the physical impacts on the wetlands and rivers such as erosion and sedimentation.

The mining activities within the catchment have led to losses in wetland areas that may have facilitated increased water flow and also have increased the number of pollutants flowing into the water resources. The alteration of vegetation and surface flow has led to the onset of erosion in the wetland areas and this may be perpetuated further by mining and related activities within the Project Area. Mining may disturb the hydrological patterns further which could in turn lead to large scale desiccation of wetland areas and the direct loss of some of the wetland areas as a result of water flow being cut off.

11.3.3 Air Quality

Historical dustfall records for the proposed Project area are available for sensitive receptor sites DB3, DB7, and DB8, and were used to evaluate cumulative impacts. The averages over the seven months at DB3 (289 mg/m2/d) and DB7 (347 mg/m2/d), DB8 (376 mg/m2/d) and DB9 (479 mg/m2/d) were taken as the background to which the model predicted Ground Level Concentration (GLC) for the same locations were added (model prediction + the background). The final cumulative values were then compared with the standards for compliance. The final cumulative levels were below the limit value for residential receptors, except at DB8 where it exceeds the limit of 600 mg/m2/d (Table 11-3).

Table 11-3: Comparison of Modelled to Baseline Data

Pollutants	Averaging Period	Location	Regulatory Limit	Dust Deposition Rates (mg/m^2/d)		
				Model	Background	Total
Dustfall	Monthly	DB3	600 mg/m^2/d (Res. Limit)	171	289	460
		DB7		106	347	453
		DB8		563	376	**939**
		DB9		101	479	580

11.3.4 Noise

The proposed Project is considered to have a negligible impact on the ambient noise level in the area. However, the existing noise sources such as existing mining activities in the area in combination with the proposed new Project activities would have a significant cumulative impact on the ambient noise levels of the area. Therefore, the recommendation to conduct noise monitoring to monitor the future impact of the proposed Project activities would be instrumental in providing an indication of the cumulative ambient noise level in the area.

11.3.5 Cultural Heritage

Cumulative impacts occur from in-combination effects of various impacts on heritage resources acting within a host of processes that result in an incremental effect. The importance of identifying and assessing cumulative impacts is that the whole is often greater than the sum of its parts. This implies that the total effect of multiple stressors or change processes acting simultaneously on a system may be greater than the sum of their effects when acting in isolation.

This Project in conjunction with other planned developments in line with the strategic development plans for the Mpumalanga Province requires consideration to identify the possible in-combination effects of various impacts to known heritage resources. Table 11-4 presents a summary of the possible cumulative impacts of the Project.

Table 11-4: Summary of Potential Cumulative Impacts

Type	Cumulative Impact	Direction of Impact	Extent of Impact
Space-crowding	The proposed infrastructure will add to the existing infrastructure associated with activities characterising the area immediately surrounding the proposed Project area and further afield. This installation of this infrastructure will result in a loss of the area within which heritage resources can exist. The area earmarked for the proposed infrastructure does, however, occur within an area approved for mining activities.	Neutral	Site-specific study area

12 Item 3(k): Methodology used in Determining and Ranking the Nature, Significance, Consequence, Extent, Duration and Probability of Potential Environmental Impacts and Risks

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

The matrix calculates the rating out of 147, whereby intensity, extent, duration and probability are each rated out of seven as indicated in Table 12-3. 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 measure proposed in this EIA report. The significance of an impact is then determined and categorised into one of eight categories, as indicated in Table 12-2, extracted from Table 12-1. The descriptions of the significance ratings are presented in Table 12-3.

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 12-1: Impact Assessment Parameter Ratings

Rating	Intensity		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 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		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		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 because of design, historic experience or implementation of adequate mitigation measures. <10% probability.

Rating	Intensity		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 12-2: Probability/ Consequence Matrix

Probability	Significance																																						
7	-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
6	-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
5	-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
4	-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
3	-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
2	-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
1	-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 12-3: 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) (-)

12.1 Item 3(k)(i): The Positive and Negative Impacts that the Proposed Activity and Alternatives will have on the Environment and the Community that may be affected

Section 9.1 above provides an explanation of the alternatives that were considered during the finalisation of the layout. The Impact Assessment detailed in Section 11 describes all identified potential impacts associated with the preferred site layout and planned Project activities.

12.2 Item 3(k)(ii): The Possible Mitigation Measures that Could be Applied and the Level of Risk

Mitigation measures for each identified impact have been proposed and are presented with the impact ratings in Section 11.1 above.

12.3 Item 3(k)(iii): Motivation where no Alternative Sites were Considered

The Ubuntu Colliery is an established coal mine. The location of the mine remains fixed and will not be relocated or changed. The additional infrastructure requiring authorisation as part of this Application will be established on an environmentally authorised land.

The alternatives considered for the new proposed activities have been detailed in Section 9 above.

12.4 Item 3(k)(iv): Statement Motivating the Alternative Development Location within the Overall Site

The locations of the additional infrastructure associated with this application have been determined based on their intended use. Construction of the additional infrastructure, except for the road, was undertaken based on Universal Coal's need for continuing with mining operations. The proposed road diversion of the D2543 has been proposed in relation to the mining area. A more detailed description is provided in Section 9.

13 Item 3(l): Full Description of the Process Undertaken to Identify, Assess and Rank the Impacts and Risks the Activity will Impose on the Preferred Site (In respect of the final site layout plan) Through the Life of the Activity

The identification of potential impacts associated with the additional infrastructure at the Ubuntu Colliery were informed by the environmental and technical specialist investigations undertaken.

Following the identification of potential impacts and detailed baseline environment, the impacts were assessed utilising the Digby Wells methodology which assesses the nature of the impact, duration and extent, intensity and the probability of the impact occurring (Section 12). Following the assessment of the potential impacts, mitigation measures are provided, and

the potential impacts are assessed post-mitigation. The significance of the pre-mitigation impacts, the proposed mitigation measures and the post-mitigation significance ratings are detailed per environmental aspect per phase of the Project in Section 11.1.

The identified impacts associated with the activities are presented in Table 14-1 below.

14 Item 3(m): Assessment of each Identified Potentially Significant Impact and Risk

Table 14-1 presents the potential impacts assessed per project activity and per phase as well as their proposed mitigation / enhancement measures for the proposed activities subject to the EIA Phase.

Table 14-1: Assessment of each identified Potentially Significant Impact

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
Construction	Surface preparation for infrastructure.	Soil, Land Use and Capability	• Compaction of soil and therefore increased surface runoff; • Increased wind, and water erosion on unprotected soils and consequently sedimentation as these soils are highly erodible; • Removal of vegetation and basal cover, increasing the potential loss of topsoil, organic material and decreased soil fertility; • Compaction, ponding, and changes to the natural hydrological functioning of the landscape; • Loss of usable soil as a resource for agriculture – disturbance, low fertility, erosion and compaction; and • Loss of Land Capability and agricultural land due to complete restrictions to cattle grazing (current land use). Reduced area for cattle grazing.	Medium-high (negative)	• If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • The topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks; • Plan site clearance and alteration activities for the dry season (May to October); • Restrict extent of disturbance within the Ubuntu Colliery Project Area and minimise activity within designated areas of disturbance; • Minimise the period of exposure of soil surfaces through dedicated planning; • Stripping operations should only be executed when soil moisture content will minimise the risk of compaction (during dry season); • Aim to minimise (or even cease) workings on windy days; • During stockpiling, preferably use the ‘end-tipping’ method to keep the stockpiled soils loose; • Ensure stockpiles are placed on a free draining location to limit erosion loss and waterlogging; • Limit stockpile height – a safe height can be regarded as the height at which material can be placed without repeated traffic over already placed material; and • Soil surface (only where top soil is partially removed) can be loosened via tillage/ripping.	Minor (negative)
Construction	Construction of surface infrastructure.	Soil, Land Use and Capability	• Soil contamination; • Migration of contaminants into groundwater and contaminate freshwater systems; and • Loss of land use and land capability (agricultural potential).	Medium-high (negative)	• Ensure proper storm water management designs are in place; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • If any spillage occurs, clean up and remediate immediately; • Spill containment and clean up kits should be available onsite and clean-up from any spill must be in place and executed at the time of a spillage with appropriate disposal as necessary; • Stabilise sides with vegetation and erosion berms to prevent head-cut erosion and loss of soil; and • Implement post-mitigation monitoring to ensure the well-functioning of the road diversion and canal. This should include a AIPs plan.	Medium-high (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
Construction	Site preparation including vegetation clearance and excavations.	Surface Water	• Sedimentation and siltation of nearby watercourses.	Minor (negative)	• If possible, construction activities must be prioritised to the dry months of the year (May to September) to limit mobilisation of sediments, dust generation and mobilisation hazardous substances from construction vehicles used during construction phase; • Dust suppression on the haul roads and other cleared areas must be undertaken on regular basis to prevent or limit dust generation; • Hydrocarbon and hazardous waste storage facilities must be appropriately bunded to ensure that leakages can be contained. Spill kits should be in place and construction workers should be trained in the use of spill kits to contain and immediately clean up any leakages or spills; • Vehicles should regularly be maintained as per a developed maintenance program. Vehicles should also be inspected daily before use to ensure there are no leakages; • Drip trays must be used to capture any oil leakages. Servicing of vehicles and machinery should be undertaken at designated hard park areas. Any used oil should be disposed of by accredited contractors; and • Ensuring implementation of a stormwater management plan to prevent the mixing of clean and dirty water.	Negligible (negative)
Construction	Handling of hydrocarbons and other chemicals; Loading, hauling and transportation of product coal.	Surface Water	• Surface water contamination leading to deterioration of water quality.			
Construction	• Site clearance and topsoil removal and limited excavations; and • Potential small-scale dewatering (if required).	Groundwater	• Potentially increased risk to the groundwater should spillage events occur and introduce contaminants into the groundwater environment; and • Lowering of the local water levels.	Construction activities are expected to mainly take place above the groundwater table. However, if required, localised groundwater abstraction and subsequent lowering of the water table should be kept to a minimum. However, water level recovery is expected to occur within the construction phase, with no residual impacts expected during the operational phase.		
Construction	Surface preparation for infrastructure.	Wetlands	• Direct loss of wetland areas; • Loss of biodiversity; • Erosion and sedimentation of wetland areas; • Water quality contamination and deterioration; and • Habitat loss due to poor water quality.	Major (negative)	• Establishment of at least a 100 m buffer zone around the remaining wetlands to protect wetland areas from the proposed developments. This would require that development occur further than 100 m from a delineated wetland area; • Revegetate the area as soon as possible to prevent erosion, sedimentation and habitat loss within the wetlands; • Restrict access to the remaining wetlands; • Place sediment trapping berms on the boundary of the 100 m buffer or end of development; • Do an offset calculation to determine the impacts and total amount of wetland habitat loss to understand the amount of wetlands to be offset; and • Develop a Wetland Offset Strategy, Rehabilitation Plan and a Monitoring Plan for the wetlands.	Moderate (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
Construction	Construction of surface infrastructure.	Wetlands	• Direct loss of wetland areas; • Habitat loss; • Loss of biodiversity; • Water contamination; and • Erosions and sedimentation of wetland areas.	Major negative	• Establishment of at least a 100 m buffer zone around the remaining wetlands to protect wetland areas from the proposed developments within the Project area. This would require that development occur further than 100 m from a delineated wetland area; • Ensure well-functioning culverts at the road crossing and wetland crossings to ensure free flow; • Reseed and vegetate the wetlands with wetland vegetation after construction to prevent erosion and sedimentation; • Prevent access to the remaining wetlands; • Place sediment trapping berms on the boundary of the 100 m buffer or end of development; • Do an offset calculation to determine the impacts and total amount of wetland habitat loss to understand the amount of wetlands to be offset; and • The development of a Wetland Offset Strategy and Rehabilitation plan for the wetlands in the Project Area.	Minor (negative)
Construction	Surface preparation and construction of proposed infrastructure	Aquatics	• Land and vegetation manipulation/clearing for infrastructure in proximity to the watercourses potentially draining into the northern tributary of the Wilge River.	Moderate (negative)	• Construction activities must maintain a 100 m buffer zone from watercourses; • Limit vegetation removal to the infrastructure footprint area only. Where removed or damaged, vegetation areas (riparian or aquatic related) should be revegetated as soon as possible; • Bare land surfaces downstream of construction activities must be vegetated to limit erosion from the expected increase in surface runoff from infrastructure; • Environmentally friendly barrier systems, such as silt nets or, in severe cases, use trenches downstream from construction sites to limit erosion and possibly trap contaminated runoff from construction; • Storm water must be diverted from construction activities and managed in such a manner to disperse runoff and prevent the concentration of storm water flow; • Water used at construction sites should be utilised in such a manner that it is kept on site and not allowed to run freely into nearby watercourses (i.e. use of a PCD); • Construction chemicals, such as paints and hydrocarbons, should be used in an environmentally safe manner with correct storage as per each chemical's specific storage descriptions; • All vehicles must be frequently inspected for leaks; • No material may be dumped or stockpiled within any rivers, drainage lines in the vicinity of the proposed establishment of new infrastructure; • All waste must be removed and transported to appropriate waste facilities; and • High rainfall periods (usually November to March) should be avoided during construction to possibly avoid increased surface runoff in attempt	Minor (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
					to limit erosion and the entering of external material (i.e. contaminants and/or dissolved solids) into associated aquatic systems.	
Construction	Physical construction of infrastructure over natural aquatic ecosystems	Aquatics	• Vegetation removal for site access and potential hydrological disturbance of associated watercourses.	Moderate (negative)	• Mitigation measures detailed for the site and vegetation clearing impact should be applied to areas leading up to the watercourse crossing points. However, the infrastructure construction over a watercourse needs additional attention due to the proximity of the activity to the aquatic ecosystems; • The design as well as the physical construction of roads should not alter the natural hydrology and connectivity of the watercourses in any way (i.e. damming or creating barriers); • Any infrastructure proposed to be in contact with the substrate/channel bottom should allow for the free flow of water and material. If hard surfaces are going to be used as foundation or if culverts are going to be installed, their base should not be noticeable above the natural channel bottom to maintain connectivity; and • Monitoring of the crossing points should also form part of the management actions to ensure correct flow occurs through the crossing point, especially during the wet season.	Negligible (negative)
Construction	Site Clearing, Construction of Surface Infrastructure and Topsoil Stockpiling.	Air Quality	• Reduction in ambient air quality.	Negligible (negative)	• Application of a dust suppressant on the haul roads and exposed areas; • Limit activity to non-windy days (wind speed less than 5.4 m/s); • Set maximum speed limits on haul roads and have these limits enforced; • The area of disturbance must be kept to a minimum at all times and no unnecessary clearing, digging or scraping must occur, especially on windy days; • The drop heights when loading onto trucks and at tipping points should be minimised; • The enclosure of crushers; and • Application of fogging system at the crusher.	Negligible (negative)
Construction	Construction phase activities.	Noise	• Noise will emanate from the machinery and vehicles operating during the construction activities.	Negligible (negative)	• Construction activities should be restricted to daylight hours (06:00 – 18:00); • Construction machinery and vehicles should be switched off when not in use; • Construction vehicles should have buzzer type reverse alarms (producing band-limited white noise) installed, rather than the conventional beeping type reverse alarms (which produce a tonal sound); • Vehicles to be serviced as per their design requirements to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and • Regulate vehicle speeds on the access and haul roads.	Negligible (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
Construction	Surface preparation for infrastructure	Heritage	• Direct impact to Heritage Resource H013.	Major (negative)	• The project related mitigation must aim to amend the project design to avoid the potential negative impact to the heritage resource. Where it is determined that the negative impact may not manifest, the heritage resource must be incorporated into an HSMP for implementation. Should Universal Coal have an HSMP, H013 must be incorporated into the existing HSMP and be subject to the same requirements encapsulated therein. • Where Project redesign and in situ conservation is not feasible based on the current mining operations and location of the mineral resources, heritage related mitigations must be employed. Heritage related mitigations will need to be undertaken in accordance with the requirements of the NHRA and NHRA Regulation, 2000 (GN R 548) will be required. Such mitigations may include a Burial Grounds and Graves Consultation (BGGC) to assess whether a GRP (which must be undertaken in accordance with Section 36 of the NHRA and Chapter IX and XI of the NHRA Regulations) is feasible. • An alternative Project design has been considered. Digby Wells assumes that Project design is the preferred alternative, and the post-mitigation impact assessment considers this mitigation strategy.	Moderate (positive)
Operational	Operation and maintenance of infrastructure	Soil, Land use and Capability	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water); • Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.	Medium-high (negative)	• Re-vegetate cleared areas and stockpiles to avoid wind and water erosion losses; • Preserve looseness of stockpiled soil by executing fertilisation and seeding operations by hand; • Soil stockpiles should be monitored for fertility via sampling and testing; • Monitoring of the condition of all unpaved roads is necessary due to the high rainfall and potential water runoff and erosion of the soils present in the Ubuntu Colliery Project Area. Water runoff from compacted road surfaces may cause erosion of road shoulders degrading the road surface. Weekly inspections need to be carried out of all unpaved roads especially during the rainy season. • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • A Topsoil Management Plan (TMP) must be prepared to demonstrate how topsoil will be preserved in a condition as near as possible to its pre-mining condition to allow successful mine rehabilitation (Statham, 2014); • Long term stockpiles should be revegetated to minimise loss of soil quality. This will minimise AIPs, maintain soil organic matter levels, maintain soil structure, and microbial activity; and • Soil pollution monitoring should be conducted at selected locations on the project site to detect any high levels of pollutants.	Minor (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
Operational	Use and maintenance of haul roads (incl. transportation of coal to washing plant).	Soil, Land use and Capability	• Compaction of soil and increased runoff potential; • Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; • Increased erosion, and consequently sedimentation; and • Soil contamination from spills and leakages.	Moderate (negative)	• Only the designated access routes are to be used to reduce any unnecessary compaction; • Compacted areas are to be ripped to loosen the soil structure. • Operations vehicles and equipment should be serviced regularly; • Service and parking areas must be paved; • Operation vehicles should remain on designated and prepared compacted gravel roads; • Spill containment and clean up kits should be available onsite and clean-up from any spill must be in place and executed at the time of a spillage with appropriate disposal as necessary; • Fuel and heavy hydrocarbon products storage on site should be secured by bunded facilities; and • It is advisable to develop a soil monitoring plan and implement it after construction through collecting and analysis of soil samples within the MOP area.	Minor (negative)
Operational	Operational activities (Runoff from the dirty water areas)	Surface Water	• Surface water contamination by runoff from dirty water areas.	Minor (negative)	• Runoff from dirty areas should be directed to the storm water management infrastructure and should not be allowed to flow into the natural environment, unless DWS discharge authorisation and compliance with relevant discharge standards as stipulated in the NWA is obtained; • The existing water quality monitoring program should be conducted for the life of mine and for a few years post closure for ongoing monitoring of water resources within and in close proximity to the project area to allow detection of any contamination arising from mine activities; • The management of general and other forms of waste must ensure collection and disposal into clearly marked skip bins that can be collected by approved contractors for disposal to appropriate disposal sites; • The overall housekeeping and storm water system management (including the maintenance of berms, de-silting of dams and conveyance channels and clean-up of leaks) must be maintained throughout the life of mine; • The hydrocarbon and chemical storage areas and facilities must be located on hard-standing area (paved or concrete surface that is impermeable), roofed and bunded in accordance with SANS1200 specifications. This will prevent mobilisation of leaked hazardous substances; and • Training of mine personnel and contractors in proper hydrocarbon and chemical waste handling procedures is recommended.	Negligible (negative)
Operational	Hydrocarbons and chemicals spillages and leakages from equipment, moving haulage trucks and machinery.	Surface Water	• Surface water contamination by hydrocarbon waste and deterioration of water quality.			
Operational	Storage or stockpiling of potentially contaminating fluid or	Groundwater	• Potential groundwater contamination if the various potential sources infiltrate into the groundwater environment.	The following actions are recommended: • The infrastructure listed below should be lined:		

