Wetland Baseline and Impact Assessment Report for Klipspruit Colliery's Proposed Unwabu Project – Underground Mining Expansion Project

WU36905

Prepared for

Seriti Power (Pty) Ltd

Document Detail

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Document History

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- 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:	Wetland Specialist
Qualifications:	Bsc (Hons)
Name of Company:	Niara Environmental Consultants (Pty) Ltd
Experience (Years):	18 years
Date:	19 January 2026

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 **Error! Reference source not found.**
(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 3
(cA) an indication of the quality and age of Base Data used for the specialist report	✓	Section **Error! Reference source not found.**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and the levels of acceptable change	✓	Section **Error! Reference source not found.**
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	✓	Section **Error! Reference source not found.**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	✓	Section **Error! Reference source not found.**
(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 **Error! Reference source not found.**
(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 **Error! Reference source not found.**
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities	✓	Section **Error! Reference source not found.**
(k) any mitigation measures for inclusion in the EMPr	✓	Section **Error! Reference source not found.**
(l) any conditions for inclusion in the environmental authorisation;	✓	Section **Error! Reference source not found.**

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
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	✓	Section **Error! Reference source not found.**
(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 13
(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) 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 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. This report presents the findings of a specialist Wetland Baseline and Impact Assessment Study that forms part of the Environmental Impact Assessment (EIA) and Integrated Water Use License Application (IWULA) Process. The objective of the assessment is to ensure that the sensitivity of the site to the proposed underground mining is considered and the information provided in this report enables the competent authority to come to a sound conclusion on the impact of the proposed project on the surrounding wetland resources.

Methodology

As part of the study, the wetland areas were identified and delineated according to the hydro-geomorphic (HGM) Classification system. An ecological health assessment was also conducted for the wetland areas to describe the current state and ecological relevance of each wetland unit using Wet-Health of the Wetland Management Series. The health of a wetland can be determined as a measure of the deviation of wetland structure and function from that wetland's natural reference condition. An ecological functional assessment of the associated wetland areas was undertaken using the WET-Ecoservices tool to determine services provided by each identified wetland unit. Furthermore, an impact assessment as per the methodology included in GN509 of 2016 was conducted to assess the impacts that the ongoing mining activities have on identified wetland areas within the Mining Rights Area. Use was made of 1:50 000 topographical maps, 1:10 000 orthophotos and Google Earth Imagery to create digital base maps of the study area onto which the wetland boundaries could be delineated using ArcMap 10.2. A desktop delineation of suspected wetland areas was undertaken by identifying rivers and wetness signatures on the digital base maps. All identified areas suspected to be wetlands were then further investigated during a site visit undertaken on the 27th of February 2024.

Activities

Use was made of 1:50 000 topographical maps, 1:10 000 orthophotos and Google Earth Imagery to create digital base maps of the study area onto which the wetland boundaries could be delineated using ArcMap 10.2. A desktop delineation of suspected wetland areas was undertaken by identifying rivers and wetness signatures on the digital base maps. All identified areas suspected to be wetlands were then further investigated during a site visit undertaken on the 27th of February 2024.

Key Findings and Recommendations

- 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);
- According to the National Freshwater Ecosystem Priority Areas (NFEPA) a Valley Floor: Channelled valley bottom wetland Rank 2 is identified within the proposed area. Therefore, the wetlands within the proposed area contributes towards maintenance of biodiversity within the greater catchment area.
- Two types of wetlands were identified within the area proposed for an underground mine, these include a Hillslope Seepage Connected to a watercourse and a Channelled Valley Bottom Wetland.
- Due to deviation from the reference condition, the hillslope seepage wetland connected to a watercourse located within the project area have been classified as follows:
  - PES-C: Moderately Modified where a moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact and
  - PES-D): Largely Modified where a large change in ecosystem processes and loss of natural habitat and biota has occurred.
- The Channelled Valley Bottom Wetland located within the project area has deviated significantly from the reference condition such that it has been classified as Seriously Modified (PES: E) where the change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable.
- The Ecological Importance and Sensitivity of the wetlands within the project are considered to be High: these wetlands are considered to be ecologically important and sensitive. The biodiversity of these wetlands may be sensitive to flow and habitat modifications. These wetlands play a role in moderating the quantity and quality of water of major rivers;
- Since no new surface mining infrastructure will be constructed as part of the project, it was concluded that, a buffer zone could not be calculated. Klipspruit Colliery agreed to maintain a 80m buffer zone around the delineated wetlands areas. The buffer area will be maintained according to the Seiti Land Management Way.
- Since no new surface mining infrastructure will be constructed, the impact assessment was conducted only for the operational, decommissioning and post-closure phases of the Unwabu project.
- The identified potential impacts wetlands were found to be significant under a worst-case scenario since the could since most of the delineated wetlands within the project area will be undermined. The following risks were identified:

- Decreased flow within wetlands due to groundwater drawdown: This potential impact was found to be moderate during the Operational, Decommissioning and Post-Closure phases of the Unwabu project.
- Surface subsidence within watercourses: this potential impact was found to be high Operational, Decommissioning and Post-Closure phases of the Unwabu project.
- Water quality deterioration due to discharge of operational mine water: This potential impact was found to be high Operational and Post-Closure phases of the Unwabu project.

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List of Abbreviations and Acronyms

Acronym	Full Term
BA	Basic Assessment
BAP	Biodiversity Action Plan
CEC	Cation Exchange Capacity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CM	Continuous Miner
DMR	Department of Mineral Resources
DMRE	Department of Mineral Resources and Energy
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ES	Ecosystem Services
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
HGM	Hydro-Geomorphic (Classification / Unit)
HIA	Health Impact Assessment
IWUL	Integrated Water Use Licence
IWULA	Integrated Water Use Licence Application
IUCN	International Union for Conservation of Nature
KNP	Kruger National Park

Acronym	Full Term
KPSS	Klipspruit South
KPS	Klipspruit Colliery
KPSX	Klipspruit Extension
LoM	Life of Mine
MR	Mining Right
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OC	Opencast (Mining)
PES	Present Ecological Status
PCD	Pollution Control Dam
PCPP	Phola Coal Processing Plant
REC	Recommended Ecological Category
RFQ	Request for Quotation
SANBI	South African National Biodiversity Institute
S102	Section 102 (Amendment under the MPRDA)
SHE	Safety, Health and Environment
UG	Underground (Mining)
WET-EcoServices	Wetland Ecosystem Services Assessment Tool
WET-Health	Wetland Health Assessment Tool
WUL	Water Use Licence

Glossary of Terms

Term	Definition
Adit	A horizontal or near-horizontal underground access tunnel driven from the surface to provide entry to underground mine workings.
Anaerobic Conditions	Soil or sediment conditions characterised by the absence of free oxygen, typically resulting from prolonged saturation and leading to distinctive chemical and biological processes.
Basic Assessment (BA)	An environmental assessment process undertaken in terms of the NEMA EIA Regulations for activities with limited environmental impacts, requiring a Basic Assessment Report and EMPr.
Bord and Pillar Mining	An underground mining method where coal is extracted in a grid pattern, leaving pillars of unmined material to support the roof.
Buffer Zone	A designated area surrounding a sensitive environmental feature, such as a wetland or watercourse, intended to protect ecological integrity by limiting development and disturbance.
Channelled Valley Bottom Wetland	A wetland occurring within a valley bottom that contains a defined stream channel and receives water from both surface runoff and subsurface flows.
Cumulative Impact	The combined effect of multiple activities or impacts over time, which may result in greater environmental change than individual impacts considered in isolation.
Desktop Assessment	An assessment undertaken using existing spatial, environmental, and literature data prior to or in support of field investigations.
Ecological Importance and Sensitivity (EIS)	A measure of the ecological value and sensitivity of a wetland or ecosystem, considering biodiversity importance, ecosystem services, and vulnerability to change.
Ecosystem Services	The benefits that ecosystems provide to people, including provisioning, regulating, supporting, and cultural services.
Environmental Authorisation (EA)	Formal approval issued by the competent authority permitting the commencement of listed activities in terms of NEMA.
Environmental Management Programme (EMPr)	A legally binding document that sets out mitigation, management, monitoring, and rehabilitation measures to manage environmental impacts associated with a project.
Field Delineation	The on-site identification and mapping of wetland or riparian boundaries using soil, vegetation, terrain, and hydrological indicators.

Term	Definition
Groundwater Drawdown	A lowering of the groundwater table resulting from abstraction, mining, or dewatering activities, potentially affecting wetland hydrology.
Hydro-Geomorphic (HGM) Unit	A classification of wetlands based on geomorphic setting, water source, and hydrodynamics, used to characterise wetland type and function.
Hydromorphic Soils	Soils that exhibit morphological features such as mottling or gleying due to prolonged or frequent saturation.
Integrated Water Use Licence (IWUL)	A licence issued under the National Water Act authorising one or more water uses under a single regulatory instrument.
Integrated Water Use Licence Application (IWULA)	The formal application process undertaken to obtain authorisation for water uses in terms of Section 21 of the National Water Act.
Life of Mine (LoM)	The anticipated operational lifespan of a mining operation, from commencement through to closure.
Mining Right	A right granted under the MPRDA authorising the extraction of minerals within a defined area and subject to environmental approval.
Opencast Mining	A surface mining method involving the removal of overburden to access mineral resources.
Present Ecological Status (PES)	An assessment of the current condition of a wetland or ecosystem relative to its natural or reference state.
Pollution Control Dam (PCD)	An engineered containment facility designed to collect and manage contaminated mine water.
Quaternary Catchment	A fourth-order hydrological management unit used in South Africa for water resource planning and management.
Recommended Ecological Category (REC)	The desired future ecological condition of a water resource, considering sustainability and acceptable levels of change.
Risk-Based Water Use Assessment	An assessment methodology prescribed by DWS to evaluate risks to water resources associated with Section 21 water uses.
Seepage Wetland	A wetland sustained primarily by subsurface groundwater flow, often occurring on slopes or at slope-valley interfaces.
Section 21 Water Use	A water use defined under Section 21 of the National Water Act, including abstraction, storage, discharge, or alteration of watercourses.

Term	Definition
Section 102 Amendment	An amendment to a mining right granted under Section 102 of the MPRDA to allow changes to approved mining activities or methods.
Subsidence	The gradual sinking or collapse of land surface caused by underground mining voids or geological instability.
Underground Mining (UG)	Mining operations conducted beneath the earth's surface to extract mineral resources.
Wetland Delineation	The process of identifying the spatial extent of a wetland using accepted scientific indicators and regulatory guidelines.
Wetland Health	The degree to which a wetland's structure and functioning deviate from its natural reference condition.
Wetland Mitigation	Measures implemented to avoid, minimise, rehabilitate, or offset adverse impacts on wetlands.
Wetland Typing	The classification of wetlands based on hydro-geomorphic characteristics and landscape position.

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 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. This report presents the findings of a specialist Wetland Baseline and Impact Assessment Study that forms part of the Environmental Impact Assessment (EIA) and Integrated Water Use License Application (IWULA) Process. The objective of the assessment is to ensure that the sensitivity of the site to the proposed open cast mining is considered and the information provided in this report enables the competent authority to come to a sound conclusion on the impact of the proposed project on the adjacent wetland resources.

1.1 Project Applicant

The proposed Nwabu Project is being undertaken by Seriti Power (Pty) Ltd ("Seriti Power"), a leading South African energy and mining company with a strong focus on responsible coal production, security of supply, and sustainable resource management. Seriti Power was established following the acquisition of selected South32 South Africa Energy Coal assets in 2021 and currently operates several large-scale coal mining operations supplying both the domestic and export markets.

Seriti Power is a wholly South African-owned company and plays a strategic role in supporting the country's energy sector through the supply of coal to Eskom power stations, as well as through export coal operations. The company places emphasis on regulatory compliance, environmental stewardship, and the responsible management of social and environmental risks associated with mining activities. Its operations are guided by internal governance frameworks that align with national legislation and recognised best practice standards for environmental and water resource management.

Seriti Power holds a valid Mining Right for coal in respect of the Klipspruit Colliery, located in the Mpumalanga Province. The Klipspruit operation has a long operational history and has undergone several regulatory amendments and authorisations over time to optimise mining methods while ensuring compliance with the Mineral and Petroleum Resources Development Act, 2002 (MPRDA), the National Environmental Management Act, 1998 (NEMA), and the National Water Act, 1998 (NWA). The proposed Nwabu Project forms part of Seriti Power's strategy to transition certain mining areas from opencast to underground mining, thereby extending the life of mine while reducing surface disturbance where practicable.

The applicant details for Seriti Power (Pty) Ltd are provided in Table 1-1 below.

Table 1-1: Applicants Details

Name of Applicant:	Seriti Power (Pty) Ltd (previously known as South32 SA Coal Holdings (Pty) Ltd)
Registration No:	1963/000537/07
Responsible Person:	Dirk Muller Operations Manager, Klipspruit Colliery
Physical Address:	Moyahabo Jumbo Makagalefe
Postal Address:	Klipspruit Colliery: Portion 12, Farm Klipfontein 3Registration Division IS Ogies, 2230 South Africa
Telephone No:	P.O Box 639 Northlands, Johannesburg

	2116
Email:	013 689 4620
	Moyahabo.Makgalefe@seritiza.com

2 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). KPS consists of three mining areas under a single Mining Right. These areas are referred to as:

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2.1 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.

2.1.1 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 2-1 below. 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 2-2 and Figure 2-3:

- 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")

