Environmental Consultants

Hydropedological Impact Assessment Report for Klipspruit Colliery's Proposed Nwabu Project - Pit BD and Pit H Underground Mining Expansion Project

Prepared for

Seriti Power (Pty) Ltd

Document Detail

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0	Lindokuhle Hlongwane	Vumile Ribeiro	24 July 2024	

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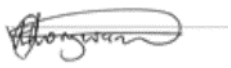
I Lindokuhle Hlongwane, as duly authorised representative of Niara Environmental Consultants (Pty) Ltd., hereby confirm my independence and declare that I:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Signature of the Specialist:	
Designation:	Soil Scientist
Qualifications:	Bsc Hons
Name of Company:	Niara Environmental Consultants (Pty) Ltd
Experience (Years):	17 Years
Date:	24 July 2024

Specialist Checklist

EIA REGULATIONS 2017 GNR 327, 325 and 324 Appendix 6 CONTENT OF THE SPECIALIST REPORTS	**In accordance with the EIA Regulations**	**Cross reference in this Report**
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	✓	Section 3
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	✓	Page 3
(c) an indication of the scope of, and the purpose for which, the report was prepared	✓	Section 1.3
(cA) an indication of the quality and age of Base Data used for the specialist report	✓	Section 7
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and the levels of acceptable change	✓	Section 7
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	✓	Section 7
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	✓	Section 7.1
(f) Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives.	✓	Section 10
(g) an identification of any areas to be avoided, including buffers;	✓	N/A
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	✓	N/A
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	✓	Section 5
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities	✓	Section 14
(k) any mitigation measures for inclusion in the EMPr	✓	Section 11
(l) any conditions for inclusion in the environmental authorisation;	✓	Section 11
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	✓	Section 11
(n) a reasoned opinion— i. whether the proposed activity, activities or portions thereof should be authorised; and (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	✓	Section 17
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	✓	N/A
(p) any other information requested by the competent authority	✓	N/A

Executive Summary

Introduction

Seriti Power (Pty) Limited (Seriti Power) (previously known as South32 SA Coal Holdings (Pty) Limited (Seriti Power) is the holder of the Mining Right (MR) for Klipspruit Colliery (KPS) issued under the Department of Mineral Resources and Energy (DMRE) (Ref No. MP 30/5/1/2/2/125 MR) near Ogies town in the Mpumalanga Province. KPS intends on applying for an EA and an Integrated Water Use License ("IWUL") for proposed change in mining method to KPSX and KPSS. The application process to be followed in terms of NEMA, for the additional activities proposed across KPSX and KPSS, is a Basic Assessment ("BA") process as contemplated under Chapter 4 of GNR 326. As such Seriti Power appointed Niara as an Independent Environmental Assessment Practitioner (EAP) to ensure compliance by undertaking the required environmental regulatory process.

Methodology

A site visit was undertaken from the 22nd of February 2024 to determine the types of soils present, their depths, their land, soil chemical and physical properties, identification, and assessment of potential impacts on soils resulting from the proposed project and mitigation measures to minimise impacts associated with the proposed project. The study was to provide conceptual understanding of the hydropedological processes and flow drivers of wetlands downslope of the areas on site and to provide conceptual descriptions on the impacts on the flow drivers to the affected wetlands.

Key Findings and Recommendations

The study area comprises of Land type Ba and Bb indicates land in which red and/or yellow brown apedal soils that are dystrophic and/or mesotrophic, dominate over red and/or yellow-brown eutrophic soils. During the hydro-pedological survey conducted, soils were first classified in accordance with the Soil Classification System (2018) and were then regrouped into hydro-pedological soil types in accordance with van Tol & Le Roux (2019). Soils observed during the survey include Witbank (Recharge-shallow), Hutton (Recharge), Clovelly (Recharge), Avalon (Interflow), Fernwood (Interflow), and Longlands (Interflow). Underground mining commenced within the Pit BD boundary and the mining method being utilised is bord and pillar mining. The inclusion of the bord and pillar mining method was to ensure optimal extraction of areas that are not profitable by OC method due to high strip ratio. The proposed KPSS and KPSS underground mine will continue using the bord and pillar mining method similar to pit BD. At this stage all the required infrastructure is already in place except for additional ventilation shafts and rescue boreholes will be constructed in strategic areas as the mining advances for both KPSX and KPSS.There are no envisaged impacts on the hydro-pedological flow paths during the construction phase. Potential impacts are expected during the operational phase and post mining. These include:

- Soil compaction and erosion;
- Hydrocarbon pollution, and
- Subsidence.

Subsidence was rated as the highest risk on the existing hydro-pedological flow paths of the project area.

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List of Abbreviations and Acronyms

BA	Basic Assessment
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
IWULA	Integrated Water Use License Application
KPS	Klipspruit Colliery
KPSS	Klipspruit South
KPSX	Weltevreden and Grootpan referred to as Klipspruit Extension
MR	Mining Right
MPRDA	Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NDM	Nkangala District Municipality
WMA	Water Management Area
WRC	Water Research Commission

1 Introduction

Seriti Power (Pty) Ltd ("Seriti Power") is the holder of a Mining Right for coal in respect of its Klipspruit Colliery ("KPS") operation issued under the Department of Mineral Resources and Energy ("DMRE") (Ref No. MP 30/5/1/2/2/125 MR). KPS consists of three mining areas under a single Mining Right. These areas are referred to as:

- KPS Main Pit which includes the Main Pit, Smaldeel and Bankfontein Pits;
- "KPSX" or Klipspruit Extension Weltevreden including Pit BD, Pit H, Pit G and Pit S; and
- "KPSS" or Klipspruit South which includes the KPSS East of the Thungela conveyor and the KPSS West of the Thungela conveyor.

KPS Main Pit holds an Environmental Management Programme Report ("EMPr"), converted in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) ("MPRDA") and approved on 14 September 2010 and the EMPr for KPSS and KPSX (Pit BD) which was approved on 17 August 2017. KPS was further awarded an Environmental Authorisation ("EA") for the Opencast ("OC") mining of Pit H in October 2022. In August 2023, an EA was granted for the OC mining of Pit G & S.

In October 2022, KPS was granted a Section 102 ("S102") amendment approval as contemplated under the MPRDA to convert the mining method for KPSX and KPSS from opencast ("OC") to underground ("UG") bord and pillar mining. A subsequent amendment application for the EA was submitted to the DMRE on the 18th of August 2023 as provided for under Regulation 29 of the NEMA Environmental Impact Assessment ("EIA") Regulations ("GNR 326"), for the conversion of the mining method from OC to UG of the area within KPSX named Pit BD. The approval of this EA is still pending.

KPS intends to apply for a change in mining method to the remainder of the KPSX and KPSS reserves from OC to UG (including all future mining areas of KPSX that fall outside of the Pit BD and inclusive of Pit H). This project has been termed and will for the purposes of this application be referred to as, the "Nwabu Project".

KPS intends on applying for an EA and an Integrated Water Use License ("IWUL") for proposed change in mining method to KPSX and KPSS. The application process to be followed in terms of NEMA, for the additional activities proposed across KPSX and KPSS, is a Basic Assessment ("BA") process as contemplated under Chapter 4 of GNR 326. Seriti Power is also required to apply for a Water Use Licence for the proposed amendments, in terms of Section 21 of the National Water Act, 1998 (Act No. 36 of 1998).

Niara Environmental Consultants (Pty) Ltd (Niara) has been appointed as an Independent Environmental Assessment Practitioner (EAP) to ensure compliance by undertaking the required environmental regulatory process. The aim of the study was to provide conceptual understanding of the hydropedological processes and flow drivers of wetlands downslope of the areas on site and to provide conceptual descriptions on the impacts on the flow drivers to the affected wetlands. Also, to provide recommendations on the mitigation and management measures to ensure minimisation of the impact to wetlands.

1.1 Project Locality

KPS and KPSS are located approximately 1 km west of the town of Ogies, with KPSX located 6 km north of the town of Ogies, in the eMalahleni Local Municipality within the Nkangala District Municipality in the Mpumalanga Province. Refer to Figure 1-1. Table 1-1 and Figure 1-2 provides the farms affected by the proposed underground mine expansion project.

Table 1-1: Activity Location

Farm Name:	Hartebeestlaagte 325 JS, Weltevreden 324 JS, Tweefontein 328 JS, Wildebeesfontein 327 JS, Grootpan 7 IS, Oggiesfontein 4 IS, Prinshof 2 IS, Klipfontein 3 IS, Smaldeel 1 IS, Phola Plant 830 IS, Zwaaiwater 11 IS.
Magisterial District:	Nkangala District Municipality
Distance and Direction from Nearest Town:	Approximately 6km north of Ogies town.
21 Digit Surveyor General Code for each Farm Portion	Attached as Appendix B.

1.2 Locality Map

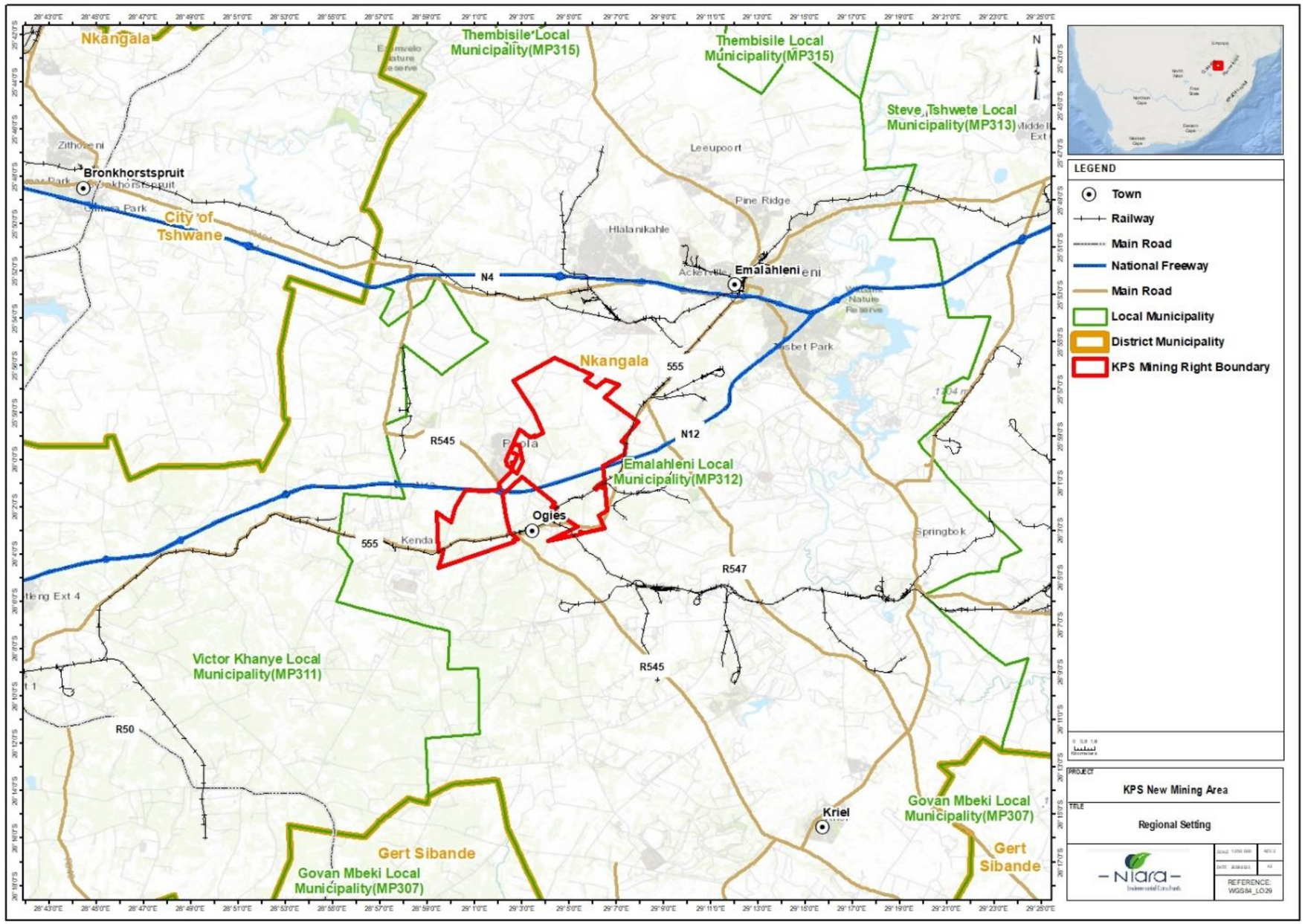

Figure 1-1: Locality Map

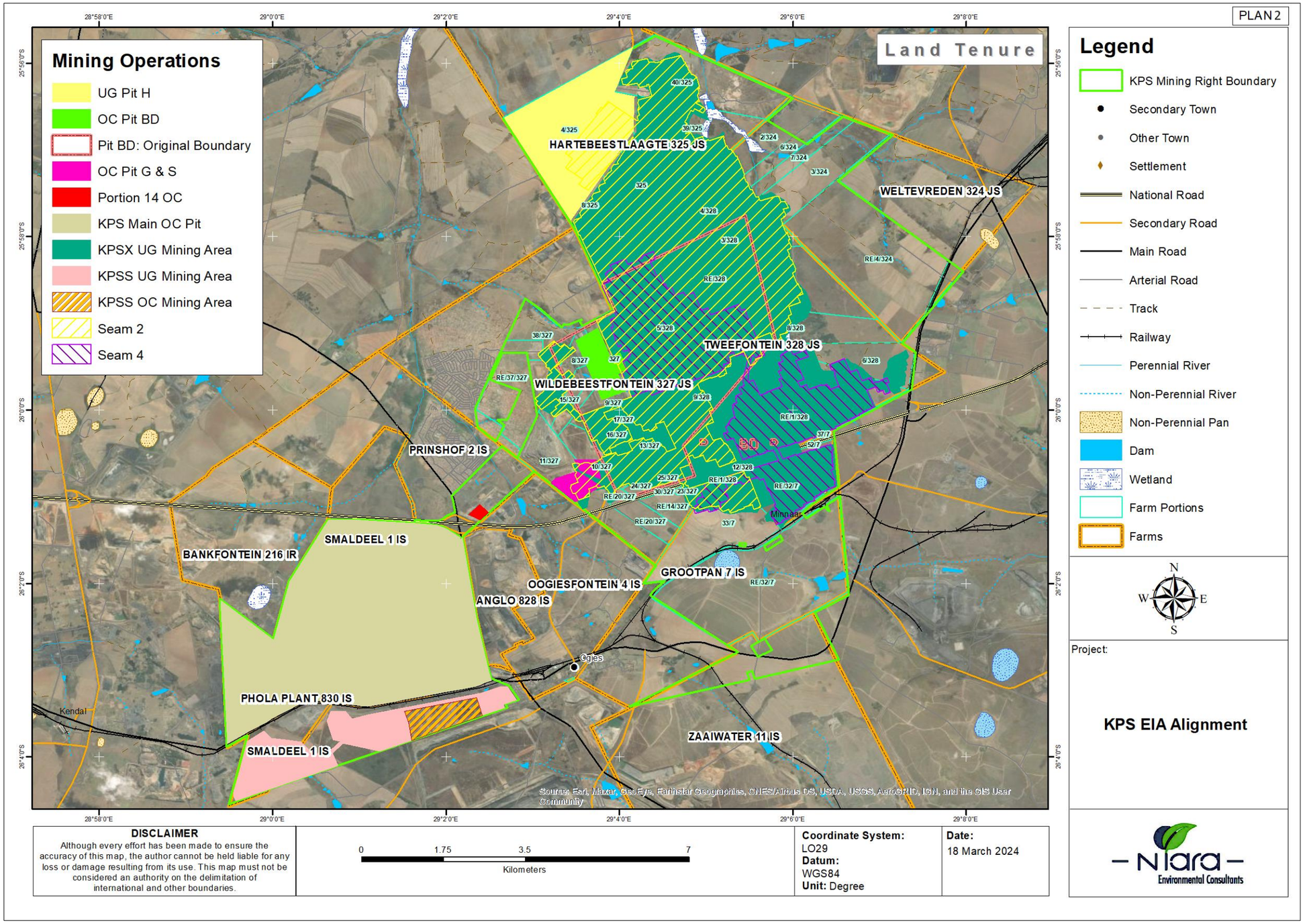

Figure 1-2: Affected farm portions over existing and proposed UG mining areas

1.3 Scope of Work

The aim of the study is to provide conceptual understanding of the hydropedological processes and flow drivers of wetlands downslope of the areas on site and to provide conceptual descriptions on the impacts on the flow drivers to the affected wetlands. Also, to provide recommendations on the mitigation and management measures to ensure minimisation of the impact to wetlands. The following steps have been considered for this assessment as per guidelines (van Tol *et al*., 2021 & 2023):

- Identification of dominant hillslopes.
- Conceptualising hillslope hydropedological responses.
- Quantification of hydropedological fluxes.