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
	material within surface infrastructure				• STP; • Product Stockpile; • WTP; and • Crushing facilities and stockpile area; • Hydrocarbons and hazardous materials must be stored in bunded areas (diesel depot area). If a considerable amount of fluid is accidentally spilled, the contaminated soil should be collected and disposed at an acceptable waste facility. The excavation should be backfilled with good quality soil.	
Operational	Operation and maintenance of infrastructure	Wetlands	• Water quality contamination and deterioration; • Habitat loss as a result of poor water quality; • Loss of biodiversity; and • Erosion and Sedimentation within the wetlands	Moderate (negative)	• Restrict access to all remaining wetlands with at least a 100 m buffer; • Maintain and monitor wetland functionality; • Clean up spillages of coal, oils, lubricants and hydrocarbons immediately, where large spills have occurred, remove the impacted soils and remediate immediately; • It is recommended that no new river/stream crossing be erected, there are several crossings within the site that can be improved for better wetland functionality and operational functionality and this will include the insertion of culverts; • Construct sediment trapping berms on edges of the roads; • Establish vegetation on berms and edges of the road to minimise the risk of erosion; • Where possible, create a preferential flow of runoff and wastewater directed towards the PCD; • Monitor the roads monthly to identify and rectify any areas that have begun to erode and where water may be flowing towards wetland areas; and • It is recommended that all mitigation measures recommended by the Digby Wells Groundwater Report for the Ubuntu Coal Mine Project be followed to prevent dewatering of wetlands.	Minor negative
Operational	Use and maintenance of haul roads (incl. transportation of coal to washing plant).	Wetlands	• Erosion of wetland crossings associated with the road diversion; • Accidental spills causing soil and water contamination; • Habitat loss as a result of poor water quality; • Increased Alien Invasive Plants (AIPs); • Loss of biodiversity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition.	Moderate (negative)	• Implement quarterly monitoring of the wetland health and functionality and rehabilitation recommendations at the wetland crossings associated with the road diversion as well as downstream of the WTP, STP and wash plant; • Access roads must be maintained and monitored to prevent erosion, head-cut erosion, sedimentation, increased AIPs and loss of wetland habitat and functionality; and • Clean up spillages of coal, oils, lubricants and hydrocarbons immediately, where large spills have occurred, remove the impacted soils and remediate immediately.	Minor (negative)
Operational	• Operation and maintenance of infrastructure.	Aquatics	• Uncontrolled contaminated runoff of stormwater or water generated from the mining operations from or through	Minor (negative)	• Runoff from dirty areas should be directed to the storm water management infrastructure (drains and PCDs) and should not be allowed to flow into the surrounding environment, unless DWS	Negligible (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
	Use and maintenance of haul roads (incl. transportation of coal to washing plant).		the surface infrastructure leading to water quality and habitat deterioration of watercourses.		discharge authorisation and compliance with relevant discharge standards as stipulated in the NWA is obtained; • Channelled water should not be dispersed in a concentrated manner. Baffles should be incorporated into artificial drainage lines/channels around the surface infrastructure to decrease the kinetic energy of water as it flows into the natural environment; • Bare surfaces downstream from the developments where silt traps are not an option should be vegetated in order to attempt to limit erosion and runoff that might be carrying contaminants; • Careful monitoring of the areas where dust suppression is proposed should be undertaken regularly. Areas concentrating water runoff should be addressed and not allowed to flow freely into associated watercourses; and • Monitoring of the associated northern tributary of the Wilge (including infrastructure at the river crossing) and the main stem Wilge River reach should be done by an aquatic specialist in order to determine potential impacts where after new mitigation actions should be implemented as per the specialist's recommendations.	
Operational	• Establishment of Open Pit, Removal of Material, Stockpiling, Operation of the Plant and Construction of Surface Infrastructure.	Air Quality	• Dust generation and reduction in ambient air quality.	Major (negative)	• Application of dust suppressant on the haul roads and exposed areas; • Limit activity to non-windy days (wind speed less than 5.4 m/s); • Set maximum speed limits on haul roads and have these limits enforced; • The area of disturbance must be kept to a minimum at all times and no unnecessary clearing, digging or scraping must occur, especially on windy days; • Enclosure of the crusher and screening circuit, fitted with dust suppresion spays; and • The drop heights when loading onto trucks and at tipping points should be minimised.	Negligible (negative)
Operational	Operational phase activities	Noise	• Noise will emanate from the machinery and vehicles operating during the operational activities.	Minor (negative)	• Machinery and vehicles should be switched off when not in use; • Construction vehicles should be have buzzer type reverse alarms (producing band-limited white noise), rather than the conventional beeping type reverse alarms (which produce a tonal sound); • Vehicles to be serviced as per their design requirements to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and • Regulate vehicle speeds on the access and haul roads.	Negligible (negative)
Operational	Operation and maintenance of infrastructure; and Use and maintenance of haul roads (incl.	Heritage	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure.			

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
	transportation of coal to washing plant).					
Decommissioning	Demolition and removal of all infrastructure (incl. transportation off site)	Soil, Land use and Capability	• Soil contamination from decommissioning of infrastructure such as the STP, WTP, depot area, offices and stockpile area; • Loss of usable soil as a resource – Erosion, sedimentation, and Compaction; and • Loss of land capability.	Medium-high (negative)	• Demolition and removal of infrastructure should be restricted to the dry season (May to October); • Opencast mine areas must be reshaped, and the soil replaced. Subsoil first then topsoil; • Total soil thickness must at least be 1 m (including 0.3 m topsoil) for the arable areas and 0.35 m (topsoil) for grazing land; • Minimize the period of exposure of soil surfaces through dedicated planning; • Foundation excavations should be filled, fertilised and re-vegetated using local vegetation; • Ensure proper storm water management designs are in place and should be kept in place until all infrastructure is removed. Where infrastructure will remain, stormwater and culverts should be maintained and monitored for erosion and AIPs; • Continue with Concurrent Rehabilitation, and implement land rehabilitation measures; • Address compacted areas by deep ripping to loosen the soil, and revegetate the area as soon as possible; • Only designated access routes are to be used to reduce any unnecessary compaction; • The backfilled, reprofiled landscape should be top soiled and revegetated to allow free drainage close to the pre-mining conditions; • Inventory of hazardous waste materials stored on-site should be compiled and arrange complete removal; and • During the decommissioning of infrastructure such as the STP, WTP, depot area, offices and stockpile area, the contaminated material should be removed. The contaminated material should be disposed of at a registered landfill site.	Negligible (negative)
Decommissioning	Rehabilitation (spreading of soil, revegetation, and profiling/contouring)	Soil, Land use and Capability	• Loss of usable soil as a resource – Erosion and Compaction; and • Loss of Land capability; and • Positive impact to the soil, land use and land capability.	Moderate (negative)	• Continue with Concurrent Rehabilitation, and implement land rehabilitation measures; • Address compacted areas by deep ripping to loosen the soil, and revegetate the area as soon as possible; • Inventory of hazardous waste materials stored on-site should be compiled, and arrange complete removal; • Ensure proper stormwater management designs are in place to ensure no excessive run-off or pooling occurs; • Only designated access routes are to be used to reduce any unnecessary compaction; and • The backfilled, reprofiled landscape should be top soiled and revegetated to allow free drainage close to the pre-mining conditions.	Negligible (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
Decommissioning	Installation of post-closure water management infrastructure	Soil, Land use and Capability	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water); • Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.	Moderate (negative)	• Revegetate cleared areas to avoid wind and water erosion losses; • Monitoring of the condition of all unpaved roads is necessary due to the high rainfall and potential water runoff and erosion of the soils present in the Ubuntu Colliery Project Area; • Water runoff from compacted road surfaces may cause erosion of road shoulders degrading the road surface. Weekly inspections need to be carried out of all unpaved roads especially during the rainy season. • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • Soil pollution monitoring should be conducted at selected locations on the project site to detect any high levels of pollutants; • Continue with Concurrent Rehabilitation, and implement land rehabilitation measures; • Address compacted areas by deep ripping to loosen the soil, and revegetate the area as soon as possible; and • Ensure proper stormwater management designs are in place to ensure no excessive run-off or pooling occurs.	Negligible (negative)
Decommissioning	Demolition of mine infrastructure (workshops, haul roads, processing plant etc.) Disturbance of soils and erosion by overland flow	Surface Water	• Sedimentation and siltation of nearby watercourses and deterioration of water quality.	Minor (negative)	• Restore the topography to pre-mining conditions as much as is practically possible by backfilling, removing stockpiles and restore the slope gradient and angle of the site; • Immediate revegetation of cleared areas; • Where practical, decommissioning activities should be prioritized during dry months of the year (May to September); • Movement of demolition machinery and vehicles should be restricted to designated access roads to minimise the extent of soil disturbance; • Use of accredited contractors for removal or demolition of infrastructure during decommissioning is recommended; this will reduce the risk of waste generation and accidental spillages; and • Ensure that the infrastructure (pipelines, fuel storage areas, pumps) are first emptied of all residual material before decommissioning.	Negligible (negative)
Decommissioning	Rehabilitation of disturbed sites close to pre-mining conditions	Surface Water	• Restoration of pre-mining streamflow regime in nearby watercourses.	Major (positive)	• No mitigation required.	Major (positive)
Decommissioning	Demolition and or removal of all infrastructure and rehabilitation of the disturbed areas.	Groundwater	• Removal of potential contamination sources.	No management actions are required.		
Decommissioning	Demolition and removal of all infrastructure (incl. transportation off site).	Wetlands	• Water quality contamination and deterioration due to an increase in sedimentation;	Moderate (negative)	• The road diversion should be permanent and not removed; • The water/sewage treatment plant may have uses post-closure for the surrounding community, this should be considered before removal;	Minor (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
			• Habitat loss as a result of poor water quality; • Loss of biodiversity; • Loss of wetland areas; • Soil erosion due to surface runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition.		• Once trenches have been backfilled and infrastructure removed, vegetation should be established on the exposed soil surfaces to minimise the risk of erosion and sedimentation into the wetland areas; • During the rehabilitation, temporary sediment trapping berms should be erected to prevent any sediment arising from rehabilitation activities washing into wetland areas; • As far as possible, conduct decommissioning work of infrastructure during the dry season and re-seeding in the wet-season; • Clean up spillages of coal, oils, lubricants and hydrocarbons immediately, where large spills have occurred, remove the impacted soils and remediate immediately; and • Continue with a wetland monitoring and rehabilitation plan beyond life of mine until final closure.	
Decommissioning	Rehabilitation (spreading of soil, revegetation, and profiling/contouring)	Wetlands	• Erosion due to exposed areas to wind and surface water runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity of the wetlands; • Change in habitat and potential change in species composition; and • Increased AIPs.	Minor (negative)	• Landscape and vegetate the exposed areas as soon as possible to prevent erosion and sedimentation within the wetlands; • Shaping of landscape should be performed in a manner the will water to drain freely towards wetland areas; • Avoid creating narrow preferential flow paths as the this could lead to erosion; and • As far as possible, conduct decommissioning of infrastructure work during the dry season and re-seeding in the wet season.	Negligible (negative)
Decommissioning	Installation of post-closure water management infrastructure	Wetlands	• Soil and water contamination from decant and spillage from WTP and STP; • Increased runoff and changes to the wetland functionality; • AIPs proliferation due to changes to the natural landscape, soils and wetlands; • Erosion and sedimentation in wetlands; and • Changes to the habitat, wetland functionality and biodiversity.	Minor (negative)	• The water management system will be only installed once the dirty areas have been cleaned and it is deemed there is no risk of water contamination; • Once trenches have been backfilled and infrastructure removed, vegetation should be established on the exposed soil surfaces to minimise the risk of erosion; • During the construction, temporary sediment trapping berms should be erected to prevent any sediment arising from rehabilitation activities washing into wetland areas; and • Implement a monitoring plan beyond life of mine or until final closure.	Negligible (negative)
Decommissioning	Physical removal of surface infrastructure and rehabilitation activities near and within drainage lines	Aquatics	• Water quality and habitat deterioration of watercourses in contact with heavy machinery and receiving runoff from surface workings.	Minor (negative)	• High rainfall periods should be avoided during decommissioning; • Removed or damaged vegetation areas should be revegetated; • Storm water must be diverted from decommissioning activities; • Water used during decommissioning should be kept onsite and not be allowed to freely flow into nearby watercourses; • Stored mine-affected water should be treated before decommissioning of any mine-related water retention areas, such as PCDs; • Land reprofiling should be done during the dry season to allow for attempts to restore the morphology of the hillslope wetlands prior to rainfall/flow events; and	Negligible (negative)