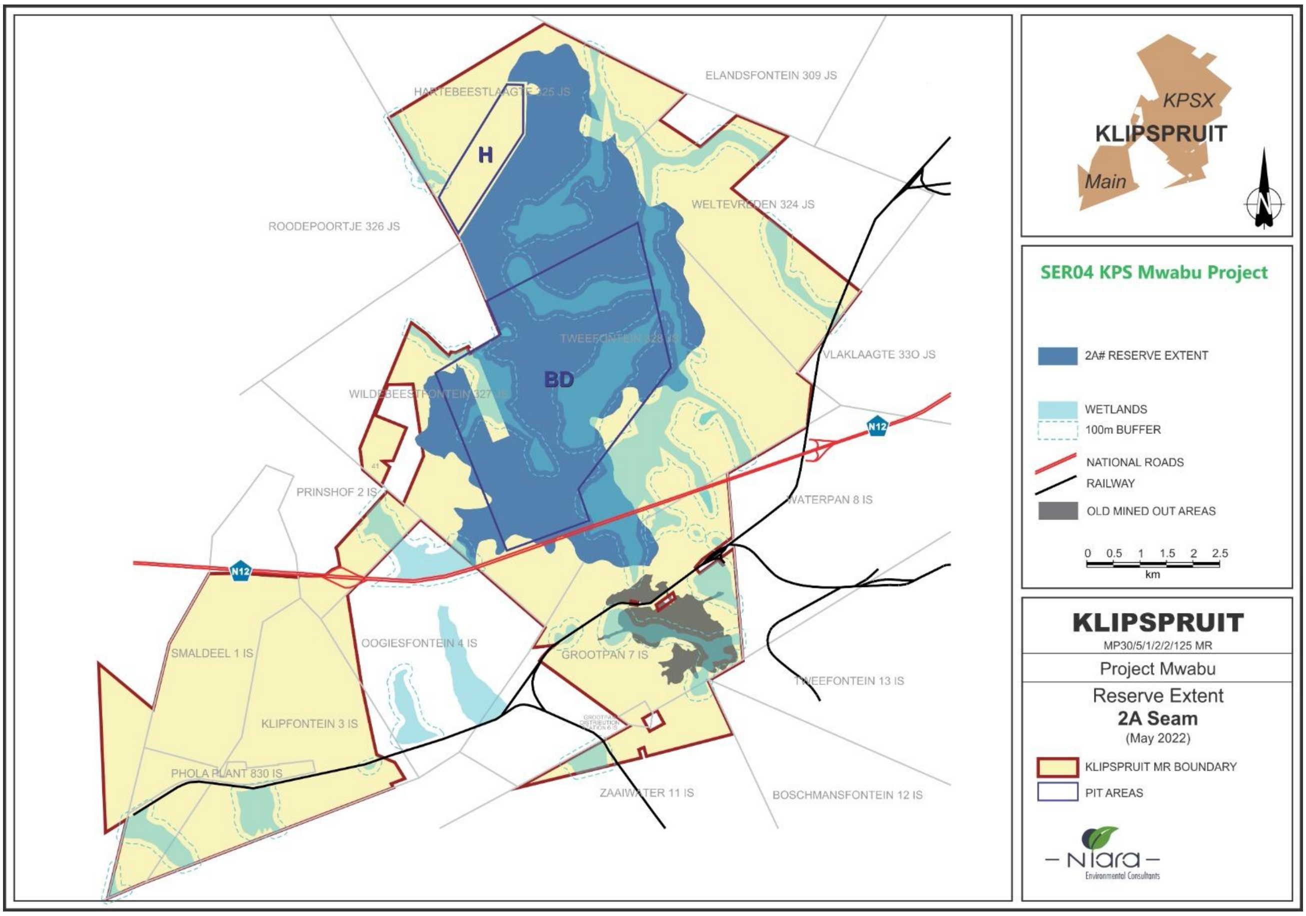


Figure 2-1: Proposed S2A Mining

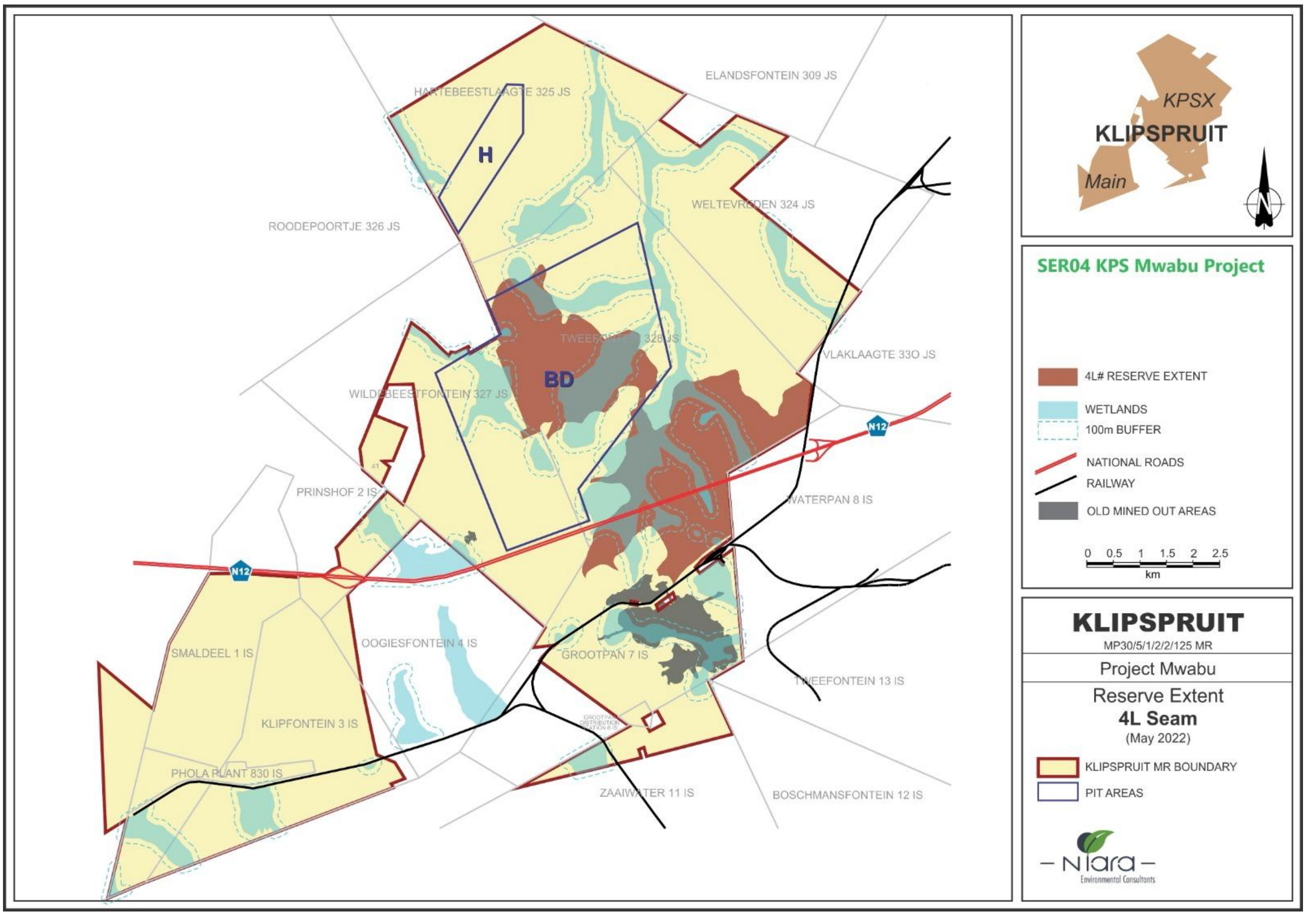


Figure 2-2: Proposed S4L Mining

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 2-3 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. These 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.

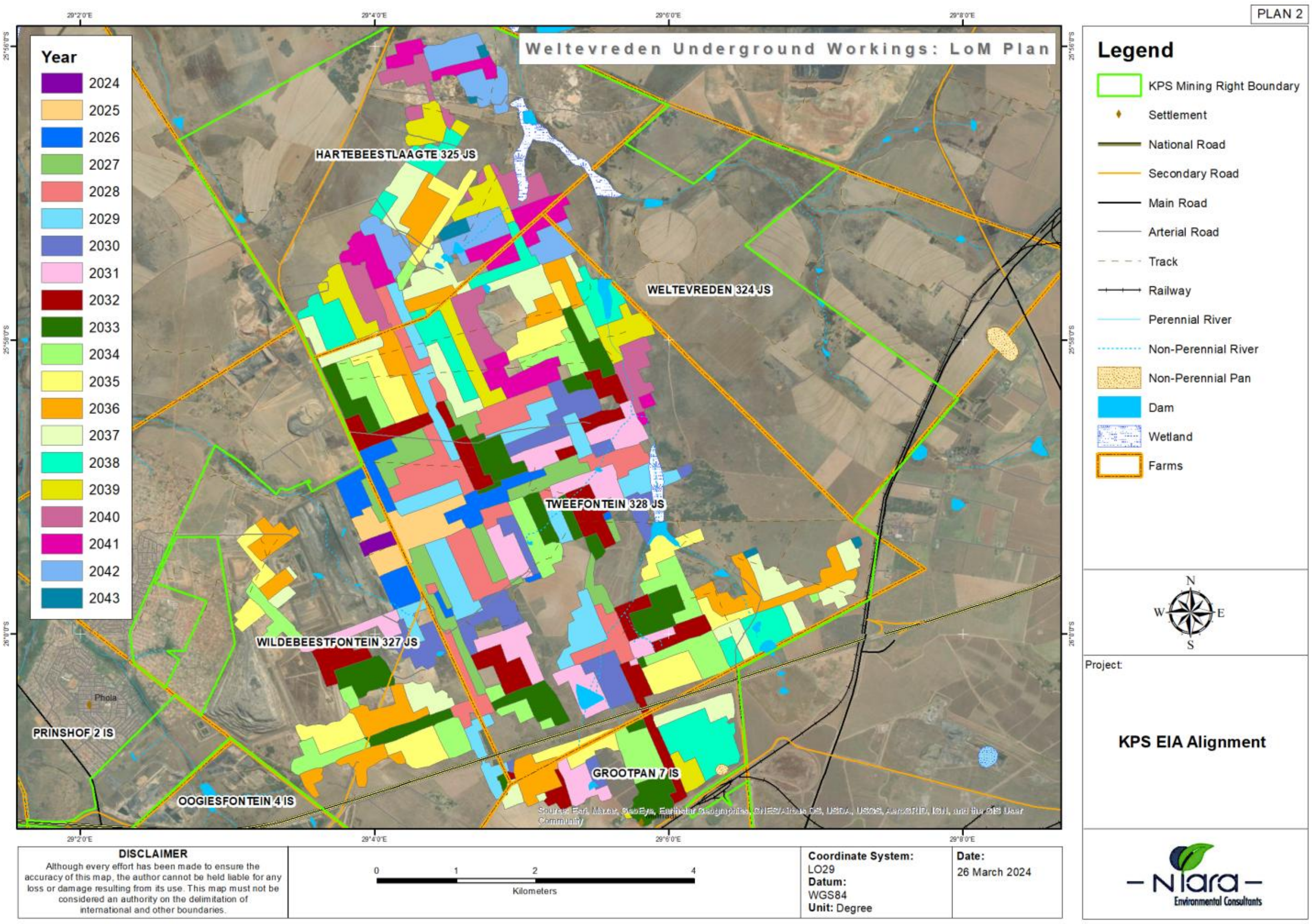


Figure 2-3: Life of Mine Plan for the Proposed KPSX UG Mining

2.1.2 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.

2.1.3 Waste Management

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

2.1.4 Summary of the Infrastructure Requirements

An adit has already been developed to support the UG mining at KPSX together with the supporting UG conveyors. An adit 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 2-4.

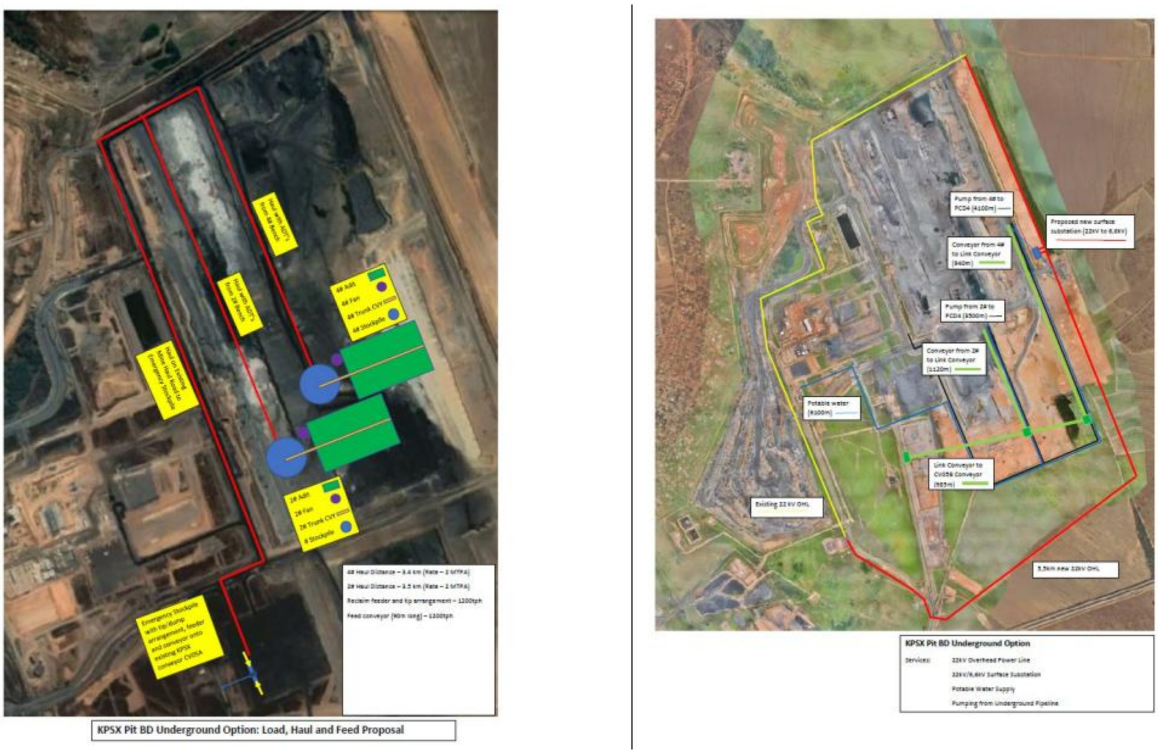


Figure 2-4: Layout for KPSX UG Haul Roads, Pipelines, Conveyor, Load-Haul and Feed Infrastructure

3 Scope of Work

The following tasks formed part of the agreed scope of work:

- Review available data for the main application area (Conservation plans, NFEPA, past studies);

- Undertake a desktop delineation of all wetlands and watercourses within the proposed drilling works for exploration purposes
- Typing of the wetlands within the area;
- Identification, description and rating of potential impacts that may arise from the proposed infrastructure amendments using the GN509 Water Use Risk Assessment methodology;
- Provide appropriate mitigation and management measures to address the identified potential impacts; and
- Compilation of a wetland baseline and impact assessment report.

4 Key Legislation

The legislation, policies and guidelines listed below are applicable to the current project in terms of biodiversity and ecological support systems.

4.1 International Legislation and Policy

- The Ramsar Convention (on wetlands of international importance);
- The IUCN (World Conservation Union). The IUCN's mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable;
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival; and
- Convention on Biological Diversity (Rio de Janeiro, 1992);

4.2 South African Legislation

- Constitution of the Republic of South Africa (Act 108 of 1996). The Bill of Rights, in the Constitution of South Africa states that everyone has a right to a nonthreatening environment and requires that reasonable measures be applied to protect the environment. This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development;
- The National Environmental Management Act (NEMA) No. 107 of 1198): Ecological Assessment Regulations, 2014. Specifically, the requirements of the specialist report as per the requirements of Appendix 6;
- The National Environmental Management: Biodiversity Act (NEM:BA) No. 10 of 2004: specifically, the management and conservation of biological diversity within the RSA and of the components of such biological diversity;

- National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations;
- National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003);
- National Water Act, 1998 (Act 36 of 1998);
- Environmental Conservation Act, 1989 (ECA), (Act no. 73 of 1989);
- National Forests Act, 1998 (Act 84 of 1998), specifically with reference to Protected Tree species;
- National Heritage Resources Act, 1999 (Act 25 of 1999);
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).

5 Expertise of a Specialist

Mr. Lindokuhle (Lindo) Hlongwane has more than eighteen 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

6 Limitations of the Assessment

The following limitations were identified;

- The findings of this assessment are based on the information collected during the site visit that was conducted during February 2024. Any changes within the project area that may affect the integrity and functionality of the delineated wetland/riparian zones post the site investigations have not been identified and therefore the results of such impacts on the wetlands/riparian zones have not been taken into consideration as part of this assessment;
- The flowering times for wetland plant species are variable and species that were not flowering during the time of field investigations may have been overlooked, and;

- The scale of the remote imagery used (1:10 000 aerial photographs and Google Earth Imagery), as well as the accuracy of the handheld GPS unit used to delineate wetlands in the field, result in the delineated wetland boundaries being accurate to approximately 10-20m on the ground. Should a greater mapping accuracy be required, the wetlands would need to be pegged in the field and surveyed using conventional survey techniques;
- The wetland assessment is confined to the proposed project area, and does not include the neighbouring and adjacent areas to project area, these areas were however considered as part of the desktop assessment;

7 Methodology

7.1 Desktop Review of Existing Data

The National Water Act, Act 36 of 1998, defines wetlands as: "Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."

The presence of wetlands in the landscape can be linked to surface water and perched groundwater tables. Wetland types are differentiated based on their hydro-geomorphic (HGM) characteristics; i.e. on the position of the wetland in the landscape, as well as the way in which water moves in, through and out of the wetland systems as indicated in Table 7-1 below. A schematic diagram of how these wetland systems are positioned in the landscape is given in the Figure 7-1 below.

