WETLAND ASSESSMENT REPORT

For the proposed Mining Right Application on the farm Winterveldt 293 KT within Modikwa Platinum Mine in Burgersfort, Limpopo Province.

Prepared By:

Segope Water & Environmental Services

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Date: May 2024

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DMRE REF:
LP30/5/1/2/2/129MRC/00017/102MR

DOCUMENT TRACKING

Project Name	Wetland Assessment Report for the proposed Mining Right Application on the farm Winterveldt 293 KT within Modikwa Platinum Mine in Burgersfort, Limpopo Province	
DMRE Ref	LP30/5/1/2/2/129MRC/00017/102MR	
Client Details	Modikwa Platinum Mine 29 Impala Rd, Chislehurston, Sandton, 2196	
		Signature
Prepared by	**Dineo Makhubela** • Environmental Assessment Practitioner/Junior Specialist at Segope Water and Environmental Services • Candidate Natural Scientist, SACNASP Reg No: 158858	
Reviewed by:	**Tshimangadzo Rasifudi**	
Reviewed and Approved by:	**Letladi Maisela**	
Last saved on	07 June 2024	

This report should be cited as 'Segope Water and Environmental Services, 2024. Wetland Assessment Report. Prepared for Modikwa Platinum Mine.'

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EXECUTIVE SUMMARY

Segope Water and Environmental Services (Segope Consulting) has been appointed by Modikwa Platinum Mine (MPM) to undertake the Wetland Assessment Study for the proposed mining development on the farm Winterveldt 293 KT under the Magisterial District of Sekhukhune District in Limpopo Province. The proposed Mining Application is a progression of the Modikwa Platinum Mine (MPM) South 2 Shaft Environmental Management Programme (EMP) which was approved in 2014 with the DMRE Reference: LP30/5/1/2/2/129MRC/00017/102MR.

The need for a particular specialist study is determined based on the environmental sensitivities of the site, identified using the Department of Forestry, Fisheries, and the Environment's (DFFE's) national web-based environmental screening tool. Due to the high sensitivity rating of the site on the screening report, the data from the desktop study and site assessment was collected as part of the investigations to be used to inform the Government's review during the application process.

A desktop assessment was conducted using NFEPA wetlands together with the DEA protected area portal which both indicated that the proposed farm is located 500m away from the proposed wetlands. The desktop assessment was followed by the site assessment which was conducted on the 24th and 25th of April 2024 to assess the current ecological condition of the proposed area, identify, and delineate any wetlands found onsite, and also assess potential impacts of the project to the proposed wetlands. However, it was also confirmed onsite that the proposed project area does not contain wetlands, hence no wetlands were delineated onsite.

The project area is situated within the quarter-degree grid square of 2430CA which consists of both man-made and natural erosion dongas that occur in areas containing clays rich in heavy metals. However, the mining area consists of rock with limited soils and it was confirmed that the soil is shallow, coarse-textured, well-drained, and low in organic matter and fertility. The area is within the endangered ecosystem of Sekhukhune Plains Bushveld and it is encroached by indigenous microphyllous trees and invaded by alien species.

Furthermore, only the Tubatsane River was observed approximately 50 m away from the proposed Mining Right boundary and no wetlands have been identified onsite. The mine needs to inform the Department of Water Services (DWS) about the planned application. It is advised to maintain a buffer of at least 32 meters around the proposed river. Additionally, decant points should be located outside of this 32-meter buffer. Water resources should be protected for the services they provide to the environment. No mining activities should be conducted in the buffer zone without considering water use license conditions from DWS.

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1. INTRODUCTION

Segope Water and Environmental Services (Segope Consulting) has been appointed by Modikwa Platinum Mine (MPM) to undertake the Wetland Assessment Study for the proposed mining development on the farm Winterveldt 293 KT under the Magisterial District of Sekhukhune District in Limpopo Province.

According to the site layout plan, the additional South 3 Opencast Project will follow the conventional open-cast methods, which include the stripping at 40 to 60 thousand tons per month (ktpm) with concurrent backfill. The ore from the open pit will be extracted by a combination of excavation, crushing, washing, and concentration, then be transported by truck to the primary crusher stockpile and waste will be disposed to waste dumps on the surface. The project area will be comprised of the following infrastructures (see **Figure 1**):

- South 3 Opencast;
- Waste Rock Dump
- South 3 Opencast offices, workshops, and stores;
- Change houses;
- Salvage transfer yard;
- Wash bay and service area;
- Parking area;
- Fuel and material storage and handling facilities;
- Explosive storage and waste explosive materials and packaging destruction areas;
- Access roads from Shaft 3 to Shaft 2
- Topsoil stockpile areas;
- Electricity provision and distribution facilities;
- Security;
- Stormwater management infrastructure
- Pollution control dams;
- Septic sewage system