Phase	Activity	Aspect	Impacts	Rating (Pre-Mitigation)	Mitigation Measures	Rating (Post Mitigation)
					• Ensure the revegetation activities use appropriate indigenous plant species.	
Decommissioning	Demolition and Removal of Infrastructure and Rehabilitation	Air Quality	• Dust generation and reduction in ambient air quality.	Minor (negative)	• Application of dust suppressant on the haul roads and exposed areas; • Limit activity to non-windy days (wind speed less than 5.4 m/s); • Set maximum speed limits on haul roads and have these limits enforced; • The area of disturbance must be kept to a minimum at all times and no unnecessary clearing, digging or scraping must occur, especially on windy days; • The drop heights when loading onto trucks and at tipping points should be minimised; and • Rehabilitation of disturbed land to allow for vegetation growth.	Negligible (negative)
Decommissioning	Decommissioning phase activities	Noise	• Noise will emanate from the machinery and vehicles operating during the construction activities.	Negligible (negative)	• Restrict decommissioning activities to daylight hours (06:00 – 18:00); • Regularly service decommissioning related machines and vehicles to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; • Construction vehicles should have buzzer type reverse alarms (producing band-limited white noise) installed, rather than the conventional beeping type reverse alarms (which produce a tonal sound); • Regulate speed limits on access roads; and • Switch off equipment when not in use.	Negligible (negative)
Decommissioning	Demolition and removal of all infrastructure (incl. transportation off site); Rehabilitation (spreading of soil, re-vegetation and profiling/contouring); and Installation of post-closure water management infrastructure	Heritage	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure. Should any infrastructure intended for demolition increase in age to older than 60 years during the Project lifecycle, the structure must be considered a heritage structure. Any alterations to these structures will be subject to a NHRA Section 34 permit application process.			

15 Item 3(n): Summary of Specialist Reports

Numerous specialist impact assessments were undertaken for the proposed Project, as set out in Table 15-1. Separate specialist reports were compiled and have been attached as appendices to this report. The specialist input included the baseline environment, potential impacts and the recommended mitigation measures. Table 15-1provides a summary of the key recommendations of the studies.

Table 15-1: Specialist Studies Undertaken for the Ubuntu Project

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included
Soils, Land Use and Land Capability	• If any erosion occurs, corrective actions must be taken to minimise any further erosion from taking place at regular intervals or after high rainfall events. Such as revegetation, erosion berms, culverts or gabions. • The impacted and rehabilitated areas must be fenced, and animals should be kept off the area until the vegetation is self-sustaining; and runoff must be controlled and managed using proper stormwater management measures. • Vehicle movement over sensitive and rehabilitated areas should be restricted to reduce compaction. • If soil is polluted, treat the soil using *in-situ* bioremediation. • If *in-situ* treatment is not possible then the polluted soil must be classified according to the Minimum Requirements for the Handling, Classification, and Disposal of Hazardous Material, and disposed at an appropriate, permitted or licensed disposal facility. • All vehicles and machines must be parked within hard park areas, and must be checked daily for fluid leaks. • Re-fuelling must take place on a sealed surface area away from soils to prevent seepage of hydrocarbons into the soil. • Place drip trays where vehicles or machinery leaks are occurring. • Fuel, grease, and oil spills should be remediated using a commercially available emergency clean up kits. • Any contractors on site must ensure that all employees are aware of the procedure for dealing with spills, and leaks, and undergo training on-site. • Soil pollution monitoring should be conducted at selected locations on the project site to detect any extreme levels of pollutants. • Establishment of effective soil cover such as lawn grass around constructed infrastructure for adequate protection from wind, and water erosion. • Minimise unnecessary removal of the natural vegetation cover outside the development footprint.	X - All recommendations have been considered and included in this report.	Appendix D
Surface water	• Nitrate was elevated specifically at monitoring point UCBSW2 which is located downstream of two tributaries. Agricultural activities are known potential sources of nitrates and this point needs to be monitored closely to identify and rectify the elevated nitrates, which may not necessarily be emanating from mining activities within Ubuntu Colliery. • Ongoing water quality monitoring of surface water is imperative during all phases of the project life and post closure to allow for early detection of potential contaminants that may cause unforeseen negative impacts on the receiving environment.	X - All recommendations have been considered and included in this report.	Appendix E
Groundwater	• It is recommended that two new monitoring boreholes are drilled; the boreholes are located downgradient of the proposed infrastructure. • During the construction phase, it is recommended that site clearance and topsoil removal activities may involve excavation which should take place above the water table, which is observed to be highly likely. No impacts on the groundwater environment are expected if the activities take place above the groundwater table. During the operational phase the following recommendations are made: • Lining the of Diesel Depot Area, Sewage Treatment Plant, Product Stockpile, Water Treatment Plant, Crushing facilities and stockpile area; • Hydrocarbons and hazardous materials must be stored in bunded areas; and • If a considerable amount of fluid is accidentally spilled, the contaminated soil should be scraped off and disposed of at an acceptable dumping facility. The excavation should be backfilled with soil of good quality.	X - All recommendations have been considered and included in this report.	Appendix F

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included
	An update to the currently monitoring network is recommended and geophysical surveys should be conducted to identify more suitable locations that take into consideration preferential groundwater flow paths in the area where boreholes are recommended.		
Wetlands and Aquatics	Wetlands- • A 500 m buffer around the remaining wetlands, where not possible at least a 100 m buffer around the wetlands is recommended to reduce impacts associated with the loss of wetland vegetation and habitat. The establishment of hydrophytic plants and facultative hydrophytes that are native to the area are also recommended. • Improve vegetation cover and establish hydrophytic plants and facultative hydrophytes that are native to the area. Reduced risk of erosion and sedimentation. • Reduce risk of erosion, compaction, and the creation of preferential flow paths. Maintain linear infrastructure. Aquatics- • A high-flow season (or wet season) aquatic survey must be undertaken prior to commencement of the Project to contribute to the updated baseline findings and to kick off the proposed monitoring programme. • The developed Aquatic Biomonitoring Programme must be adopted on an annual basis, prior to the commencement of the Construction Phase of the Project. This programme should continue for the life of the Project and for at least three years post the Decommissioning Phase. • The proposed Project must aim to maintain the stipulated Recommended Ecological Category (REC) of C (i.e. Moderately Modified) (or improve to better state) for the associated Wilge River and associated reaches. • The proposed Project should adopt a water and habitat quality preservation mindset throughout the life of the Project. In other words, the proposed activities should not result in the deterioration/degradation of aquatic habitat (i.e. riparian and instream habitat) and water quality within the associated aquatic ecosystems.	X - All recommendations have been considered and included in this report.	Appendix G
Air Quality	• Revive the dustfall monitoring network and maintain the programme for the LoM; • Set up a continuous real-time air quality monitoring station to measure criteria particulate and gaseous pollutants; • Designate a qualified person to act as the Environmental Officer (EO) to oversee implementation of mitigation measures and assess efficiency regularly; • Ensure air quality information is incorporated into the environmental management information system and submit annual reports to the South African Atmospheric Emission Licensing & Inventory Portal (SAAELIP), as required by law; • Establish codes of practice for good housekeeping concerning dust management and mitigation, including regular cleaning of spillages, spraying of stockpiles, open areas and roads, appropriate restrictions on vehicle movements and speeds; • Enclosure of the crushing and screening circuit, fitted with dust suppression sprays to contain emissions; and • Monitor the air quality management measures and information to ensure that adopted mitigation measures are sufficient to achieve current air quality standards at the Project area and nearby receptors.	X - All recommendations have been considered and included in this report.	Appendix H
Noise	• It is recommended that even though the proposed activities could have a negligible impact on the noise sensitive receivers, the implementation of the proposed mitigation measures could further reduce the significance of the noise impacts. The implementation of a monitoring plan would also be imperative to identifying, monitoring, and managing future noise impacts (increases and/or decreases in noise levels) throughout the Project's life.	X - All recommendations have been considered and included in this report.	Appendix I
Cultural Heritage	The recommendations included in the existing HIA (Higgitt & Nel, 2012) include: • The *in-situ* preservation of all burial grounds and graves including a 20 m buffer zone that must be demarcated around each of the burial grounds. Monitoring must be conducted during blasting to assess any damage to the heritage resources and access must be granted to any heritage user;	X - All recommendations have been considered and included in this report.	Appendix J

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included
	• Where the *in situ* preservation of burial grounds is not feasible, a GRP in terms of Section 36 of the NHRA will be required. Universal Coal will be required to identify *bona fide* Next-of-Kin (NoK) and reach agreement on the future of individual graves through consultation; • A Phase 2 archaeological study for the site H004 (an ash midden) if the Project activities occur in proximity to this site; • Where structures older than 60 years may be impacted, Universal Coal will require a destruction permit issued in terms of Section 34 of the NHRA; and • A CFP, which must be developed and implemented during ground clearance activities. Considering the nature and the scope of the Project, Digby Wells recommends the following additional recommendations be implemented prior to the commencement of the Project: • Universal Coal must avoid impacts to H013 through an amendment of the proposed D2456 district road diversion routing and implement a 100 m no-go buffer zone around the heritage resource; • Universal Coal must develop and implement an HSMP to conserve H013 *in situ*. Where Universal Coal have developed such a management plan, this must be updated to include H013; • Where Project design amendments are not feasible, Universal Coal will need to embark on a consultation process to assess whether a GRP is feasible; and • To mitigate against potential direct impacts against previously unidentified heritage resources and where Universal Coal has not done so already, Universal Coal must develop and implement a CFP prior to the commencement of Project activities. This CFP must be approved by the HRAs prior to implementation.		
Traffic and Transport	• It is recommended that the proposed mining activities and road diversion are supported from a traffic engineering perspective with a speed limit of 80km/h, required minimum curve lengths and minimum radii on the D2543, as proposed in this report (and on Drawing 21005/AL/01) and to the relevant standards of the Mpumalanga Department of Public Works, Roads and Transport.	X - All recommendations have been considered and included in this report.	Appendix K
Rehabilitation and Closure	• Adequate planning and action plans put in place (storm water management, waste management, engineering designs and rehabilitation). • The financial provision should be updated should there be significant changes to the MWP. The changes might have a significant impact on the financial provision estimate. • Complete a detailed material balance to ensure enough material is available to rehabilitate all the disturbed areas, or to establish if material will need to be imported, resulting in cost implications. • The groundwater model must be regularly updated to ensure current and relevant information is available to implement the most suitable management strategies for the mitigation of negative impacts. • Maintain a database reflecting market related Preliminary and General percentages for all projects in anticipation of potential amendments to this aspect of GN R.1147. • Develop an optimised post mining landform design informed by the ground water modelling and post closure water balance to ensure that free draining areas and in-pit evaporative areas can be constructed accurately. • Conduct predictive landform modelling to integrate the remaining mining and backfilling activities as far as possible to limit expensive rehandling. • Utilise the post landform design elevations to manage concurrent pit backfilling once there is sufficient space within the pit.	X - All recommendations have been considered and included in this report.	Appendix L

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included
	• As mining progresses, it is in Universal Coal's best interest to review and revise the final pit design periodically to establish if the final design is still relevant, practical, and the most cost-effective solution. In addition to this it is recommended that a final landform design assessment be conducted and that concurrent rehabilitation is aligned to such plan. • Monitoring of surface and groundwater at monitoring points needs to be undertaken to ensure the correct management strategies are adopted when mining commences. • The financial provision estimate needs to be updated on an annual basis as a requirement of the NEMA. This will ensure that all costs become more accurate over time and will reflect current market conditions. • Regular audits should be undertaken by a soil scientist during the soil stripping process. This will guarantee that soil is stripped and stockpiled correctly.		

16 Item 3(o): Environmental Impact Statement

16.1 Item 3(o)(i): Summary of the Key Findings of the Environmental Impact Assessment

The Environmental Impact Statement is utilised to summarise all the potential environmental impacts identified during each phase of the proposed Project. The significance of the impacts associated with the relevant Project Phases, pre-mitigation and post-mitigation, is summarised in Table 14-1, above.

16.2 Item 3(o)(ii): Final Site Map

The infrastructure layout plan on which this impact assessment is based is provided in Figure 5-1 above and appended as Appendix B.

16.3 Item 3(o)(iii): Summary of the Positive and Negative Implications and Risks of the Proposed Activity and Identified Alternatives

The negative and positive impacts are tabulated in Section 11.1 of this report, in Table 11-2.

The key negative impacts associated to the proposed Project include but are not limited to:

- Air and Noise pollution;
- Potential negative impacts on ecology, including soil quality;
- Potential for alien invasive plants proliferation;
- Potential for water resource contamination; and
- Loss of wetlands.

Please Note: if the proposed mitigation and management strategies are implemented, the impacts can be reduced.