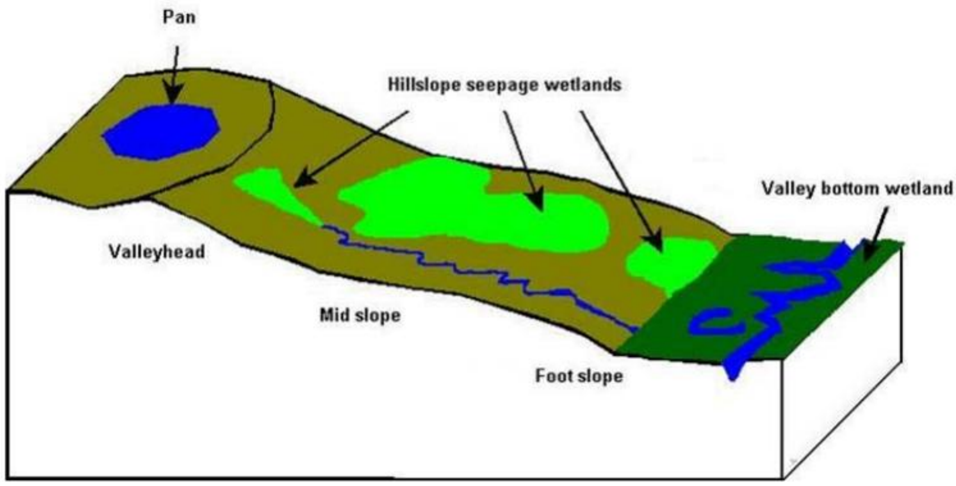
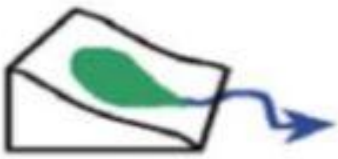


Figure 7-1: Diagram Illustrating the Position of the Various Wetland Types Within the Landscape

Table 7-1: Wetland Hydrogeomorphic Units (Modified from Brinson 1993; Kotze 1999 and Marneweck and Batchelor 2002)

Wetland type	Position in the landscape	Description
Floodplain		Valley bottom areas with a well-defined stream channel, gently sloped and characterized by floodplain features such as oxbow depression and natural levees and the alluvial (by water) transport and deposition of sediment, usually leading to a net accumulation of sediment. Water inputs from main channel (when channel banks overspill) and from adjacent slopes.
Valley bottom with a channel		Valley bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterized by the net accumulation of alluvial deposits or may have steeper slopes and be characterized by the net loss of sediment. Water inputs from the main channel (when channel banks overspill) and from adjacent slopes.
Valley bottom without a channel		Valley bottom areas with no clearly defined stream channel, usually gently sloped and characterized by alluvial sediment deposition, generally leading to a net accumulation of sediment. Water inputs mainly from the channel entering the wetland and also from adjacent slopes
Hillslope seepage linked to a stream channel.		Slopes on hillsides, which are characterized by colluvial (transported by gravity) movement of materials. Water inputs are mainly from subsurface flow and outflow is usually via a well-defined stream channel connecting the area directly to a stream channel

Wetland type	Position in the landscape	Description
Isolated hillslope seepage		Slopes on hillsides that are characterized by colluvial transport (transported by gravity) movement of materials. Water inputs are from subsurface flow and outflow either very limited or through diffuse sub-surface flow but with no direct link to a surface water channel.
Pan/Depression		A basin-shaped area with a closed elevation contour that allows for the accumulation of surface water (ie. It is inward draining). It may also receive subsurface water. An outlet is usually absent and so this type of wetland is usually isolated from the stream network

Use was made of 1:50 000 topographical maps, 1:10 000 orthophotos and Google Earth Imagery to create digital base maps of the study area onto which the wetland/riparian zones boundaries could be delineated using ArcMap 10.2. A desktop delineation of suspected wetland/riparian zones was undertaken by identifying rivers and wetness indicators on the digital base maps. All identified areas suspected to be wetland/riparian zones were then further investigated in the field.

In addition, the National Wetland Inventory (SANBI) and the Atlas of Freshwater Ecosystem Priority Areas in South Africa (Nel et al., 2011) were consulted to determine the presence of wetland/river systems within the area. Existing wetland data around the study area was consulted and utilized where applicable including wetland/riparian zones data from national wetland inventory and NFEPA wetland data.

The following information sources were considered for the desktop assessment;

- Aerial imagery (Google Earth Pro);
- Department of Water and Sanitation (DWS, 2018);
- The National Freshwater Ecosystem Priority Areas (Nel et al., 2011); and

7.2 Wetland Identification, Delineation and Classification

Field work for the wetland/riparian zone delineation study was undertaken in February 2023. During the field work, wetlands were identified and delineated according to the delineation procedure as set out by the “A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas” document, as described by DWAF (2005) and Kotze and Marneweck (1999). A cross section of a typical wetland is presented in Figure 7-2 below. Using this procedure, wetlands were identified and delineated using the following indicators:

- Terrain Unit Indicator (Identifies those parts of the landscape where wetlands are more likely to occur);

- Soil Form Indicator (Identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation;
- Soil Wetness Indicator (Identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation); and; and the
- Vegetation Indicator (Identifies hydrophilic vegetation associated with frequently saturated soils).

Vegetation is the primary indicator of a wetland, which must be present under normal circumstances. However, the soil wetness indicator tends to be the most important in practice. The remaining three indicators are used in a confirmatory role. The reason for this, is that the response of vegetation to changes in the soil moisture regime or management are relatively quick and may be transformed, whereas the morphological indicators in the soil are significantly more permanent and will hold the indications of frequent and prolonged saturation long after a wetland has been drained (perhaps several centuries) (DWAF, 2005).

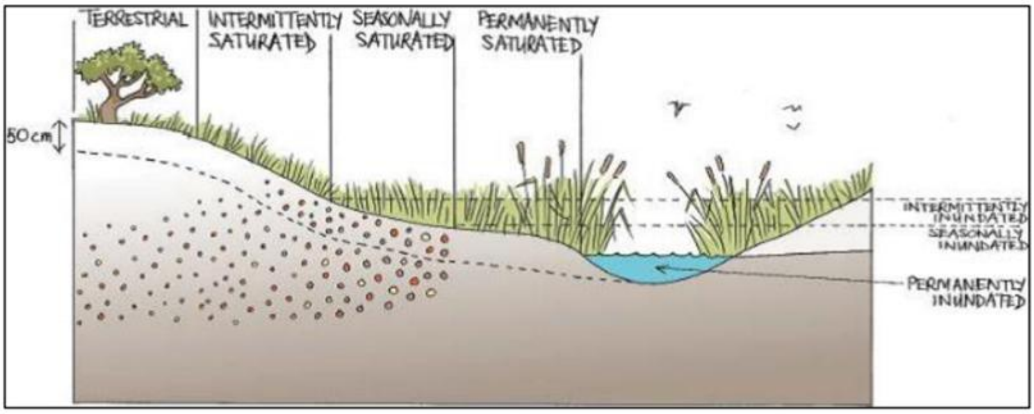


Figure 7-2: Cross Section Through a Wetland, Indicating How the Soil Wetness and Vegetation Indicators Change (Ollis et al., 2013)

7.3 Present Ecological Status

The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, and then to convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of impact of individual activities/occurrences and then separately assessing the intensity of impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The Present State (PES) categories are provided in Table 7-2 below.

Table 7-2: The PES Categories (Macfarlane, et al. 2009)

Category	Description	Impact Score Range	Present State Category
None	Unmodified, natural	0 to 0.9	A
Small.	Largely Natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place	1.0 to 1.9	B

Moderate.	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact	2.0 to 3.9	C
Large	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4.0 to 5.9	D
Serious	Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable	. 6.0 to 7.9	E
Critical	Critically Modification. The modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8.0 to 10	F

7.4 Ecological Importance and Sensitivity (EIS)

The method used for the EIS determination was adapted from the method as provided by DWS (1999) for floodplains. The method takes into consideration PES scores obtained for WET-Health as well as function and service provision to enable the assessor to determine the most representative EIS category for the wetland feature or group being assessed. A series of determinants for EIS are assessed on a scale of 0 to 4, where 0 indicates no importance and 4 indicates very high importance. The mean of the determinants is used to assign the EIS category as listed in Table 7-3.

Table 7-3: Description of EIS Categories.

EIS Category	Range of Mean	Recommended Ecological Management Class
Very High: Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these wetlands is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers.	3.1-4.0	A
High: Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these wetlands may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.	2.1-3.0	B
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	1.1-20	C
Low marginal: Wetlands that is not ecologically important and sensitive at any scale. The biodiversity of these wetlands is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.	<1	D

7.5 Ecosystem Services

The assessment of the ecosystem services supplied by the identified wetlands was conducted per the guidelines as described in WET-Eco-Services (Kotze, et al, 2009). An assessment was undertaken that examines and rates the following services according to their degree of importance and the degree to which the services are provided, see Table 7-4 below.

Table 7-4: Classes for Determining the Likely Extent to Which a Benefit is Being Supplied

Score	Rating of likely extent to which a benefit is being supplied
<0.5	Low
0.6-1.2	Moderately Low
1.3-2.0	Intermediate
2.1-3	Moderately High
>3.0	High

8 Impact Assessment Methodology

The Risk/Impact Matrix is based on the DWS 2015 publication: Section 21(c)&(i) Water use Risk Assessment Protocol. The environmental risk/impact of any aspect is determined by a combination of parameters associated with the risk/impact. Each parameter connects the physical characteristics of an impact to a quantifiable value to rate the environmental risk.

Impact assessments were conducted based on a methodology that includes the following:

- Clear processes for impact identification, and evaluation;
- Specification of the impact identification techniques;
- Criteria to evaluate the significance of impacts;
- Design of mitigation measures to lessen impacts;
- Definition of the different types of impacts (indirect, direct, or cumulative); and
- Specification of uncertainties.

After all risks/impacts have been identified, the nature of each impact can be assessed. The risk/impact assessment considers the physical, biological, socio-economic, and cultural information and will then estimate the likely parameters and characteristics of the impacts. The impact prediction will aim to provide a basis from which the significance of each risk/impact can be determined and appropriate mitigation measures can be developed.

The risk assessment methodology is based on defining and understanding the three basic components of the risk, i.e. the source of the risk, the pathway, and the target that experiences the risk (receptor).

A summary of the water-related impacts over the different phases of the project is presented in this section indicating the most significant impacts on water resources in the Project. This section has been referenced from DWA Risk-Based Water Use Authorisation Approach and Delegation Guidelines.

To assess each of the factors for each impact, the ranking scales as contained in Table 8-1 were used

Table 8-1: Ranking Scales for Risk Assessment

Severity	
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5
Spatial Scale	
Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas (downstream within quaternary catchment)	3
National (impacting beyond secondary catchment or provinces)	4
Global (impacting beyond SA boundary)	5
Duration	
One day to one month, PES, EIS and/or REC not impacted	1
One month to one year, PES, EIS and/or REC impacted but no change in status	2
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and/or REC permanently lowered	4
More than life of the organisation/facility, PES and EIS scores, a E or F	5
Frequency of the activity	
Annually or less	1
6 monthly	2
Monthly	3
Weekly	4

Severity	
Daily	5
Frequency of the incident/ impact	
Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5
Legal Issues	
No legislation	1
Fully covered by legislation (wetlands are legally governed)	5
Detection	
Immediately	1
Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

The maximum value of significance is 300 as shown in Table 8-2 below. Environmental impact/risks could therefore be rated as either high (H), moderate (M), or low (L) significance on the following basis:

- More than 170 points indicate high (H) environmental significance;
- Between 56 – 169 points indicate moderate (M) environmental significance;
- Less than 55 points indicate low (L) environmental significance

Table 8-2: Rating Class

Rating	Class	Management Description
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and requires specialist input. Wetlands are excluded.

170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve.

The methodology determines the environmental significance using the following equations indicated in Table 8-3 below:

Table 8-3: Calculations

Consequence =	Severity + Spatial Scale + Duration
Likelihood=	Frequency of Activity + Frequency of Incident +Legal Issues + Detection
Significance \Risk=	Consequence X Likelihood

- Spatial scale;
- Duration of impact; and
- Severity/magnitude.

Significance is obtained by multiplying the consequence of the impact with the probability of occurrence, as follows:

- Significance = Consequence x Likelihood as shown in Table 8-3
- The maximum score that can be obtained is 300 significance points (Table 8-2).

Additionally, impacts/risks were determined to be negative or positive based on how they affect the environment.

- Positive Environmental Impacts: Those activities that result in the overall environmental benefit;
- Negative Environmental impacts: Activities that result in an overall degradation of the environment.

9 Description of the Baseline Environment

9.1 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 as indicated in Figure 9-1. Furthermore, Figure 9-2 and Table 9-1 indicates the farm portions affected by the proposed activity.

Table 9-1: 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.
Application Area (Ha)	

Magisterial District:	Nkangala District Municipality
Distance and Direction from Nearest Town:	Approximately 6km north of Ogies town.

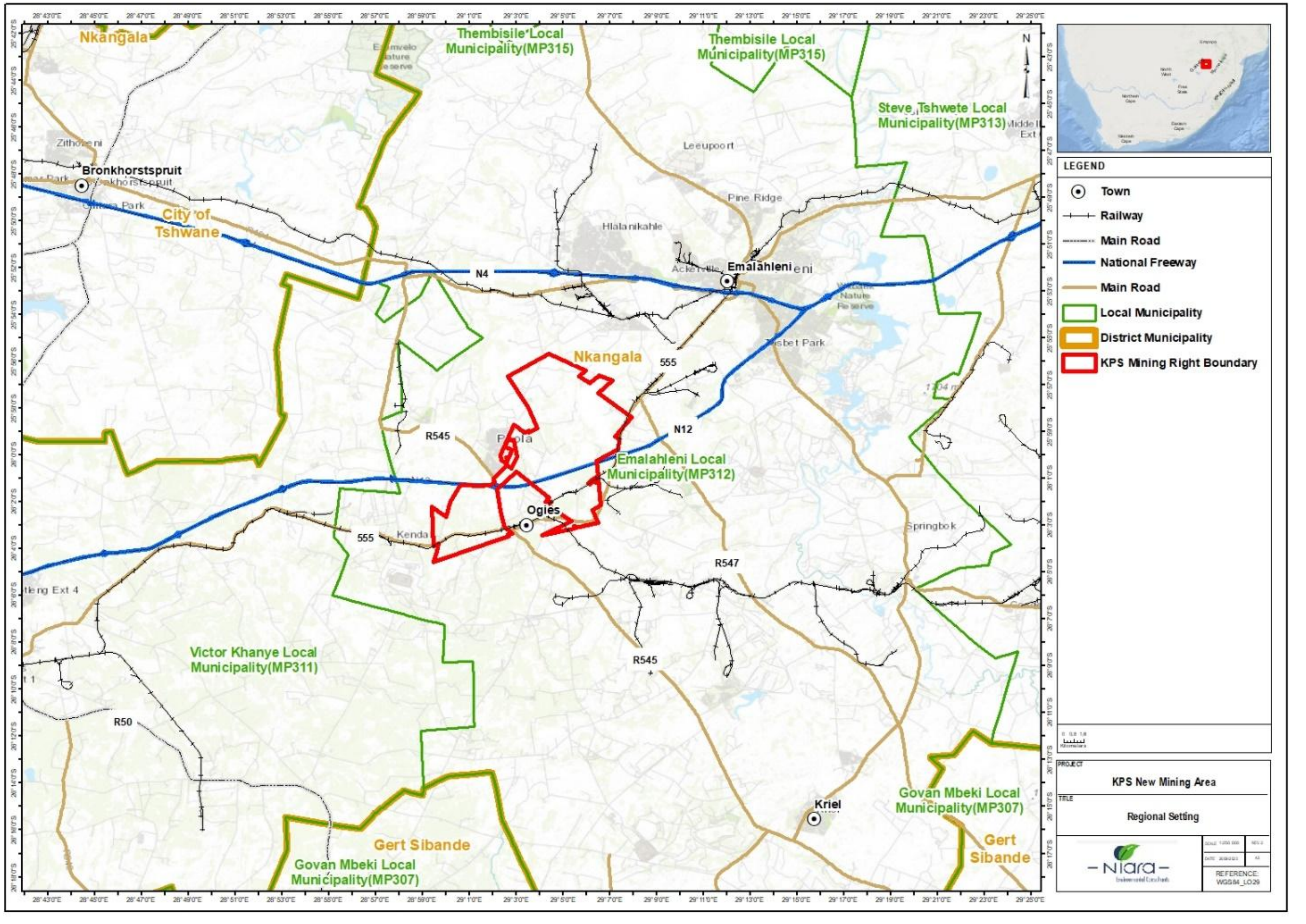


Figure 9-1: Unwabu Project Locality Map

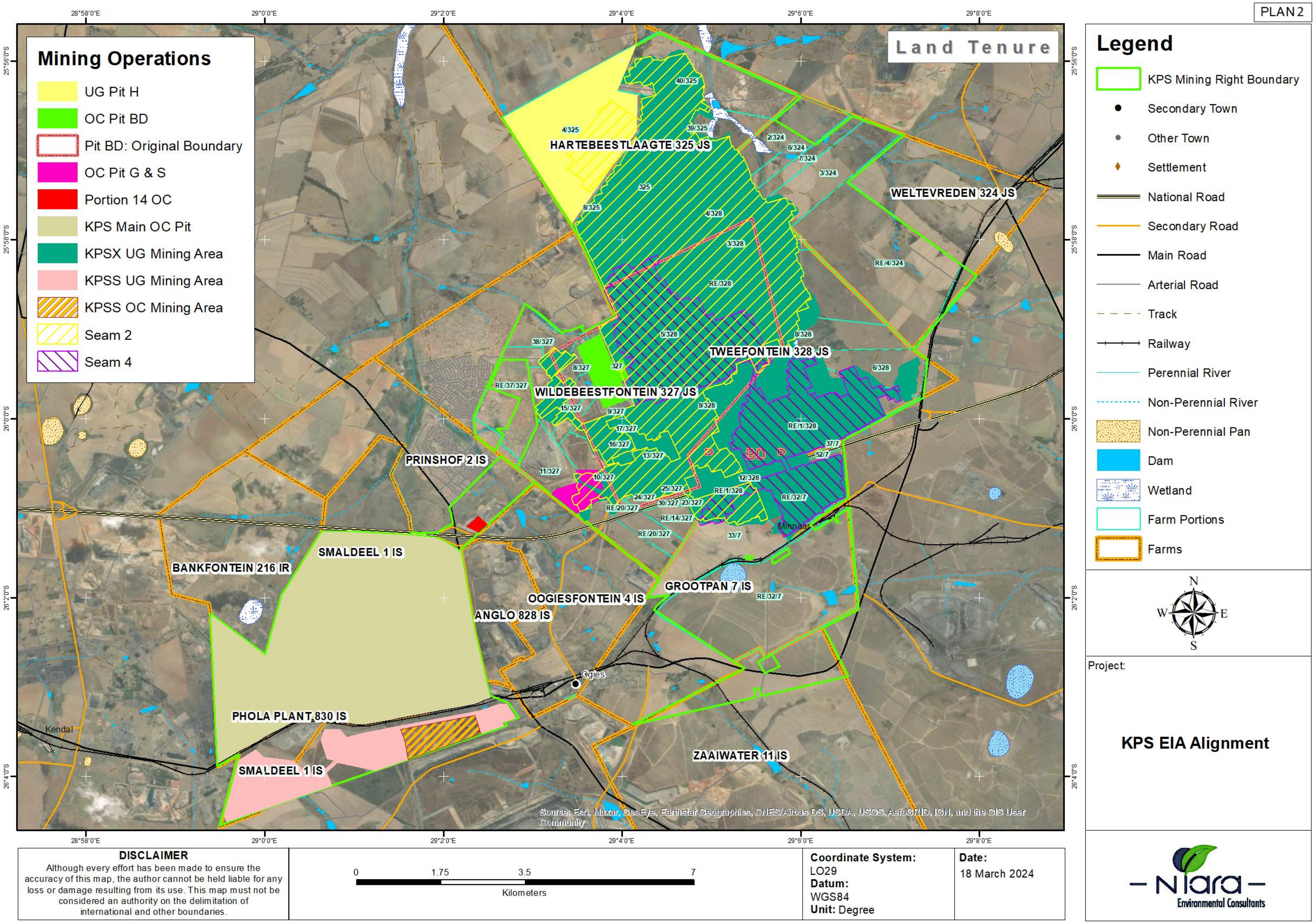


Figure 9-2: Unwabu Project Affected Farm Portions Over Existing and Proposed UG Mining Areas