2 Terms of Reference

The terms of reference for this study are to fulfil the requirements of the Guideline for Hydropedological Impact Assessments (HIA) and Minimum Requirements published by the Department of Water and Sanitation (DWS) (2021) and Water Research Commission (WRC) (2023). The minimum report content requirements are as follows:

- Identify land types (Land Type Survey Staff, 1972 – 2006) within the study area.
- Hillslopes should be representative of the topography and land types.
- Transect soil survey should be conducted on each of the identified (Le Roux *et al*., 2011).
- Soil observations should be made at a regular interval, not exceeding 100m, on the transect.
- Observation depth should be until refusal and where the soil depth exceeds 2m, auger observations must be made in the bottom of the pit to describe soil/saprolite/bedrock transition.
- Soils should be described and classified in accordance with the South African Soil Classification System (Soil Classification Working Group, 2018).
- Soil profiles should then be regrouped into one of the seven hydropedological groups (van Tol & Le Roux, 2019).
- The occurrence, sequence, and coverage of the different hydropedological groups on a transect must then be used to describe the hydrological behaviour of the hillslope (van Tol *et al*., 2013).
- Include a graphical representation of the dominant and sub-dominant flowpaths at hillslope scale prior to development.
- The impact of the proposed development on the hydropedological behaviour should also be graphically presented. This should typically include the location of development on the hillslope and the anticipated impact of the development on water flows.

3 Details and Expertise of Specialist

Mr. Lindokuhle (Lindo) Hlongwane has more than seventeen years of experience in the Environmental Consulting field and more than fifteen years of experience within the Wetland assessment field. Lindo was involved in the updating, testing and roll out of "A practical field procedure for identification and delineation of wetlands and riparian areas" which is the guideline adopted by the Department of Water and Sanitation (DWS) for the identification and delineation of wetland areas.

Lindo Hlongwane (Wetland Specialist), graduated with a B.Sc. (hons) degree from the University of Witwatersrand, Johannesburg, South Africa in 2006. Lindo started working for Wetland Consulting Services Pty Ltd in 2007 as part of a programme supported by the Department of Water Affairs. The aim of the project was to update, test and roll out the "A practical field procedure for identification and delineation of wetlands and riparian areas". Lindo has since gained extensive experience conducting wetland delineation and assessment studies for scoping assessments, environmental impact assessments, and reserve determination studies for projects ranging from urban and linear infrastructure developments to coal and platinum group mining projects. Lindo is a Registered Natural Scientist (SACNASP).

A summarised CV of the Specialist is attached as Appendix A to this report

4 Project Description

Seriti Power (Pty) Ltd ("Seriti Power") is the holder of a Mining Right for coal in respect of its Klipspruit Colliery ("KPS") operation issued under the Department of Mineral Resources and Energy ("DMRE") (Ref No. MP 30/5/1/2/2/125 MR).

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4.1 Mining

KPSX was approved in 2011 with the mining of the full extent of Pit BD via the OC method. Pit H was further approved in 2023 for mining via OC method. When Seriti Power took over the operation of KPS in 2021 from South32 SA Coal Holdings, Seriti Power undertook an evaluation of all the assets obtained. The evaluation's focus was on the viability of the mine, including product market evaluations, operational optimisation and cost optimisation. This resulted in Seriti Power's change in mining strategy for the whole of KPS's remaining reserves from OC to UG. UG mining was the initial strategy for KPSS mining in 2006 but was later changed to OC in 2017 due to the economic value at the time.

4.1.1 KPSX Proposed Mining

The KPSX mining of Pit BD was amended from OC to UG in October 2022 through a S102 amendment process as contemplated under the MPRDA. The EA amendment is still outstanding. The S102 approved amendment covers the full extent of the unmined UG reserves within the KPSX (including Pit H) and KPSS mining areas as indicated in **Figure 1-2** above. The mineable coal seams within the KPSX area are the following and the focus of the UG mining will be on the main seams as illustrated in **Figure 4-1** and **Figure 4-2**:

- 5 seam ("S5")
- 4 upper A seam ("S4A")
- 4 upper seam ("S4U")
- 4 lower seam ("S4L")
- 2A seam ("S2A")
- 2 seam ("S2")
- 1 seam ("S1")

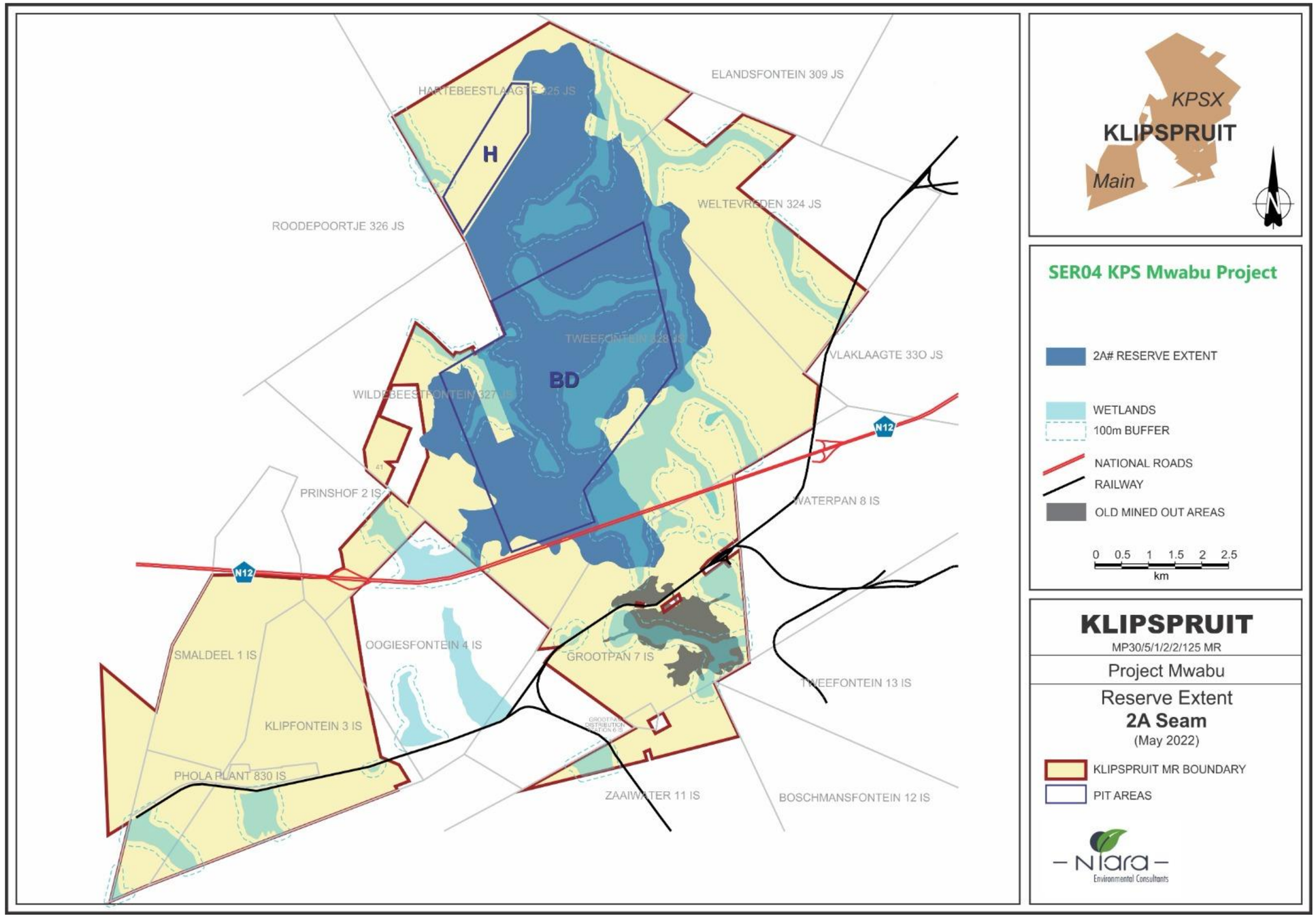


Figure 4-1: Proposed S2A mining

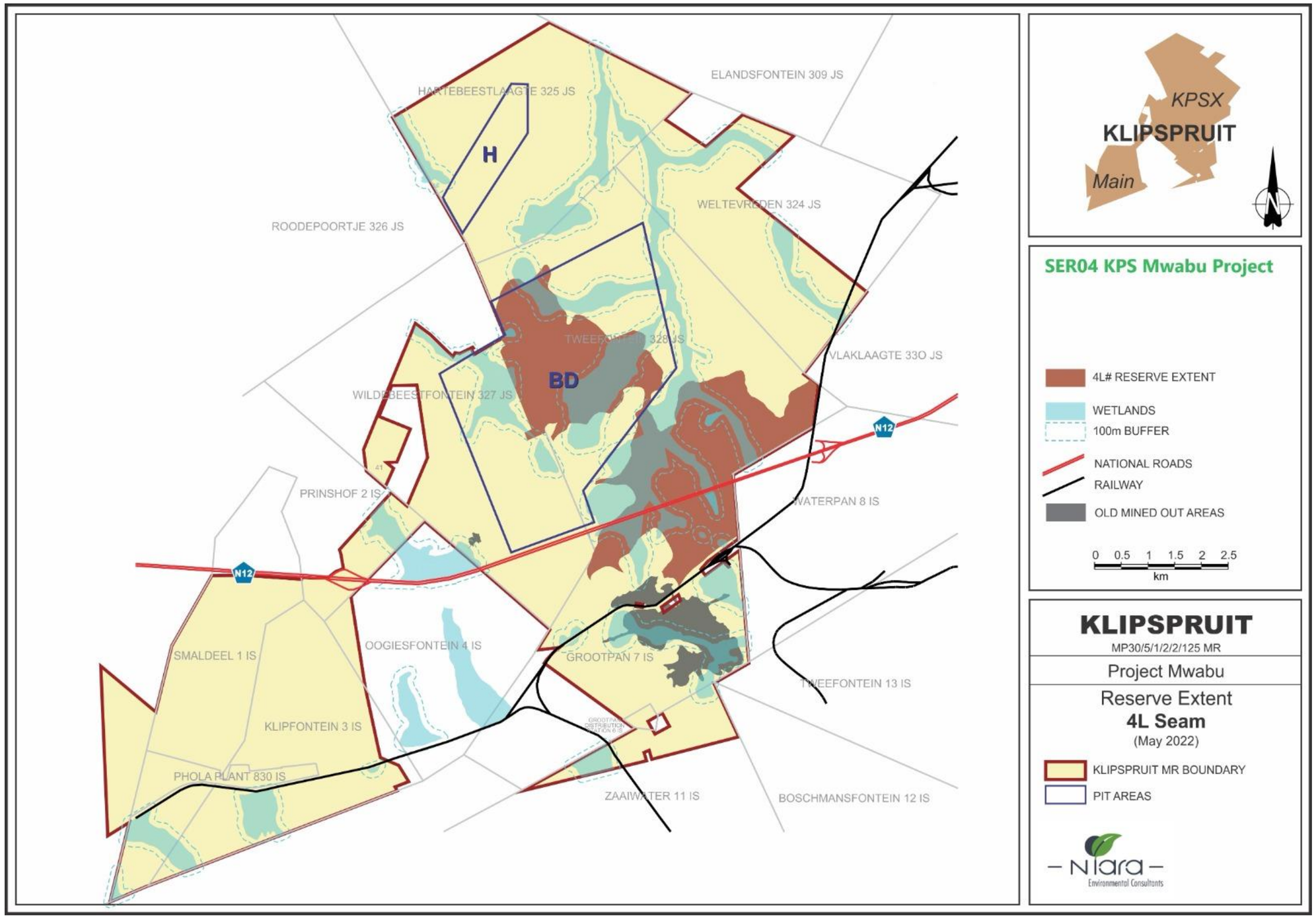


Figure 4-2: Proposed S4L Mining

The mineable coal seams at KPSS will include S5, S4U, S2 and S1.

UG mining has commenced within the Pit BD boundary and the mining method being utilised is bord and pillar mining. The inclusion of the bord and pillar mining method was to ensure optimal extraction of areas that are not profitable by OC method due to high strip ratio (Seriti Power, 2022). An adit has been developed from the pit BD highwall which provides access to the UG workings. The mining will advance towards the North, East, West and Southern directions from the Pit BD boxcut area. The proposed UG mining for both KPSS and KPSX is depicted in Figure 4-3 below. The proposed UG mining will extend mining to 2042. The UG workings designs are based on the following principles for both KPSS and KPSX (Seriti Power, 2022):

- UG workings are expected to be located approximately 25m below the ground surface with a mining height cut-off at 1.5m.
- A safety factor of not less than 1.3 will be applied on all workings with a pillar survival estimated at >99% for >500 years.
- No superimposition of the pillar between S4L and S2A and superimposition of the pillar between S2A and S1 as recommended by the geotechnical study.

UG mining using bord and pillar method will be conducted using a Continuous Miner ("CM") with parallel roadways in the direction of the advance. Perpendicular roads called splits will be developed at predetermined intervals to parallel roads. This road interlinks are the ones that create the pillars. The following activities form part of the board and pillar mining method (Seriti Power, 2022):

- Coal cutting and loading: The CM uses the rotating drum to cutting head, equipped with cutting picks to cut the coal face. The loading mechanism collects the broken coal and delivers it onto the gathering arm, which loads the coal on the CM's chain conveyor. The CM's conveyor transports the broken coal from the front to the rear of the CM. The CM's chain conveyor's capability of horizontal and vertical movements allows for coal loading into the shuttle car.
- Coal hauling and tipping: The loaded shuttle car is used to haul the coal to the section feeder breaker that crushes the coal and feeds it into the conveyor belt system.
- Roof support: A roof bolt machine installs the roof bolts once the CM has finished the development face and roof support is installed on a systematic basis. Roof bolts enhance the stability of the overlying roof. The spacing between roof bolts and the length of the roof bolts is determined during geotechnical studies.
- Coal transportation: The coal is transported using a conveyor belt system from the mining sections to the coal stockpile, linked with the overland conveyor on surface via the UG adit.

The strategy for the mining of the KPSS UG reserve will follow the same methodology as the one depicted above for KPSX and the UG resource will be accessed by using an adit which will be developed on the KPSS OC highwall.