The key positive impacts associated to the proposed Project include the following:

- Restoration of pre-mining streamflow regime in nearby watercourses;
- The Project will contribute to the existing operation, which has created long-term employment opportunities, and which generates revenue feeding into the regional and national economies in a sector which is employing a growing portion of the workforce; and
- The construction of road diversion will create short-term employment opportunities and will generate revenue which will feed into the local economy.

17 Item 3(p): Proposed Impact Management Objectives and the Impact Management Outcomes for Inclusion in the EMPR

The EMP Report seeks to achieve a required end state and describes how activities that have, or could have, an adverse impact on the environment and surrounding communities will be mitigated, controlled and monitored.

The EMP will address the environmental impacts and possible unplanned events during each phase of the Project (Construction, Operational, Decommissioning and Post-Closure). Due regard must be given to environmental protection during the entire Project; a number of environmental recommendations are made to achieve environmental protection. These recommendations are aimed at ensuring that the Applicant and contractors maintain adequate control over the Project to:

- Minimise the extent of an impact during the life of the Project;
- Ensure appropriate restoration of areas affected by the Project; and
- Prevent long term environmental degradation.

18 Item 3(q): Final Proposed Alternatives

A road diversion is required by Universal Coal for the continuation of mining due to the proximity of the approved open pits to the existing district road, known as D2546. The proposed road diversion of the D2543 will optimise the operation.

The alternatives considered and motivations for the preferred alternatives are detailed in Section 9 above.

19 Item 3(r): Aspects for Inclusion as Conditions of Authorisation

The EAP recommends the following conditions for the DMRE to consider for inclusion into the Authorisation:

- The mitigation/enhancement measures contained in the attached specialist reports (Table 15-1) and EMPr must be adhered to;
- Monitoring must be undertaken as described in the monitoring programme provided in Part B Section 8;
- CFPs must be developed for the construction phase in the event of accidental exposure of unidentified heritage resources;
- The closure cost assessment should be updated and submitted as per the legislative requirements;
- Performance assessments must be undertaken as set out in conditions for authorisation and license conditions; and
- The Rehabilitation Plan will be implemented concurrently.

The studies and impact assessment have been based on the proposed mine layout and mine works programme. Should there be any changes to the proposed Project description, the adequacy and accuracy of the work may be affected, and additional work may be required to address the limitations.

In the instance where there is a change to the project, the EAP and Specialist team will be required to review the mine infrastructure layout and provided opportunity to amend the respective impact assessments.

20 Item 3(s): Description of any Assumptions, Uncertainties and Gaps in Knowledge

This section highlights the assumptions, uncertainties, limitations and knowledge gaps relevant to the assessment and mitigation measures of the various specialist studies undertaken. Refer to Table 20-1 below.

Table 20-1: Specialist Studies Assumptions, Uncertainties, and Gaps

Specialist Study	Assumptions, Uncertainties and Gaps
General	• Information related to the project has been provided by the Applicant. • It is understood that the road diversion, which triggers a Listed Activity, has not yet been constructed based on information provided by the Applicant but the additional infrastructure has been established. • At the time of the compilation of the Final Scoping Report as well as Impact Assessments by specialists, it was understood that none of the additional infrastructure had been constructed. • It is assumed a WUL is required for infrastructure within 500m of wetlands.
Soil, Land Use, and Land Capability	• Soil characteristics and descriptions in the report were supported by data obtained from previously conducted studies done by Digby Wells for Brakfontein Colliery in 2012. For reference conditions, a total of six representative soil samples were collected from different proposed development areas to compare to the historical data. • The area surveyed was based on the layout presented by the Universal Coal in June 2020. The study focused on the Brakfontein 264 IR/RE portion 0 and Brakfontein 264 IR portion 10 only with relevance to the new infrastructure. • Land suited for crop production was assumed also to be suitable for other, less intensive uses such as pasture, natural grazing, forestry and wildlife. • Soils are contiguous hence differentiation is not abrupt, and the transition zone cannot be completely captured during any given soil survey. • The soils within the capability classes are similar only with respect to the degree of limitations in soil use for agricultural purposes or with respect to the impact on the soils when they are so used.
Surface water	• The water quality report by Ecosolve Consulting (2020) reviewed by Digby Wells is assumed to present correct water quality data that was collected correctly and analysed appropriately by a SANAS accredited laboratory.
Wetlands and Aquatics	Wetlands- • The wetland assessment is based on the original wetland assessment completed for the Ubuntu Project completed in 2012 (reference number: Digby Wells Environmental. An Ecological Assessment of The Wetland Systems of The Brakfontein Mining Operation, UNI1292). The 2020 assessment contained in this report is an update of the previous study.

Specialist Study	Assumptions, Uncertainties and Gaps
	• The area surveyed was based on the layout presented by Universal Coal in June 2020. • Wetlands situated within the 500 m zone of regulation were assessed mostly on a desktop level with very limited verification in the field. • Both the 2012 and 2020 Wetland Assessments were conducted in winter and therefore some restrictions regarding vegetation, identification and flows in the systems. Aquatics- • No field work was undertaken, thus the assessment was based on desktop data analysis. • The 2012 Aquatic Ecology Assessment, undertaken during the dry season, was the primary source of data utilised for the current project. • A single dry season survey was undertaken. • The specific designs for the diversion of district road D2546 and culvert type was not yet confirmed at the time of writing.
Air Quality	• Since mining activities were selected to demonstrate the worst-case scenario, the predicted model may have resulted in an overestimation, thus the uncertainty associated with dispersion models.
Noise	• The assessment of the onsite noise scenario was based on baseline measurements collected in 2012. • The construction phase is assumed to be carried out during daytime hours only (06:00-18:00). • It is assumed that during the operational phase of the project, only 80% of the mining machinery will be operational for day and night-time. • The modelling adopted a conservative worst-case scenario approach assuming that all activities for each phase are being carried out simultaneously.
Cultural Heritage	• Whilst every attempt was made to obtain the latest available information, the reviewed literature does not represent an exhaustive list of information sources for the various study areas. • The pre-disturbance survey focused on the infrastructure footprint area and did not re-assess heritage resources identified to date through any other assessments undertaken to inform the current authorisations.

Specialist Study	Assumptions, Uncertainties and Gaps
	• At the time of the pre-disturbance survey, access was not possible for the entire infrastructure footprint as the Ubuntu Mine is presently operational. These properties were not surveyed by the heritage consultant. This includes the area of Portion 4 of the farm Brakfontein 264 IR covered by the approved OC1 footprint. • At the time of the pre-disturbance survey, some of the site-specific Project areas had been cleared as part of the current and approved Ubuntu Colliery activities. • Whilst every attempt was made to survey the extent of the site-specific study area (considering the points above), the HIA report does not present an exhaustive list of identified heritage resources. Overgrown vegetation limited visibility at the time of the pre-disturbance survey. • Archaeological and palaeontological resources commonly occur at subsurface levels. These types of resources cannot be adequately recorded or documented by assessors without destructive and intrusive methodologies and without the correct permits issued in terms of Section 35 of the NHRA.
Rehabilitation and Closure	Assumptions- • Information, mitigation measures and recommendations provided in this report are based on the specialist studies completed as part of the EIA and subsequent specialist assessments undertaken for the mine; • The commitments contained within this report currently exclude any comments or issued raised by Stakeholders and/or I&APs; • It must be noted that mining has just started, thus some of the information contained within this report is based as a conceptual level. As the mine progresses and more information becomes available, this report should be updated, thus the Closure and Rehabilitation report should be considered as a living document and should be reviewed and updated, if required on an annual basis; and • The Rehabilitation and Closure Plan (RCP) and Financial Provision is being updated for 2021 and a consolidated costing will be provided for the existing infrastructure and proposed infrastructure that forms part of the current application. Limitations- • Current information available to Digby Wells was used in developing the Plan; • The information contained within the RCP is based on the layout plans available. If there is a significant change or addition of other infrastructure areas, the Plan will need to be updated to cater for this change;

Specialist Study	Assumptions, Uncertainties and Gaps
	• The RCP must be considered as a living document and will be updated as additional information becomes available, and as monitoring and rehabilitation progresses; and • Vegetation monitoring and maintenance will take place for three years post closure.

21 Item 3(t): Reasoned Opinion as to Whether the Proposed Activity should or should not be Authorised

The road diversion has been assessed for potential impacts associated. A summary of the specialist assessments undertaken is contained in Section 15. Based on these findings, the impacts can be mitigated on condition that the Applicant strictly adheres to the recommendations presented in the EMP.

21.1 Reasons why the Activity should be Authorised or Not

Most of the additional infrastructure has been constructed however, these do not trigger Listed Activities according to NEMA. The road diversion proposed is a Listed Activity that, in the opinion of the EAP, should be authorised based on the impact assessment conducted as part of this EIA. In the instance that the Applicant follows the mitigation measures proposed herein, coupled with the monitoring programme, the overall impact should be manageable.

21.2 Conditions that must be Included in the Authorisation

All mitigation measures included in this EIA/EMP Report and the associated specialist studies should be conditions to the authorisation. All specialist recommendations have been captured in Table 15-1.

21.2.1 Specific Conditions to be Included into the Compilation and Approval of the EMPR

The following specific conditions are proposed:

- The mitigation/enhancement measures contained in the attached specialist reports (Table 15-1)and EMPr must be adhered to;
- Monitoring must be undertaken as described in the monitoring programme provided in Part B Section 8;
- CFPs must be developed for the construction phase in the event of accidental exposure of unidentified heritage resources;
- The closure cost assessment should be updated and submitted as per the legislative requirements;
- Performance assessments must be undertaken as set out in conditions for authorisation and license conditions; and
- The Rehabilitation Plan will be implemented concurrently.

21.2.2 Rehabilitation Requirements

The rehabilitation requirements, as set out in the rehabilitation plan (Appendix L) will be adhered to.

22 Item 3(u): Period for which the Environmental Authorisation is Required

The infrastructure is required for the Life of Mine which is six years. Mining operations began in 2019 and thus the EA is required for 5 years. The road diversion will be permanent.

23 Item 3(v): Undertaking

The undertaking required to meet the requirements of this section is provided at the end of the EMPr in Part B, Section 12.

24 Item 3(w): Financial Provision

The financial provision is done in terms of regulation 53 and 54 of the MPRDA regulations. The financial provision considered the financial provision regulations (2015) using the DMRE Guidelines for Calculating the Quantum of Financial Provision (using 2019 rates escalated from 2005).

According to the DMRE method of calculation, the cost for rehabilitation and closure of the Ubuntu Colliery for unscheduled closure is R 14,729,425, as of May 2020 (Incl. VAT). The additional infrastructure will require an additional amount of R 791,537 (Incl. VAT), refer to Table 24-1 below.

Table 24-1: Ubuntu Mine Financial Provision Summary (Additional infrastructure – January 2021)

Class A (High Risk)		Unit:	A	B	C	D	E=A*B*C*D
Component	Description:		Quantity	Master rate	Multiplication factor	Weighting factor 1	Amount (Rands)
			Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & Power lines)	m^3	0.00	R 15.81	1.00	1.00	R 0
2 (A)	Demolition of steel buildings & Structures	m^2	840.99	R 220.30	1.00	1.00	R 185,267
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	0.00	R 324.65	1.00	1.00	R 0
3	Rehabilitation of access roads	m^2	0.00	R 39.42	1.00	1.00	R 0
4(A)	Demolition & rehabilitation of electrified railway lines	m	0.00	R 382.62	1.00	1.00	R 0
4(B)	Demolition & rehabilitation of non-electrified railway lines	m	0.00	R 208.70	1.00	1.00	R 0
5	Demolition of housing &/or administration facilities	m^2	0.00	R 440.59	1.00	1.00	R 0
6	Opencast rehabilitation including final voids & ramps	ha	0.00	R 224,238.95	**1.00**	1.00	R 0
7	Sealing of shafts, adits & inclines	m^3	0.00	R 118.26	1.00	1.00	R 0
8(A)	Rehabilitation of overburden & spoils	ha	0.00	R 153,975.86	1.00	1.00	R 0
8(B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	0.00	R 191,774.16	1.00	1.00	R 0
8(C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	0.00	R 557,003.05	**1.00**	1.00	R 0
9	Rehabilitation of subsided areas	ha	0.00	R 128,931.60	1.00	1.00	R 0
10	General surface rehabilitation	ha	2.55	R 121,974.86	1.00	1.00	R 310,695
11	River diversions	ha	0.00	R 121,974.86	1.00	1.00	R 0
12	Fencing	m	0.00	R 139.13	1.00	1.00	R 0
13	Water management	ha	0.00	R 46,378.27	**1.00**	1.00	R 0
14	2 to 3 years of maintenance & aftercare	ha	2.55	R 16,232.40	1.00	1.00	R 41,347

Class A (High Risk)		Unit:	A	B	C	D	E=A*B*C*D
Component	Description:		Quantity	Master rate	Multiplication factor	Weighting factor 1	Amount (Rands)
			Step 4.5	Step 4.3	Step 4.3	Step 4.4	
15(A)	Specialist studies	m	0.00	R 0.00	1.00	1.00	R 0
							R 537,309
Weighting Factor 2 (step 4.4)			**1.05**			**Sub Total 1**	**R 564,175**
			Preliminary and General	12.00	% of Sub Total 1		**R 67,700.99**
			Contingency	10.00	% of Sub Total 1		**R 56,417.50**
						Sub Total 2	**R 688,293**
						VAT (15%)	**R 103,244**
						GRAND TOTAL Incl. VAT	**R 791,537**

Digby Wells recommends that when the first year of mining has taken place, that a detailed financial provision calculation is completed. In addition, it is recommended that the financial provision be annually updated as per the requirements of NEMA and GN R1147.

24.1 Explain how the Aforesaid Amount was Derived

The DMRE calculation model was compiled using Microsoft Excel. The standard DMRE unit rates were escalated with CPI from 2005 to 2020. The mining area was then classified with a risk rating table as specified in the DMRE guidelines.

24.2 Confirm that this Amount can be Provided for from Operating Expenditure

Universal has made provision for closure as legally required. A liability assessment update will continue to be undertaken annually to ensure the financial provision is in line with the closure cost.

25 Item 3(x): Deviations from the Approved Scoping Report and Plan of Study

The Scoping Report was compiled under the assumption and information that the additional infrastructure had not been constructed. Since then, all additional infrastructure except for the road was constructed.

26 Item 3(y): Specific Information Required by the Competent Authority

The sub-sections below provide additional information which should be considered by the competent authority for the Project. The impact on the socio-economic conditions and the potential impacts and risks on heritage resources are considered below.

26.1 Impact on the Socio-economic Conditions of any Directly Affected Person

The additional infrastructure is not expected to have any additional direct socio-economic impacts. All findings of the existing Social Impact Assessment remain valid and applicable to the Ubuntu Colliery Project. All recommendations in that report remain applicable and must be implemented.

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

The HIA (Appendix J) was completed as part of this Project. Potential impacts and risks on heritage resources were investigated and assessed, and where possible, mitigation measures were provided. One additional heritage resource was identified within the Project Area. The identified impacts to the heritage resources can be mitigated through the recommendations included in Section 15.