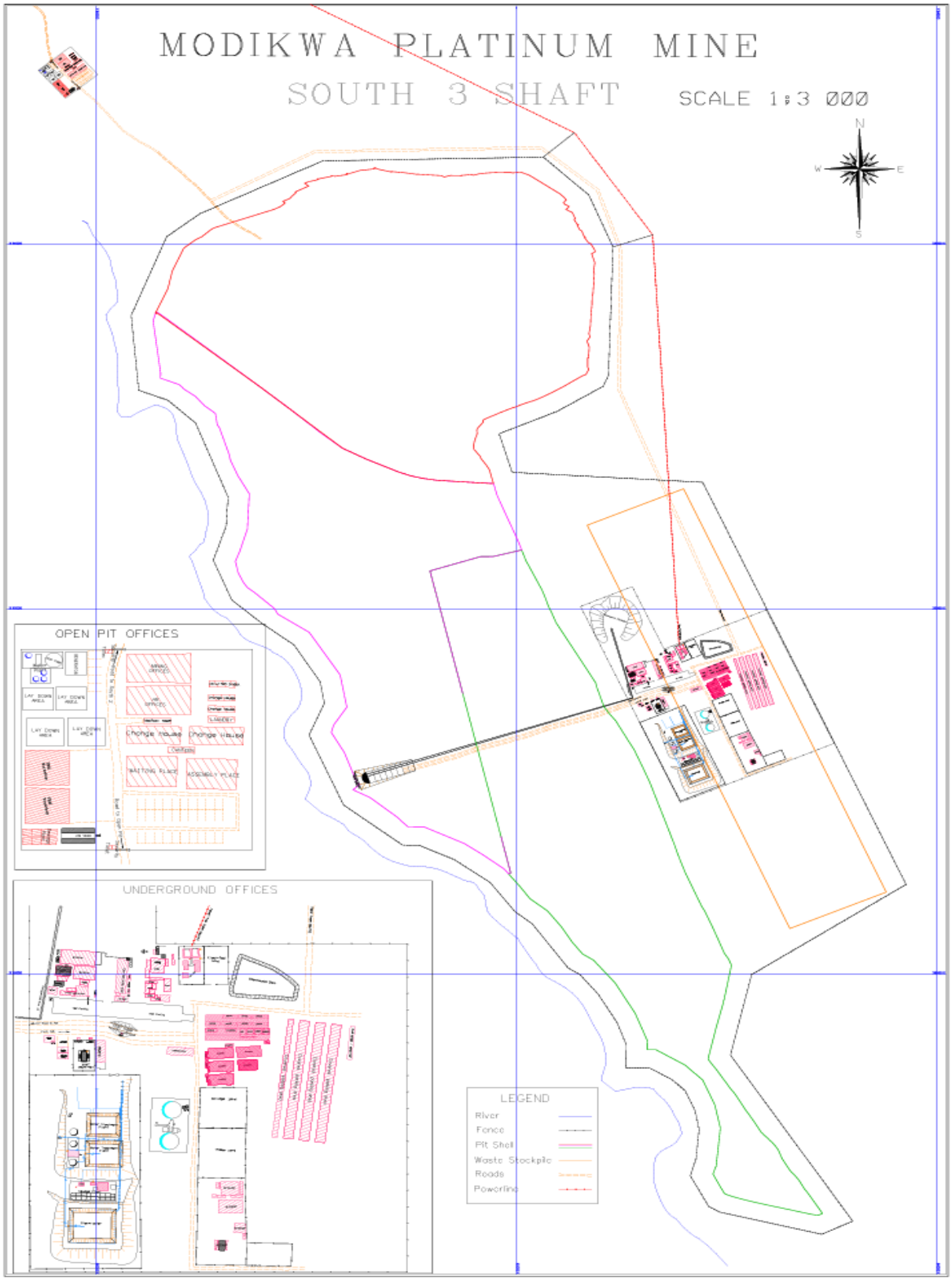


Figure 1: Mine layout plan for the proposed mining area (Modikwa Platinum Mine, 2024)

1.1. Purpose of the report

In accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the NEMA Environmental Impact Assessment (EIA) Regulations (2017), the issuing of an Environmental Authorization (EA) requires the undertaking of a Basic Assessment (BA) process, with associated Public Participation Process (PPP) and specialist studies. The need for a particular specialist study is determined based on the environmental sensitivities of the site, identified using the Department of Forestry, Fisheries, and the Environment's (DFFE's) national web-based environmental screening tool.