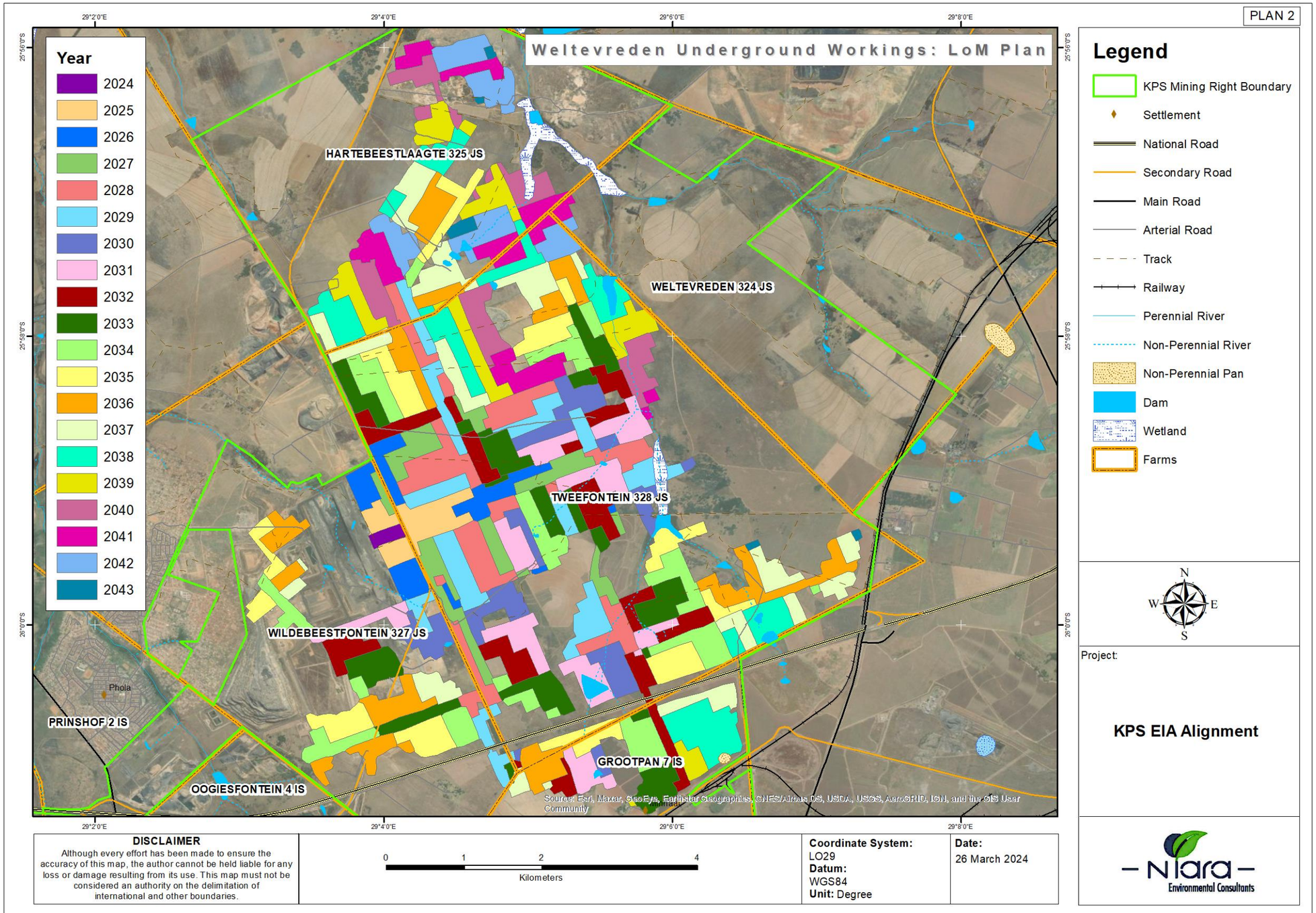


Figure 4-3: Life of Mine plan for the proposed KPSX UG mining

4.1.2 Processing

Once the coal is mined from the UG workings, it will be transported via a network of conveyors to the Phola Processing Plant ("PCPP") which is located adjacent to the KPS operation. The coal is beneficiated here resulting in various grades of quality produced. Following beneficiation at the PCPP, the coal will be transported via rail to the Richards Bay Coal Terminal for export, with a small component being retained for domestic use. Coal discard will be stored at the existing discard dump at the KPS and will be used as additional backfill material in the mining voids as part of the rehabilitation of the KPS.

4.1.3 Waste Management

All waste generated on site will be managed accordingly as per KPS' existing waste management procedures.

4.1.4 Summary of the Infrastructure Requirements

An audit has already been developed to support the UG mining at KPSX together with the supporting UG conveyors. An audit with the supporting UG conveyors will be constructed to support the UG mining at KPSS. This will be constructed on the existing KPSS OC highwall. Further, additional ventilation shafts and rescue boreholes will be constructed in strategic areas as the mining advances for both KPSX and KPSS. To manage additional dewatering activities from the UG workings, pipelines will be constructed which will link up with existing pipelines on surface and discharge in existing pollution control dams ("PCDs"). Should there be a need in future, a storage dam might also be constructed underground. Potable water supply to the UG workings will be delivered by pipelines which will link up with the existing potable water supply from the EMalahleni Water Treatment Plant. All other existing infrastructure will be utilised to support the proposed UG mining development including PCDs, power supply, haul roads, workshops, pipelines and water supply. The layout for the infrastructure at KPSX is depicted in **Figure 4-4**.

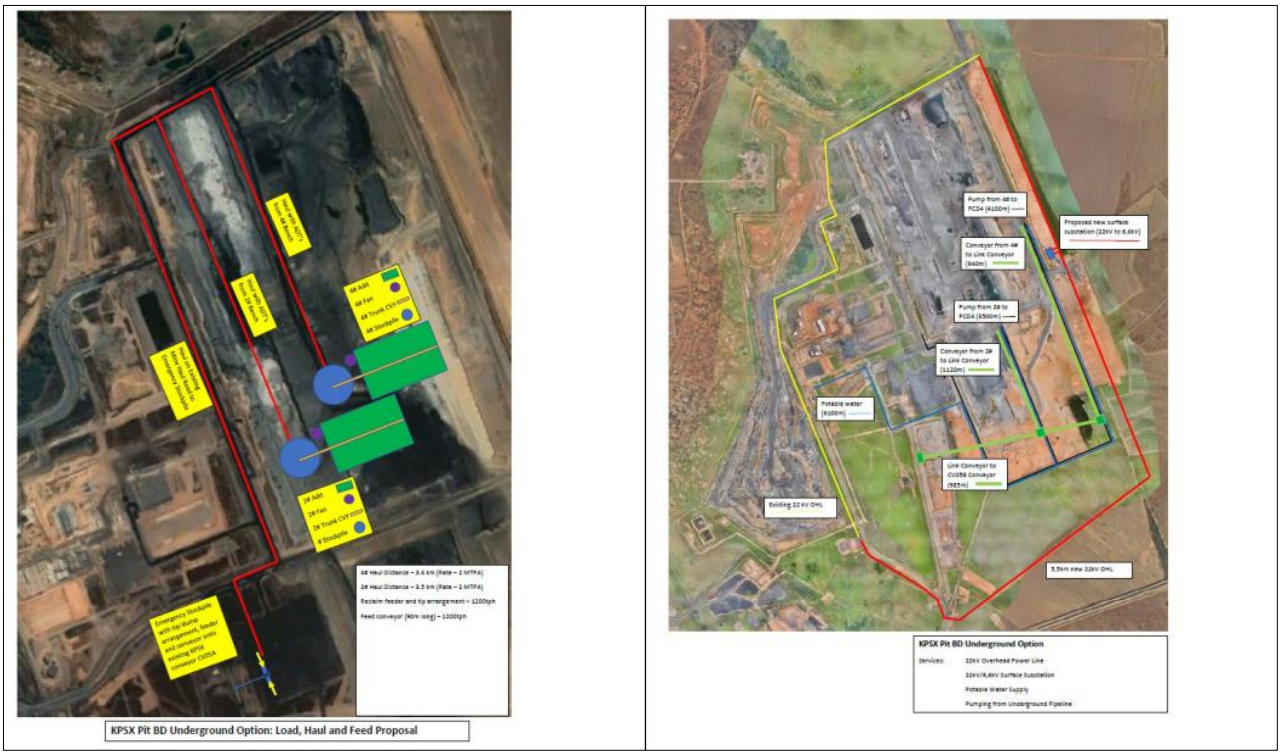


Figure 4-4: Layout for KPSX UG haul roads, pipelines, conveyor, load-haul and feed infrastructure

5 Limitations of the Assessment

The following are the recognised limitations and assumptions of the Specialist study that were made during the assessment and reporting phase:

- The information provided in this report is based on information gathered from the site visit undertaken on 22nd of February 2024 and information reviewed from previous studies.
- Hydropedological assessments and interpretations assume that the soil morphology is in phase with the current soil water regime. Soil morphology changes slowly due to alterations in soil water regimes (for example due to land-use and climate change). Another assumption is that the surveyed hillslopes are representative of the entire site.
- Terrain analyses were performed to identify dominant hillslopes reflective of typical terrain forms, but there might be areas which are not represented by these hillslopes and might respond hydropedologically different. This is one of the limitations of the study. In addition, hydropedological interpretations provide only qualitative descriptions of dominant flowpaths.
- The methodologies and procedures applied during sampling and report writing are followed in the soil science community. Therefore, it is the opinion of the professional specialist that this assessment was carried out with sufficient sampling and in sufficient detail to enable the Proponent, the EAP and the Regulating Authorities to make an informed decision regarding the proposed activity.

6 Legislative and Policy Framework

The South African Environmental Legislation needs to be considered includes the following:

6.1 National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998)

- Purpose: NEMA provides the overarching framework for environmental governance in South Africa.
- Requirements: Mandates Environmental Impact Assessments (EIAs) for activities likely to have significant environmental impacts, including hydropedological assessments.
- Relevance: Ensures that potential hydropedological impacts are identified, assessed, and mitigated.

6.2 National Water Act (NWA), 1998 (Act No. 36 of 1998)

- Purpose: Regulates the use, management, and conservation of water resources.
- Requirements: Requires water use licenses for activities impacting water resources, including groundwater and surface water interactions.

- Relevance: Addresses the hydropedological aspects of water resource impacts and sustainable water management.

6.3 Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002)

- Purpose: Regulates mineral and petroleum resources development in South Africa.
- Requirements: Requires Environmental Management Plans (EMPs) and Environmental Management Programs (EMPrs) for mining activities.
- Relevance: Ensures that hydropedological impacts are considered in the environmental management of mining projects.

6.4 Water Services Act, 1997 (Act No. 108 of 1997)

- Purpose: Regulates water supply and sanitation services.
- Requirements: Addresses the management of water services infrastructure.
- Relevance: Informs the planning and management of water-related impacts of mining activities.

6.5 Administrative Framework

6.5.1 Department of Mineral Resources and Energy (DMRE)

- Role: Regulatory authority for mining activities.
- Responsibilities: Reviews and approves Environmental Management Programs (EMPrs) and ensures compliance with the MPRDA.

6.5.2 Department of Water and Sanitation (DWS)

- Role: Regulatory authority for water resources management.
- Responsibilities: Issues water use licenses, monitors compliance with the NWA, and oversees water resource impact assessments.

6.5.3 Department of Environment, Forestry and Fisheries (DEFF)

- Role: Oversees environmental governance and compliance.
- Responsibilities: Reviews Environmental Impact Assessments (EIAs), ensures compliance with NEMA, and addresses broader environmental impacts.

6.5.4 Provincial Environmental Authorities

- Role: Provincial oversight and implementation of environmental policies.

- Responsibilities: Review and approve environmental assessments and ensure local compliance with national and provincial regulations.

6.5.5 Catchment Management Agencies (CMAs)

- Role: Regional water management.
- Responsibilities: Implement water resource management strategies and coordinate local water use licensing.

6.5.6 Local Municipalities

- Role: Local governance and service provision.
- Responsibilities: Ensure local infrastructure and community services are managed and maintained.

7 Approach and Methodology

7.1 Methodology

The following activities have been undertaken for this study to address the scope of work for the assessment:

7.1.1 Desktop Study and Literature Review

The desktop study for the proposed development included a review of the historical data, aerial imagery, a review of scoping report and land type data. Land Type data was used to obtain generalised soil patterns and terrain types for the project site. Land Type data exists in the form of published 1:250 000 scale maps. These maps indicate delineated areas of similar terrain types, pedosystems (uniform terrain and soil pattern) and climate (Land Type Survey Staff, 1989). The land type and historical data were then used to plan the field survey. A review of all available data and information was undertaken to determine the status quo of the soil environments on the site and the immediate surrounding areas. Niara conducted a literature review of the existing baseline data related to the soil assessments. The following sources of information were reviewed and utilised for the compilation of this report:

- Digby Wells. January 2015. Environmental Impact Assessment for KPSX: Weltevreden, Soil Survey Report. BHP2690. Billiton Energy Coal South Africa (Pty) Limited (BECSA).
- Wetlands Consulting Services. January 2016. Hydrological Wetland and Flow Contribution to Streams Scenario Assessment Klipspruit Extension Project South32 SA Coal. Project: 1155-2015. South32 SA Coal Holdings Pty Ltd
- Digby Wells. July 2018. Environmental Impact Assessment and Environmental Management Programme Alignment for Klipspruit Colliery near Ogies, Mpumalanga, Soil and Land Capability Assessment Report. SOU4087. South32 SA Coal Holdings (Pty) Ltd (South32).
- Digby Wells. March 2020. Environmental Impact Assessment and Environmental Management Programme for Listed Activities Associated with the South32 Klipspruit Colliery Alignment Project, Mpumalanga Province, EIA and EMP Report. SOU4087. South32 SA Coal Holdings (Pty) Ltd (South32).

- Niara Environmental Consultants. November 2021. Hydropedological Impact Assessment. Environmental Authorisation for the Klipspruit Colliery Dragline Relocation Project near Ogies town, Mpumalanga Province. Seriti Power (Pty) Ltd.
- Niara Environmental Consultants. November 2022. Hydropedological Impact Assessment. Environmental Authorisation for the Klipspruit Colliery for the Proposed Additions to KPSX, Specifically the Inclusion of Pits H, G & S Project near Ogies town, Mpumalanga Province. Seriti Power (Pty) Ltd.

7.1.2 Field Survey and Soil Classification

Hydropedology is the relatively new, interdisciplinary research field which focuses on the interactive relationship between soils and water. Soil physical properties, such as the hydraulic conductivity and porosity, have an important impact on the occurrence and rates of hydrological processes. In turn, hydrological processes play an important role on the formation of soil morphological properties such as colour, mottles, macropores and carbonate accumulations. Accurate mapping and the interpretation of these soil morphological properties can thus be used to conceptualise and characterise hydrological processes including water flowpaths, storage mechanisms and the connectivity between different flowpaths.

In general, hydropedological information assists with effective water resource management, as required by the NWA, through improved understanding and characterisation of hydrological processes. The hydropedological assessment was done February 2024 and the slopes within the project area were assessed. The soil forms (types of soil) found were described using the South African Taxonomic Soil Classification System (Soil Classification Working Group, 2018). Soil diagnostic horizons were used to classify the soil forms as well as hydropedological units namely recharge-, interflow- and responsive soils.

7.1.3 Identification of Hydrological Soil Types

Soil forms identified on site were regrouped into various hydrological soil types according to van Tol and Le Roux, 2019 as indicated in Table 7-1. The flow paths from the crest of a slope to the valley bottom is assessed and classified. According to Le Roux, *et al*. (2015), the classification largely considers the flow drivers during a rainfall event and the associated flow paths of water through the soil.