27 Item 3(z): Other Matters Required in Terms of Sections 24(4)(a) and (b) of the Act

This section is not applicable to the proposed Project.

Part B: Environmental Management Programme Report

1 Details of the EAP

The details and expertise of the EAP have been included in Section 2.1 and 2.2 of Part A respectively as required.

2 Description of the aspects of the activity

A number of specialist studies were undertaken as part of the environmental regulatory process during the EIA Phase for the Project. These have been included in Section 10 of Part A.

3 Composite Map

A Composite Map is shown in Figure 3-1 (and Appendix B) which depicts the mining associated infrastructure and environmental aspects assessed which informed the impact assessment.

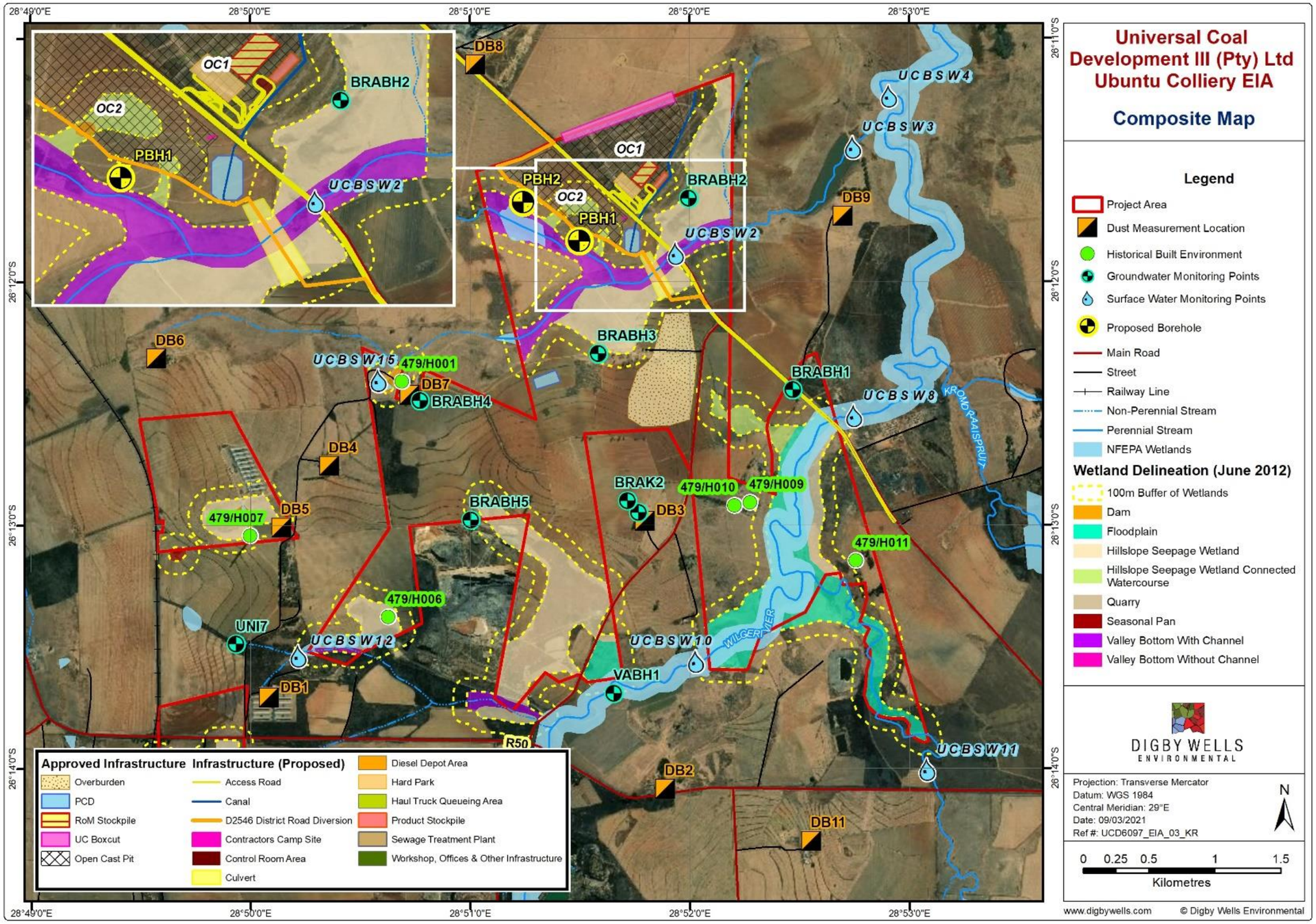


Figure 3-1: Composite Map

4 Description of Impact management objectives including management statements

The following subsections describe the closure objectives and details regarding the water uses relating to the project.

4.1 Determination of closure objectives

Closure and rehabilitation are a continuous series of activities that begin with planning prior to the project's design and construction, and end with achievement of long-term site stability and the establishment of a self-sustaining ecosystem. Not only will the implementation of this concept result in a more satisfactory environmental conclusion, but it will also reduce the financial burden of closure and rehabilitation.

The preliminary closure objectives for the Ubuntu Colliery are as follows:

- Return land, mined by open pit methods, as far as possible to a land capability to that which existed prior to mining and that the management level required to utilise the rehabilitated land is within the means of the farmer who uses it;
- Ensure that as little water as possible seeps out of the various sections of the mine and where this is unavoidable, ensure that the water is contained or treated if the volume is significant and if it does not meet statutory water quality requirements;
- Remove mine infrastructure that cannot be used by a subsequent landowner or a third party. Where buildings can be used by a third party, arrangements will be made to ensure their long-term sustainable use;
- Clean up all dump and loading areas and rehabilitate these as far as possible to a land capability to that which existed prior to mining.
- Follow a process of closure that is progressive and integrated into the short and long term mine plans and that will assess the closure impacts proactively at regular intervals throughout project life;
- Implement progressive rehabilitation measures, beginning during the construction phase wherever possible;
- Leave a safe and stable environment for both humans and animals and make their condition sustainable;
- To prevent any soil and surface/groundwater contamination by managing all water on site;
- Comply with local and national regulatory requirements;
- Form active partnerships with local communities to take care of management of the land after mining, where possible; and

- To maintain and monitor all rehabilitated areas following re-vegetation or capping (placement of a layer of material, e.g. clay or sandstone, which prevents/limits capillary movement of water between soil and pollution source).

Rehabilitation and closure objectives have been tailored to the project at hand. The RCP aims to assist Universal Coal in carrying out successful rehabilitation of the Ubuntu Colliery.

5 The Process for Managing any Environmental Damage, Pollution, Pumping and Treatment of Extraneous Water or Ecological Degradation as a Result of Undertaking a Listed Activity

The Listed Activities applicable to the Project have been assessed and determined to result in environmental damage. The potential impacts associated with these activities have been identified and assessed for each environmental aspect in Section 11, Part A.

It must be noted that the scope of the application and assessment does not include the opencast pits but rather the additional infrastructure required to continue mining. It is therefore assumed that the risk, impacts, mitigation and management measures required to avoid or remedy Acid Mine Drainage have been assessed.

5.1 Volumes and rate of water use required for the operation

The proposed Project involving additional infrastructure is not envisaged to trigger the need for abstraction and use of water.

5.2 Has a water use licence has been applied for

A Water Use Licence Application for the establishment of the additional infrastructure in the 500m regulated area of watercourses is required in terms of Section 21 (c) and (i) of the NWA. As per the composite map, the infrastructure lies outside the 100 m buffer.

6 Impacts to be mitigated in their respective phases

The proposed mitigation measures and its compliance with the relevant standards are presented in Table 6-1.

Table 6-1: Impacts to be Mitigated in their Respective Phases

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
Construction					
Soils, Land Use and Land Capability	• Surface preparation for infrastructure: • Site clearing, including the removal of vegetation and topsoil. Surface preparation for infrastructure; and • Stripping topsoil and soft overburden; Loading, hauling and stockpiling.	• Compaction of soil and therefore increased surface runoff; • Increased wind, and water erosion on unprotected soils and consequently sedimentation as these soils are highly erodible; • Removal of vegetation and basal cover, increasing the potential loss of topsoil, organic material and decreased soil fertility; • Compaction, ponding, and changes to the natural hydrological functioning of the landscape; • Loss of usable soil as a resource for agriculture – disturbance, low fertility, erosion and compaction; and • Loss of Land Capability and agricultural land due to complete restrictions to cattle grazing (current land use). Reduced area for cattle grazing.	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	• Chamber of Mines Guidelines • NEMA; and • The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA).	Life of Construction Phase
	• Construction of surface infrastructure: • Construction of mine related infrastructure including roads (excluding pits).	• Complete removal of the soil and change in land capability during the construction of the open-cast pit; • Soil contamination; • Migration of contaminants into groundwater and contaminate freshwater systems; and • Loss of land use and land capability (agricultural potential).	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.		
Hydrology (Surface Water)	• Site preparation including vegetation clearance and excavations.	• Sedimentation and siltation of nearby watercourses.	• If possible, construction activities must be prioritised to the dry months of the year (May to September) to limit mobilisation of sediments, dust generation and mobilisation hazardous substances from construction vehicles used during construction phase; • Dust suppression on the haul roads and other cleared areas must be undertaken on regular basis to prevent or limit dust generation; • Hydrocarbon and hazardous waste storage facilities must be appropriately bunded to ensure that leakages can be contained. Spill kits should be in place and construction workers	• NWA; • NEMA; • DWS Best Practice Guideline G1: Storm Water Management; and • GN R 704.	• Life of Construction Phase
	• Handling of hydrocarbons and other chemicals; Loading, hauling and transportation of product coal.	• Surface water contamination leading to deterioration of water quality.			

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
			should be trained in the use of spill kits to contain and immediately clean up any leakages or spills; • Vehicles should regularly be maintained as per a developed maintenance program. Vehicles should also be inspected daily before use to ensure there are no leakages; • Drip trays must be used to capture any oil leakages. Servicing of vehicles and machinery should be undertaken at designated hard park areas. Any used oil should be disposed of by accredited contractors; and • Ensuring implementation of a stormwater management plan to prevent the mixing of clean and dirty water.		
Wetlands and Aquatics	• Surface preparation for infrastructure	• Direct loss of wetland areas; • Loss of biodiversity; • Erosions and sedimentation of wetland areas; • Water quality contamination and deterioration; and • Habitat loss because of poor water quality.	• Control through the establishment of at least a 100 m buffer zone around the remaining wetlands to protect wetland areas from the proposed developments. This would require that development occur further than 100 m from a delineated wetland area; • Remedy through revegetate the area as soon as possible to prevent erosion, sedimentation and habitat loss within the wetlands; • Control through restrict access to the remaining wetlands; • Control through place sediment trapping berms on the boundary of the 100 m buffer or end of development; • Remedy by doing an offset calculation to determine the impacts and total amount of wetland habitat loss to understand the amount of wetlands to be offset; and • Remedy by developing a Wetland Offset Strategy, Rehabilitation Plan and a Monitoring Plan for the wetlands.	• NEMA; • NWA; • NEM: BA; • National Freshwater Ecosystems Priority Areas (NFEPA, Nel et al., 2011).; and • the Ramsar Convention and the South African Wetlands Conservation Programme (SAWCP).	• Daily/Monthly
	• Construction of surface infrastructure	• Direct loss of wetland areas; • Habitat loss; • Loss of biodiversity; and • Erosions and sedimentation of wetland areas.	• Control through establishment of a 100 m buffer zone around the remaining wetlands to protect wetland areas from the proposed developments within the study area. This would require that development occur further than 100 m from a delineated wetland area; • Control through		

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
			• Control by prevent access to the remaining wetlands; • Control and remedy by place sediment trapping berms on the boundary of the 100 m buffer or end of development; and • Remedy by the development of a Wetland Offset Strategy and Rehabilitation plan for the wetlands in the Project area.		
Air Quality	• Site clearing; • Access and haul road construction; • Construction of surface infrastructure.	• Poor air quality due to the generation of dust	• Apply wetting agents, dust suppressants, and binders on exposed areas; • Limit activity to non-windy days (with wind speed ≤ 5.4 m/s); • Keep the area of disturbance to a minimum and avoid any unnecessary clearing, digging, or scraping, especially on windy days; • Construct surfaces of all access roads from lateritic soils and avoid fine/colloidal (e.g. clays and silts) materials; • Minimise the drop heights when loading onto trucks and at tipping points; and • Set maximum speed limits and have these limits enforced.	• NEMA; • National Environmental Management: Air Quality Act, Act.39 of 2004, 2004; and • National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), National Dust Control Regulations (2013).	• On commencement of the construction phase and for the duration of the phase
Noise	• Surface preparation for infrastructure • Construction of surface infrastructure	• Noise emanating from machinery while conducting these activities can reach at the surrounding sensitive receivers	• Construction activities should be restricted to daylight hours (06:00 – 18:00); • Construction machinery and vehicles should be switched off when not in use; • Construction vehicles should have buzzer type reverse alarms (producing band-limited white noise) installed, rather than the conventional beeping type reverse alarms (which produce a tonal sound); • Vehicles to be serviced as per their design requirements to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and • Regulate vehicle speeds on the access and haul roads.	• National Noise Control Regulations.	• Upon commencement of the construction phase
Heritage	• D2546 road diversion	• Damage to or destruction of H013	• Project redesign to avoid the heritage resource and implement a 100 m no-go buffer zone around the resource.	• National Heritage Resources Act No. 25 of 1999	• Before the commencement of the Project
	• All Activities	• Damage to or destruction of previously unidentified heritage resources.	• Develop and implement CFP.		• Before the commencement of the Project
Operational					

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
Soils, Land Use and Land Capability	• Operation and maintenance of infrastructure	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water); • Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; • All erosion observed within the operational footprint should be remedied immediately and included as part of an ongoing rehabilitation plan; and • All soils compacted as a result of operational activities should be ripped/scarified (<300 mm) and profiled.	• Chamber of Mines Guidelines; • NEMA; and • CARA.	• Life of Operational Phase
	• Use and maintenance of haul roads (incl. transportation of coal to washing plant)	• Compaction of soil and increased runoff potential; • Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; • Increased erosion, and consequently sedimentation; • Soil contamination from spills and leakages.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; • Remediate using commercially available emergency clean up kits. • Monitor the Storm water diversion berm/trench, culvert and road. Ensure that no contaminants are entering the wetland from the road and that no erosion is taking place. If contamination/erosion is discovered, this must be remedied immediately; • All spills should be immediately cleaned up and treated accordingly; • Erosion berms should be installed downgradient of the pit areas to prevent gully formation and siltation of the wetland resources; • Ensure a soil management programme is implemented and maintained to minimise erosion and sedimentation; • Concurrent rehabilitation is recommended, and pit areas should be backfilled and suitably rehabilitated on an ongoing basis for the life of the proposed operation; • All vehicles must be regularly inspected for leaks; • Re-fuelling must take place on a sealed surface area away from wetlands to prevent ingress of hydrocarbons into topsoil; and • Allow only essential personnel within the buffer areas for all wetland features identified.		