In terms of Section 1 of the Aquatic Biodiversity Protocol (2020): An applicant intending to undertake an activity identified in the scope of this protocol on a site identified on the screening tool as being of: "Very high sensitivity" for aquatic biodiversity, must submit an Aquatic Biodiversity Specialist Assessment. If any part of the proposed development footprint falls within an area of "very high" sensitivity, the assessment and reporting requirements prescribed for the "very high" sensitivity apply to the entire footprint. In the context of this protocol, development footprint means the area in which the proposed development will take place and includes any area that will be disturbed.

The screening tool identified the site footprint of "High Sensitivity" for Aquatic Biodiversity due to the Tubatsane River. This triggered the need for a full Aquatic Biodiversity Assessment, as per the Biodiversity Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (hereafter referred to as the "Aquatic Biodiversity Protocol"), published in Government Notice No. 320 on 20 March 2020. Additionally, following Section 21 of the National Water Act (NWA), 1998 (Act 36 of 1998) and the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals 2017, a Wetland Delineation Report is required in support of the General Authorization (GA) application for water uses associated with development within 500m of a wetland.

1.2. Project Area Description

The proposed Modikwa Platinum Mine (MPM) South 3 Opencast development covers approximately 273 Hectors and it is situated within the Farm Winterveldt 293 KT under the Local Municipality of Fetakgomo Tubatsane in the Sekhukhune District Municipality, Limpopo Province. The project area is located approximately 600 m north of Pelaneng community, approximately 4km northwest of Stocking Town, and approximately 3 km northeast of Tukakgomo Community, refer to **Figure 2**.