9.2 Regional Setting

Klipspruit reserve falls within the Springs-Witbank coalfield. The lithological profile is comprised of soft overburden, hard overburden, No. 5 coal seam, Inter burden, No. 4U coal seam, Interburden, No. 4L coal seam, Interburden, No. 3 coal seam; Inter burden, No.2 coal seam, Inter burden and No.1 coal seam. The main coal seams present are the No.4 and No. 2 coal seams with an average parting thickness of 12m. The interburden mainly consists of fine-grained sandstone and sandy mudstone as indicated in Figure 9-3. The west-east profile shows that the topography is fairly flat over the area. The south-north profile indicates that the topography slopes downwards from the south towards the north of the strip mine section. The west east striking Ogies Dyke is situated to the north of the R555 between the proposed strip mine and the underground mine workings. Excess base material is present in the stratigraphical units. The total sulphur percentage of all of the lithologies is moderate (0.001% - 0.846%).

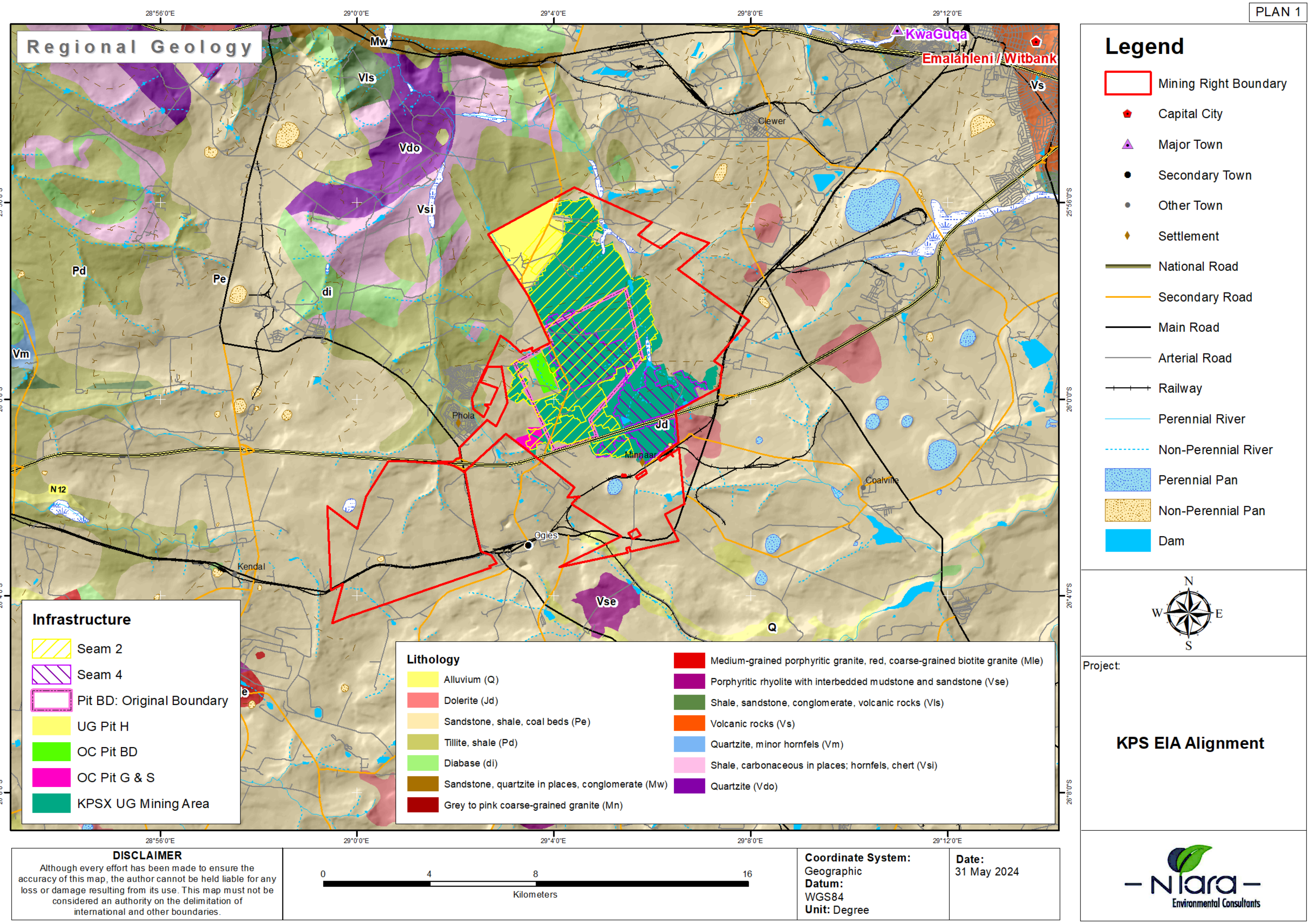


Figure 9-3: Unwabu Project Geology Setting

9.3 Land Types and Soil Forms

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, as illustrated in Figure 9-4 and Figure 9-5. 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. Soils observed during the survey include Witbank, Hutton, Clovelly, Fernwood, and Longlands, as illustrated in Figure 9-6.

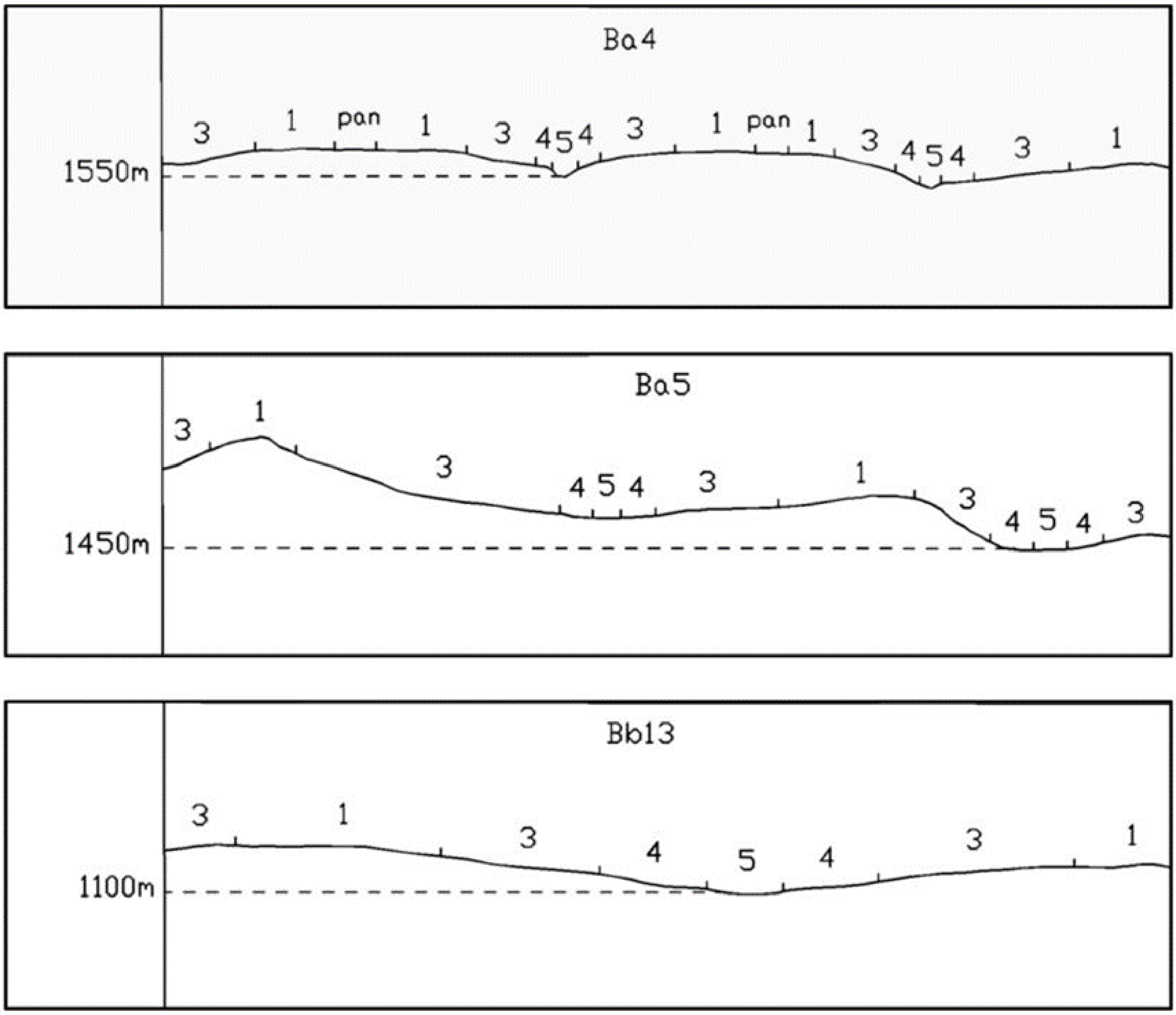


Figure 9-4: Representative Terrain Form Sketch of Land Types

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. 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. 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. The **Hutton** soil form consists of an orthic A and red apedal B over unspecified material. These soils are well-drained, usually slightly acidic, and have a low cation exchange capacity (CEC) due mainly to clay mineral composition (kaolinite, iron oxides) and sometimes low clay content. The **Clovelly** soil form consists of an orthic A and yellow-brown apedal B over unspecified material. Like those of the **Hutton** form, these soils are well-drained, slightly acidic and have low CEC. The **Longlands** soil form consists of orthic topsoil on an E horizon, over soft plinthic B subsoil. The E horizon is distinguishable by criteria, namely:

- Grey, pale yellow or white matrix colours.
- Being intermittently saturated with water.
- The depletion of iron oxides, clay, and organic matter.
- Being loose when wet and hardens and becomes brittle when dry.

In the study area, the mottling found in the **Longlands** soil form is formed because of the gentle, concave slopes of the study site which intermittently receive Fe-rich water through seepage from surrounding areas. From a land use point of view, the **Longlands** soil form has a low to moderate agricultural potential. The waterlogged, anaerobic conditions can present problems with rooting depth. The Witbank soil form (Transported Technosols), which are 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. The **Fernwood** soil form consists of orthic A on an E horizon. This sequence of horizons indicates a waterlogged soil indicating a potential lateral water movement in the soil profile on the low water permeability of the sandstone layer underlying the soil observed in low lying areas (seepage zones). Soils with an E horizon as representing 'Permanent or Seasonal Wetness'

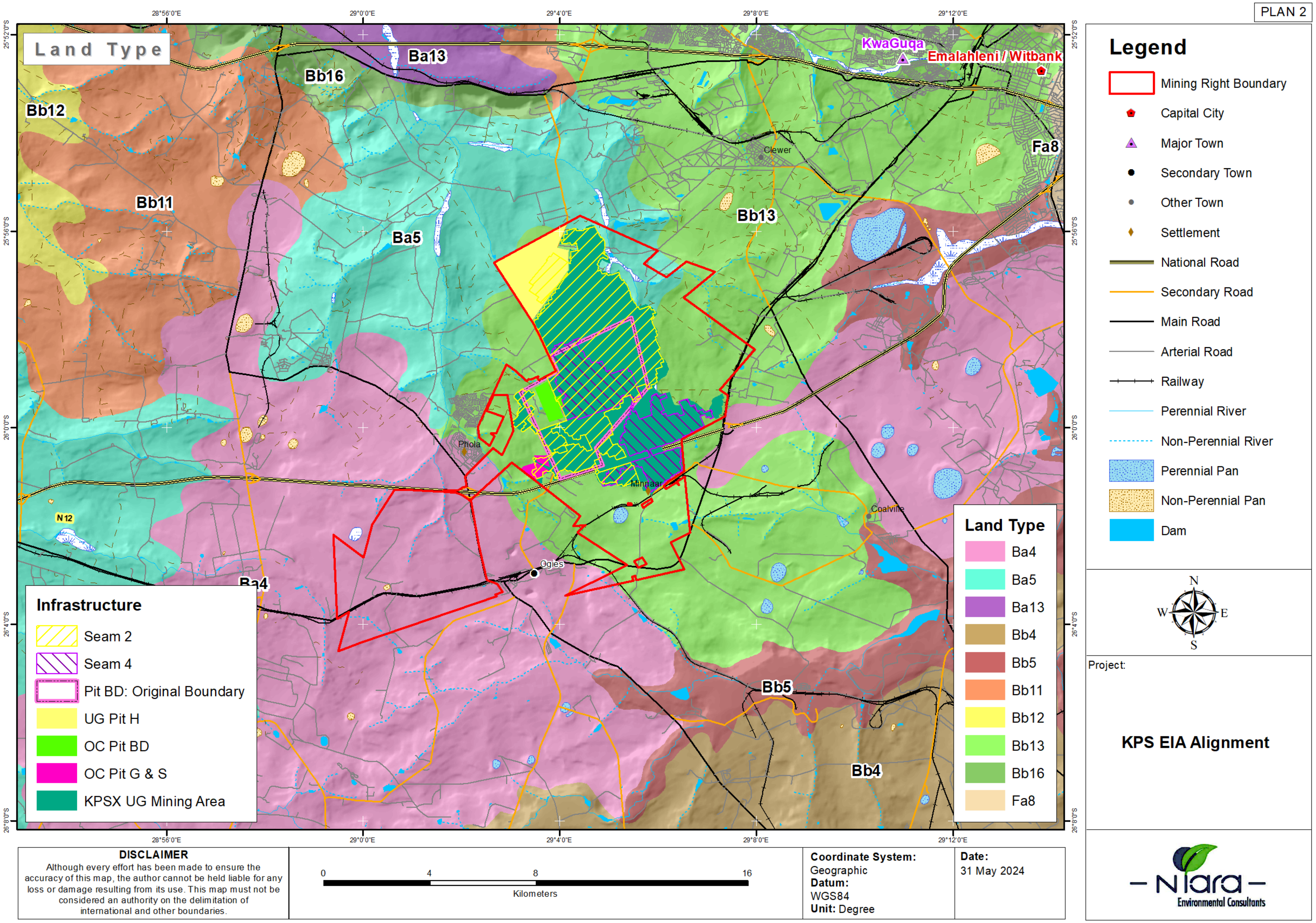


Figure 9-5: Land Types in the Vicinity of the uNwabu Project Area

Figure 9-6: Examples of the Identified Soil Forms: A – C) Hutton (Red Apedal), D) Clovelly, E) Longlands, F) Albic & G – H) Witbank (Transported Technosols)

9.4 Climate

Most climatic data was obtained from the Bethal weather station with record of more than 60 years except for rainfall data obtained from the Ogies rainfall station and wind data from the air quality specialist report for the Witbank area. The climate of the study area can be described as temperate, experiencing warm summers and cold winters with sharp frost. On average the area experiences 8.3 hours of sunshine per day, and only nine days a year without sunshine.