Table 7-1: Hydrological Soil Types of the Studied Hillslopes (van Tol and Le Roux, 2019)

Hydrological soil type	Description
Recharge	Soils without any morphological indication of saturation. Vertical flow through and out of the profile into the underlying bedrock is the dominant flow direction. These soils can either be shallow on fractured rock with limited contribution to evapotranspiration or deep freely drained soils with significant contribution to evapotranspiration
Interflow (A/B)	Duplex soils where the textural discontinuity facilitates build-up of water in the topsoil. Duration of drainable water depends on rate of evapotranspiration, position in the hillslope (lateral addition/release), and slope (discharge in a predominantly lateral direction).
Interflow (soil/bedrock)	Soils overlying relatively impermeable bedrock. Hydromorphic properties signify temporal build of water on the soil/bedrock interface and slow discharge in a predominantly lateral direction.
Responsive (shallow)	Shallow soils overlying relatively impermeable bedrock. Limited storage capacity results in the generation of overland flow after rain events.
Responsive (saturated)	Soils with morphological evidence of long periods of saturation. These soils are close to saturation during rainy seasons and promote the generation of overland flow due to saturation excess.
Stagnating	Soil's outflow of water is limited or restricted. The A and/or B horizons are permeable but morphological indicators suggest that recharge and interflow are not dominant. These soils are observed in regions with a high evapotranspiration and the dominant hydrological flow path in the soil is upward, driven by evapotranspiration.

8 Description of the Baseline

This section provides a description of the receiving environment and existing conditions on and in the vicinity of the proposed project components.

8.1 Climate

The study area is situated in the Olifants Water Management Area 4 (WMA 4) within the B20G quaternary catchment, and small portions of B11F and B20F. The topography of the project area and surrounds is undulating with numerous ridges and valleys. The study area is situated in the Highveld Region of the Mpumalanga Province at an approximate elevation of 1596 meters above mean sea level (mamsl).

The region is characterised by warm to hot summers and cool to cold winters. Showers and thunderstorms occur during the summer months (October – Mar) and the winter months are normally arid and cold (June – August). The annual average rainfall ranges from 2 to 100mm as illustrated in Figure 8-1. The seasonality of the rainfall, showing the highest rainfall during October, November, December, and January. The maximum average temperature in summer is 27°C and in winter is 18°C. The minimum average temperatures 14°C in summer to just below 2°C in winter, as illustrated in Figure 8-2. According to the Mpumalanga Biodiversity

Sector Plan Handbook (Lötter *et al*., 2014), there has already been notable shifts in climate in terms of increased average temperatures in Mpumalanga. Heat waves are becoming more frequent while cold days, nights and frost are becoming less frequent.

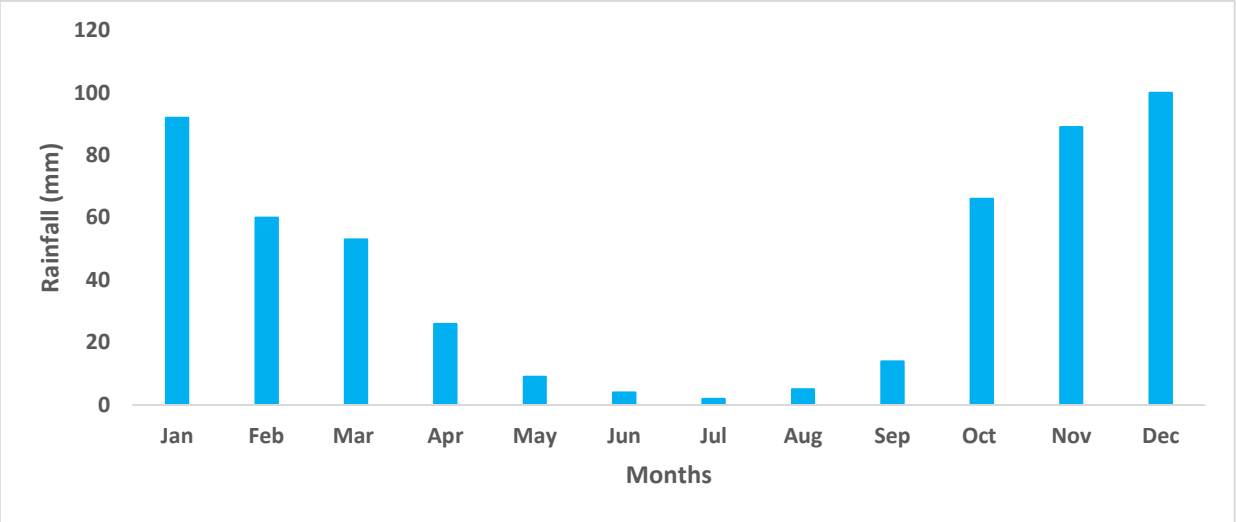


Figure 8-1: Average monthly rainfall for Ogies

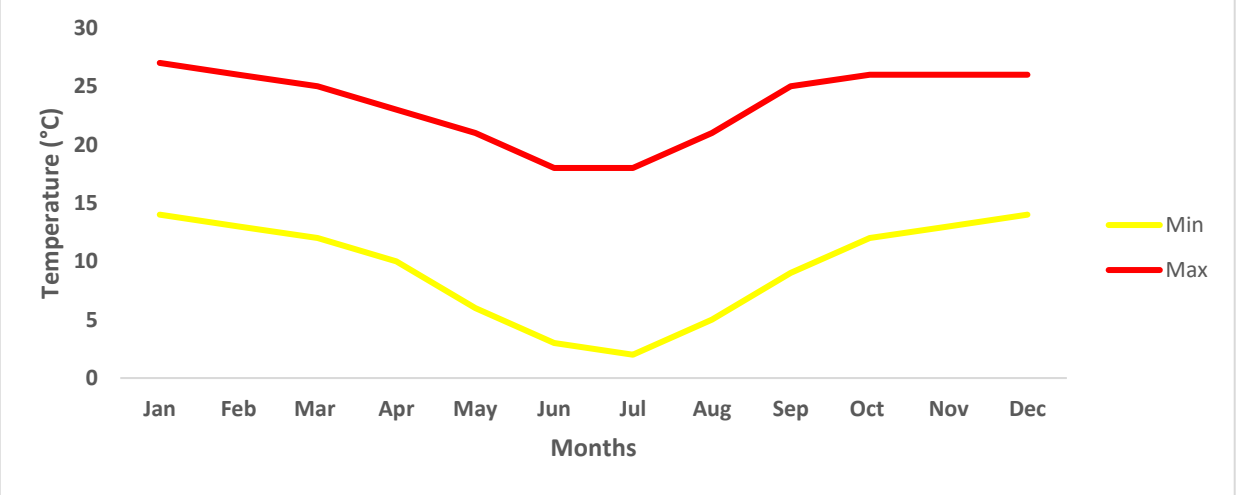


Figure 8-2: Average monthly temperature for Ogies

8.2 Geology

The project area occurs within the Witbank Coalfield and the Witbank Coalfield has five coal seams, numbered as No. 1 (lower most coal seam) to No. 5 (upper most coal seam). The sequence of the Karoo Supergroup in the project area comprises of the Ecca Group and the underlying Dwyka Group. The surface geology of the study area can be described as consisting mainly of shales, coal beds, and sandstones of the Ecca Group with intrusive dolerite, as illustrated in Figure 8-3. This geology has given rise to many of the in-situ characteristics of soils that are found in the area. Soils derived from shale/mudstone are generally high in clay (>25%) while those derived from the sandstone geology are low in clay (<15%). The dolerite derived soils are usually red in colour and have a clay percentage of >30%.

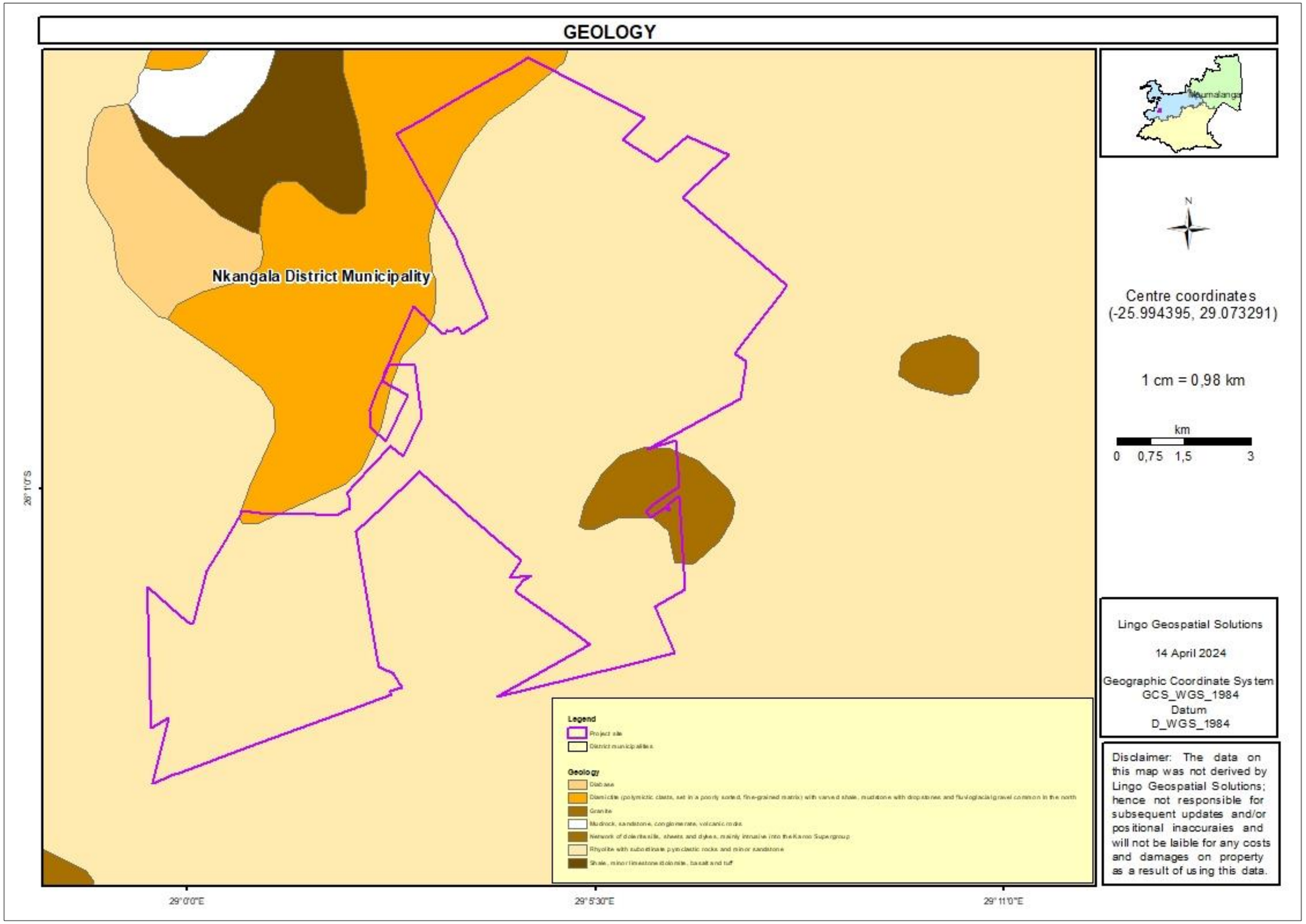


Figure 8-3: Geology of the Project Area

8.3 Quaternary Catchments

The water resources of South Africa have been divided into Quaternary Catchments, which are regarded as the principal water management units in the country (DWAF 2011). A Quaternary Catchment is a fourth order catchment in a hierarchical classification system in which the primary catchment is the major unit. The majority of the Klipspruit Colliery Mining Rights Area falls within the quaternary catchment B20G, with wetlands associated with the Saalboomspruit, a tributary of the Wilge River. The south-western portion of the site falls within the B11F catchment, which is bisected by the Olifants River, and a small portion at the north-east of the site occurs within the catchment B11G. The quaternary catchments are regarded as Largely Modified, according to the Department of Water and Sanitation (DWS).

The water systems associated with the Klipspruit Colliery Mining Rights Area are all linked to the Olifants River and fall within the greater Olifants River catchment. The Quaternary catchments are represented in Figure 8-4. Owing to the cumulative impacts on the Olifants River, as well as its link to important habitats in the Kruger National Park (KNP), the DWS has recently placed significant emphasis on the importance of conservation of watercourses associated with this catchment.

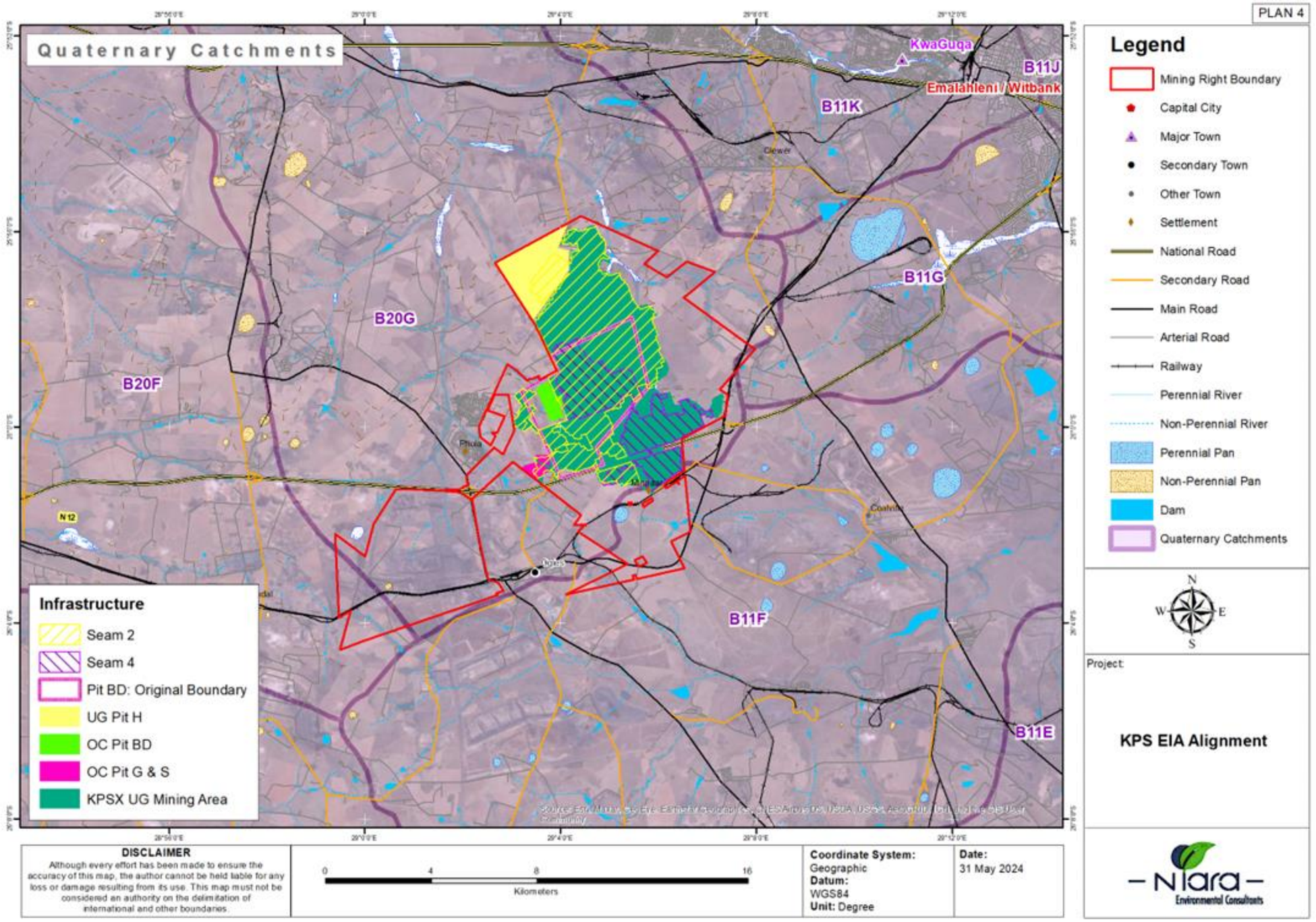


Figure 8-4: Quaternary catchment

8.4 Vegetation

The study area is located within the Grassland Biome of South Africa and the grassland biome is one of the most threatened biomes in South Africa, due largely to agricultural and mining activities (Mucina & Rutherford 2006). The Grassland biome is characterised by high summer rainfall and dry winters. This biome happens to be the second-largest biome in the country, covering 28.4% of the country or covering an area extent of more than 360 000km^2.