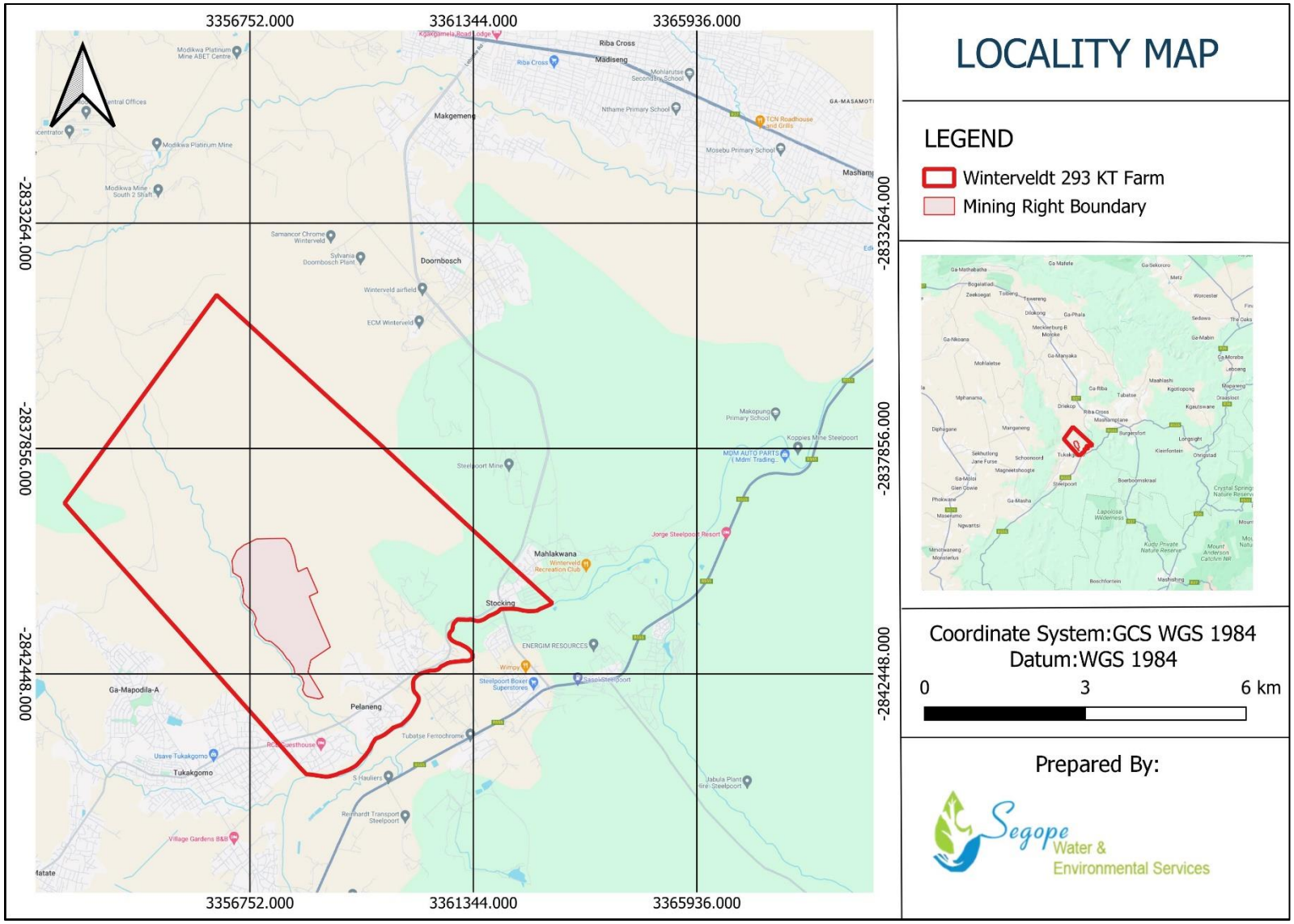


Figure 2:Locality Map for the proposed South 3 Opencast development *(Segope Consulting , 2024)*

2. DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT

2.1. Climate

Climate plays a significant role in the formation, characteristics, and maintenance of wetlands, and it is an important factor in wetland assessment. Wetlands are transitional areas between terrestrial and aquatic ecosystems, and they are particularly sensitive to changes in climate. The proposed project area falls under Burgersfort, where the summers are warm, wet, and partly cloudy and the winters are short, cool, dry, and clear. Over the course of the year, the temperature typically varies from 9°C to 28°C and is rarely below 6°C or above 33°C.

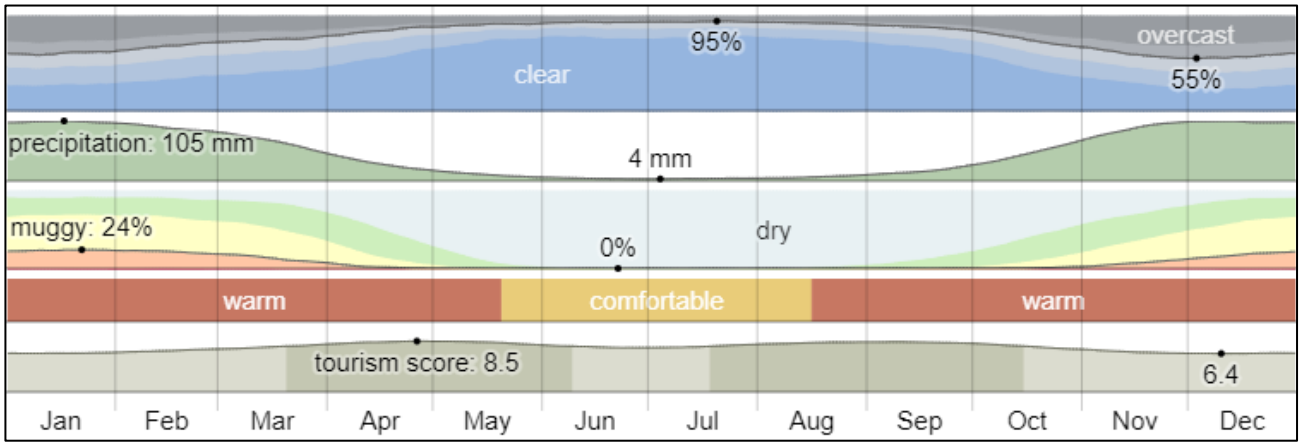


Figure 3: Burgersfort weather by month *(weatherspark.com)*

Precipitation

The chance of wet days in Burgersfort varies very significantly throughout the year. The wetter season lasts 5.2 months, from October 21 to March 26, with a greater than 26% chance of a given day being a wet day. The month with the most wet days in Burgersfort is December, with an average of 15.0 days with at least 1 millimeter of precipitation. The drier season lasts 6.8 months, from March 26 to October 21. The month with the fewest wet days in Burgersfort is July, with an average of 0.6 days with at least 1 millimeter of precipitation.

The month with the most days of rain alone in Burgersfort is December, with an average of 15.0 days. Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 51% on December 1, Refer to **Figure 4**.