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
Hydrology (Surface Water)	• Operational activities (Runoff from the dirty water areas)	• Surface water contamination by runoff from dirty water areas.	• Runoff from dirty areas should be directed to the storm water management infrastructure and should not be allowed to flow into the natural environment, unless DWS discharge authorisation and compliance with relevant discharge standards as stipulated in the NWA is obtained; • The existing water quality monitoring program should be conducted for the life of mine and for a few years post closure for ongoing monitoring of water resources within and in close proximity to the project area to allow detection of any contamination arising from mine activities; • The management of general and other forms of waste must ensure collection and disposal into clearly marked skip bins that can be collected by approved contractors for disposal to appropriate disposal sites; • The overall housekeeping and storm water system management (including the maintenance of berms, de-silting of dams and conveyance channels and clean-up of leaks) must be maintained throughout the life of mine; • The hydrocarbon and chemical storage areas and facilities must be located on hard-standing area (paved or concrete surface that is impermeable), roofed and bunded in accordance with SANS1200 specifications. This will prevent mobilisation of leaked hazardous substances; and • Training of mine personnel and contractors in proper hydrocarbon and chemical waste handling procedures is recommended.	• NEMA; • NEM:WA; • NWA; and • DWA BPGs, 2008	• During the Operational Phase
	• Hydrocarbons and chemicals spillages and leakages from equipment, moving haulage trucks and machinery.	• Surface water contamination by hydrocarbon waste and deterioration of water quality.			
Wetlands and Aquatics	• Operation and maintenance of infrastructure	• Water quality contamination and deterioration; • Habitat loss as a result of poor water quality; • Loss of biodiversity; and • Erosion and Sedimentation within the wetlands	• Control by restrict access to all remaining wetlands with at least a 100 m buffer; • Remedy by maintain and monitor wetland functionality; • Remedy by clean up spillages of coal, oils, lubricants and hydrocarbons immediately, where large spills have occurred, remove the impacted soils and remediate immediately;	• NEMA; • NWA; • NEM: BA; • NFEPA, Nel et al..; and • the Ramsar Convention and the SAWCP.	• Continuously

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
			• Control and remedy by recommended that no new river/stream crossing be erected, there are several crossings within the site that can be improved for better wetland functionality and operational functionality and this will include the insertion of culverts; • Remedy by construct sediment trapping berms on edges of the roads; • Remedy by establish vegetation on berms and edges of the road to minimise the risk of erosion; • Remedy by where possible, create a preferential flow of runoff and wastewater directed towards the PCDs; • Remedy by monitor the roads monthly to identify and rectify any areas that have begun to erode and where water may be flowing towards wetland areas; and • Control and remedy by recommended that all mitigation measures recommended by the Digby Wells Groundwater Report for the Ubuntu Coal Mine Project be followed to prevent dewatering of wetlands.		
	• Use and maintenance of haul roads (incl. transportation of coal to washing plant)	• Erosion of wetland crossings associated with the road diversion; • Accidental spills causing soil and water contamination; • Habitat loss as a result of poor water quality; • Increased Alien Invasive Plants (AIPs); • Loss of biodiversity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition.	• Control and remedy by implementing quarterly monitoring of the wetland health and functionality and rehabilitation recommendations at the wetland crossings associated with the road diversion as well as downstream of the WTP, STP and wash plant; • Control by access roads must be maintained and monitored to prevent erosion, head-cut erosion, sedimentation, increased AIPs and loss of wetland habitat and functionality; and • Remedy by clean up spillages of coal, oils, lubricants and hydrocarbons immediately, where large spills have occurred, remove the impacted soils and remediate immediately.		
Air Quality	• Drilling and blasting of ROM ore and overburden • Loading, handling, and stockpiling of	• Poor air quality due to the generation of dust	• Apply wetting agents, dust suppressants, and binders on exposed areas and haul roads; • Conduct mining activities judiciously on windy days (with wind speed ≥ 5.4 m/s); • Keep the area of disturbance to a minimum and avoid any unnecessary clearing, digging, or scraping, especially on windy days;	• NEM: AQA and • National Ambient Air Quality Standards	• Measurements must commence before the start of the operation phase and for the life of mine.

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
	ROM ore and overburden • Operation of the open pit workings; • Stockpiling (rock dumps, soils, ROM, discard dump) establishment and operation • Operation of the screening and crusher circuit.		• Minimise the drop heights when loading onto trucks and at tipping points; • Enclosure of the crusher and screening circuit, fitted with dust suppression spays; and • Set maximum speed limits and have these limits enforced.		
Noise	• Operation and maintenance of infrastructure • Use and maintenance of haul roads (incl. transportation of coal offsite)	• Noise emanating from machinery while conducting these activities can reach at the surrounding sensitive receivers	• Machinery and vehicles should be switched off when not in use; • Construction vehicles should have buzzer type reverse alarms (producing band-limited white noise) installed, rather than the conventional beeping type reverse alarms (which produce a tonal sound); • Vehicles to be serviced as per their design requirements to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and • Regulate vehicle speeds on the access and haul roads.	• National Noise Control Regulations.	• Upon commencement of the operational phase
Decommissioning					
Soils, Land Use and Land Capability	• Demolition and removal of all infrastructure (incl. transportation off site)	• Soil contamination from decommissioning of infrastructure such as the STP, WTP, depot area, offices and stockpile area; • Loss of usable soil as a resource – Erosion, sedimentation and Compaction; and Loss of land capability.	• Actively re-vegetate disturbed areas immediately after decommissioning; • No material will be dumped within any rivers, tributaries or drainage lines; • All soils compacted as a result of mining activities should be ripped/scarified (<300 mm), profiled and re-seeded with indigenous vegetation; • No vehicles or heavy machinery will be allowed to drive indiscriminately within any wetland areas or their buffer areas. All vehicles must remain on demarcated roads; • All vehicles must be regularly inspected for leaks;	• Chamber of Mines Guidelines; • NEMA; and • CARA.	Life of Operational Phase

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
			• Re-fuelling must take place on a sealed surface area away from wetlands to prevent ingress of hydrocarbons into topsoil; and • All spills should be immediately cleaned up and treated accordingly.		
	• Rehabilitation (spreading of soil, re-vegetation and profiling/contouring)	• Loss of usable soil as a resource – Erosion and Compaction; and • Loss of Land capability; and Positive impact to the soil, land use and land capability.	• Ensure no erosion, incision and canalisation takes place; • Erosion berms should be installed downstream of areas to be re-profiled and contoured to prevent gully formation; • All erosion observed within the operational footprint should be remedied immediately and included as part of an ongoing rehabilitation plan; • All soils compacted as a result of rehabilitation activities should be ripped/scarified (<300 mm) and profiled; • Active re-vegetation of exposed soils should take place to prevent the onset of erosion; • No vehicles or heavy machinery will be allowed to drive indiscriminately within any wetland areas and their associated buffer areas. All vehicles must remain on demarcated roads and within the rehabilitation footprint; • All vehicles will be regularly inspected for leaks; • Re-fuelling must take place on a sealed surface area away from wetlands to prevent ingress of hydrocarbons into topsoil; and • All spills should be immediately cleaned up and treated accordingly.		
	• Installation of post-closure water management infrastructure	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water); • Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.	• If post-mining decant takes place the water should be treated prior to release into the environment; and • Investigation into the water quality and the most appropriate treatment measures must be conducted.		
Hydrology (Surface water)	• Demolition of mine infrastructure (workshops, haul roads, processing plant etc.) Disturbance of soils	• Sedimentation and siltation of nearby watercourses and deterioration of water quality.	• Restore the topography to pre-mining conditions as much as is practically possible by backfilling, removing stockpiles and restore the slope gradient and angle of the site; • Immediate revegetation of cleared areas;	• NEMA; • NEM:WA; • NWA; • GN R 704; and • DWA BPGs, 2008.	During the decommissioning phase

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
	and erosion by overland flow		• Where practical, decommissioning activities should be prioritized during dry months of the year (May to September); • Movement of demolition machinery and vehicles should be restricted to designated access roads to minimise the extent of soil disturbance; • Use of accredited contractors for removal or demolition of infrastructure during decommissioning is recommended; this will reduce the risk of waste generation and accidental spillages; and • Ensure that the infrastructure (pipelines, fuel storage areas, pumps) are first emptied of all residual material before decommissioning.		
	• Rehabilitation of disturbed sites close to pre-mining conditions	• Restoration of pre-mining streamflow regime in nearby watercourses.			
Wetlands and Aquatics	• Demolition and removal of all infrastructure (incl. transportation off site)	• Water quality contamination and deterioration due to an increase in sedimentation; • Habitat loss as a result of poor water quality; • Loss of biodiversity; • Loss of wetland areas; • Soil erosion due to surface runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition.	• Control and remedy by the water/sewage treatment plant may have uses post-closure for the surrounding community, this should be considered before removal; • Remedy by once trenches have been backfilled and infrastructure removed, vegetation should be established on the exposed soil surfaces to minimise the risk of erosion and sedimentation into the wetland areas; • Remedy by during the rehabilitation, temporary sediment trapping berms should be erected to prevent any sediment arising from rehabilitation activities washing into wetland areas; • Remedy by as far as possible, conduct decommissioning work of infrastructure during the dry season and re-seeding in the wet-season; • Remedy by clean up spillages of coal, oils, lubricants and hydrocarbons immediately, where large spills have occurred, remove the impacted soils and remediate immediately; and • Remedy by continue with a wetland monitoring and rehabilitation plan beyond life of mine until final closure.	• NEMA; • NWA; • NEM: BA; • NFEPA, Nel et al..; and • the Ramsar Convention and the SAWCP.	During Construction and Decommissioning Phases.
	• Rehabilitation (spreading of soil, revegetation, and profiling/contouring)	• Erosion due to exposed areas to wind and surface water runoff;	• Remedy by landscape and vegetate the exposed areas as soon as possible to prevent erosion and sedimentation within the wetlands;		

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
		• Siltation of surface water resources leading to deteriorated water quality and quantity of the wetlands; • Change in habitat and potential change in species composition; and • Increased AIPs.	• Remedy by shaping of landscape should be performed in a manner the will water to drain freely towards wetland areas; • Remedy by avoid creating narrow preferential flow paths as the this could lead to erosion; and • Remedy by as far as possible, conduct decommissioning of infrastructure work during the dry season and re-seeding in the wet season.		
	• Installation of post-closure water management infrastructure	• Soil and water contamination from decant and spillage from PDCs; • Increased runoff and changes to the wetland functionality; • AIPs proliferation due to changes to the natural landscape, soils and wetlands; • Erosion and sedimentation in wetlands; and • Changes to the habitat, wetland functionality and biodiversity.	• Control and remedy by the water management system will be only installed once the dirty areas have been cleaned and it is deemed there is no risk of water contamination; • Remedy by once trenches have been backfilled and infrastructure removed, vegetation should be established on the exposed soil surfaces to minimise the risk of erosion; • Remedy by during the construction, temporary sediment trapping berms should be erected to prevent any sediment arising from rehabilitation activities washing into wetland areas; and • Remedy by implementing a monitoring plan beyond life of mine or until final closure.		
Air Quality	• Dismantling and removal of infrastructure • Rehabilitation of the Project area • Post-closure monitoring and rehabilitation	Poor air quality due to the generation of dust	• Apply wetting agents, dust suppressants, and binders on exposed areas; • Conduct mining activities judiciously on windy days (with wind speed ≥ 5.4 m/s); • Keep the area of disturbance to a minimum and avoid any unnecessary clearing, digging, or scraping, especially on windy days; • Minimise the drop heights when loading onto trucks and at tipping points; • Set maximum speed limits and have these limits enforced; • The dismantling of infrastructure must occur in phases; and • The rehabilitated landscape should be vegetated.	• NEM: AQA and • National Ambient Air Quality Standards	On commencement of the decommissioning phase and for the duration of the phase

Aspect	Activities	Impacts	Mitigation Measures	Compliance with standards	Time period for implementation
Noise	• Demolition and removal of all infrastructure (incl. transportation off site) • Rehabilitation (spreading of soil, re-vegetation and profiling/contouring) • Installation of post-closure water management infrastructure	Noise emanating from machinery while conducting these activities can reach at the surrounding sensitive receivers	• Restrict decommissioning activities to daylight hours (06:00 – 18:00); • Regularly service decommissioning related machines and vehicles to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; • Construction vehicles should have buzzer type reverse alarms (producing band-limited white noise) installed, rather than the conventional beeping type reverse alarms (which produce a tonal sound); • Regulate speed limits on access roads; and • Switch off equipment when not in use.	National Noise Control Regulations.	Upon commencement of the decommissioning phase

7 Impact management outcomes

Table 7-1 provides a description of impact management outcomes, identifying the standard of impact management required for the aspects.

Table 7-1: Impacts to be Mitigated in their Respective Phases

Aspect	Activities	Potential impacts	Mitigation type	Standard to be achieved
Construction Phase				
Soils, Land Use and Land Capability	• Surface preparation for infrastructure: • Site clearing, including the removal of vegetation and topsoil. Surface preparation for infrastructure; and • Stripping topsoil and soft overburden; Loading, hauling and stockpiling.	• Compaction of soil and therefore increased surface runoff; • Increased wind, and water erosion on unprotected soils and consequently sedimentation as these soils are highly erodible; • Removal of vegetation and basal cover, increasing the potential loss of topsoil, organic material and decreased soil fertility; • Compaction, ponding, and changes to the natural hydrological functioning of the landscape; • Loss of usable soil as a resource for agriculture – disturbance, low fertility, erosion and compaction; and • Loss of Land Capability and agricultural land due to complete restrictions to cattle grazing (current land use). Reduced area for cattle grazing.	• Modify, remedy, control, or stop through concurrent rehabilitation through the life of mine	• Chamber of Mines Guidelines • NEMA; and • The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA).
	• Construction of surface infrastructure: • Construction of mine related infrastructure including roads (excluding pits).	• Complete removal of the soil and change in land capability during the construction of the open-cast pit; • Soil contamination; • Migration of contaminants into groundwater and contaminate freshwater systems; and • Loss of land use and land capability (agricultural potential).		