The dominant vegetation unit that occurs in the project area is Rand Highveld Grassland (Gm11) and Eastern Highveld Grassland (Gm12) (Mucina & Rutherford, 2006). The Eastern Highveld Grassland is recorded on the plains between Belfast in the east and the eastern side of Johannesburg in the west, extending southwards to Bethal, Ermelo and west of Piet Retief within the Mpumalanga and Gauteng Provinces of South Africa. The Eastern Highveld Grassland is found on slightly to moderately undulating plains, including some low hills and pan depressions and consist of 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. Woody species include *Acacia caffra*, *Celtis africana*, *Diospyros lycioides subsp. lycioides*, *Parinari capensis*, *Protea caffra* and *Rhus magalismontana*.

The Rand Highveld Grassland occurs in Gauteng, North-West, Free State and Mpumalanga Provinces. Rand Highveld Grassland is considered endangered, and it is poorly conserved. Almost half has been transformed mostly by cultivation, plantations, urbanisation, or dam building. Cultivation may also have had an impact on an additional portion of the surface area of the unit where old lands are currently classified as grasslands in land cover classifications and poor land management has led to the degradation of significant portions of the remainder of this unit. Scattered aliens (most prominently Acacia mearnsii) occur in about 7% of this unit. Only about 7% has been subjected to moderate to high erosion levels (Mucina & Rutherford, 2006).

9 Results and Discussion

9.1 Land Types and Soils

A land type survey on a scale of 1:250 000 was conducted in the early 1970s to compile inventories of the natural resources of South Africa in terms of soil, terrain, and climate. The land type indicates the dominant soil forms and their occurrence in terms of percentages. The study area comprises of land types of Ba4, Ba5 and Bb13 and presence of a plinthic catena dominates these land types, as illustrated in Figure 9-2. Land type Ba and Bb indicates land in which red and/or yellow brown apedal soils are dystrophic and/or mesotrophic, dominate over red and/or yellow-brown eutrophic soils. A plinthic catena that in its perfect sequence is represented by (in order from highest to lowest in the upland landscape crest, midslope and foot slope positions). Red well drained soils for example Hutton soil types, yellow Clovelly soils in the midslope landscape position and less well drained soil in foot slope and valley bottom positions such as the Fernwood and Longlands soil forms. In addition, shallow Glencoe and Dresden soils, underlain by hard plinthite, occur in some places within the landscape.

The Ba4 Land Type is dominated by 45% crest and 40% mid-slope terrain unit positions in the landscape. Other positions in the landscape are foot-slope and valley bottom positions occupying 10% and 5% of the landscape positions respectively see the

representative terrain sketch, Figure 9-1. The Ba 4 Land type is dominated by deep well drained red/yellow brown apedal soils, and the following list of soil types occur within the crest position of this land type: Hutton, Avalon and Glencoe.

The Ba5 Land Type is dominated by 20% crest and 60% mid-slope terrain unit positions in the landscape. Other positions in the landscape are foot-slope and valley bottom positions occupying 15% and 5% of the landscape positions respectively see the representative terrain, Figure 9-1. The Ba 5 Land type is dominated by deep well drained red/yellow brown apedal soils, and the following list of soil types occur within this land type in the crest of the landscape: Hutton, Clovelly, Avalon and shallow rocky soils (Mispah).

The Bb13 land type is, is dominated by 40 % crest and 45 % midslope positions, the remainder (15 %) is occupied by valley bottom landscape positions see the representative terrain form sketch, Figure 9-1. The Bb13 Land type is dominated by deep well drained yellow brown apedal soils, and the following list of soil types occurs within the crest in this land type; Clovelly, Avalon and shallow soils such as Mispah and Glencoe.

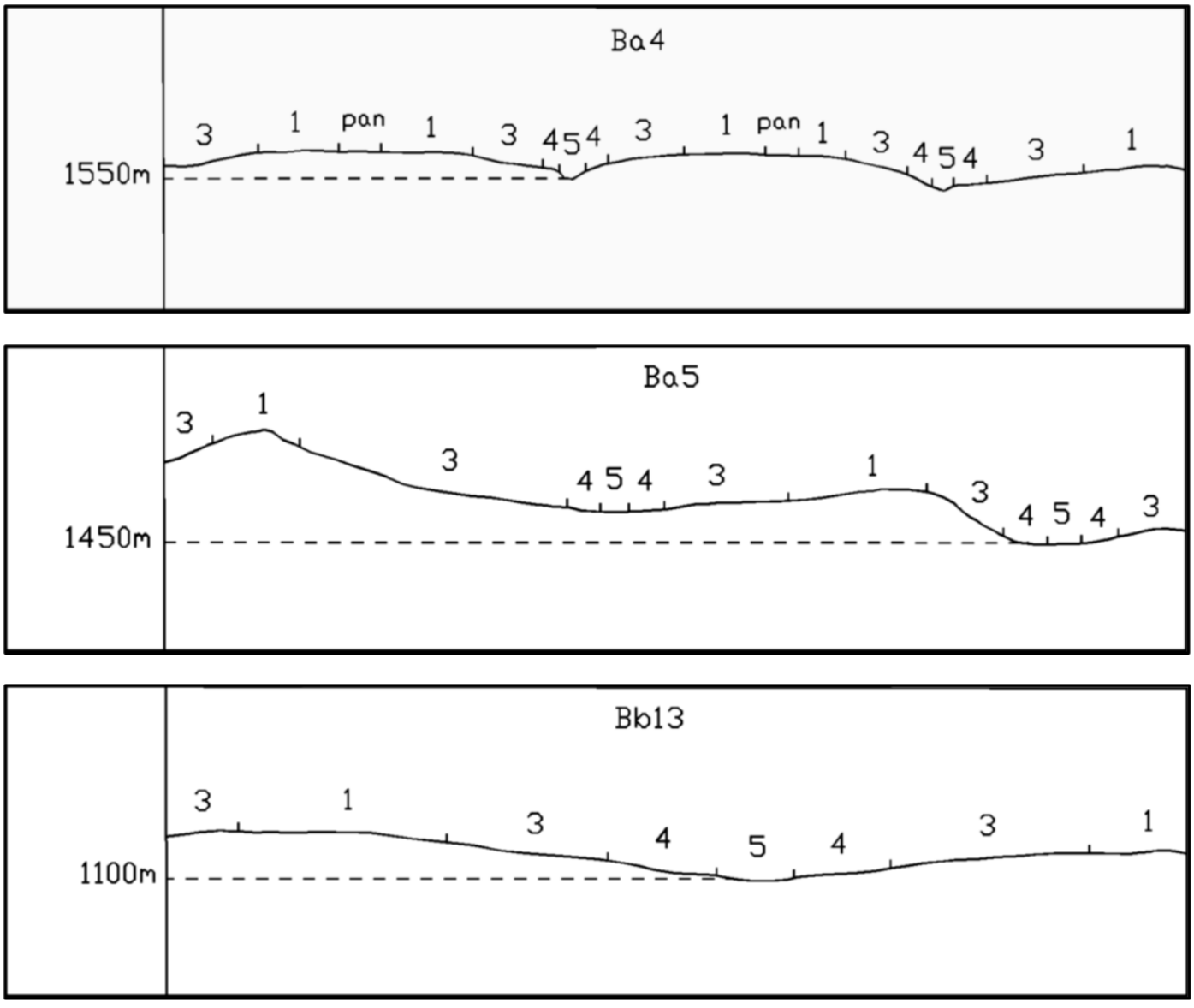


Figure 9-1: Representative Terrain Form Sketch of Land Types

The project site is dominated by the presence of high potential agricultural soils such as Hutton, Clovelly, Avalon soils; shallow soils such as Mispah and wetland soils such Fernwood and Longlands, Figure 9-3. Also, the project area has been transformed by the mining activities, Transported Technosols were observed. Materials intentionally transported by human intervention and already been impacted by mining activities (open cast areas and stockpiles). The properties of these soil forms are affected strongly by the nature of the material or the human activity that placed it and they are more likely to be contaminated than soils from other groups.

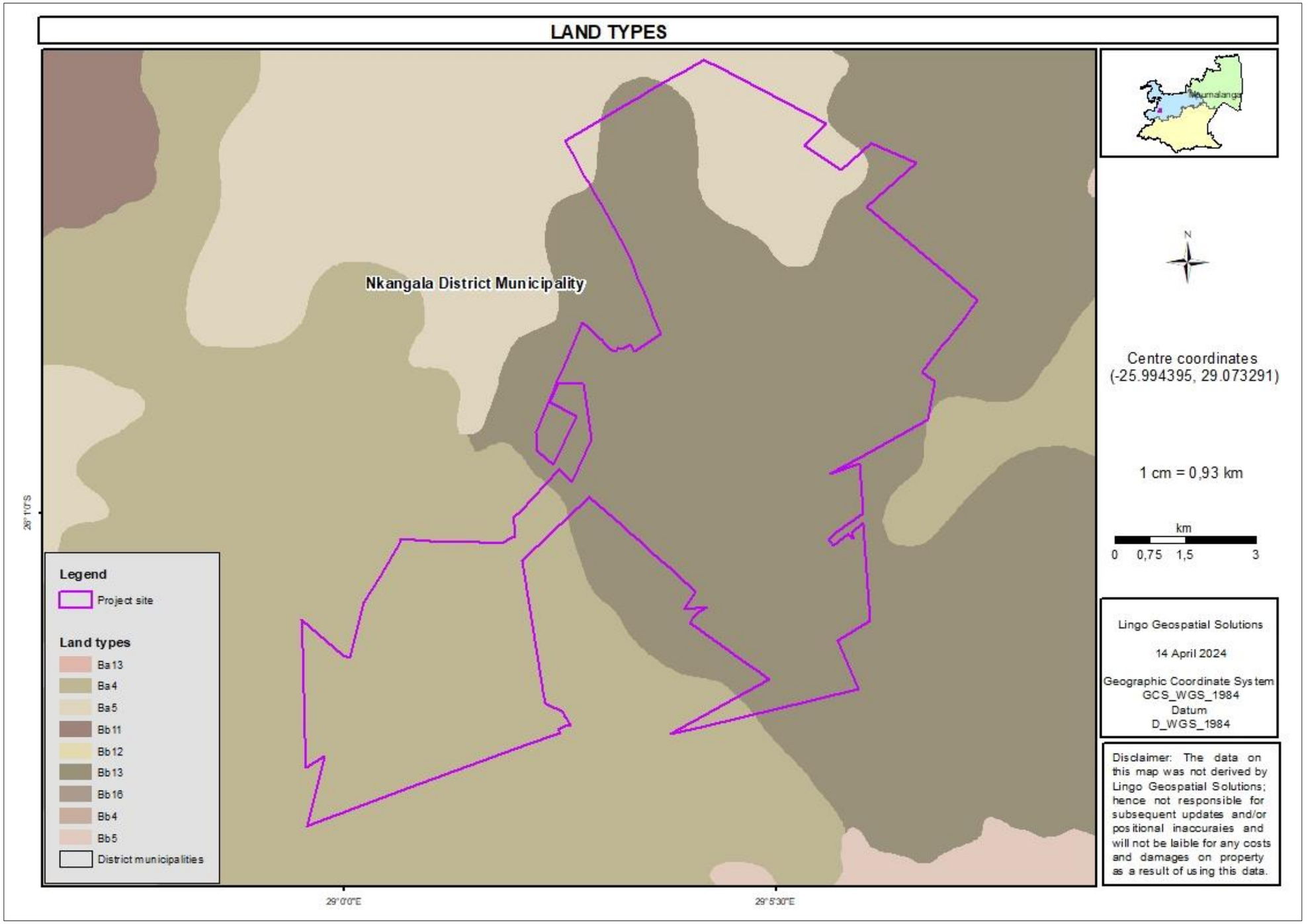


Figure 9-2: Land Types in the Vicinity of the Project Area

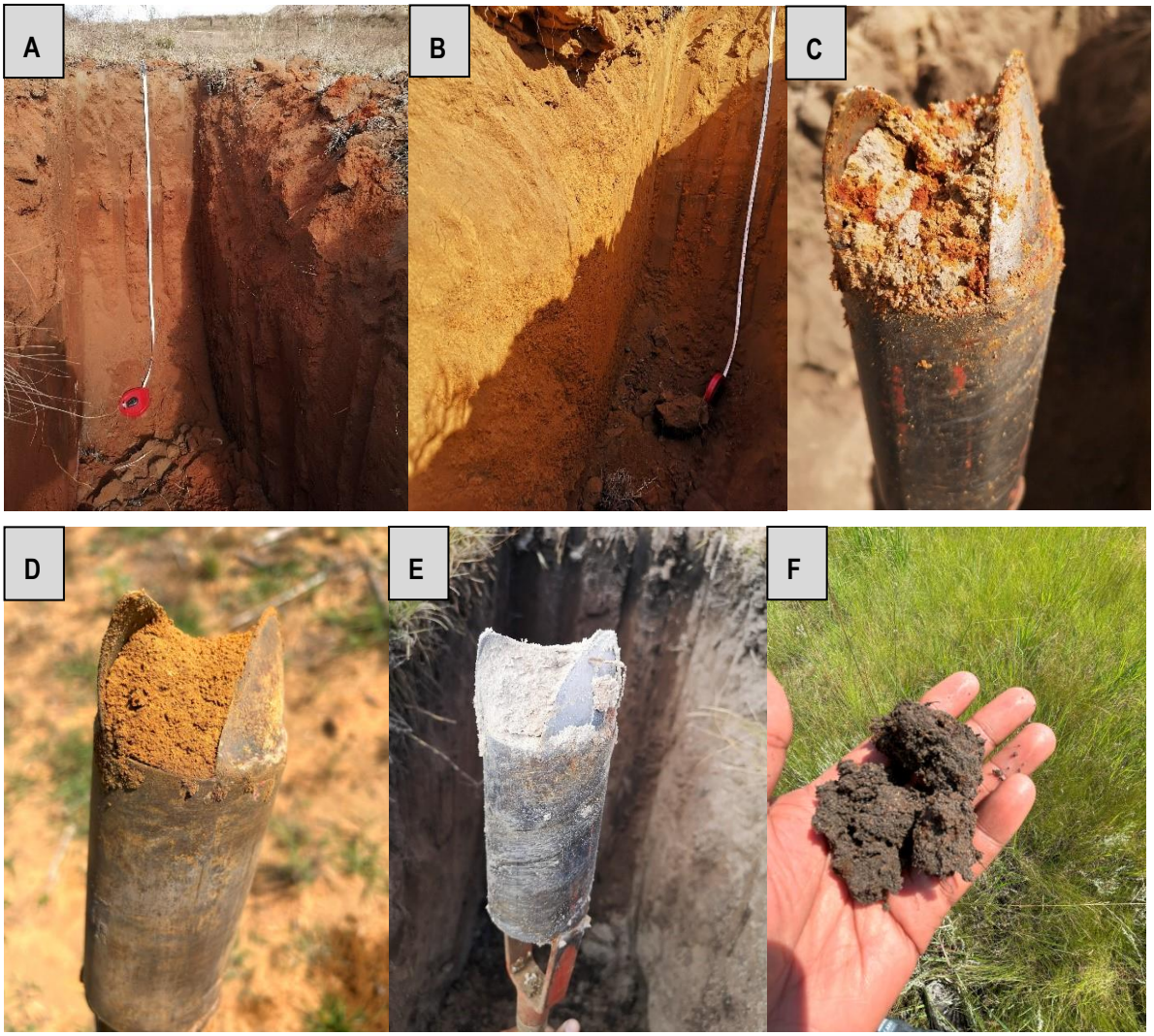


Figure 9-3: Examples of the identified soil forms: A) Hutton (Red apedal), B) Clovelly, C) Longlands, D) Avalon, E & F) Wetland soils (Albic & G)

9.2 Current Land Use, Surrounding and Historical

Results from the field soil survey (soil form and depth) and analysis (selected chemical and physical parameters), as well as observations made on site, will be used to inform the potential and realistic land uses for the area. The most dominant land uses within the project are mining activities (Coal) and the other land uses on the site are crop production mainly maize and soybeans. Surrounding land use can be broadly defined as arable land under cultivation on commercial farms (Dryland and Pivot Irrigated) and open cast mining.