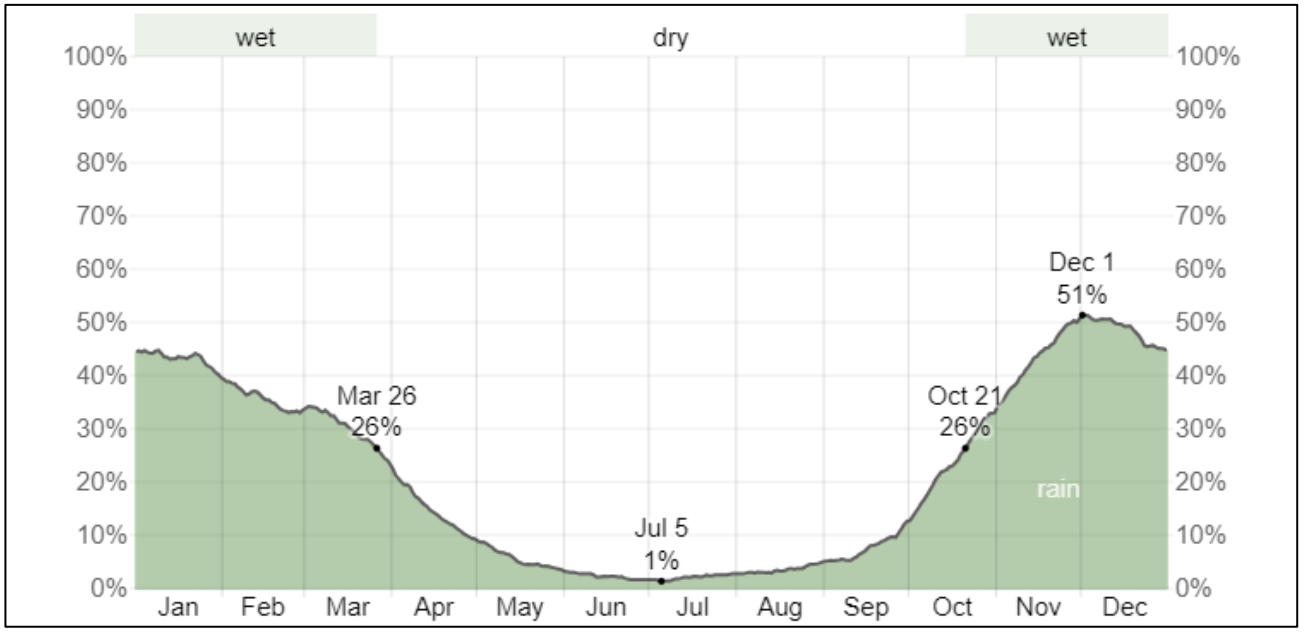


Figure 4: Daily Chance of Precipitation in Burgersfort *(weatherspark.com)*

2.2. Regional vegetation

The proposed project area is located in the SVcb 27 Sekhukhune Plains Bushveld bioregion (Low & Rebelo, 1996) (see **Figure 5**)**.** The vegetation unit is mostly found in Limpopo and Mpumalanga Provinces: Lowland area from Burgersfort and the lower basin of the Steelpoort River in the south, northwards through the plains of the Motse River basin to Jobskop and Legwareng (south of the Strydpoort Mountains). Continues up the basin of the Olifants River to around Tswaing and the valleys of the Lepellane and Mohlaletsi Rivers on an altitude that ranges between 700–1 100 m.

The vegetation type occurs in the slightly to moderately undulating plains including some low hills and pan depressions. The vegetation is short dense grassland dominated by the following species:

Table 1: Dominant Plant Species

Vegetation Unit	Dominant Plant Species	Species Scientific Names
Sekhukhune Plains Bushveld	Sekhukhune endemic	**Small Tree:** *Lydenburgia cassi- noidesSK*. **Tall Shrub:** *Nuxia gracilisD.* **Low Shrubs:** *Amphiglossa trifloraD, Asparagus foureiN, Hibiscus barnardiiSK, Orthosiphon fruticosusCB, Petalidium oblongifoliumCB, Rhus batophylla*
	Woody Climber	Asparagus sekukuniensis. **Herb:** Aneilema longirrhizumSK. **Geophytic Herb:** Chlorophytum cyperaceumSK. **Succulent Herb:** Piaranthus atrosanguineus