Aspect	Activities	Potential impacts	Mitigation type	Standard to be achieved
Hydrology (Surface Water)	• Site clearing; • Access and haul road construction; • Construction of Infrastructure; • Topsoil stockpiling; and • Loading, transport, tipping and spreading of materials	• Siltation of water resources due to increased turbidity from dust and soil erosion; and • Water contamination due to leaks or spills of hazardous and hydrocarbon containing material	• Storm water management: Control contamination of receiving waterbodies by consideration of potential contamination sources and strategic decommissioning to minimize on potential environmental impacts	• DWS Best Practice Guideline G1: Storm Water Management and GN 704.
Wetlands and Aquatics	• Surface preparation for infrastructure	• Direct loss of wetland areas; • Loss of biodiversity; • Erosions and sedimentation of wetland areas; • Water quality contamination and deterioration; and • Habitat loss because of poor water quality.	• Modify, remedy, control, or stop through concurrent rehabilitation through the life of mine	• NEMA; • NWA; • NEM: BA; • National Freshwater Ecosystems Priority Areas (NFEPA, Nel et al., 2011).; and • the Ramsar Convention and the South African Wetlands Conservation Programme (SAWCP).
	• Construction of surface infrastructure	• Direct loss of wetland areas; • Habitat loss; • Loss of biodiversity; and • Erosions and sedimentation of wetland areas.		
Air Quality	• Site clearing; • Access and haul road construction; • Construction of surface infrastructure.	• Poor air quality due to the generation of dust	• Control through the implementation of an air quality management plan; • Dust control measures; and • Ambient air quality monitoring	• NEMA; • National Environmental Management: Air Quality Act, Act.39 of 2004, 2004; and • National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), National Dust Control Regulations (2013).
Noise	• Surface preparation for infrastructure • Construction of surface infrastructure	• Noise emanating from machinery while conducting these activities can reach at the surrounding sensitive receivers	• Control through the implementation of an air quality management plan; • Dust control measures; and • Ambient air quality monitoring	National Noise Control Regulations.
Heritage	• D2546 road diversion	• Damage to or destruction of H013	• Avoid	National Heritage Resources Act No. 25 of 1999
	• All Activities	• Damage to or destruction of previously unidentified heritage resources.	• Control	
Operational Phase				
Soils, Land Use and Land Capability	• Operation and maintenance of infrastructure	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water);	• Modify, remedy, control, or stop through concurrent rehabilitation through the life of mine	• Chamber of Mines Guidelines;

Aspect	Activities	Potential impacts	Mitigation type	Standard to be achieved
		• Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.		• NEMA; and • CARA.
	• Use and maintenance of haul roads (incl. transportation of coal to washing plant)	• Compaction of soil and increased runoff potential; • Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; • Increased erosion, and consequently sedimentation; • Soil contamination from spills and leakages.		
Hydrology (Surface Water)	• Stockpiling; • Diesel storage and explosives magazine; • Movement of vehicles and mine machinery; and • Storage, handling and treatment of hazardous products (including fuel, explosives and oil) and waste	• Siltation of water resources due to increased turbidity from dust and soil erosion; • Water contamination due to leaks or spills of hazardous and hydrocarbon containing material; and	• Implementation of the proposed stormwater management plan will control the impacts by mitigating the impacts	• Rehabilitation Plan; and • To avoid impacts to surface water.
Wetlands and Aquatics	• Operation and maintenance of infrastructure	• Water quality contamination and deterioration; • Habitat loss as a result of poor water quality; • Loss of biodiversity; and • Erosion and Sedimentation within the wetlands	• Modify, remedy, control, or stop through concurrent rehabilitation through the life of mine	• NEMA; • NWA; • NEM: BA; • NFEPA, Nel *et al*..; and • the Ramsar Convention and the SAWCP.
	• Use and maintenance of haul roads (incl. transportation of coal to washing plant)	• Erosion of wetland crossings associated with the road diversion; • Accidental spills causing soil and water contamination; • Habitat loss as a result of poor water quality; • Increased Alien Invasive Plants (AIPs); • Loss of biodiversity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition.		
Air Quality	• Drilling and blasting of ROM ore and overburden • Loading, handling, and stockpiling of ROM ore and overburden • Operation of the open pit workings; • Stockpiling (rock dumps, soils, ROM, discard dump)	• Poor air quality due to the generation of dust	• Control through the implementation of an air quality management plan; • Dust control measures; and • Ambient air quality monitoring	• NEM: AQA and • National Ambient Air Quality Standards

Aspect	Activities	Potential impacts	Mitigation type	Standard to be achieved
	establishment and operation • Operation of the screening and crusher circuit.			
Noise	• Operation and maintenance of infrastructure • Use and maintenance of haul roads (incl. transportation of coal offsite)	• Noise emanating from machinery while conducting these activities can reach at the surrounding sensitive receivers	• Control through the implementation of an air quality management plan; • Dust control measures; and • Ambient air quality monitoring	National Noise Control Regulations.
Decommissioning				
Soils, Land Use and Land Capability	• Demolition and removal of all infrastructure (incl. transportation off site)	• Soil contamination from decommissioning of infrastructure such as the STP, WTP, depot area, offices and stockpile area; • Loss of usable soil as a resource – Erosion, sedimentation and Compaction; and • Loss of land capability.	• Modify, remedy, control, or stop through concurrent rehabilitation through the life of mine	• Chamber of Mines Guidelines; • NEMA; and • CARA.
	• Rehabilitation (spreading of soil, re-vegetation and profiling/contouring)	• Loss of usable soil as a resource – Erosion and Compaction; and • Loss of Land capability; and • Positive impact to the soil, land use and land capability.		
	• Installation of post-closure water management infrastructure	• Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to land and water); • Soil contamination; and • Loss of usable soil for agriculture – changing the land capability.		
Hydrology (Surface water)	• Demolition and removal of infrastructure; • Rehabilitation and closure.	• Siltation of water resources due to increased turbidity from soil erosion; • Restoration of the pre-mining streamflow regime in adjacent watercourses	• Storm water management: Control contamination of receiving waterbodies by consideration of potential contamination sources and strategic decommissioning to minimize on potential environmental impacts	To prevent siltation of surface water resources.
Wetlands and Aquatics	• Demolition and removal of all infrastructure (incl. transportation off site)	• Water quality contamination and deterioration due to an increase in sedimentation; • Habitat loss as a result of poor water quality; • Loss of biodiversity; • Loss of wetland areas; • Soil erosion due to surface runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity; • Siltation of wetlands due to erosion; and	• Modify, remedy, control, or stop through concurrent rehabilitation through the life of mine	• NEMA; • NWA; • NEM: BA; • NFEPA, Nel *et al*..; and • the Ramsar Convention and the SAWCP.

Aspect	Activities	Potential impacts	Mitigation type	Standard to be achieved
		• Change in habitat and potential change in species composition.		
	• Rehabilitation (spreading of soil, revegetation, and profiling/contouring)	• Erosion due to exposed areas to wind and surface water runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity of the wetlands; • Change in habitat and potential change in species composition; and • Increased AIPs.		
	• Installation of post-closure water management infrastructure	• Soil and water contamination from decant and spillage from PDCs; • Increased runoff and changes to the wetland functionality; • AIPs proliferation due to changes to the natural landscape, soils and wetlands; • Erosion and sedimentation in wetlands; and • Changes to the habitat, wetland functionality and biodiversity.		
Air Quality	• Dismantling and removal of infrastructure • Rehabilitation of the Project area • Post-closure monitoring and rehabilitation	• Poor air quality due to the generation of dust	• Control through the implementation of an air quality management plan; • Dust control measures; and • Ambient air quality monitoring	• NEM: AQA and • National Ambient Air Quality Standards
Noise	• Demolition and removal of all infrastructure (incl. transportation off site) • Rehabilitation (spreading of soil, re-vegetation and profiling/contouring) • Installation of post-closure water management infrastructure	• Noise emanating from machinery while conducting these activities can reach at the surrounding sensitive receivers	• Control through the implementation of an air quality management plan; • Dust control measures; and • Ambient air quality monitoring	National Noise Control Regulations.

8 Financial provision

This section describes the process of determining the financial provision for the Ubuntu Colliery. This section has been compiled using the Rehabilitation, Decommissioning and Closure Plan compiled by Digby Wells in January 2021. (Appendix L).

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

Closure objectives associated with the project have been indicated in Section 4.1.

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

A Public Participation Process was undertaken during November and December 2020 for the Scoping Phase of the Project. As indicated in the Final Scoping Report, attempts were made to organise FGMs with I&APs however, these were unsuccessful.

Details of the PPP are included in this report in Section 9.2 of Part A. The Rehabilitation and Closure Plan (RCP) has been made available for public review and comment together with this Draft EIA Report. All comments received that pertain to the RCP will be recorded in the final report. FGMs will be held with I&APs during the EIA Phase.

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

Table 8-1overleaf provides a summary of the rehabilitation actions and plans which must be followed. The Rehabilitation and Closure Plan is provided in Appendix L .

Table 8-1: Summary of Rehabilitation and Closure Action Items

Aspect	Description
Workshops, Offices and other Infrastructure	The re-usable items should be removed from the site; Remaining structures should be demolished to 1 m below surface and the demolition rubble removed; and Soil should be tested for contamination. If contamination is discovered, this soil should be removed and disposed of in the appropriate waste disposal facility.
	Once the site has been cleared the exposed underlying materials should be reshaped to create a gently sloping, free-draining topography; Re-instate natural drainage lines to limit erosion and sediment build up within local river courses.
	Appropriate topsoil sourced from the topsoil stockpiles should be replaced to a minimum thickness of 300 mm on the rehabilitated areas.
	Topsoil should be fertilised and to reduce compaction.
	Reseed with grasses and improve species diversity by planting species. Additionally, replant species that were relocated due to mining construction.
	Alien invasive species must be removed.
	Restrict access of people/machinery/vehicles/grazing animals on newly rehabilitated land to allow regeneration of vegetation and reduce erosion.
	Ensure robust care and maintenance plans.
Diesel Bay	All contamination should be removed during operation.
	Demolish concrete bund wall and dispose of contaminated material at a hazardous waste facility.

Aspect	Description
	Once the site has been cleared the exposed underlying materials should be reshaped to create a gently sloping, free-draining topography; Re-instate natural drainage lines to limit erosion and sediment build up within local river courses.
	Appropriate topsoil sourced from the topsoil stockpiles should be replaced to a minimum thickness of 300 mm on the rehabilitated areas.
	Topsoil should be fertilised and ripped to reduce compaction.
	Reseed with grasses and improve species diversity by planting species. Additionally, replant species that were relocated due to mining construction.
	Alien invasive species must be removed.
	Restrict access of people/machinery/vehicles/grazing animals on newly rehabilitated land to allow regeneration of vegetation and reduce erosion.
	Ensure robust care and maintenance plans.
Access and Service Roads (with weighbridge)	Roads that can and will be used for rehabilitation/monitoring or by other users post-closure should be left *in situ*.
	Demolish weighbridge and dispose the waste at a general waste facility.
	Appropriate topsoil sourced from the topsoil stockpiles should be replaced to a minimum thickness of 300 mm on the rehabilitated areas.
	Topsoil should be fertilised and ripped to reduce compaction.
	Reseed with grasses and improve species diversity by planting species. Additionally, replant species that were relocated due to mining construction.

Aspect	Description
	Alien invasive species must be removed.
	Restrict access of people/machinery/vehicles/grazing animals on newly rehabilitated land to allow regeneration of vegetation and reduce erosion.
	Ensure robust care and maintenance plans.
Overburden	Utilise overburden material as backfill to fill the open pits.
	Once the site has been cleared the exposed underlying materials should be reshaped to create a gently sloping, free-draining topography; and Re-instate natural drainage lines to limit erosion and sediment build up within local river courses.
	Appropriate topsoil sourced from the topsoil stockpiles should be replaced to a minimum thickness of 300 mm on the rehabilitated areas.
	Topsoil should be fertilised and ripped to reduce compaction.
	Reseed with grasses and improve species diversity by planting species. Additionally, replant species that were relocated due to mining construction
	Alien invasive species must be removed.
	Restrict access of people/machinery/vehicles/grazing animals on newly rehabilitated land to allow regeneration of vegetation and reduce erosion;
	Ensure robust care and maintenance plans.
Open pit Mining areas and Wetlands	The final void should be sloped and backfilled with overburden up to 40% of the total pit void area and to a depth of the corresponding decant elevation of the individual pit.

Aspect	Description
	Construct a earth bund wall with overburden on the perimeter of each in pit lake, as a safety measure with thorny vegetation will be constructed.
	Long term management of the rehabilitated open pit areas will be required via contractual agreements with land owners.
	Rehabilitation specifications and goals will need to be set for wetland rehabilitation as well as arable land rehabilitation
	Trail plots will have to be established to determine wetland rehabilitation and crop production rates on rehabilitated land and to set specific criteria and methodologies for how this land will be prepared and used.
Run of Mine (ROM) pads	Remove contaminated coal veneer on ROM pads and dispose at hazardous waste facility.
	Demolish concrete retaining wall and reshape the material behind the retaining wall.
	Once the site has been cleared the exposed underlying materials should be reshaped to create a gently sloping, free-draining topography; and Re-instate natural drainage lines to limit erosion and sediment build up within local river courses.
	Appropriate topsoil sourced from the topsoil stockpiles should be replaced to a minimum thickness of 300 mm on the rehabilitated areas.
	Topsoil should be fertilised and ripped to reduce compaction.
	Reseed with grasses and improve species diversity by planting species. Additionally, replant species that were relocated due to mining construction.
	Restrict access of people/machinery/vehicles/grazing animals on newly rehabilitated land to allow regeneration of vegetation and reduce erosion.

Aspect	Description
	Ensure robust care and maintenance plans.
(PCD)	Desilt the pollution control dam.
	Remove HDPE liner and dispose of at a hazardous waste facility.
	Breach pollution control dam walls.
	Once the site has been cleared the exposed underlying materials should be reshaped to create a gently sloping, free-draining topography; and Re-instate natural drainage lines to limit erosion and sediment build up within local river courses.
	Appropriate topsoil sourced from the topsoil stockpiles should be replaced to a minimum thickness of 300 mm on the rehabilitated areas.
	Topsoil should be fertilised and ripped to reduce compaction.
	Reseed with grasses and improve species diversity by planting species. Additionally, replant species that were relocated due to mining construction.
	Alien invasive species must be removed.
	Restrict access of people/machinery/vehicles/grazing animals on newly rehabilitated land to allow regeneration of vegetation and reduce erosion.
	Ensure robust care and maintenance plans.
Site fencing	Fencing should be removed and disposed.

Aspect	Description
	Soil should be ripped to reduce compaction.
	Reseed with grasses and improve species diversity by planting species. Additionally, replant species that were relocated due to mining construction.
Topsoil Berms	Once the site has been cleared the exposed underlying materials should be reshaped to create a gently sloping, free-draining topography; and Re-instate natural drainage lines to limit erosion and sediment build up within local river courses.
	Topsoil should be fertilised and ripped to reduce compaction.
	Reseed with grasses and improve species diversity by planting species. Additionally, replant species that were relocated due to mining construction.
	Alien invasive species must be removed.
	Restrict access of people/machinery/vehicles/grazing animals on newly rehabilitated land to allow regeneration of vegetation and reduce erosion.
	Ensure robust care and maintenance plans.

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

The Rehabilitation Plan has been compiled in support of the closure objectives. Areas where infrastructure is proposed to be located will be the areas where the current land use will be impacted upon. For these areas it is recommended that the mine rehabilitate the areas back to grazing or similar, as these areas are expected to be relatively small in size. The end land use for the areas associated with the open pit mining activities will most likely be rehabilitated or converted into in-pit lakes as per the preferred closure option.

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

The financial provision was compiled in accordance with the Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine as published by the DMRE (previously known as the DMR, dated January 2005. The provision was updated in May 2020 and the annual update will shortly commence. Based on this costing has been provided for the proposed new infrastructure as part of the current application process, however the costing that was also undertaken during May 2020 has also been provided.

Section 24 in Part A of the EIA provides a summary of the Financial Provision. According to the DMRE method of calculation, the cost for rehabilitation and closure of the mine for unscheduled closure is **R 14,729,425,** as of May 2020 (incl. VAT). The additional infrastructure will require an additional amount of **R 791,537** (incl. VAT).