Table 9-2: Climate Data Breakdown

Month	Mean Monthly Temperature (°C)	Average Daily Temperature		Average Monthly Rainfall (Ogies Rainfall Station		A-pan Evaporation (mm)
		Max	Min	Distribution %	Monthly rain	
Jan	19.5	25.8	13.2	17.80	128.1	180
Feb	19.2	24.4	13.0	13.65	97.6	153
Mar	18.0	24.5	11.4	10.78	77.6	150
Apr	15.2	22.1	8.1	5.85	42.1	111
May	11.7	19.6	3.8	2.43	17.5	94
Jun	8.4	16.9	0.0	1.18	8.5	81
Jul	8.5	17.1	0.2	0.97	7.0	90
Aug	11.5	20.1	2.9	1.35	9.7	135
Sep	14.8	23.1	6.5	3.25	23.4	176
Oct	17.2	24.5	9.9	10.11	72.8	191
Nov	18.8	24.5	11.4	16.14	116.2	170
Dec	19.0	25.4	12.7	16.57	119.3	198
Annual	15.1	22.5	7.7	100	719.8	1729

Table 9-2 above provides information on the temperatures, rainfall and evaporation for the Ogies area. The mean daily maximum temperature is 25.8°C in Jan uary (midsummer) and 17.1°C in July (mid-winter). Average daily minimum temperature is 13.2ºC in January and 0.2ºC in July. The rainy season in Ogies extends from October through to April when ±90% of the rainfall occurs. The humidity is low during the day and increasing slightly as the temperature cools at night. Rainfall peaks occur in December and January. During the dry winter months of June, July and August only ±3.5% of the rainfall occurs. The average annual precipitation is ± 720mm while the average A-pan evaporation is 1730mm, almost 2.5 times the annual rainfall. Severe frost can occur at times with the average first and last days of frost being 21 May and 1 September, respectively. The average duration of the frost period is

103 days. Extreme first and last dates of recorded frost over a period of 30 years are 15 April and 18 October respectively. Bethal receives only 3 hailstorms on average annually. These storms are most prevalent in early summer.

9.5 Regional Vegetation

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 (Mucina and Rutherford, 2006) (please see Figure 9-7 below). Both these vegetation types are considered to be nationally endangered with none conserved and some altered, primarily by cultivation.

The conservation status of the Eastern Highveld Grassland vegetation type is very poor with large parts that are either currently cultivated or previously ploughed, and the remaining untransformed vegetation occurs as patchy remnants that are heavily overgrazed.

Eastern Highveld Grassland occurs in the Mpumalanga and Gauteng provinces. The eastern Highveld Grassland occurs in the plains between Belfast in the east and the eastern side of Johannesburg in the west and extends southwards to Bethal, Ermelo and West of Piet Retief. The Eastern Highveld Grassland altitude ranges from 1520m to 1780m above mean sea level but also declines as low as 1300m (Mucina and Rutherford, 2006).

This vegetation type is characterized by short dense grassland, dominated by the usual highveld grass composition (Aristida, Digitaria, Eragrostis, Themeda, etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (Acacia caffra, Celtis africana, Parinari capensis, etc.).

Approximately 44% of the Eastern Highveld Grassland has already been transformed by cultivation, urban sprawl, mining, plantations and dams. This vegetation type has been afforded the status of endangered with a conservation target of 24%.

Rand Highveld Grassland occurs in Gauteng, North-West, Free State and Mpumalanga Provinces. In areas between rocky ridges from Pretoria to Witbank, extending onto ridges of the Stoffberg and Roosenekal regions as well as west of Krugersdorp cantered in the vicinity of Derby and Potchefstroom, extending southwards and northeastwards form there. Altitude ranges from 1 300m to 1 635m, but reaches 1 760m in places (Mucina & Rutherford, 2006). Rand Highveld Grassland is considered endangered. It is poorly conserved (only 1%). Small patches are protected in statutory reserves (Kwaggavoetpad, Van Riebeeck Park, Bronkhorstspruit, and Boskop Dam Nature Reserve) and in private conservation areas (e.g. Doornkop, Zemvelo, Rhenosterpoort and Mpopomeni). 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 surface area of the unit where old lands are currently classified as grasslands in land cover classifications and poor land management has led to 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).

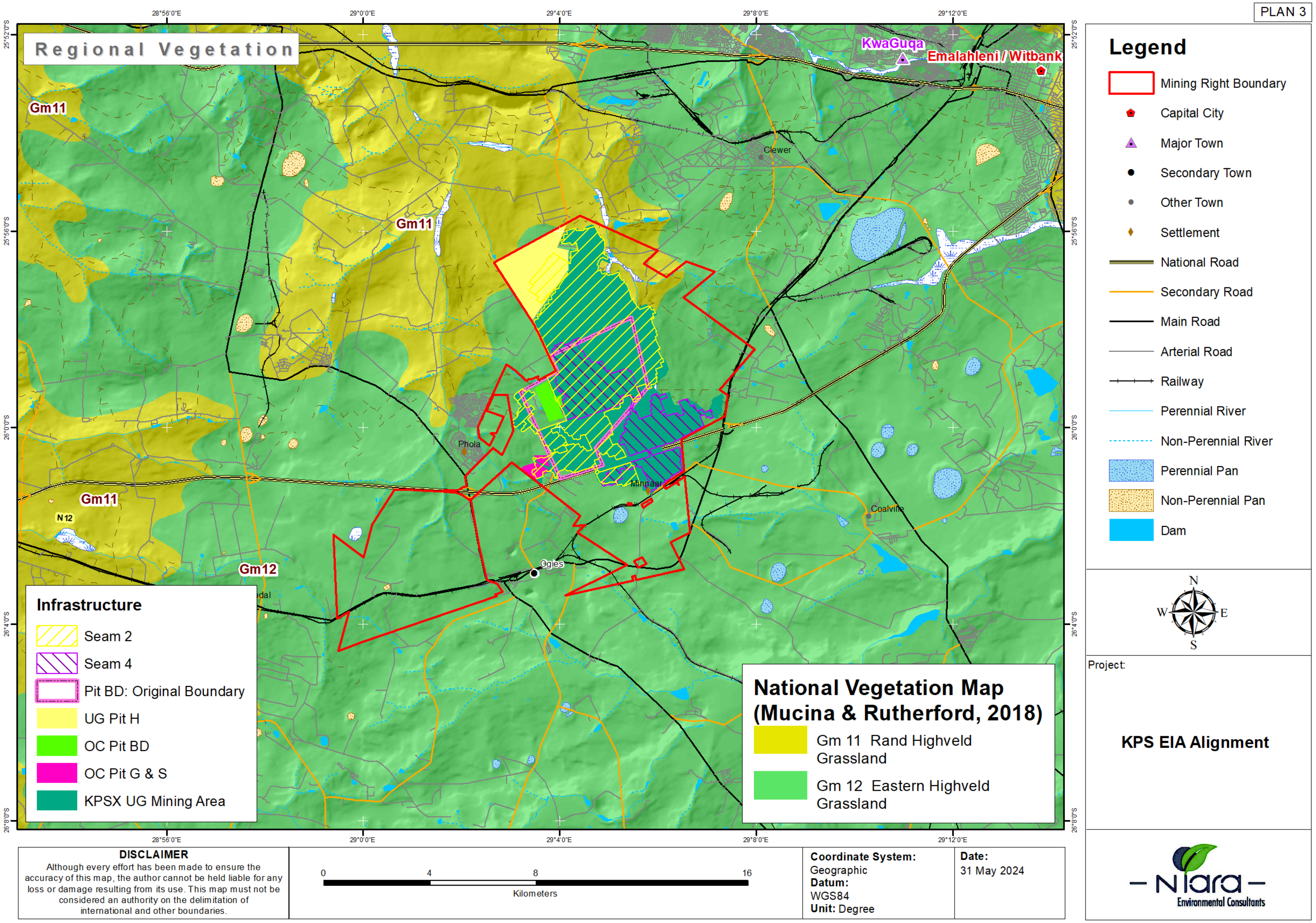


Figure 9-7: Vegetation Within the uNwabu Project Area

9.6 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 9-8. 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.

9.7 Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources were considered to evaluate the importance of the wetland areas located within the project area (Nel et al. 2011).

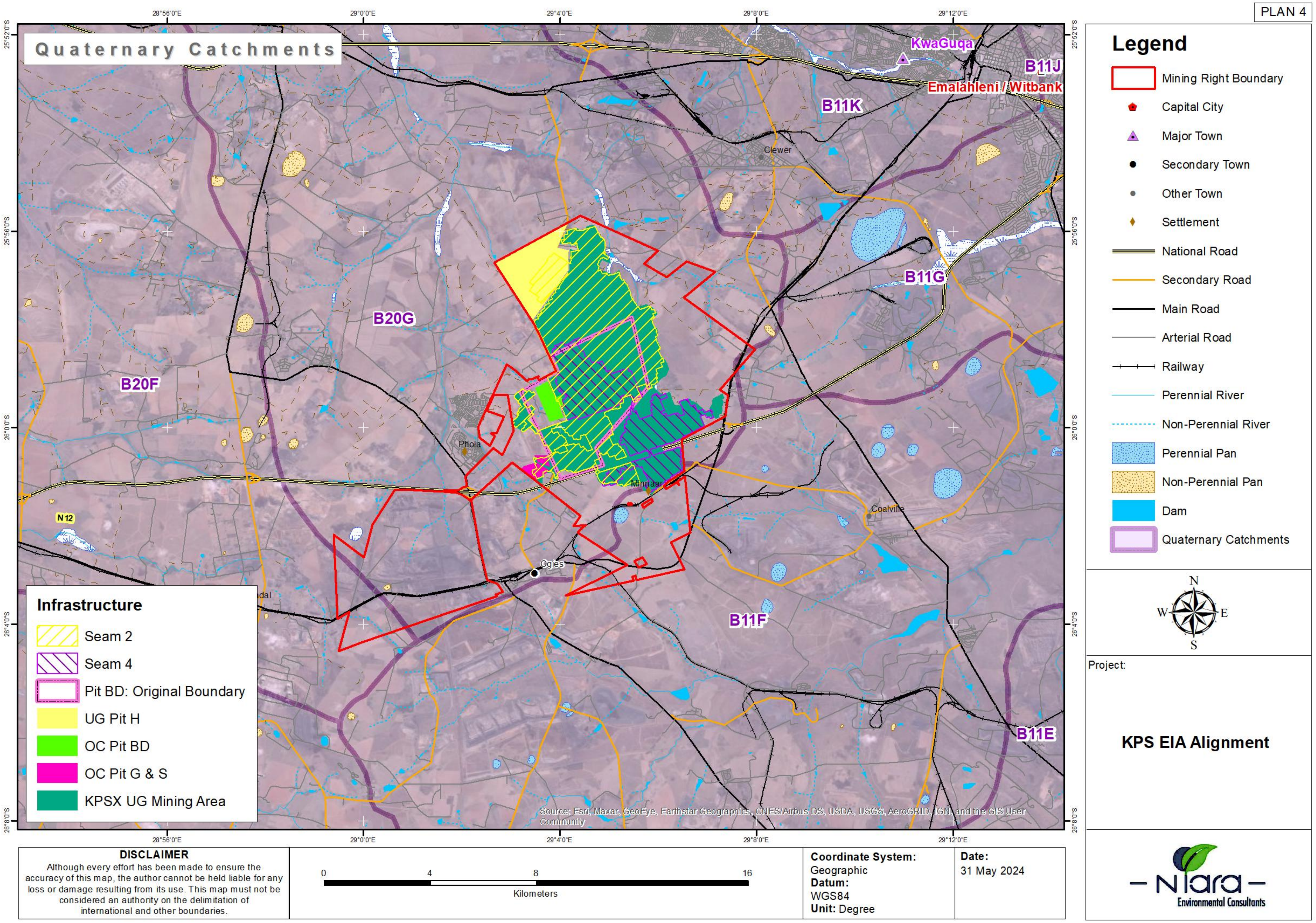


Figure 9-8: Unwabu Project Quaternary catchments

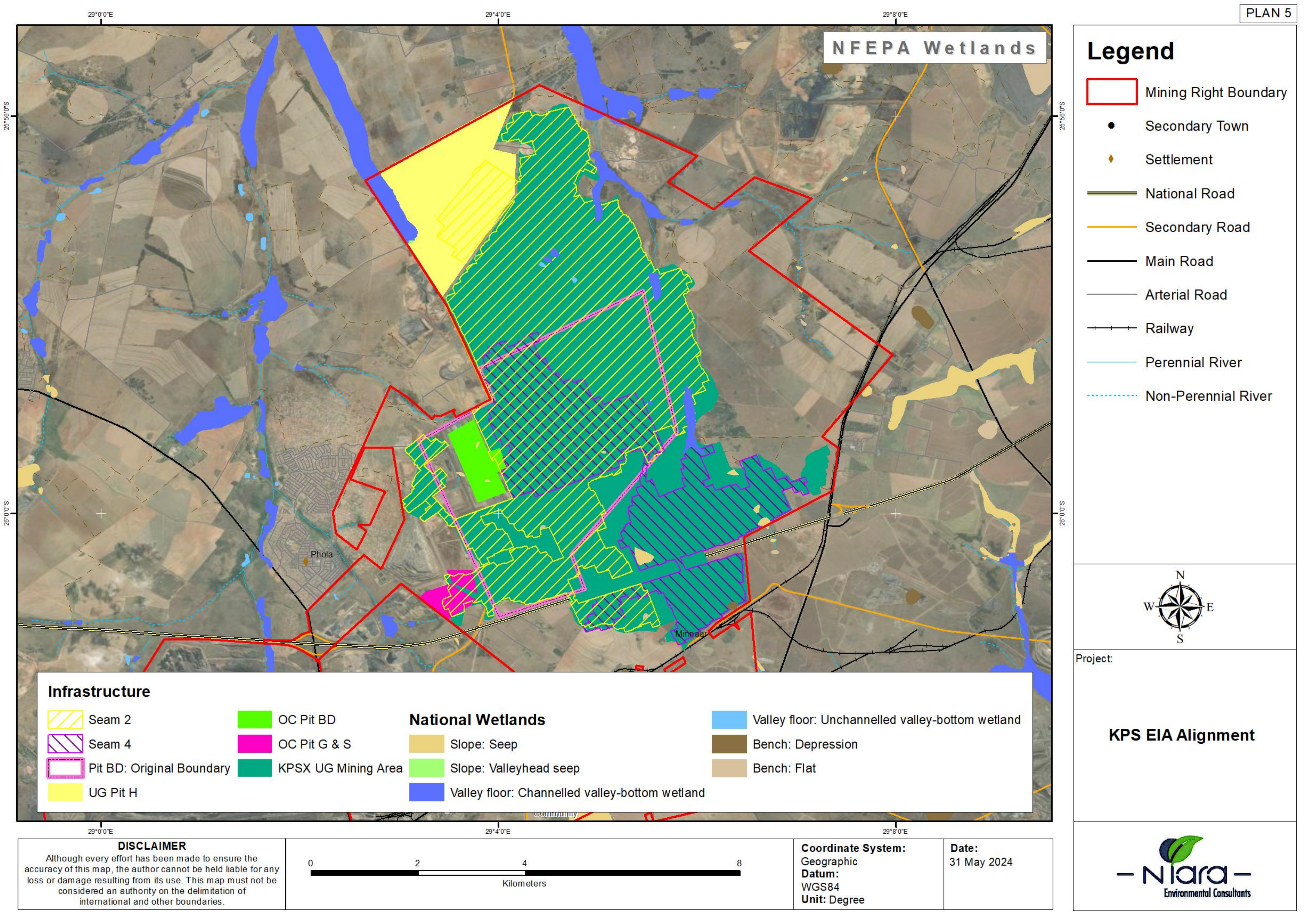


Figure 9-9: NFEPA Wetlands Within the Unwabu Project Area

Findings of this study indicate that a Valley Floor: Channelled valley bottom wetland Rank 2 is identified within the project area as indicated in Figure 9-9 above. As per Table 7 2, the wetland areas within the project area have a Rank 2 which indicates that these wetlands contribute significantly towards maintenance of biodiversity.