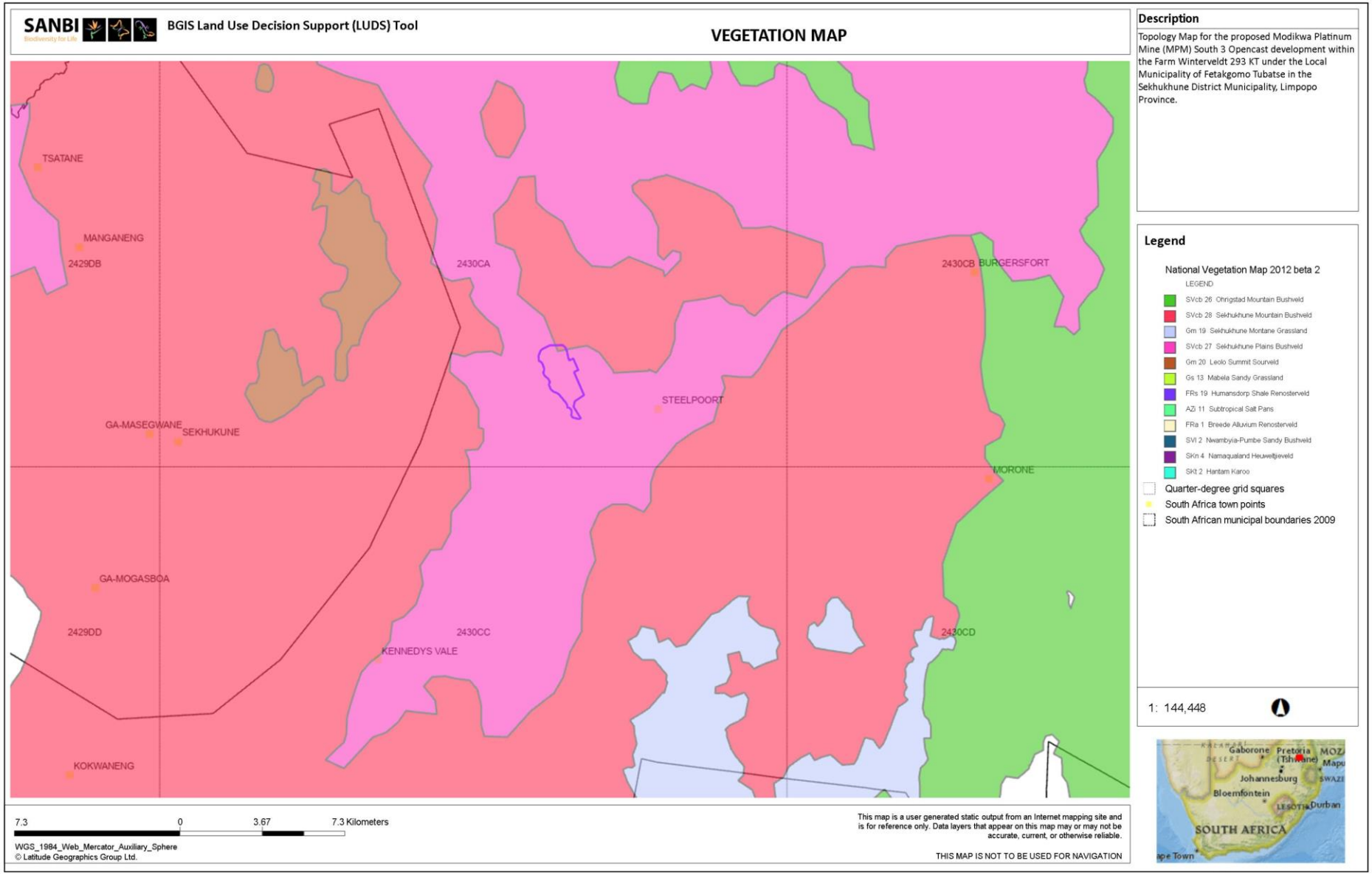


Figure 5: Vegetation type for the proposed project area *(Segope Consulting , 2024).*

2.3. Topography

Topography is the study of the shape and features of land surfaces. The topography of an area could refer to the surface shapes and features themselves, or a description (especially their depiction in maps). Topography is a field of geoscience and planetary science and is concerned with local detail in general, including not only relief but also natural and artificial features, and even local history and culture. The project area is characterized by flat slope and steep slope (on the north-eastern part), as indicated on **Figure 6** and it was also confirmed during site assessment.