8.6 Confirm that the financial provision will be provided as determined

Universal Coal have made provision for closure of the Ubuntu Colliery as required legally. Annual updates to the liability assessment must be undertaken to ensure that the financial provision allocated is aligned with the closure cost.

9 Monitoring compliance and performance assessment

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon have been provided in the subsequent sections according to environmental aspects.

9.1 Monitoring of impact management actions

This section describes the monitoring programme which is an important management tool for detecting negative impacts as they arise and implementing the necessary mitigation measures. This section has been presented as per environmental aspect of the Project.

9.1.1 Soils, Land Use and Land Capability

Monitoring of soils must be undertaken in terms of:

iii) EIA Regulations, 2014 (as amended);

iv) NEMA, 1998 (Act No. 107 of 1998);

v) NEM: WA, 2008 (Act No. 59 of 2008); and

vi) CARA, 1983 (Act No. 43 of 1983).

External monitoring should commence from prior to the Construction Phase to ensure baseline information regarding soils and vegetation and to monitor any changes thereof. The Mine Manager (MM) and the Environmental Practitioner (EP) are responsible to report on results of the monitoring program. Internal monitoring reports should be required, reporting on the progress of the state of the monitoring and rehabilitation programme. This should be completed after each external monitoring report.

9.1.2 Hydrology (Surface Water)

Water quality monitoring has been on going at Ubuntu Colliery. The overall objective of the monitoring programme is to establish a surface monitoring database (time series data) that would represent surface water qualities down and up-gradient of the mining area prior to the commencement of mining.

9.1.3 Groundwater

There is ongoing monitoring at the Project Area. In addition to the monitoring network, two new boreholes (PBH1 and PBH2) are proposed. The proposed boreholes are located downgradient of the proposed new infrastructure. The proposed boreholes are important as they are intended to play a dual purpose of monitoring downgradient of the proposed pits (OC1 and OC2) which is not part of the activities under assessment however it is crucial that this gap in the current water monitoring network is covered. The pit is a potentially significant contamination source, and it is important that these impacts (if any) are monitored.

9.1.4 Wetlands and Aquatics

The monitoring programme are based on the following points:

- External monitoring should commence from prior to the Construction Phase to ensure baseline information regarding soils and vegetation and to monitor any changes thereof;
- Throughout the Operational and Decommissioning Phases, bi-annual (twice a year) external monitoring of wetland health, soils and vegetation, preferable one survey after the rainy season (March to May) and one after the dry season (July to September) (Please see Aquatic Impact Assessment Report);
- Monitoring should be done in terms of:
    - Appendix 6 of the NEMA EIA Regulations, 2014, (as amended);

- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA); and
- The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA).

- The Mine Manager (MM) and the Environmental Practitioner (EP) are responsible to report on results of the monitoring program; and
- Internal monitoring reports should be required, reporting on the progress of the state of the monitoring and rehabilitation programme. This should be completed after each external monitoring report.

9.1.5 Air Quality

It is recommended that the historic dustfall monitoring network be reinstated and maintained from the construction phase through the LOM. In addition, it is recommended that a continuous real-time monitoring station with the ability to measure both particulates and gases be commissioned before the commencement of the construction phase activities. The frequency of monitoring will ensure that diurnal, seasonal, annual, and inter-annual records are available to inform management decision making.

9.1.6 Noise

Although the noise impacts of the proposed Project on the receivers is significantly low, it is recommended that a monitoring plan be implemented to monitor the future noise impacts (increases and/or decreases in noise levels) throughout the Project's life. Components to be included in the proposed monitoring plan are discussed below:

- Noise monitoring is to be conducted throughout all phases (Construction, Operation and Decommission) of the Project's life;
- Quarterly, long-term (48 hours) noise measurements must be conducted at the prescribed locations as per the baseline noise measurement locations of this report; and

vii) Noise monitoring is to be conducted in accordance with the SANS 10103:2008 guidelines.

9.1.7 Heritage

The recommendations of the Heritage Impact Assessment do not require a monitoring programme.

9.1.8 Rehabilitation and closure

The physical aspects of rehabilitation should be carefully monitored during the operational phase as well as during the establishment of the desired final ecosystem.

The following items should be monitored continuously:

- Alignment of actual final topography to agreed planned landform;
- Depth of topsoil stripped and placed;
- Chemical, physical and biological status of replaced soil;
- Erosion status;
- Surface drainage systems and surface water quality;
- Groundwater quality at agreed locations;
- Vegetation basal cover;
- Vegetation species diversity;
- Faunal re-colonisation (Sherman and pitfall trapping); and
- Proportion of mined land that has been fully rehabilitated.

9.2 Monitoring and reporting frequency

The monitoring and reporting frequency for environmental aspects described in Section 9 is provided in Table 9-1

9.3 Responsible persons

The responsible persons for the respective monitoring programmes are detailed in Table 9-1.

9.4 Time period for implementing impact management actions

The time periods for implementing impact management actions has been provided for in Table 9-1.

9.5 Mechanism for monitoring compliance

Table 9-1 presents the environmental monitoring and management programme for the Project.

Table 9-1: Aspects to be Monitored

Source Activity	Monitoring Element	Functional requirements for monitoring	Roles and responsibilities (For the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions
Soil, Land Use and Land Capability				
All activities throughout the Project	Site Inspection • Stripping depths; • Stockpiles to check degradation and or pollution; • Soil surfaces before replacing soil to ensure that pre mined topography is emulated; • Random inspection of soil thickness on rehabilitated sections; • Fertility analysis and amelioration procedures prior to re-vegetation; and • Evaluating and readjusting the rehabilitation plan.	• Assessment of rehabilitated soil thickness and soil characteristics by means of auger observations using a detailed grid; • A post-mining land capability map based on soil thickness and characteristics; • A proposed post-mining land use map; • Erosion occurrences; • Soil acidity and salt pollution analyses (pH, electrical conductivity and sulphate) at 0-250 mm soil depth every 4 hectares (ha) (200 m x 200 m); • Fertility analysis (exchangeable cations K, Ca, Mg and Na and phosphorus) every 16 ha (400 m x400 m); and • Bulk density analysis every 4 ha (200 m x 200 m).	• The Environmental Officer (EO) should ensure soil contamination monitoring on site, especially where hydrocarbons are stored and applied; • EO to give training to sub-contractors and all workers on the operational procedures and mitigation measures; • The EO should be responsible to determine effectiveness of erosion control structures; and • A qualified scientist to evaluate the stockpiles.	Progressive monitoring must take place at least bi-annually and should involve the following: • Inspection of stripping depths; • Inspection of stockpiles to check degradation and or pollution; • Inspection of soil surfaces before replacing soil to ensure that pre mined topography is emulated; • Random inspection of soil thickness on rehabilitated sections; • Fertility analysis and amelioration procedures prior to re-vegetation; and • Evaluating and readjusting the rehabilitation plan.
	Vegetation Cover • Vegetation cover; • Soil depth; and • Soil fertility.	• During the vegetation cover monitoring, the presence of invasive weeds should be detected. An active program of weed management, to control the presence and spread of invasive weeds, will need to be instituted, so that any weeds encroaching because of the disturbed conditions are controlled.	• The Mine Manager (MM) and the EO should ensure soil contamination monitoring on site, especially where hydrocarbons are stored and applied; • EO to give training to sub-contractors and all workers on the operational procedures and mitigation measures; and • The MM and the EO should be responsible to determine effectiveness of erosion control structures.	• Vegetation cover assessments, soil depth and soil fertility testing should be carried out as a combined operation annually, during the growing season and at least one month after rain has fallen.
	Erosion • Erosion status; and • Runoff.	• Where fresh erosion channels are found, indicating that active erosion is occurring, remediation work will need to be programmed to improve the vegetation cover or divert rainwater runoff, as indicated by the specific site conditions.		• Erosion assessments should be carried out in the rehabilitated areas to visually check for erosion channels. This should be done twice a year, during the summer growing season, and again after rain events.
Hydrology (Surface Water)				

Source Activity	Monitoring Element	Functional requirements for monitoring	Roles and responsibilities (For the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions
Operation and decommissioning	Water quality and quantity	Monitor the impact of the mining activities and infrastructure through the continuous analyses of water quality and quantity.	Samples should be collected by an independent and qualified surface water consultant using the best practise guidelines and analysed by a SANAS-accredited laboratory.	Monthly during operation except where negative impacts are detected in which case, weekly. Weekly during decommissioning.
Wetlands and Aquatics				
All activities throughout the Project	Wetland Health	• As the proposed Project Area is comprised largely of wetland habitat, it is recommended that the WET-Health and WET-Ecoservices tools should be used to re-evaluate PES and EcoServices; • To compensate for the loss of wetland areas due to the destruction of aquifer recharge areas and the subsequent loss of ecological services due to the mining Project, a rehabilitation programme is recommended; • Wetland area size; • Wetland, habitat and aquatic health; and • Wetland physical attributes (functionality).	• The MM and the EO should ensure wetland contamination monitoring on site, especially where hydrocarbons are stored and applied; • EO to give training to sub-contractors and all workers on the operational procedures and mitigation measures; and • The MM and the EO should be responsible to determine effectiveness of erosion control structures.	• Quarterly basis by a suitably qualified wetland specialist for the duration of the Construction Phase, and annually for the duration of the Operational Phase; and • Upon closure and decommissioning, annual monitoring should take place for another three years to ensure no emerging impacts are identified, which may need to be addressed.
	Water Quality: *In situ* water testing focusing on temperature, pH, conductivity and oxygen content.	• Water quality should be tested on a biannual basis at each monitoring site to determine the extent of change from baseline results. • No noticeable change from determined baseline water quality for each respective season	Qualified aquatic ecologist	Bi-Annual
	Habitat Quality: Instream and riparian habitat integrity; and Availability/suitability of macroinvertebrate habitat at each monitoring site.	• The application of the IHI should be done on a reach basis for the northern tributary of the Wilge River as well as for the Wilge River; and • The IHAS must be applied at each monitoring site prior to sampling. • The Ecological Category determined for each assessed site must be maintained (and improved; and • The baseline IHAS scores should improve.	Qualified aquatic ecologist	Annual
	Macroinvertebrates: Macroinvertebrate assemblages must be assessed biannually.	• This must be done through the application of the latest SASS5, incorporated with the application of the MIRAI as outlined in this Aquatic Study. • The baseline SASS5 scores should not noticeably deteriorate; and • Baseline Ecological Categories should not be allowed to drop in category for each assessed site.	Qualified aquatic ecologist	Annual
	Fish:	• Sampling of fish must be undertaken during the wet season at the associated Wilge River reaches utilising standard electro-	Qualified aquatic ecologist	Annual

Source Activity	Monitoring Element	Functional requirements for monitoring	Roles and responsibilities (For the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions
	Fish assemblages must be assessed biannually	narcosis techniques followed by the application of FRAI for applicable reaches. • Baseline Ecological Categories should not be allowed to drop in category for each assessed site. The main goal for the Project must be to conserve the expected sensitive and conservation important species.		
Air Quality				
All activities throughout the Project	Particulates and gases	Particulate pollutants from the ongoing mining operation must be kept below the South African standards: • GN R 1210 of 24 December 2009 • GN R 486 of June 2012; and • GN R 827 of 1 November 2013	A designated EO onsite to collect ambient air quality data and submit it to an independent consultant for interpretation and reporting.	• Monthly dustfall monitoring; • Continuous PM_{10}, $PM_{2.5}$ monitoring; • Continuous monitoring of gases: SO_2, NO_2, and CO
Noise				
All activities throughout the Project	Noise disturbance	• Noise monitoring in line with the requirements of SANS 10103:2008 on-site, and at selected receivers • Ambient noise • Levels should be sampled in terms of the following parameters: ○ The A-weighted equivalent sound pressure level (LAeq) for duration not less than 30 minutes per monitoring point; and ○ Measurements to be taken during both daytime (06:00 to 22:00) and the night time (22:00 to 06:00).	EO	• Monitoring to be conducted on a quarterly basis during construction. • Thereafter monitoring should be on a bi-annual basis throughout the life of mine

10 Indicate the frequency of the submission of the performance assessment/ environmental audit report

In accordance with the EIA Regulations (2014), as amended, an external independent Environmental Audit will be undertaken every year. The Environmental Audit Report will be submitted to the DMRE and other relevant authorities and stakeholders where required.

11 Environmental Awareness Plan

The following subsections outlining the Environmental Awareness Plan for the Project. The Environmental Awareness Plan is a means of introducing and describing the requirements for environmental and social planning during the life of the Project.

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

Section 39 of the MPRDA requires Mining to develop an environmental awareness plan to inform the employees of any environmental risks which may result from their work. Therefore, the objectives of the environmental awareness plan will be:

- To educate employees regarding their role in conserving the environment and the importance of conserving natural resources,
- To identify environmental training needs for employees and contractors at all levels,
- To ensure that employees whose work could cause significant environmental impact as identified by the mine are competent to perform those tasks to which they are assigned,
- To enable employees to identify environmental impacts or non-conformances of their work activities on the environment,
- To familiarise employees with emergency preparedness and response requirements,
- To be aware of the potential consequences of deviation from specified operating procedures, and
- To conduct their work and manage mining activities in an environmentally responsible manner.

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

Environmental risk management will be conducted through implementation of the Environmental Management and Mitigation Measures contained in this report. These measures represent a Risk Based Environmental Management Programme and contain all

the elements required to effectively deal with all environmental risks to avoid pollution or degradation of the environment.

Management shall establish and maintain procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to relevant communication from external I&APs. The organisation shall consider processes for external communication on its significant environmental aspects and record its decisions.

Communication is a management responsibility. All line supervisors are responsible for effective communication within their own sections. Methods for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to relevant communication from I&APs must be established for the Project.

12 Specific information required by the Competent Authority

The financial provision for the environmental rehabilitation and closure requirements of mining operations is governed by NEMA, as amended, which provides in Section 24P that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision will continue to be reviewed annually. The assumptions, uncertainties and gaps in knowledge provided by specialists are presented in Section 20, Part A and conditions of authorisation and approval of the EMP to be considered by the Competent Authority are presented in Section 21.2 (Part A).

13 Undertaking

The EAP herewith confirms:-

viii) the correctness of the information provided in the reports

ix) the inclusion of comments and inputs from stakeholders and I&APs ;

x) the inclusion of inputs and recommendations from the specialist reports where relevant; and

xi) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

Signature of the Environmental Assessment Practitioner:	
Name of Company:	Digby Wells Environmental
Date:	April 2021

Appendix A: EAP CV and Qualifications

Appendix B: Plans

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Appendix C: PP Chapter

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Appendix D: Soil, Land Use and Land Capability Assessment

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Appendix E: Surface Water Assessment

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Appendix F: Groundwater Assessment

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Appendix G: Wetland and Aquatics Assessment

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Appendix H: Air Quality Assessment

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Appendix I: Noise Impact Assessment

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Appendix J: Heritage Assessment

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Appendix K: Traffic and Transport Assessment

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Appendix L: Rehabilitation and Closure Assessment