Table 9-3: NFEPA Wetlands Ranking Criteria

Criteria	Rank
Wetlands that intersect with a RAMSAR site.	1
Wetlands within 500 m of an IUCN threatened frog point locality; Wetlands within 500 m of a threatened waterbird point locality; Wetlands (excluding dams) with the majority of their area within a sub-quaternary catchment that has sightings or breeding areas for threatened Wattled Cranes, Grey Crowned Cranes and Blue Cranes; Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands of exceptional Biodiversity importance, with valid reasons documented; and Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands that are good, intact examples from which to choose.	2
Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands of biodiversity importance, but with no valid reasons documented.	3
Wetlands (excluding dams) in A or B condition AND associated with more than three other wetlands (both riverine and non-riverine wetlands were assessed for this criterion); and Wetlands in C condition AND associated with more than three other wetlands (both riverine and non-riverine wetlands were assessed for this criterion)	4
Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing Impacted Working for Wetland sites.	5
Any other wetland (excluding dams).	6

10 Baseline Assessment Findings

10.1 Wetland Delineation and Typing

The wetland delineation was conducted with the aid of aerial imagery as well as a site visit conducted in February 2024. Findings indicate that two wetland hydro-geomorphic (HGM) units were identified within the proposed project area. An HGM unit is a recognisable physiographic wetland-unit based on the geomorphic setting, water source of the wetland and the water flow patterns (Macfarlane et al., 2009). Below is the description of each HGM unit. The identified wetland HGM units are classified as:

- Hillslope Seepage Wetland Connected to a Watercourse (1251 hectares).
- Channelled Valley Bottom wetland (470.9 hectares)

According to the wetland definition used in the NWA, Act 36 of 1998, typical wetland vegetation is the primary indicator, which must be present under normal circumstances, however, in practice the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role. The soil wetness indicator is based on the presence of hydromorphic features in the soil. The hydromorphic features in the soil develop as a result of a fluctuating water table and prolonged periods of anaerobic soil conditions. Prolonged periods of anaerobic soil conditions result in a change in the chemical characteristics of the soil. Certain soil components, such as iron and manganese, which are insoluble under aerobic conditions, become soluble when the soil becomes anaerobic, and can thus be leached out of the soil profile. The fluctuation of the water table results in the alternation between aerobic and anaerobic conditions within the soil profile. Lowering of the water table results in a switch from anaerobic to aerobic soil conditions, causing dissolved iron to return to an insoluble state and precipitate in the form of mottles or gleying which is described as the redoximorphic features in the soils.

Wetland vegetation communities also known as hydrophytes are species that have adapted to some level of inundation of the soil and 'facultative hydrophytes' are able to survive in both inundated and terrestrial soils. A hydrophytic plant community is dominated by species that have been distributed as a result of hydrological factors such as: flow rates, water depth, timing and duration of flooding, sediment accumulation, and underground water exchange. Hydrophytes are used as indicators of the presence of wetlands and have been listed according to the DWAF specifications. The type and distribution of these species is dependent on the hydroperiod (characterized by the duration and the depth of flooding). Some of the identified hydrophytes include species such as *Imparata Cylindrica, Juncus effuses, various Cyperaceous species, Sporobolus sp., Eragrostis sp. Monopsis decipiens, Lobelia sp, and several Helichrysum species.*

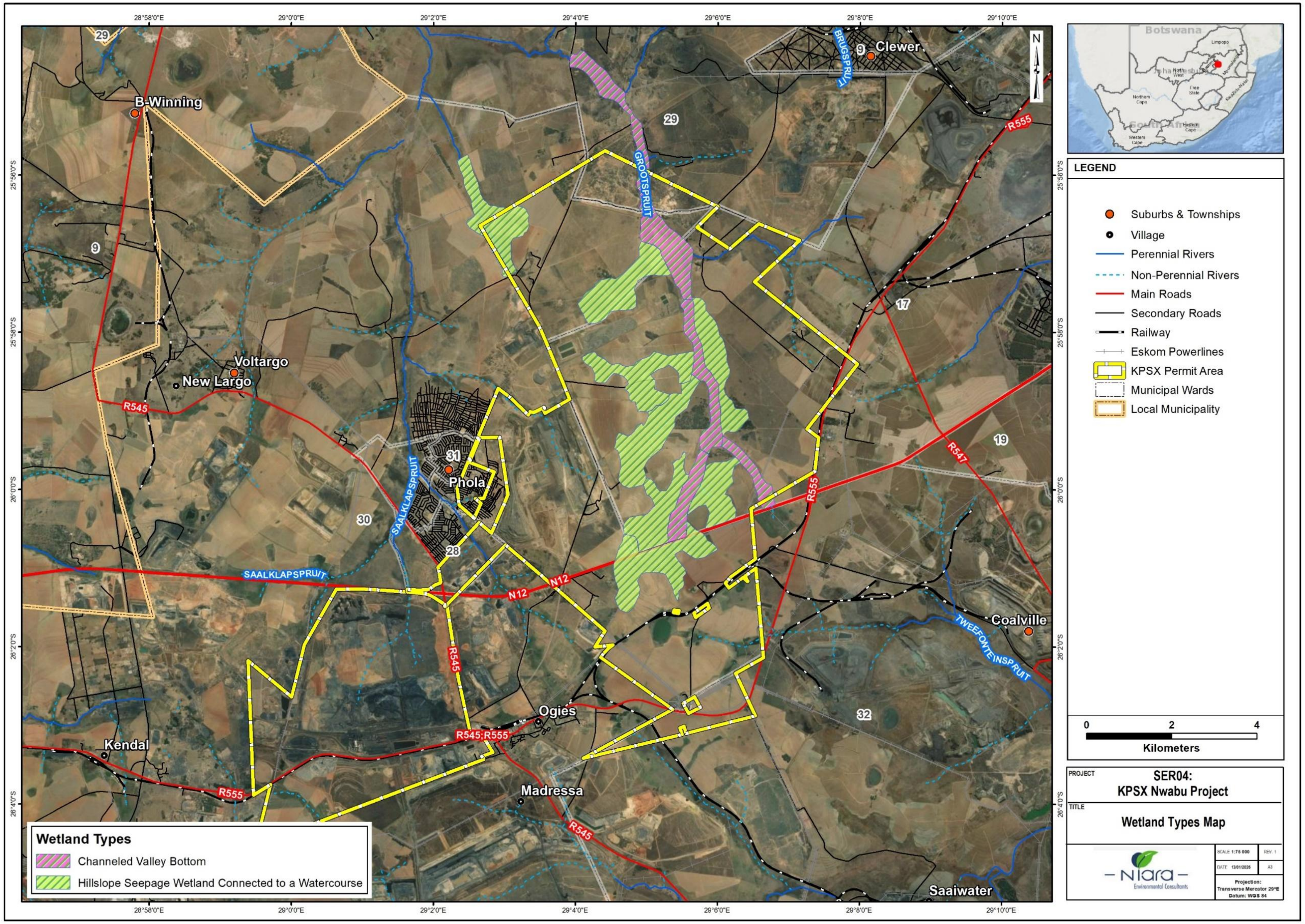


Figure 10-1: Map of the Delineated Wetland Areas Within the uNwabu Project Area

10.1.1 Hillslope Seepage Wetlands

Hillslope seepage wetlands are usually associated with a perched groundwater table, where precipitation that occurs within the greater catchment is temporarily stored within the soil profile as a result of impervious strata. The impervious strata within the soil profile is normally made up of an unweathered parent material or swelling clays typically associated with granites, sandstones or shales. Hillslope seepage wetlands are expressed where the soil profile is shallow enough such that impervious layer and the water stored within the soil profile are expressed on the surface. The soils in the area must be waterlogged long enough for oxygen to be depleted through a chemical process of reduction which results in the presence of radoximorphic features in the soil. Hillslope seepage wetlands are created and maintained by infiltration processes that occur in the surrounding non-wetland areas within the catchment. Hillslope seepage wetlands connected to watercourses are wetland systems which are directly linked on the surface to watercourses. This type of system typically contributes to flow in the watercourses, even if this contribution is only on a seasonal basis. Some of the indicators used to classify the identified HGM unit are indicated in below in Figure 10-2 below.

Figure 10-2: Typical Hillslope Seepage Wetland Features

10.1.2 Channelled Valley Bottom Wetland

The valley bottom wetlands are typically located at the lowest position in a landscape where the water drained from the local slopes accumulate. Water expressed in the hillslope seepage wetlands may also drain towards the valley bottom wetlands. These wetland systems play important functions such as sediment trapping, flood attenuation and nutrient-cycling. The valley bottom wetland on site receives extensive amounts of sediment and flow from the surrounding cultivated slopes as well as from the mining infrastructure (overburden stock piles etc). This allows an opportunity for contact between solute-laiden water and the wetland vegetation, thus providing an opportunity for flood and contaminant (nutrients, pesticides, herbicides) attenuation. Extensive areas of these wetlands remain saturated as stream channel input is spread diffusely across the valley bottom, even at low flows (Kotze et al., 2007). These wetlands also tend to have a high organic content. Facultative wetland indicator plant species, comprising a mixture of grasses and sedges are evident as longitudinal bands within a relatively narrow zone along the valley bottoms. Facultative wetland plant species usually grow in wetlands (67-99% of occurrences) but occasionally are found in non-wetland areas. The valley bottom wetland within the project are has become channelled due to construction of dams, construction of canals to facilitate drainage and excessive erosion. Figure 10-3 below indicates a distinct channel that drains the wetland and the associated soil type.

Figure 10-3: A Distinct Channel That is Typical Channelled Valley Bottom Wetland System

10.2 Present Ecological Status (PES)

The identified wetlands within the project area is located within an active mining area that has been exposed to coal mining, human settlements and agricultural land use for many years. Some of the anthropogenic impacts identified on the wetlands include:

- Active mining activities in the direct catchment of the wetland area, as well as immediately adjacent to the wetland;

- Mining activities encroaching into the edges of the wetland areas;
- Crop farming encroaching into the edges of the wetland areas
- Overburden and coal stock piling in close proximity to the wetland, potentially adding to the deteriorating water quality;
- Impoundment of flow due to a dam;
- A number of formal and informal road crossings leading to flow impoundment;
- Illegal dumping that impacts the water quality;
- Abandoned mine shaft;
- Active erosion (head cuts);

Based on the findings of the current assessment study, the present ecological state of the wetlands on site can be described as follows (See Figure 10-4 below).

Due to deviation from the reference condition, the hillslope seepage wetland connected to a watercourse located within the project area have been classified as follows:

- PES-C: Moderately Modified where a moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact and
- PES-D): Largely Modified where a large change in ecosystem processes and loss of natural habitat and biota has occurred.

The Channelled Valley Bottom Wetland located within the project area is classified as

- PES-E: Seriously Modified where the change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable

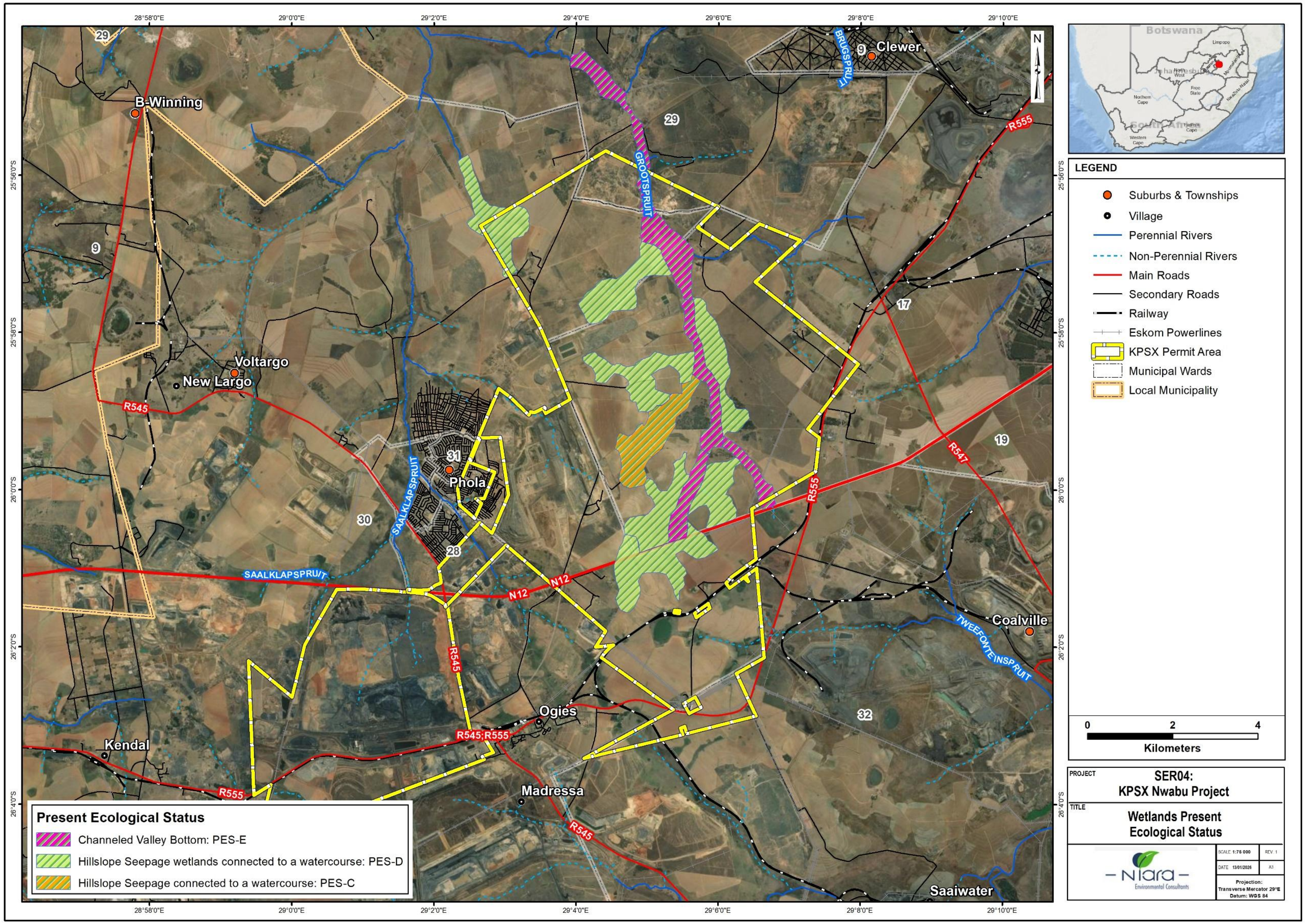


Figure 10-4: Map Illustrating the Results of the PES Assessment of the Identified Wetland Areas Within the Project Area.

10.3 Ecological Importance and Sensitivity

The wetlands within the project area form part of the Olifants River Primary catchment which is a heavily utilised and economically important catchment. Wetlands and rivers within the Olifants River Catchment upstream of Loskop Dam have been greatly impacted upon by various activities, which include mining, power stations, water abstraction, urbanization, agriculture etc. As a result of these impacts serious water quality and quantity concerns have been raised within the sub-catchment. Given this situation, and the fact that wetlands can support functions such as water purification and stream flow regulation, a high importance and conservation value is placed on all wetlands and rivers within the catchment that have as yet not been seriously modified. Within this context, an EIS assessment was conducted on the wetlands identified within the project areas. Further considerations that informed the IS assessment included:

- The location of the study area within a vegetation type (Eastern Highveld Grassland) considered extensively transformed and threatened, having been classed as Vulnerable.
- The wetland vegetation types of the area, Mesic Highveld Grassland Bioregion and Mesic Highveld Grassland Bioregion, which are considered to be Critically Endangered;
- The largely modified state of the wetlands within the study area and the catchment, with most of the wetland habitat considered largely modified and extensively impacted by surrounding mining and agricultural activities;
- The NFEPA status of the identified hillslope seepage wetland and the associated ranking (See Figure 9-9 above)

It is these considerations that have informed the scoring of the wetlands in terms of their importance and sensitivity. The Ecological Importance and Sensitivity of the wetlands within the project area is calculated as follows:

- Hillslope Seepage Wetland: EIS-C (Moderate): Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers as indicated in Figure 9-5 below.
- Channelled Valley Bottom: EIS-C (Moderate): Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers as indicated in Figure 9-5 below.
- Channelled Valley Bottom: EIS-D (Low marginal): Wetlands that is not ecologically important and sensitive at any scale. The biodiversity of these wetlands is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.