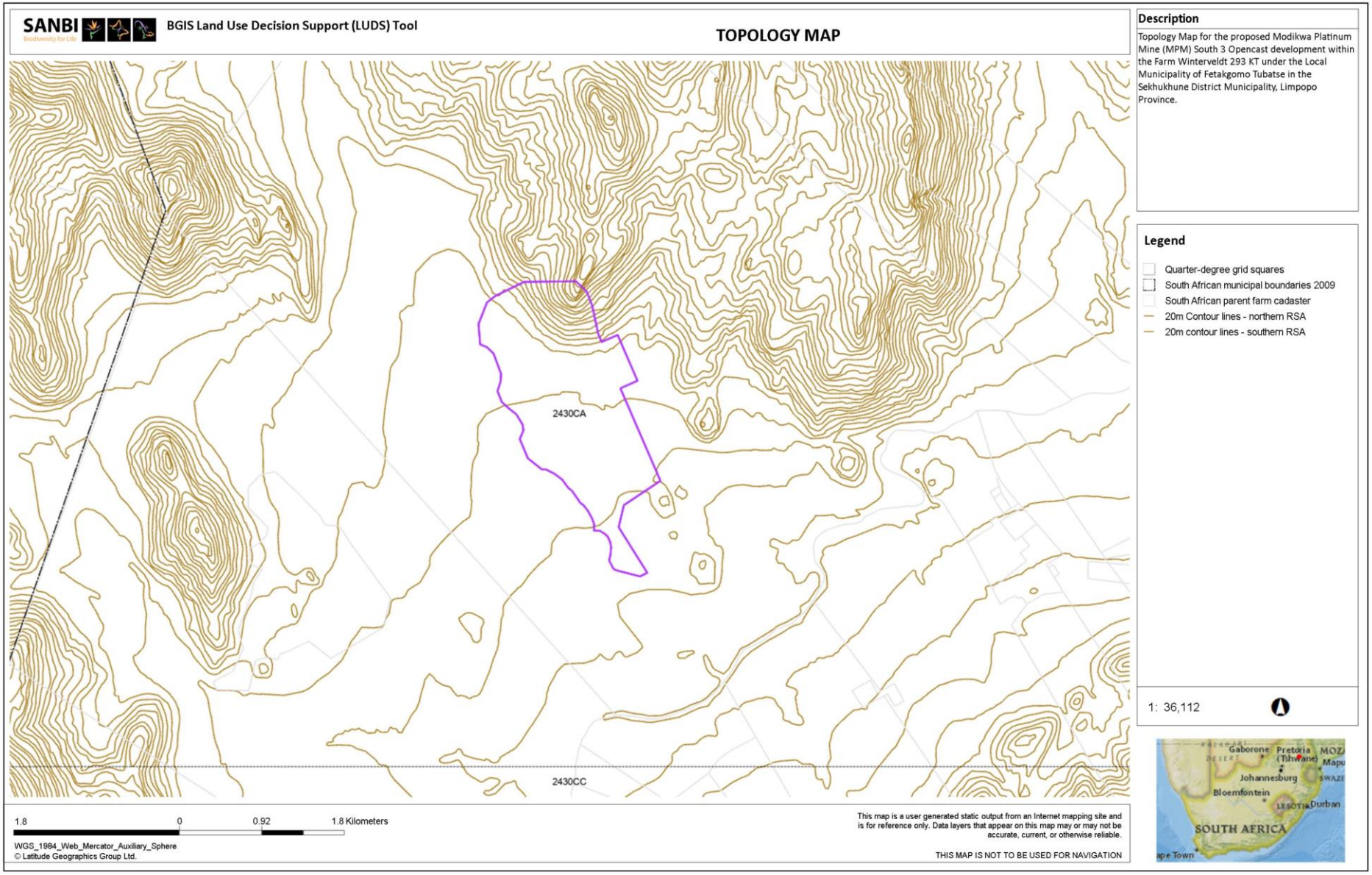


Figure 6:Topography of the project area *(Segope Consulting, 2024)*

2.4. Soil

Soils can vary widely in their color and base status (pH) due to different factors such as parent material, climate, vegetation, and human activities. Undifferentiated clays, red, yellow, and greyish soils with low to medium base status can be found in various parts of the world, and they each have specific characteristics and properties. The project area consists of two soil classes namely:

❖ **Non-soil land classes:**

Non-soil land classes refer to areas where the surface is not covered by soil or where the soil is extremely thin and discontinuous. These classes are typically dominated by rock and for the proposed project, the proposed soil type is found on the steep slope (Mountainous) as shown on the topography map. The non-soil land classes contain the following characteristics:

- **Surface:** Exposed bedrock with little to no soil cover.
- **Texture:** Solid, often smooth or fractured.
- **Drainage:** Excellent, with no water retention capacity.
- **Vegetation:** Minimal to none, with occasional lichens or mosses in cracks.
- **Examples:** Rocky outcrops, cliffs, mountainous regions.

❖ **Swelling Clay Soils:**

Swelling clay soils, also known as expansive clays, are characterized by their ability to expand when wet and contract when dry. This can cause significant issues for infrastructure and agriculture.

- **Mineral Composition:** Rich in clay minerals like montmorillonite, which have high shrink-swell capacity.
- **Texture:** Fine-textured, often heavy and sticky when wet, hard, and cracked when dry.
- **Color:** Can vary but often appears dark when wet and lighter when dry.
- **Water Retention:** High water-holding capacity but can become waterlogged.
- **Drainage:** Poor drainage, leading to potential waterlogging in wet conditions.
- **Fertility:** Can be fertile but challenging to manage due to swelling and shrinking.

Most of the area consists of red apedal soils. Deep, loamy Valsrivier soils are characteristic of the plains, and shallow Glenrosa soils are found on the low-lying, rocky hills. Patches of erodible black, melanic structured horizons are common around small mountains. Some Steendal soils are underlain by gypsum (Low & Rebelo , 1996).