9.3 Hillslope Hydrology

In South Africa, hydropedological classification of soils are based on defining the hydrological function of soils within a hillslope (van Tol *et al*., 2013). The pedological soil forms are typically associated with soil water regimes. The soil form along with the soil hydromorphic signatures and can be used to infer soil water flow dynamics. In work by van Tol (2019) the pedological soil forms

have categorised according to their hydropedological function in a hillslope. These categories were used to define the hydropedological classification of the project area. Figure 9-4 illustrates a typical example of the hydropedological response of a hillslope. In the recharge zone, the dominant flow direction is vertical through the soil and into the fractured rock, from where it can recharge groundwater levels or downslope positions in the hillslope soils. Lateral flow at the A/B horizon interface or soil/bedrock interface dominate in the interflow zone. The responsive zone is fed by lateral flowing water from the interflow zone as well as via the bedrock from the recharge zone.

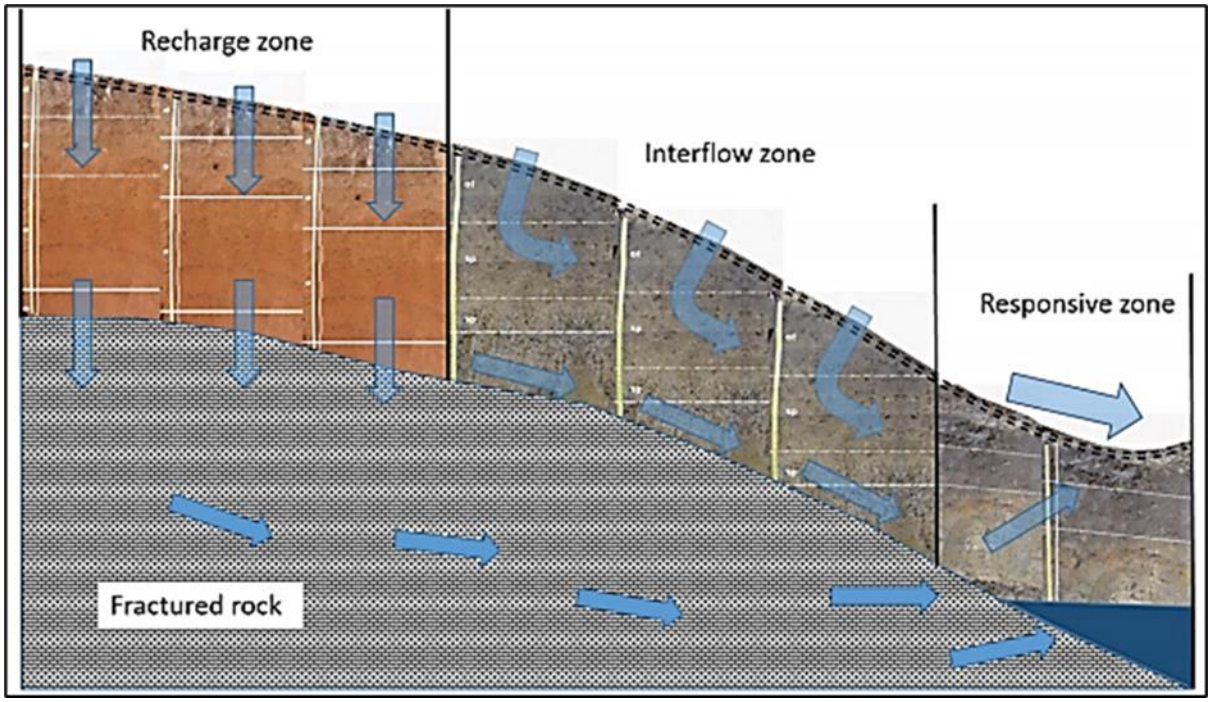


Figure 9-4: A Typical Conceptual Presentation of Hydrological Flow Paths on Different Hydropedological Soil Types – Hillslope Hydropedological Behaviour (DSA, 2017)

Soils were first classified in accordance with the Soil Classification System (2018) and were then regrouped into hydropedological soil types in accordance with van Tol & Le Roux (2019), as indicated in Table 9-1.

Table 9-1: Regrouping of Soil Forms into Hydropedological Soil Types

Soil Forms (Soil Classification Working Group, 2018)	Hydropedological Soil Type (van Tol & Le Roux, 2019)
Hutton	Recharge (Deep)
Clovelly	Recharge (Deep)
Avalon	Interflow (Soil/bedrock)
Longlands	Interflow (A/B Horizon)
Witbank	Recharge (Shallow)
Mispah	Recharge (Shallow)
Fernwood	Interflow (Soil/bedrock)

10 Alternative Assessment

In accordance with the requirements outlined in Appendix 2 of the EIA Regulations 2014, as amended, a consideration of reasonable and feasible alternatives, including site and technology alternatives and the "do-nothing" alternative must be undertaken. Each alternative is to be accompanied by a description and comparative assessment of the advantages and disadvantages that such development and activities will pose on the environment and socio-economy. When no feasible and/or reasonable alternatives can be identified and investigated in terms of a comparative assessment during the Scoping Phase, the EIA Report will then not contain a section with alternatives.

The EIA Regulations 2014, as amended, define alternatives as the different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

- The property on which or location where it is proposed to undertake the activity;
- The type of activity to be undertaken;
- The design or layout of the activity;
- The technology to be used in the activity;
- The operational aspects of the activity; and
- The option of not implementing the activity.

Limited alternatives may exist for the project may exist for the Proposed Project.

The Department of Environmental Affairs (DEA) EIA guidelines necessitate the consideration of various development alternatives as part of the EIA process. The consideration of project alternatives is a key requirement of an EIA as it provides a basis for choice for the competent authority and I&APs. In the NEMA EIA Regulations, alternatives in relation to a proposed activity are defined as "different means of meeting the general purpose and requirements of the activity, which may include alternatives to the –

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

- type of activity to be undertaken;
- design or layout of the activity;
- technology to be used in the activity; and
- operational aspects of the activity.

Alternatives that are considered must be reasonable and feasible and should have the potential to reduce negative impacts that may occur due to the proposed Project. Alternatives are considered as a means of reaching the same need and purpose as the proposed Project in a way that minimises the impacts and maximises the benefits. The anticipated environmental impacts which these alternatives may pose have been discussed below.

The following alternatives were considered for the mining of the Nwabu Project:

- Mining method alternatives;
- Mining footprint;
- No-go option.

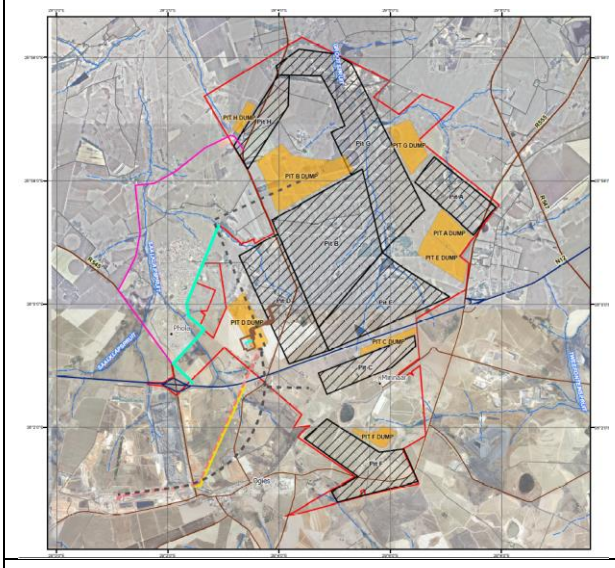
10.1 Mining Method Alternatives

An array of underground and surface mining techniques exists; however, technical and economic feasibility studies are required to determine which process/method is best. These studies are based on the regional geologic conditions, including characteristics of the site; seam continuity; thickness; structure; quality; and depth and strength.

Both the OC mining method and the UG method were considered, where the UG mining was found to be the preferred mining strategy going forward due to the following reasons:

- The proposed area of mining has a significant number of wetlands which will be destroyed when using OC method;
- The destruction of wetlands requires rehabilitation compensation measures in other wetlands within the catchment which require significant financial resources;
- Most of the areas to be mined at KPSX had significantly higher strip ratios which would increase the mining expenses and waste management costs.

The OC mining considered and the UG preferred option are illustrated in **Figure 10-1** below.



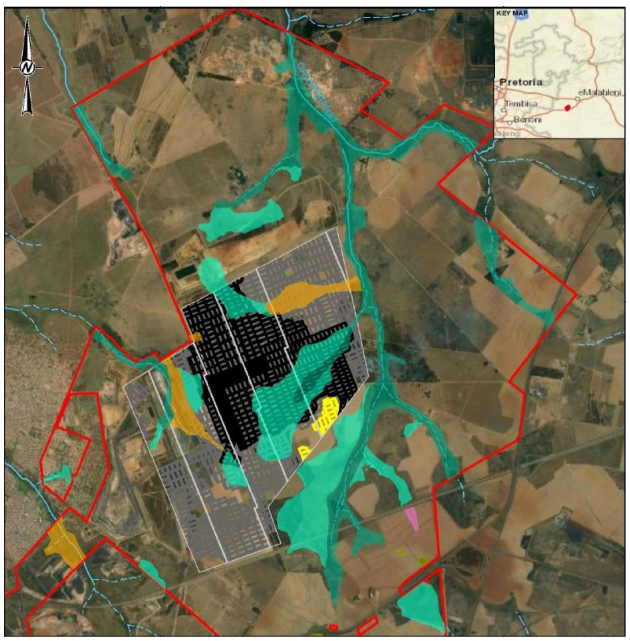
OC Mining Alternative

UG Mining (Preferred Option)

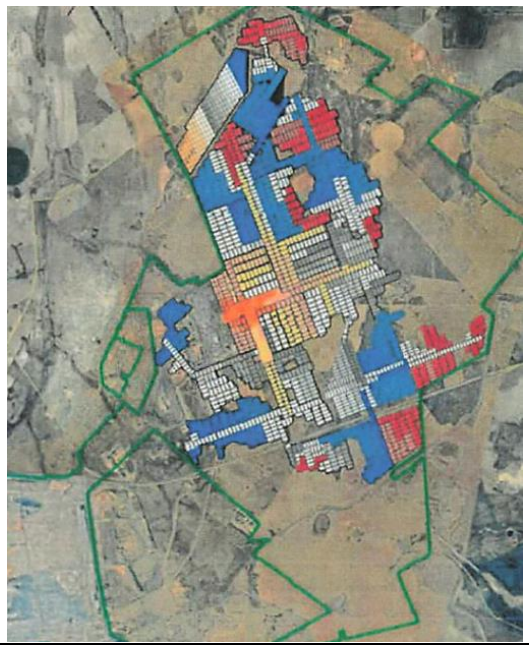
Figure 10-1: Mining Method Alternatives

10.2 Mining Footprint

As Pit BD mining has already been approved in 2017 for OC mining, KPS did consider only converting this pit to UG mining initially, as it was assumed that the authorisation process for the amendment would be quicker. However, the economic viability of the project was not adequate to sustain the project, hence the preferred alternative was to mine the economically viable reserves remaining at KPSX. The considered alternatives are illustrated in **Figure 10-2** below.



UG Mining Alternative- Only Pit BD



UG Mining _Whole Extent (Preferred Option)

Figure 10-2: Mining Footprint Alternatives

10.3 No-go Option

The No-go alternative was deemed non-viable as this would mean the current KPS OC pits would be depleted in 2039, resulting in the closure of the facility whilst the reserves are still available. This "premature" closure would also result in a shortage of coal to both Eskom and the Export market and impact negatively on the country's GDP. The ongoing capital investment planned for KPS for the development of UG and OC mining is estimated at R1.7 billion and will not be invested if the project does not continue.

11 Unplanned Events – Pollution

The fate of pollution will differ depending whether it was spilled on recharge, interflow, or responsive soils. A spill on recharge soils is likely to end up in the groundwater. Pollutants spilled on interflow soils will migrate downslope through the soil. Pollutants spilled on responsive soils it will end up quickly to streams and other surface water bodies. There is a risk of accidental spillages of hazardous substances (hydrocarbons or oils) from vehicles or other equipment during the installation of additional ventilation shafts and rescue boreholes. Contamination as a result of accidental leakage of oils and hydrocarbons from equipment used and it must be ensured

that the requirements of the National Environmental Management Waste Act of 2008 are met for the prevention of pollution. Hydrocarbon spills or leaks can occur; therefore, emergency procedures need to be put in place for remediation.

12 Impact Assessment Rating Methodology

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management and approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance. Five factors need to be considered when assessing the significance of community health impacts, namely:

- Relationship of the impact to **temporal** scales (duration) - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
- Relationship of the impact to **spatial** scales - the spatial scale defines the physical extent of the impact.
- The severity of the impact - the **severity/beneficial** scale is used to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party.
- The severity of impacts can be evaluated with and without mitigation to demonstrate how serious the impact is when it is not allayed. The word 'mitigation' means not just 'compensation' but includes concepts of containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.
- The **likelihood** of the impact occurring - the likelihood of impacts taking place because of Project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g., loss of vegetation), but other impacts are not as likely to occur (e.g., vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.

Each criterion is ranked with scores assigned as presented in Table 12-1 to determine the overall **significance** of an activity. The criterion is then considered in two categories, viz. effect of the activity and the likelihood of the impact. The total scores recorded for the consequence and likelihood are then read off the matrix presented in Table 12-2 to determine the overall significance of the impact. The overall significance is either negative or positive.

The ***environmental significance*** scale is an attempt to evaluate the importance of a particular impact. This evaluation needs to be undertaken in the relevant context, as an impact can either be ecological or social, or both. The evaluation of the significance of an impact relies heavily on the values of the person making the judgment. For this reason, impacts of a social nature need to reflect the values of the affected society.

12.1 Prioritisation of Impacts

Negative impacts that are ranked as being of **"VERY HIGH" and "HIGH**" significance will need to be investigated further to determine how the impact can be minimised or what alternative activities or mitigation measures can be implemented. These impacts may also assist decision makers i.e., numerous HIGH negative impacts may bring about a negative decision.

For impacts identified as having a negative impact of **"MODERATE"** significance, it is standard practice to investigate alternate activities and/or mitigation measures. The most effective and practical mitigations measures will then be proposed.

For impacts ranked as **"LOW"** significance, no investigations or alternatives will be considered. Possible management measures should be investigated to ensure that the impacts remain of low significance.