It is however noted that the wetlands within the project area are located within the Class III: Heavily Used quaternary catchments B20G and B11F. The overall Recommended Ecological Category for both quaternary catchments is a Catergory B.

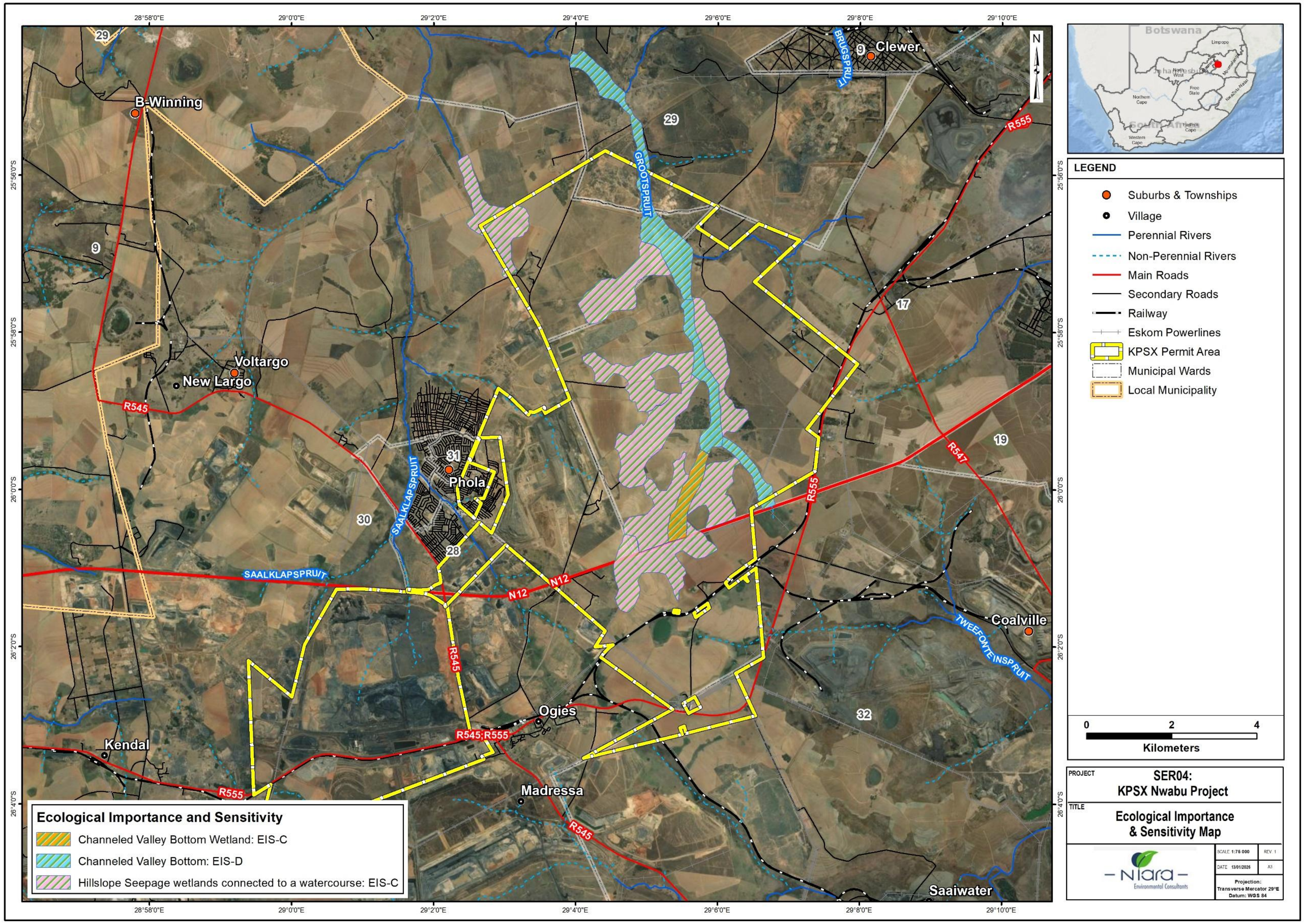


Figure 10-5: Map Illustrating the Results of the EIS Assessment

10.4 Ecosystem Services Assessment Findings

The ecosystem services provided by the identified wetland areas within the project area were assessed and rated using the WET-EcoServices method (Kotze, et al. 2009). The summarised results for the wetland are shown in below Table 10-1.

Numerous functions are typically attributed to wetlands, which include nutrient removal (and more specifically nitrate removal), sediment trapping (and associated with this is the trapping of phosphates bound to iron as a component of the sediment), stream flow augmentation, flood attenuation, trapping of pollutants and erosion control. Many of these functions attributed to wetlands are wetland type specific and can be linked to the position of wetlands in the landscape as well as to the way in which water enters and flows through the wetland. Thus not all wetlands can be expected to perform all functions, or to perform these functions with the same efficiency. Wetlands of the same type and located within the same general landscape setting are likely to perform the similar functions.

10.4.1 Hillslope Seepage Wetlands Connected to a Watercourse

Seepage wetlands are typically maintained by shallow sub-surface interflow, derived from rainwater. Rainfall infiltrates the soil profile, percolates through the soil until it reaches an impermeable layer (e.g. a plinthic horizon or the underlying geology), and then flows laterally through the soil profile along the aquitard (resulting in the formation of a perched water table). The seepage wetlands are merely the surface expression of this perched water table in those areas where a shallow soil profile results in the perched water table occurring within 50cm of the soil surface. The hillslope seepage wetland systems within the project area are adjacent cultivated land and received surface run-off from the cultivated lands. This systems play a major role in sediment trapping, toxicant assimilation, nutrient removal mainly due to the extent of these systems within the project area. As shown in Table 10-1 sediment trapping, phosphate assimilation, nitrate assimilation and toxicant assimilation were classed as Moderately High. Stream augmentation and biodiversity maintenance were classed as High. Furthermore, some of the hillslope seepage wetland within the project area are classified as a NFEPA wetland with a 2 ranking. This is due to the biodiversity support role.

10.4.2 Channelled Valley Bottom Wetlands

Channelled valley bottom wetland systems on site are expected to play an important role in biodiversity support. These wetlands provide a range of habitats, from temporarily wet, moist, to open water in channels and permanent depressions, which can accommodate a wide range of plant and faunal species. As these systems are also linear in nature, they have a significant role to play in maintaining corridors of natural vegetation through otherwise modified landscapes, allowing for the continued migration of species, as well as providing suitable foraging and breeding habitat for many species. As shown in Table 10-1, valley bottom wetlands scored the higher in the provision of ecological services within the project area.

Table 10-1: The Eco-Services Offered by the Hillslope Seepage Wetland Onsite

Wetland Functionality	HGM Units

Ecosystem Services Supplied by each Wetland HGM Unit				Hillslope Seepage Wetland Connected to a Watercourse	Channelled Valley Bottom Wetland
Indirect Benefits	Regulating and Supporting Benefits	Flood attenuation		1.8	2.8
		Stream Augmentation		3.0	2.9
		Water Quality Enhancement Benefits	Sediment Trapping	1.1	1.9
			Phosphate Assimilation	2.3	1.1
			Nitrate Assimilation	2.2	1.2
			Toxicant Assimilation	2.6	1.4
			Erosion Control	1.9	1.8
Direct Benefits		Carbon Storage		1.2	1.6
	Biodiversity Maintenance			1.9	2.8
	Provisioning Benefits	Provisioning of Water for Human Use		1.3	2.9
		Provisioning of Harvestable Resources		1.2	1.7
		Provisioning of Cultivated Foods		1.8	1.7
	Cultural Benefits	Cultural Heritage		0.4	1.0
		Tourism and Recreation		0.6	0.9
		Education and Research		0.5	0.9
Overall				**23.8**	**26.6**

11 Buffer Zones Calculation

The buffer zones are a requirement in order to facilitate the protection of the delineated wetland areas within the project area. The purpose of the establishment of buffer zones is to minimize the anthropogenic impacts associated with development on the receiving water resources. A buffer zone is defined as:

"the strips of undeveloped, typically vegetated land (composed in many cases of riparian habitat or terrestrial plant communities) which separate development or adjacent land uses from aquatic ecosystems (rivers and wetlands)."

These strips of undeveloped typically vegetated land (buffer zones) have been shown to perform a wide range of functions, and have therefore been adopted as a standard measure to protect water resources and associated biodiversity (Macfarlane & Bredin, 2017a). Some of these key functions include:

- Maintaining basic aquatic processes.
- Reducing impacts on water resources from upstream activities and adjoining land uses.
- Providing habitat for aquatic and semi-aquatic species.

- Providing habitat for terrestrial species.
- A range of ancillary societal benefits.

However, though buffer zones can potentially provide some, or all, of the above-mentioned functions, not all water resource-related problems can be addressed simply by applying a buffer zone, and they should ideally be implemented with a range of complementary mitigation and management measures (Macfarlane & Bredin, 2017a). Notable impacts or threats to water resources that cannot necessarily be addressed through the application of a buffer zone alone include:

- Point-source discharges (such as sewage outflows),
- Hydrological changes caused by stream flow reduction, and
- Groundwater contamination or use

With regards to the proposed underground coal mine, no new mining infrastructure will be constructed as part of the project. An adit has already been developed to support the UG mining at KPSX together with the supporting UG conveyors. The mined coal will be transported via a network of conveyors to the Phola Processing Plant ("PCPP") which is located adjacent to the KPS operation. Only additional ventilation shafts and rescue boreholes will be constructed in strategic areas as the mining advances for both KPSX and KPSS. Additionally the ventilation shafts have been located in close proximity to the existing edit.

As such the proposed underground coal mine will not have direct impacts on the delineated wetland areas within the project area. Seriti Power has agreed to implement the Seiti Land Management Way within the 80m buffer zone around the delineated wetland areas. Seiti Land Management Way is a Framework that is integrated with the business processes as well as mine closure. The aim of the implementation of the Seiti Land Management Way is to ensure ongoing monitoring within the 80m buffer zone and prevent further degradation of wetland areas.

12 Impact Assessment

Figure 12-1 below indicates the proposed underground Life of Mine Plan in relation to the delineated wetlands. As indicated in Section 11 above, all the required surface infrastructure is already in place including the additional ventilation shafts and rescue boreholes. The ventilation shafts and rescue boreholes have been located within the edit area. Figure 12-2 indicates the proposed Section 21 (c) and (i) Water uses to be applied for. The highest risk to the survival of the delineated wetlands during and post mining is the potential for subsidence as underground workings are expected to be located approximately 100m below the ground surface with a mining height cut-off at 1.5m. The assessment of potential impacts to wetlands as a result of undermining was undertaken as per the assessment methodology detailed in Section 7.

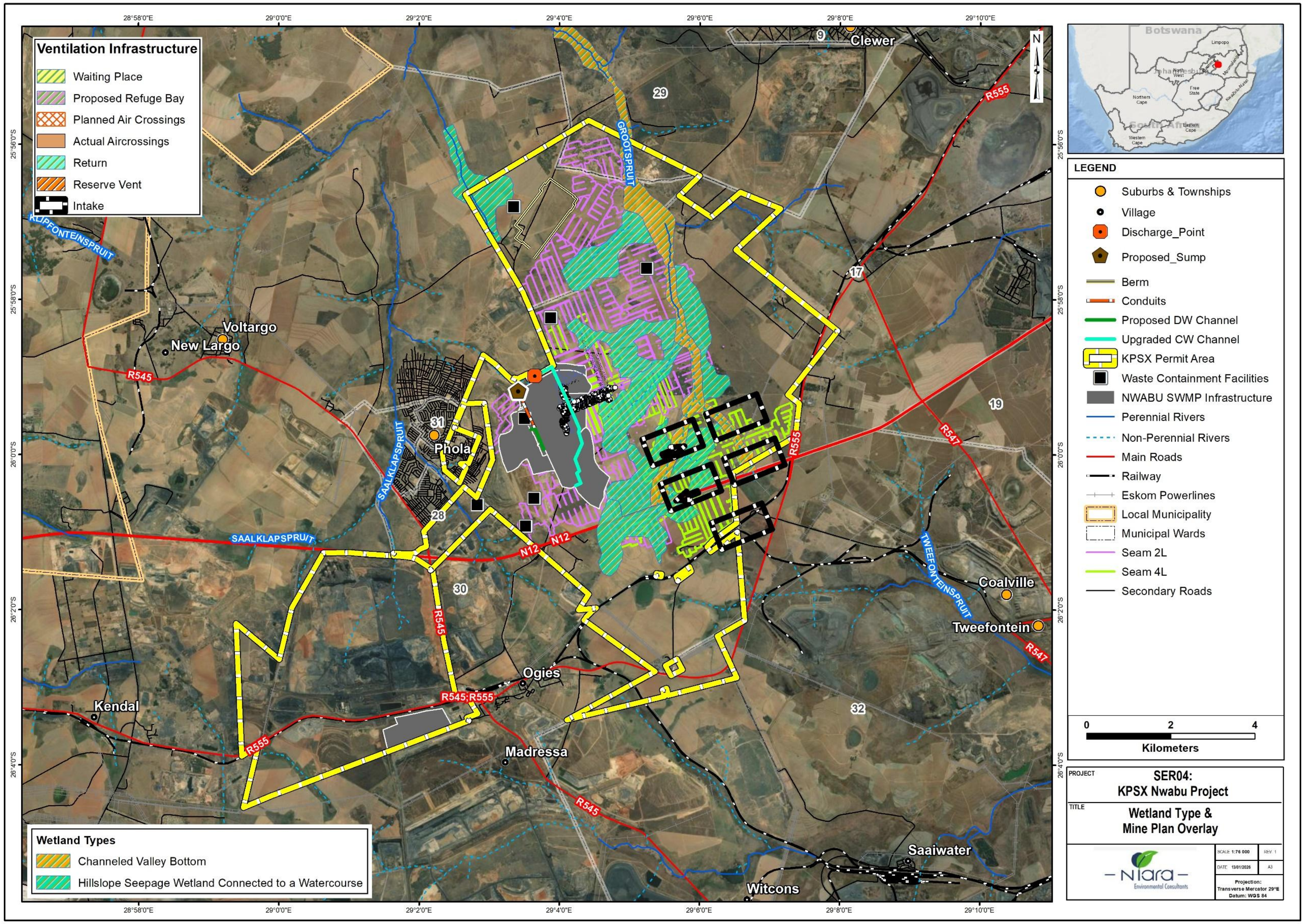


Figure 12-1: Wetland HGM Units in Relation to the Mine Plan.

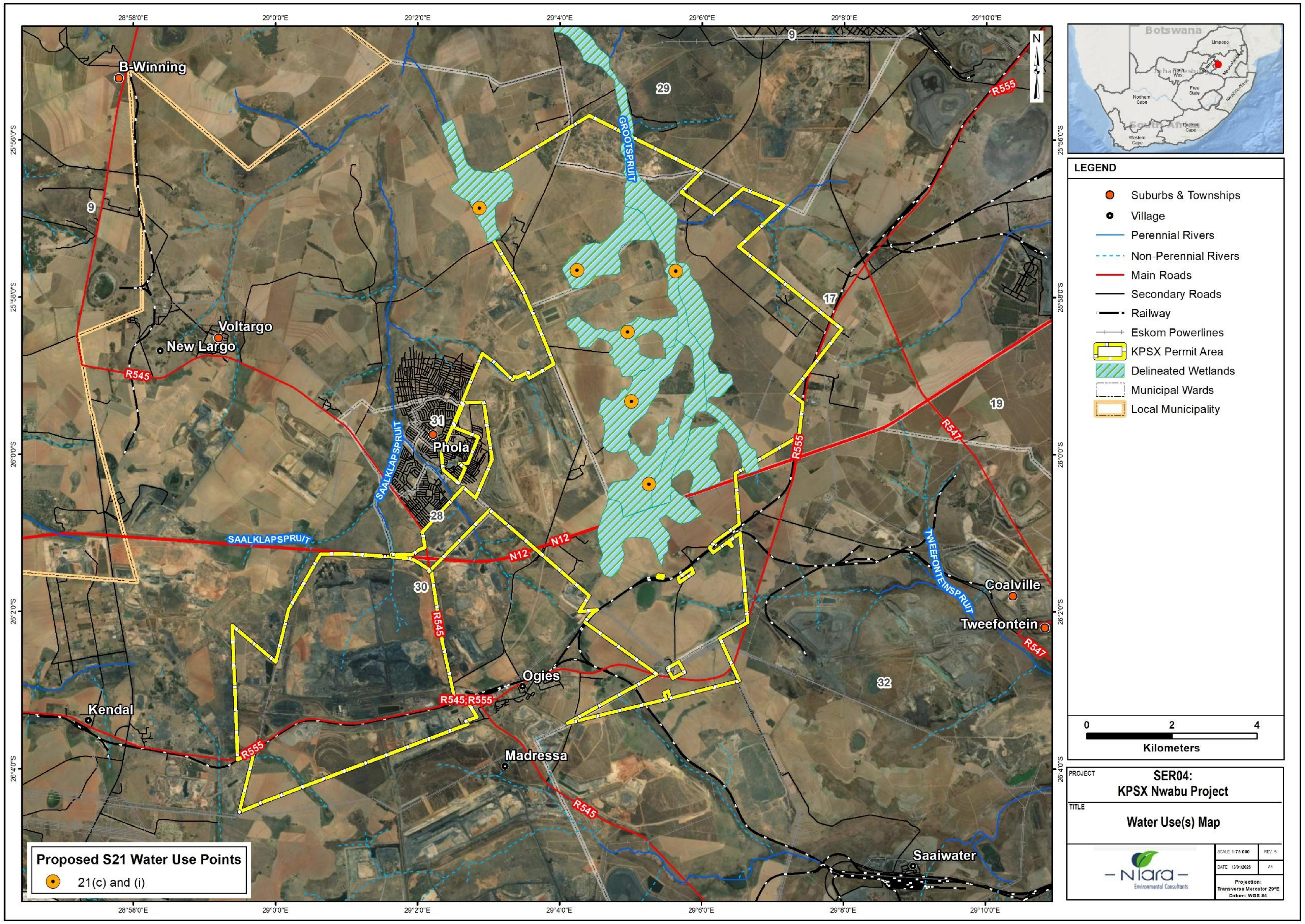

LEGEND
Suburbs & Townships
Village
Perennial Rivers
Non-Perennial Rivers
Main Roads
Secondary Roads
Railway
Eskom Powerlines
KPSX Permit Area
Delineated Wetlands
Municipal Wards
Local Municipality
Proposed S21 Water Use Points
21(c) and (i)
0 2 4
Kilometers
PROJECT
SER04:
KPSX Nwabu Project
TITLE
Water Use(s) Map
B-Winning
Voltargo
New Largo
Phola
Ogies
Kendal
Madressa
Coalville
Tweefontein
Saaiwater
GROOTSPRUIT
SAALKLAPSPRUIT
TWEEFONTEINSPRUIT
N12
R545
R555
R547
Botswana

Figure 12-2: Proposed Section 21 (c) and (i) Water Uses Per HGM Unit

12.1 Loss of flow to and from the watercourses (Hillslope Seepage Connected to a Watercourse, Channelled Valley Bottom)

The identified wetland HGM units within the study area are maintained by a combination of direct rainfall, surface runoff, interflow and groundwater inputs. The relative importance of these various inputs differs between wetland types and between individual wetlands depending on the characteristics of the catchment, soil and underlying geology. Not all wetlands receive water from all the above-mentioned input sources, i.e., some wetlands will not receive groundwater inputs (e.g., the small shallow depressions or sheetrock seeps) while others might be maintained virtually exclusively by surface runoff and direct precipitation. Underground mining will result in a drawdown of groundwater underneath the watercourses, and this is likely to affect both hillslope seepage wetlands and the channelled valley bottom wetlands raising the risk that groundwater inputs to wetlands could be lost or reduced. This potential loss of surface water and shallow groundwater supporting the wetlands onsite into the mined-out voids underground is one of the biggest concerns from a wetland perspective. This impact is however unlikely to be significant as mining is taking place at approximately 96m below ground level.

12.2 Surface subsidence in watercourses

Underground mining will be undertaken using the bord-and-pillar method, which seeks to ensure the structural stability of the overlying rock strata. However, undermining of watercourses raises the risk of subsidence within the watercourses where pillars fail or underground workings collapse depending on the pillar safety factor. Subsidence below the watercourses does not only alter the surface topography of the watercourses and impact the flow characteristics of wetlands, leading to knock on changes in wetland vegetation, increased risk of erosion and general habitat degradation but can also lead to the creation of preferential flow paths from surface water in the wetlands into the underground mining voids, increasing the loss of water from the wetlands. Shallow underground coal mining can potentially result in surface subsidence. The depth of the seams from the surface is approximately 96m below ground level. It should be noted that there is no stability assessment undertaken for the site by rock engineers to identify amongst other things, roof and floor conditions, associated safety factors, Piller life Index and risk of sinkhole formations for undermine sensitive areas (wetlands and watercourses). Without this information the impacts remains highly significance.

12.3 Discharge of contaminated mine water

During the operational phase of the mine, groundwater will enter the mine workings and, where excess water is encountered, will need to be pumped to the surface and disposed of. Such water could potentially become contaminated within the mine workings and lead to water quality impacts to receiving watercourses on the surface if discharged to the environment. The significance of these impacts on water quality remains high and with appropriate water management strategy during and post operations and including treatment options, the significance is likely to be moderately significant to the receiving environment.

12.4 Decant of contaminated mine water

The most significant water quality impact, however, is likely to occur only several years or decades post closure of the mine. Following the completion of mining, the underground mine workings will fill with water and eventually start decanting. In reality, the recovery of groundwater levels at the underground workings will depend on the mine plan and dewatering rates. Decanting water is likely to be significantly contaminated and potentially acidic, with severe consequences for water quality and aquatic biota in receiving watercourses, however, this is more likely to affect systems downslope if allowed to enter these watercourses uncontrolled and untreated. Decant of contaminated water to watercourses is likely to persist for many decades after mine closure. The significant impacts of decanting remain high and with an appropriate water management strategy during and post operations, including treatment options the significance is likely to be moderate and significant to the receiving environment. Geochemical characterisation of the material shows that no acid mine drainage conditions are expected to form. The leach testing show element concentrations that comply with leach concentration guideline values. This is therefore of low significant.

12.5 Significance of impacts

Expected impacts on wetlands are summarised in Table 7. The impact assessment in this section focuses purely on the proposed underground mining and not the construction of the required surface infrastructure. The existing infrastructure from approved underground mining will be utilised for the expansion areas. The results of the impact assessment are shown in Section 9.1.4.1

Table 12-1: Expected Impacts on Wetlands as well as the Project Phase When the Impacts are Likely to Occur

Expected Impact	Construction Phase	Operational Phase	Decommissioning Phase	Post-Closure Phase
Decreased flow within wetlands due to groundwater drawdown.		x	x	x
Surface subsidence within wetlands.		x	x	x
Water quality deterioration due to discharge of operational mine water		x		
Water quality deterioration due to the decanting of contaminated mine water.				x

As per the proposed plan, most of the delineated wetlands within the project area will be undermined as such, potential impacts on the wetlands under a worst-case scenario could be significant. The following reports are very important in the decision making.

- Water balance and flow drivers of the wetlands and other watercourses and quantification of flow losses.
- Underground mining stability assessments including roof and floor conditions, associated safety factors, Pillar life Index and risk of sinkhole formations for undermining sensitive areas (wetlands and watercourses).

Table 12-2DWS Risk Impact Matrix

Activity	Aspect	Pre-Mitigation											Proposed Mitigation Measures	Post-Mitigation										
		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating
	Operational Phase																							
Undermining of wetlands and watercourses	Decreased flow within watercourses due to groundwater drawdown	4	3	5	12	4	4	1	3	12	144	**Moderate**	Refer to the hydrogeological and hydro pedological wetland and groundwater report for full details.	2	2	3	7	2	2	1	2	7	49	**Low**
Undermining of wetlands and watercourses	Surface subsidence within watercourses	5	4	5	14	5	5	5	3	18	252	**High**	Refer to the wetland report for full details. There is no report from rock engineer for the stability assessment of the underground mining in the local geology including recommendation of pillar and safety factors. Without the recommendations from a qualified rock engineer around the stability and subsidence, geotechnical recommendations as a result of the underground mining of the sensitive areas in the study area, this impact remains highly significance.	4	3	4	11	4	4	1	3	12	132	**Moderate**

Activity	Aspect	Pre-Mitigation											Proposed Mitigation Measures	Post-Mitigation										
		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating
Undermining of wetlands and watercourses	Water quality deterioration due to discharge of operational mine water	4	4	5	13	3	3	5	3	14	182	High	• No direct discharge of underground water into the wetland areas should take place; • All removed underground water should be treated prior to release into the environment; • The water discharge structure should be designed by a qualified engineer and must be designed as natural as possible as a bio retention pond with rock, topsoil and indigenous vegetation; • A discharge structure maintenance plan must be implemented to include the discharge bio retention pond, erosion control measures, energy dissipators, water quality, vegetation and alien control. • A comprehensive and appropriate environmental assessment and monitoring programme (including bio-monitoring, sediment sampling and ecotoxicology) to determine the impact, change, deterioration and improvement of the aquatic system must be implemented by the mine.	3	3	3	9	3	3	1	3	10	90	**Moderate**
Decommissioning Phase																								

Activity	Aspect	Pre-Mitigation											Proposed Mitigation Measures	Post-Mitigation										
		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating
Undermining of wetlands and watercourses	Decreased flow within watercourses due to groundwater drawdown	4	3	5	12	4	4	1	3	12	144	**Moderate**	Refer to the hydrogeological and hydro pedological wetland and groundwater report for full details.	2	2	3	7	2	2	1	2	7	49	**Low**
Undermining of wetlands and watercourses	Surface subsidence within watercourses	5	4	5	14	5	5	5	3	18	252	**High**	Refer to the wetland report for full details. There is no report from rock engineer for the stability assessment of the underground mining in the local geology including recommendation of pillar and safety factors. Without the recommendations from a qualified rock engineer around the stability and subsidence, geotechnical recommendations as a result of the underground mining of the sensitive areas in the study area, this impact remains highly significance.	4	3	4	11	4	4	1	3	12	132	**Moderate**
Post-Closure Phase																								

Activity	Aspect	Pre-Mitigation											Proposed Mitigation Measures	Post-Mitigation										
		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating
Undermining of wetlands and watercourse	Decreased flow within watercourses due to	4	3	5	12	4	4	1	3	12	144	**Moderate**	Refer to the hydrogeological and hydro pedological wetland and groundwater report for full details.	2	2	3	7	2	2	1	2	7	49	**Low**
Undermining of wetlands and watercourses	Surface subsidence within watercourses	5	4	5	14	5	5	5	3	18	252	**High**	Refer to the wetland report for full details. There is no report from rock engineer for the stability assessment of the underground mining in the local geology including recommendation of pillar and safety factors. Without the recommendations from a qualified rock engineer around the stability and subsidence, geotechnical recommendations as a result of the underground mining of the sensitive areas in the study area, this impact remains highly significance.	4	3	4	11	4	4	1	3	12	132	**Moderate**

Activity	Aspect	Pre-Mitigation											Proposed Mitigation Measures	Post-Mitigation										
		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating		Severity	Spatial Scale	Duration	Consequence	Frequency of activity	Frequency of incident	Legal Issues	Detection	Likelihood	Significance	Risk Rating
Undermining of wetlands and watercourses	Water quality deterioration due to discharge of operational mine water	4	4	5	13	3	3	5	3	14	182	**High**	• No direct discharge of underground water into the wetland areas should take place; • All removed underground water should be treated prior to release into the environment; • The water discharge structure should be designed by a qualified engineer and must be designed as natural as possible as a bio retention pond with rock, topsoil and indigenous vegetation; • A discharge structure maintenance plan must be implemented to include the discharge bio retention pond, erosion control measures, energy dissipators, water quality, vegetation and alien control. • A comprehensive and appropriate environmental assessment and monitoring programme (including bio-monitoring, sediment sampling and ecotoxicology) to determine the impact, change, deterioration and improvement of the aquatic system must be implemented by the mine.	3	3	3	9	3	3	1	3	10	90	**Moderate**

13 Cumulative Impacts;

Cumulative impacts are contextual and encompass a broad spectrum of impacts at different spatial and temporal scales (IFC, 2013) i.e. cumulative impacts can result from individually minor but collectively significant activities taking place over a period of time (Dutta, et al., 2012). These are not new types of impacts but recognition that impacts from individual projects and activities can combine in time and space. In some cases, cumulative impacts occur because a series of projects of the same type are being developed. In other cases, cumulative impacts occur from the combined effects over a given resource of a mix of different types of projects; for example, the development of a manufacturing site, access roads, transmission lines, and other adjacent land uses. Even with extensive mitigation, significant latent impacts on the receiving wetland areas my still occur. The following cumulative impacts are likely to occur as a result of the proposed underground mining at KPSX and KPSS;

- Degradation of wetland areas;
- Water quality deterioration within the catchment;
- Subsidence

The most significant impact contributing to water quality deterioration is acid mine drainage derived from decanting of underground mine workings. Based on how the decant water is discharged to the environment, wetlands and water courses are likely to receiving acid mine drainage generally associated with a drop in pH and a rise in salinity, increased concentrations of metals and sulphates playing an important role. This impacts aquatic biodiversity, with a loss of sensitive species leading to a reduction in diversity and dominance of tolerant species.

14 Conclusions

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. All three quaternary catchments are regarded as Largely Modified, according to the Department of Water and Sanitation (DWS);
- According to the National Freshwater Ecosystem Priority Areas (NFEPA) a Valley Floor: Channelled valley bottom wetland Rank 2 is identified within the proposed area. Therefore, the wetlands within the proposed area contributes towards maintenance of biodiversity within the greater catchment area.

- Two types of wetlands were identified within the area proposed for an underground mine, these include a Hillslope Seepage Connected to a watercourse and a Channelled Valley Bottom Wetland.
- Due to deviation from the reference condition, the hillslope seepage wetland connected to a watercourse located within the project area have been classified as follows:
  - PES-C: Moderately Modified where a moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact and
  - PES-D): Largely Modified where a large change in ecosystem processes and loss of natural habitat and biota has occurred.
- The Channelled Valley Bottom Wetland located within the project area has deviated significantly from the reference condition such that it has been classified as Seriously Modified (PES: E) where the change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable
- The Ecological Importance and Sensitivity of the wetlands within the project are considered to be High: these wetlands are considered to be ecologically important and sensitive. The biodiversity of these wetlands may be sensitive to flow and habitat modifications. These wetlands play a role in moderating the quantity and quality of water of major rivers;
- Since no new surface mining infrastructure will be constructed as part of the project, it was concluded that, a buffer zone could not be calculated. Klipspruit Colliery agreed to maintain a 80m buffer zone around the delineated wetlands areas. The buffer area will be maintained according to the Seiti Land Management Way
- Since no new surface mining infrastructure will be constructed, the impact assessment was conducted only for the operational, decommissioning and post-closure phases of the Unwabu project.
- The identified potential impacts wetlands were found to be significant under a worst-case scenario since the could since most of the delineated wetlands within the project area will be undermined. The following risks were identified.
  - Decreased flow within wetlands due to groundwater drawdown: This potential impact was found to be moderate during the Operational, Decommissioning and Post-Closure phases of the Unwabu project.
  - Surface subsidence within watercourses: this potential impact was found to be high Operational, Decommissioning and Post-Closure phases of the Unwabu project.
  - Water quality deterioration due to discharge of operational mine water: This potential impact was found to be high Operational and Post-Closure phases of the Unwabu project.

15 Recommendations

The following recommendations have been made:

- It is recommended that Klipspruit Colliery should develop a wetland monitoring plan to be implemented along with the mine progression towards the wetland areas.
- It is recommended that Mbali Colliery should collaborate with Department of Water and Sanitation, Upper Olifants Catchment Management Agency, Mpumalanga Parks and Tourism Agency, South African National Biodiversity Institute, Working for Wetlands and other mining houses within the catchment area to proactively manage the integrity of wetlands within quaternary catchments B11F and B20G.

15.1 Monitoring Requirements

The following monitoring tasks are recommended for Klipspruit Colliery to ensure the efficacy of the implementation of the recommended mitigation measures and to timely detect further deterioration in the integrity of wetland areas upstream, within and downstream of the Unwabu Project Area.

- Develop an annual wetland monitoring programme (measuring PES of wetlands upstream, within and downstream of the Unwabu Project Area). The annual monitoring programme should include:
    - A fixed-point photographic record of the affected the delineated wetland areas as mining progresses. Fixed points should be selected along the watercourse area at three points (west corner, middle, and east corner). They should ensure good visual coverage of the entire area is obtained. Fixed point photographs should be taken in the end of dry (September) and end of wet season (May) every year.
    - Visual inspection of all wetland areas at the end of the wet season.

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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, Vanderbijlpark, 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

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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)

R. Osman

DVC (Academic

BMhacquel

Head, Centre for Part-Time Studies

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