Table 12-1: Ranking of Evaluation Criteria

EFFECT	**Temporal Scale (Duration)**			**Score**
	Short term	Less than 5 years		1
	Medium term	Between 5-20 years		2
	Long term	Between 20 and 40 years (a generation) and from a human perspective also permanent		3
	Permanent	Over 40 years and resulting in a permanent and lasting change that will always be there		4
	Spatial Scale			
	Localised	At localised scale and a few hectares in extent		1
	Study Area	The proposed site and its immediate environs		2
	Regional	District and Provincial level		3
	National	Country		3
	International	Internationally		4
	Severity	**Severity**	**Benefit**	
	Slight	Slight impacts on the affected system(s) or party(ies)	Slightly beneficial to the affected system(s) and party(ies)	1
	Moderate	Moderate impacts on the affected system(s) or party(ies)	Moderately beneficial to the affected system(s) and party(ies)	2
	Severe/ Beneficial	Severe impacts on the affected system(s) or party(ies)	A substantial benefit to the affected system(s) and party(ies)	4
	Very Severe/ Beneficial	Very severe change to the affected system(s) or party(ies)	A very substantial benefit to the affected system(s) and party(ies)	8
LIKELIHOOD	**Likelihood**			
	Unlikely	The likelihood of these impacts occurring is slight		1
	May Occur	The likelihood of these impacts occurring is possible		2
	Probable	The likelihood of these impacts occurring is probable		3
	Definite	The likelihood is that this impact will definitely occur		4

* In certain cases, it may not be possible to determine the severity of an impact thus it may be determined: Do not know/ cannot know.

Table 12-2: Matrix used to Determine the Overall Significance of the Impact Based on the Likelihood and Effect of the Impact

Likelihood		Effect													
		3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	3	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	4	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Table 12-3: Description of Environmental Significance Ratings and Associated Range of Scores

Significance Rating	Description	Positive	Negative
Low	An acceptable impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in either positive or negative medium to short term effects on the social and/or natural environment.	4-7	4-7
Moderate	An important impact which 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 either a positive or negative medium to long-term effect on the social and/or natural environment.	8-11	8-11
High	A serious impact, if not mitigated, may prevent the implementation of the Project (if it is a negative impact). These impacts would be considered by society as constituting a major and usually a long-term change to the (natural &/or social) environment and result in severe effects or beneficial effects.	12-15	12-15

Very High	A very serious impact which, if negative, may be sufficient by itself to prevent implementation of the Project. The impact may result in permanent change. Very often these impacts cannot be mitigated and usually result in very severe effects, or very beneficial effects.	16-20	16-20

13 Hydropedological Implications of the Underground Proposed Mining Activities

The expansion of underground workings will mostly be done on already disturbed areas and is not envisaged to result in significant losses of soil-water interactions that existed prior to the establishment of the existing opencast and underground workings. As indicated in Section ab 10 above, all the required infrastructure is already in place except for additional ventilation shafts and rescue boreholes will be constructed in strategic areas as the mining advances for both KPSX and KPSS. The strategic positions in which the additional ventilation shafts and rescue boreholes will be located have not been specified. As such there are no envisaged impacts on the hydropedological flow paths during the construction phase. Potential impacts are expected during the operational phase and post mining.

13.1 Impact Assessment

The main activities expected are as follows:

Construction Phase

- No impacts are expected during the construction phase

Operational Phase

- Vehicular activity to access the ventilation shafts and rescue boreholes;
- Alteration of hydro-pedological flow paths
- Hydrocarbon pollution.

Decommissioning Post-Closure Phase

- Monitoring and Rehabilitation
- Subsidence

The potential impacts on natural resources include:

- Soil erosion due to vegetation clearance and drilling causing a reduction in soil quality and disruption the receiving water resources.
- Soil chemical pollution because of oil and fuel spillages from drilling machinery and storage of hazardous chemicals.

- Soils will be compacted by the movement of machinery, and this reduces infiltration rates and the ability for plant roots to penetrate the compacted soil.

13.1.1 Operational Phase Impacts

During the operational phase, site clearing is necessary for the preparation of surface for the installation of additional ventilation shafts and rescue boreholes. Vehicles will drive on the soil surface, thereby causing compaction of the soils. This reduces infiltration rates and the ability for plant roots to penetrate the compacted soil. The installation of additional ventilation shafts and rescue boreholes process can result in additional sediment ending up in the water course due to earthworks or trenches used to divert water away from working areas. Sediment can result in silt build-up downstream, increase the turbidity of the water and result in habitat changes. Given the limited nature of the earthworks, sedimentation is not anticipated to occur to a significant degree.

13.1.1.1 Alteration of hydro-pedological flow paths

Table 13-1: Alteration of hydro-pedological flow paths

Alteration of hydro-pedological flow paths: Site Clearing and topsoil removal for the installation of additional ventilation shafts and rescue boreholes – localised soil compaction is expected to take place during the installation of the additional ventilation shafts and rescue boreholes due to the usage of heavy machinery. The movement of heavy machinery on the soil surface causes compaction which reduces the vegetation's ability to grow.		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
Extent *(Local, Regional, International)*	1	1
Duration *(Short term, Medium term, Long term)*	3	2
Magnitude *(Major, Moderate, Minor)*	3	2
Probability *(Definite, Possible, Unlikely)*	4	3
Calculated Significance Rating (Low, Medium, High)	**Medium (11)**	**Low (8)**
Impact Status: (positive or negative)	Negative	Negative
Irreplaceable loss of resources: (Yes or No)	Yes	
Reversibility: (Reversible or Irreversible)	Irreversible	
Can impacts be enhanced: (Yes or No)	Yes	
Mitigation Measures • The additional ventilation shafts and rescue boreholes must be located outside of the sensitive environment such as wetlands; • Existing access routes and disturbed areas should be utilised as far as possible to access planned borehole locations. Where no existing tracks are available, a single access track to each planned borehole location should be used. • Vegetation clearing should only be undertaken if absolutely necessary and should be limited to the smallest footprint possible • If any erosion occurs, corrective actions must be taken to minimise any further erosion from taking place. This may entail planting vegetation (indigenous) or constructing barriers to prevent further erosion. • The handling of the stripped topsoil should be minimised to ensure the soil's structure does not deteriorate significantly. • Ensure proper storm water management designs are in place to prevent soil erosion.		

Alteration of hydro-pedological flow paths: Site Clearing and topsoil removal for the installation of additional ventilation shafts and rescue boreholes – localised soil compaction is expected to take place during the installation of the additional ventilation shafts and rescue boreholes due to the usage of heavy machinery. The movement of heavy machinery on the soil surface causes compaction which reduces the vegetation's ability to grow.		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
▪ All earthworks must take place during the dry season. ▪ Stockpiles must be located away from any waterway or water flow path in the landscape.		

13.1.1.2 Hydrocarbon Pollution

Table 13-2: Hydrocarbon Pollution

Hydrocarbon Pollution: Pollution of soil resources may occur as a result of the use of heavy machinery during installation of additional ventilation shafts and rescue boreholes – localised hydrocarbon impacts are likely to occur due to spills, leaks and overfills.		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
Extent *(Local, Regional, International)*	2	1
Duration *(Short term, Medium term, Long term)*	3	2
Magnitude *(Major, Moderate, Minor)*	2	2
Probability *(Definite, Possible, Unlikely)*	3	2
Calculated Significance Rating (Low, Medium, High)	**Medium (10)**	**Low (7)**
Impact Status: (positive or negative)	Negative	Negative
Irreplaceable loss of resources: (Yes or No)	Yes	
Reversibility: (Reversible or Irreversible)	Reversible	
Can impacts be enhanced: (Yes or No)	Yes	
Mitigation Measures ▪ Care must be taken in the handling and storage of all drilling fluids, oils, greases and fuel on site, including all drilling vehicle and support vehicle fluids. A spill kit will be available on site in case of accidental spillages. ▪ All contractors and labour must undergo environmental awareness training, and be encouraged to maintain a "clean" working area, and report any (potential) risks to the environment as a result of the drilling programme; ▪ No fixing, servicing or cleaning of vehicles/machinery to take place on site. All malfunctioning drilling equipment must be moved designated workshop areas for fixing; ▪ All vehicles must be regularly inspected for potential hydrocarbon leaks. High-level maintenance must be undertaken on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills. ▪ No storage of fuel and diesel on site. ▪ Fuel and oil spills should be remediated using a commercially available emergency clean up kits. For major spills, if soils are contaminated, they must be stripped and disposed of at a licensed waste disposal site. ▪ Drip trays must be used while vehicles are not in use. ▪ Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately by trained staff with the correct equipment and protocols.		

13.1.2 Decommissioning Phase Impacts

13.1.2.1 Monitoring and Rehabilitation

Table 13-3: Monitoring and Rehabilitation

Monitoring and Rehabilitation: Rehabilitation of roads associated infrastructure could cause compaction and erosion if rehabilitation is not done correctly. This could be because of poor vegetation establishment which would resulting exposed surfaces and increase the risk of erosion		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
Extent *(Local, Regional, International)*	3	1
Duration *(Short term, Medium term, Long term)*	2	2
Magnitude *(Major, Moderate, Minor)*	2	2
Probability *(Definite, Possible, Unlikely)*	3	2
Calculated Significance Rating (Low, Medium, High)	**Medium (10)**	**Low (7)**
Impact Status: (positive or negative)	Negative	Negative
Irreplaceable loss of resources: (Yes or No)	Yes	
Reversibility: (Reversible or Irreversible)	Irreversible	
Can impacts be enhanced: (Yes or No)	Yes	
Mitigation Measures - Ensure proper stormwater management designs are in place to ensure no run-off or pooling occurs. - Contour slopes to minimise erosion and run-off. - Plant native vegetation to prevent erosion and encourage the self-sustaining development of a productive ecosystem. - Remove buildings to foundation level. Demolished rubble must be disposed of in accordance with Rehabilitation - Plan and approval from the South African authorities. - Only designated access routes are to be used to reduce any unnecessary compaction. - The topsoil should be shaped considering the pre-mining landscape.		

13.1.2.2 Subsidence

Table 13-4: Subsidence

Monitoring and Rehabilitation: Subsidence – Subsidence is likely to occur following the extraction of coal due to the shallow depth (25m) within which mining is planned to take place. After coal is extracted from beneath the ground, the land above can sink and fill the hollow mine workings. This can cause uneven surfaces that may impact the manner in which water flows.		
	Impact Rating Without Mitigation	**Impact Rating with Mitigation**
Extent *(Local, Regional, International)*	2	1
Duration *(Short term, Medium term, Long term)*	4	1
Magnitude *(Major, Moderate, Minor)*	4	2
Probability *(Definite, Possible, Unlikely)*	2	1

Calculated Significance Rating (Low, Medium, High)	**High (12)**	**Low (5)**
Impact Status: (positive or negative)	Negative	
Irreplaceable loss of resources: (Yes or No)	Yes	
Reversibility: (Reversible or Irreversible)	Irreversible	
Can impacts be enhanced: (Yes or No)	Yes	
Mitigation Measures • All precautionary measures should be taken to ensure no surface subsidence occurs post mining in the project area. As such, it is recommended that a detailed subsidence risk assessment is undertaken to determine the likelihood of subsidence and the likely consequences of such subsidence. The risk assessment should inform the mine plan and design. • No high extraction mining should take place such that the area is impacted by subsidence post mining; • However, should subsidence occur, measures must be taken to ensure the continuation of, or if necessary, reinstate, the natural hydrology within the landscape.		

13.1.3 Cumulative Impacts

Surrounding land uses in proximity to the KPS include commercial cultivation and grazing which have contributed to the degradation of the present wetlands within the project area. Additionally, the existing mining activities have also contributed to land use change, resulting in the loss of the valuable ecological functions provided by the wetlands within the study area.

The proposed change from opencast to underground mining is, however, not expected to significantly increase impacts on the hydropedology of the project area. This is because the proposed surface infrastructure already exists on the disturbed areas and mining will be conducted underground, as mentioned. Cumulative impacts will, therefore, be low – moderate on the nearby water resources especially with the implementation of proposed mitigation measures.

14 Modelling

Modelling was not undertaken due to the expansion of underground workings will mostly be done on already disturbed areas and is not envisaged to result in significant losses of soil-water interactions that existed prior to the establishment of the existing opencast and underground workings. As such, all the required infrastructure is already in place except for additional ventilation shafts and rescue boreholes will be constructed in strategic areas as the mining advances for both KPSX and KPSS. The strategic positions in which the additional ventilation shafts and rescue boreholes will be located have not been specified. As such no additional impacts on the hydropedological flow paths are expected.

In addition to this, there is already comprehensive and recent baseline data available from previous studies, additional hydropedological modelling may not provide significant new insights. The preliminary assessments indicate that the expansion project will have minimal or negligible impact on the hydropedological aspects of the area, extensive modelling might be unnecessary. Furthermore, the use of continuous miners, as opposed to blasting, is known to result in significantly lower disturbances to soil and

water interactions. Given the lower impact of continuous mining methods on hydropedology, the necessity for additional modelling is reduced.

In summary, given the existing comprehensive baseline data, minimal predicted impact, stakeholder acceptance, and cost considerations, it was deemed to be more effective to forego additional hydropedological modelling for the Nwabu Project. Instead, focusing on direct mitigation measures, adaptive management, and addressing more critical environmental concerns will ensure a balanced, efficient, and effective environmental impact assessment process.

15 Supervision, Responsibilities and Summary of Mitigation Measures and Management

Supervision and monitoring is required during the drilling process and construction of ventilation shafts and rescue boreholes. Table 15-1 provides the roles and responsibilities of the people that will be responsible for implementing excavations and stockpiling procedures. The responsibilities of the contractor need to be documented in contract documents.

Table 15-1: Supervision and Monitoring Program

Aspect	Measures and Actions	Timeframe/Frequency	Cluster Applicability	Responsibility
Soil erosion and sediment control	Clearing activities must be restricted to the intervention areas.	Operational Phase	Ventilation Shafts and Rescue Boreholes	Contractors, Environmental Control Officer and Project Manager
Waste management	Bins must be provided for disposal of waste during construction.	Operational Phase	Ventilation Shafts and Rescue Boreholes	Contractors, Environmental Control Officer and Project Manager
Hazardous materials	Spillage plan must be developed. Refuelling must be done offsite to prevent potential soil pollution from spillage. Spillages must be reported immediately.	Operational Phase	Ventilation Shafts and Rescue Boreholes	Contractors, Environmental Control Officer and Project Manager
Equipment and storage areas	Equipment maintenance must be done offsite. Storage areas must be within the fenced area and located away from all sensitive areas	Operational Phase	Ventilation Shafts and Rescue Boreholes	Contractors, Environmental Control Officer and Project Manager
Stockpile management	Stockpiled soils must not be located far away from replacement areas. Must be	Operational Phase	Ventilation Shafts and Rescue Boreholes	Contractors, Environmental Control Officer and Project Manager

Aspect	Measures and Actions	Timeframe/Frequency	Cluster Applicability	Responsibility
	protected from potential erosion and limit the height. Must be kept clear of weeds and alien vegetation.			
Land Use	Maintain and minimise land use change within the license areas. Evaluation of land use within the mining precinct using satellite imagery	Post construction phase – annually	Ventilation Shafts and Rescue Boreholes	Environmental Control Officer
Rehabilitated areas	Maintain the quality and condition of rehabilitated areas. Continuous monitoring of rehabilitated areas for closure compliance	Post construction phase – annually	Ventilation Shafts and Rescue Boreholes	Environmental Control Officer

16 Environmental Statement

It is my professional opinion that this application is considered favourably, as all the required infrastructure is already in place except for additional ventilation shafts and rescue boreholes will be constructed in strategic areas as the mining advances for both KPSX and KPSS. No further soil impacts are expected to result from the proposed underground mining activities within the project area.

17 Response to concerns

This section is to be completed in response to issues raised during the Public Participation Process. Thus far, no issues relating to the hydropedological assessment has been brought to the attention of the specialists. Should any comment be received, it will be addressed in this report.

18 Conclusions and Recommendations

The following conclusions were made:

- According to 'The vegetation of South Africa, Lesotho and Swaziland', the Klipspruit Colliery Mining Rights Area falls within the Eastern Highveld Grassland and the Rand Highveld Grassland vegetation types;
- The majority of the Klipspruit Colliery Mining Rights Area falls within the quaternary catchment B20G, with wetlands associated with the Saalboomspruit, a tributary of the Wilge River. The south-western portion of the site falls within the B11F catchment, which is bisected by the Olifants River, and a small portion at the north-east of the site occurs within the

catchment B11G. Both quaternary catchments are regarded as Largely Modified, according to the Department of Water and Sanitation (DWS);

- The study area comprises of Land type Ba and Bb indicates land in which red and/or yellow brown apedal soils that are dystrophic and/or mesotrophic, dominate over red and/or yellow-brown eutrophic soils. Soils observed during the survey include Witbank, Hutton, Clovelly, and Longlands.
- The dominant land capability classes in the project area were medium, high, and very-high (06 – 15), and soil types ranged from moderately suitable such as Hutton and Clovelly to less suitable for crop production such as Longlands and Fernwood soils.
- The project site is dominated by the presence of high potential agricultural soils such as Hutton, Clovelly, Pinedene and Oakleaf soils, which represent 60% of the total area. Forty percent of the project area consists of wetland soils. The Hutton, Avalon, Pinedene, Oakleaf and Clovelly soil types present within the project site can all be stripped and stockpiled together because the inherent soil properties are similar. The soil types are dominated by deep well drained red and yellow soils;
- However, the Avalon and Longlands soils do contain a soft plinthic layer in the subsoil. This soft plinthic layer should not be stripped with the brown Avalon and grey Longlands subsoil, because this layer hardens to a rock like consistency when exposed to air. Fernwood wetland soils should be stripped, if allowed and agreed upon by the authority, and stockpiled separately from all other soils.
- Underground mining has commenced within the Pit BD boundary and the mining method being utilised is bord and pillar mining. The inclusion of the bord and pillar mining method was to ensure optimal extraction of areas that are not profitable by OC method due to high strip ratio. The proposed KPSS and KPSS underground mine will continue using the bord and pillar mining method similar to pit BD.
- An adit has been developed from the pit BD highwall which provides access to the UG workings, as such all the required infrastructure is already in place except for additional ventilation shafts and rescue boreholes will be constructed in strategic areas as the mining advances for both KPSX and KPSS. The strategic positions in which the additional ventilation shafts and rescue boreholes will be located have not been specified.
- As such, all the required infrastructure is already in place except for additional ventilation shafts and rescue boreholes will be constructed in strategic areas as the mining advances for both KPSX and KPSS.
- There are no envisaged impacts on the hydro-pedological flow paths during the construction phase.
- Potential impacts are expected during the operational phase and post mining. These include:
    - Soil compaction and erosion;
    - Hydrocarbon pollution, and
    - Subsidence.
- Subsidence was rated as the highest risk on the existing hydro-pedological flow paths of the project area.

19 References

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EDUCATION AND QUALIFICATIONS

- Bsc Hons, University of Witwatersrand, 2006
- Bsc Degree, University of Witwatersrand, 2005

AFFILIATIONS

- South African Council for Natural Scientific Professions
- Network for Industrially Contaminated Land in Africa

YEARS OF EXPERIENCE

- 17 Years

KEY COMPETENCIES

- Baseline Wetland Assessments
- Contaminated Land Management
- Environmental Auditing

COUNTRIES OF WORK EXPERIENCE

- South Africa
- Botswana
- Mali

LANGUAGES

- English
- IsiZulu
- Southern Sotho

BIOGRAPHY

Lindokuhle Hlongwane serves as the Principal Consultant with over 17 years of professional experience as both a Wetland Specialist and a Contaminated Land Specialist. Lindokuhle has worked extensively both locally and internationally. He is a registered Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP) and is also an active member and steering committee fellow of the Network for Industrially Contaminated Land in Africa (NICOLA).

Lindokuhle began his career in wetland assessments during his internship, contributing to the rollout and update of “A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas.” Since then, he has conducted numerous wetland assessments across various sectors, including housing developments, mining, and industrial projects.

In the realm of contaminated land management, Lindokuhle's expertise encompasses baseline contamination assessments, delineation of contamination plumes, development of Conceptual Site Models, setting Remedial Objectives (RO), crafting End State Visions, conducting Remedial Alternatives Analyses (RAA), and overseeing the installation of Remediation Systems such as Multi-Phase Extraction, Soil Vapour Extraction, and Sub-slab Depressurization Systems. He is adept at evaluating the efficacy of remediation systems, ensuring that remedial objectives are met, and driving projects to successful closure.

Lindokuhle is skilled in managing complex projects and navigating interactions with challenging stakeholders. His extensive experience also includes collaborating with landowners and conveyancers to provide critical input for land sale agreements. A self-motivated and trained project manager, Lindokuhle prioritizes budget, schedule, safety, and the quality of the final product. He firmly believes that incident-free operations are achievable when stakeholders unite as One Team to complete projects with zero incidents.

EMPLOYMENT HISTORY

Jul-2013 to Present: Independent Environmental Consultant

Jun-2012 to Jun-2013: Wetland Specialist, Digby Wells Environmental (Pty) Ltd

Jan-2010 to May-2012: Contaminated Land Specialist , Mills And Otten Environmental Consulting (Pty) Ltd

Jan-2007 to Mar-2009: Internship, Wetlands Consulting Services (Pty) Ltd

EXPERIENCE HIGHLIGHTS

The below highlight key recent and relative project experience:

- Rolling out of the Practical Field Procedure for Identification and Delineation of the Wetlands and Riparian Areas (DWAF 2005), DWAF, Trainer
- Crocodile West Ecological Reserve Determination Study, DWAF, Trainee Fluvial Geomorphologist
- Thukela Hydro Electric Power Scheme: Ecological Reserve Determination Study , DWAF, Fluvial Geomorphologist
- Wetland Assessment Study for the Proposed Universal Coal plc: Kangala Coal Mine, Delmas, Mpumalanga Province, South Africa, Kangala Coal Mine, Wetland Specialist
- External Audit in Fulfilment of The Integrated Water Use Licence for Klipspruit Water Treatment Plant- Year 2022, Seriti Klipspruit Colliery, Lead Auditor

Please consult the attached appendix for a comprehensive list detailing the project experiences undertaken.

APPENDIX A: PROJECT EXPERIENCE

Duration	Assignment name / brief description of main deliverables/outputs	Name of client and country of assignment	Role on the assignment
2007-2008	Rolling out of the Practical Field Procedure for Identification and Delineation of the Wetlands and Riparian Areas (DWAF 2005).	Department of Water Affairs and Forestry, South Africa	Trainer
2008-2009	Upgrading the Practical Field Procedure for Identification and Delineation of the Wetlands and Riparian Areas (DWAF 2005).	Department of Water Affairs and Forestry, South Africa	Trainer
2007-2008	Upper Vaal Ecological Reserve Determination Study	Department of Water Affairs and Forestry, South Africa	Trainee Fluvial Geomorphologist
2007-2008	Inkomati Ecological Reserve Determination Study	Department of Water Affairs and Forestry, South Africa	Trainee Fluvial Geomorphologist;
2008-2009	Crocodile West Ecological Reserve Determination Study	Department of Water Affairs and Forestry, South Africa	Fluvial Geomorphologist
2008-2009	Groot Marico Ecological Reserve Determination Study	Department of Water Affairs and Forestry, South Africa	Fluvial Geomorphologist
2008-2009	Weza River Ecological Reserve Determination Study	Department of Water Affairs and Forestry, South Africa	Fluvial Geomorphologist
2009-2010	Mzimvubu River Ecological Reserve Determination Study	Department of Water Affairs and Forestry, South Africa	Fluvial Geomorphologist
2009-2010	Thukela Hydro Electric Power Scheme: Ecological Reserve Determination Study	Department of Water Affairs and Forestry, South Africa	Fluvial Geomorphologist
2015	Wetland Assessment Study for a Pan Associated with an Existing Honingkranz sand Winning Operations, Bronkhorstspruit, Mpumalanga Province, South Africa;	Honningkrantz Sand Winning Operations, South Africa	Wetland Specialist
2013	Wetland Assessment Study for the Proposed Exxaro Coal: Thabametsi Coal Mine, Lephalale, Limpopo Province, South Africa;	Exxaro Coal, South Africa	Wetland Specialist
2013	Wetland Assessment Study for the Existing Rand Gold Resources: Loulo-Gounkoto Gold Mine, Mali	Rand Gold Resources, Mali	Wetland Specialist
2013	Wetland Assessment Study for the Proposed Universal Coal plc: Kangala Coal Mine, Delmas, Mpumalanga Province, South Africa;	: Kangala Coal Mine, South Africa	Wetland Specialist
2013	Wetland Assessment Study for the Proposed Universal Coal plc: Roodekop Coal Mine, Delmas, Mpumalanga Province, South Africa;	Roodekop Coal Mine, South Africa	Wetland Specialist

Duration	Assignment name / brief description of main deliverables/outputs	Name of client and country of assignment	Role on the assignment
2014	Wetland Assessment Study for the Proposed Msobo Coal: Cronsbrey Coal Mine, Chrissesmere, Mpumalanga Province, South Africa;	Xstarta Coal, South Africa	Wetland Specialist
2014	Wetland Assessment Study for the Proposed Anglo Thermal Coal: Dalyshope Coal Mine, Liphalale, Limpopo Province, South Africa;	Anglo Thermal Coal, South Africa	Wetland Specialist
2014	Wetland Assessment Study for the Proposed Msobo Coal: Harwar Coal Mine, Chrissesmere, Mpumalanga Province, South Africa;	Xstarta Coal, South Africa	Wetland Specialist
2014	Wetland Assessment Study for the Proposed Coal Fired Power Station and Associated Infrastructure: IPP Thabametsi Power Station, Liphalale, Limpopo Province, South Africa;	Thabametsi IPP, South Africa	Wetland Specialist
2014	Wetland Assessment Study for the Proposed Anglo Thermal Coal: Dalyshope Coal Mine, Liphalale, Limpopo Province, South Africa;	Anglo Thermal Coal	Wetland Specialist
2014	Wetland Assessment Study for the Proposed Vedanta IPP Project: Vedanta Resources PLC, Liphalale, Limpopo Province, South Africa;	Vedanta Resources PLC	Wetland Specialist
2012	Wetland Assessment Study for the Proposed BHP Billiton: Klipsruit Coal Mine, Oogies, Mpumalanga Province, South Africa;	Klipsruit Coal Mine, South Africa	Wetland Specialist
2012	Wetland Assessment Study for the Proposed Waste Rock Dump associated with the existing Anglo Thermal Coal Greenside Colliery, Witbank, Mpumalanga Province, South Africa;	Anglo Thermal Coal Greenside Colliery, South Africa	Wetland Specialist
2012	Wetland Assessment Study for the Proposed Waste Rock Dump Associated with the Existing Anglo Thermal Coal Kleinkopje Colliery, Witbank, Mpumalanga Province, South Africa;	Anglo Thermal Coal Kleinkopje Colliery	Wetland Specialist
2015	Wetland Assessment Study for the Proposed Waste Rock Dump Associated with the Existing Anglo Thermal Coal Goedehoop Colliery, Witbank, Mpumalanga Province, South Africa;	Anglo Thermal Coal Goedehoop Colliery, South Africa	Wetland Specialist
2014	Wetland Assessment Study to Support the Biodiversity Management Plan at the Existing Anglo Thermal Coal New Vaal Colliery, Vanderbijylpark, Free State Province, South Africa;	Anglo Thermal Coal New Vaal Colliery, South Africa	Wetland Specialist

Duration	Assignment name / brief description of main deliverables/outputs	Name of client and country of assignment	Role on the assignment
2014	Wetland Assessment Study for the Proposed Geluksdal Tailings Storage Facility and Pipeline Infrastructure: Gold One International, Randfontein, Gauteng Province, South Africa;	Gold One International, South Africa	Wetland Specialist
2017	Ecological Assessment of Wetland Areas Associated with the Proposed Olive Street Estate Located on Portions of the Farm Vlakfontein 523 JR, Bronkhorstspruit;	Olive Street Estate, South Africa	Wetland Specialist
2017	Baseline Wetland Assessment Study for the Proposed Schoongezicht Coal Mine Located on Portions of Portion 6 of the Farm Schoongezicht 308 JS Emalahleni, Mpumalanga Province;	Schoongezicht Coal Mine, South Africa	Wetland Specialist
2023	Baseline Wetland Assessment Study for the Water Use Licence Application for Randfontein Estate Limited: Doornkop Mine	Randfontein Estate Limited, South Africa	Wetland Specialist
2016	Baseline Wetland Assessment Study for the Proposed Railway Coal Siding at the Highveld Steel and Vanadium Corporation Plant on the Farm Elandsfontein 309 JS, Clewer, Emalahleni, Mpumalanga Province	Highveld Steel (Pty) Ltd, South Africa	Wetland Specialist
2023	External Audit Report in Fulfilment of The Integrated Water Use License for Klipspruit Extension- Year 2022;	Seriti, Klipspruit Colliery, South Africa	Lead Auditor
2023	External Audit in Fulfilment of The Integrated Water Use License for Klipspruit Main Pit- Year 2022;	Seriti, Klipspruit Colliery, South Africa	Lead Auditor
2023	External Audit in Fulfilment of The Integrated Water Use Licence for Klipspruit South Pit- Year 2022	Seriti, Klipspruit Colliery, South Africa	Lead Auditor
2023	External Audit in Fulfilment of The Integrated Water Use Licence for Klipspruit Water Treatment Plant- Year 2022;	Seriti, Klipspruit Colliery, South Africa	Lead Auditor
2023	Khutala Colliery Regulation 704 Compliance Audit and stormwater management Plan dated October 2023;	Seriti, Khutala Coal Mine, South Africa	Lead Auditor
2023	External Audit Report in Fulfilment of The Integrated Water Use License for Khutala Mine Portion 16 - Year 2022;	Seriti, Khutala Coal Mine, South Africa	Lead Auditor

Duration	Assignment name / brief description of main deliverables/outputs	Name of client and country of assignment	Role on the assignment
2023	External Audit Report in Fulfilment of The Integrated Water Use Licence for Klipspruit South Pit- Year 2022;	Seriti Klipspruit Colliery, South Africa	Lead Auditor

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

At a congregation of the University

held on 6 April 2006

Lindokuhle Vincent Hlongwane

was admitted to the Degree of

Bachelor of Science

Dean, Faculty of Science

Vice-Chancellor and Principal

Registrar

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

At a congregation of the University

held on 05 April 2007

Lindokuhle Vincent Hlongwane

was admitted to the Degree of

Bachelor of Science with Honours

(Ecology, Environment and Conservation)

Dean :Faculty of Science

Vice-Chancellor and Principal

Registrar

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Lindokuhle Vincent Hlongwane

Registration number: 400100/13

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule I of the Act)

Biological Science **05 June 2013**

05 June 2013

Pretoria

President

Executive Director

CPTS0168-20010/02/

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

Certificate of Competence

DVC (Academic)

Centre for Part-Time Studies

This is to certify that

Lindokuhle Hlongwane

from 24 August 2020 to 02 December 2020
has met the minimum requirements for competence in

Principles of Project Management Theory and Practice

(details overleaf)

BMMhacquel

...d, Centre for Part-Time Studies

...te of Issue: 12 May 2021

R. Osman

DVC (Academic