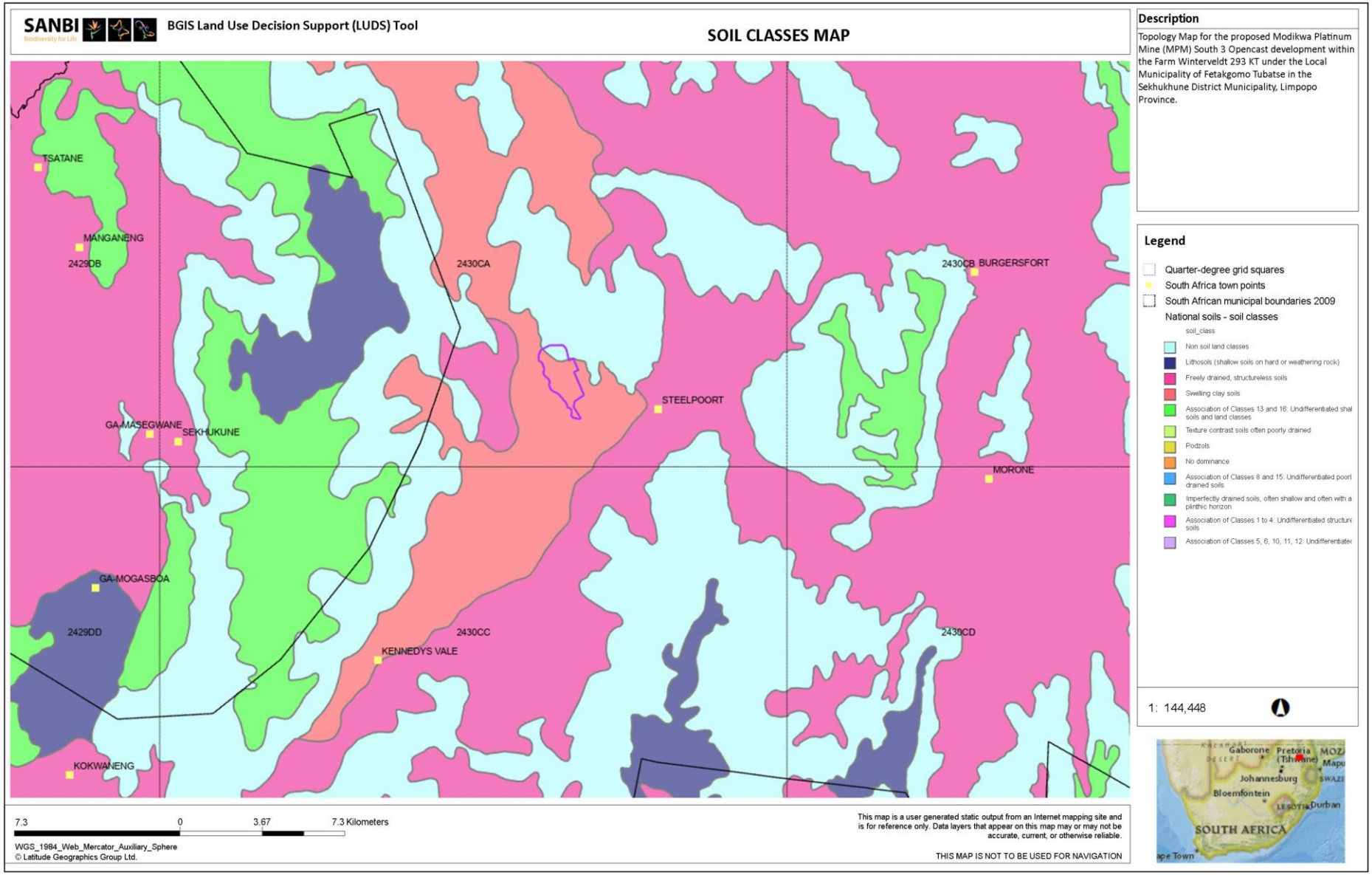


Figure 7: The soil types of the proposed project area *(Segope Consulting, 2024)*

2.5. Drainage and River Ecosystem

The project area falls between B41J Quaternary Catchments within the Olifants Water Management Area **(see Figure 8).** The Olifants WMA is mainly occupied by the South African portion of the Olifants River Catchment, excluding the Letaba River Catchment. The Olifants River originates to the east of Johannesburg, initially following northwards before gently curving eastwards towards the Kruger National Park, where it is met at the confluence with the Letaba River before flowing into Mozambique.

The climate varies significantly from the cool highveld in the south to subtropical conditions east of the escarpment, with a mean annual precipitation rate ranging from 601 to 800 mm. Diverse economic activity includes mining, metallurgic industries, irrigation, dryland, subsistence agriculture, and ecotourism. The provision of water to meet ecological requirements in the Olifants River is one of the controlling factors in managing water resources throughout the WMA. Several dams control much of the flow in these rivers. The Olifants WMA receives water from transfers to serve as cooling water for power generation, while smaller transfers are made to neighboring WMA (StatsSA, 2010).

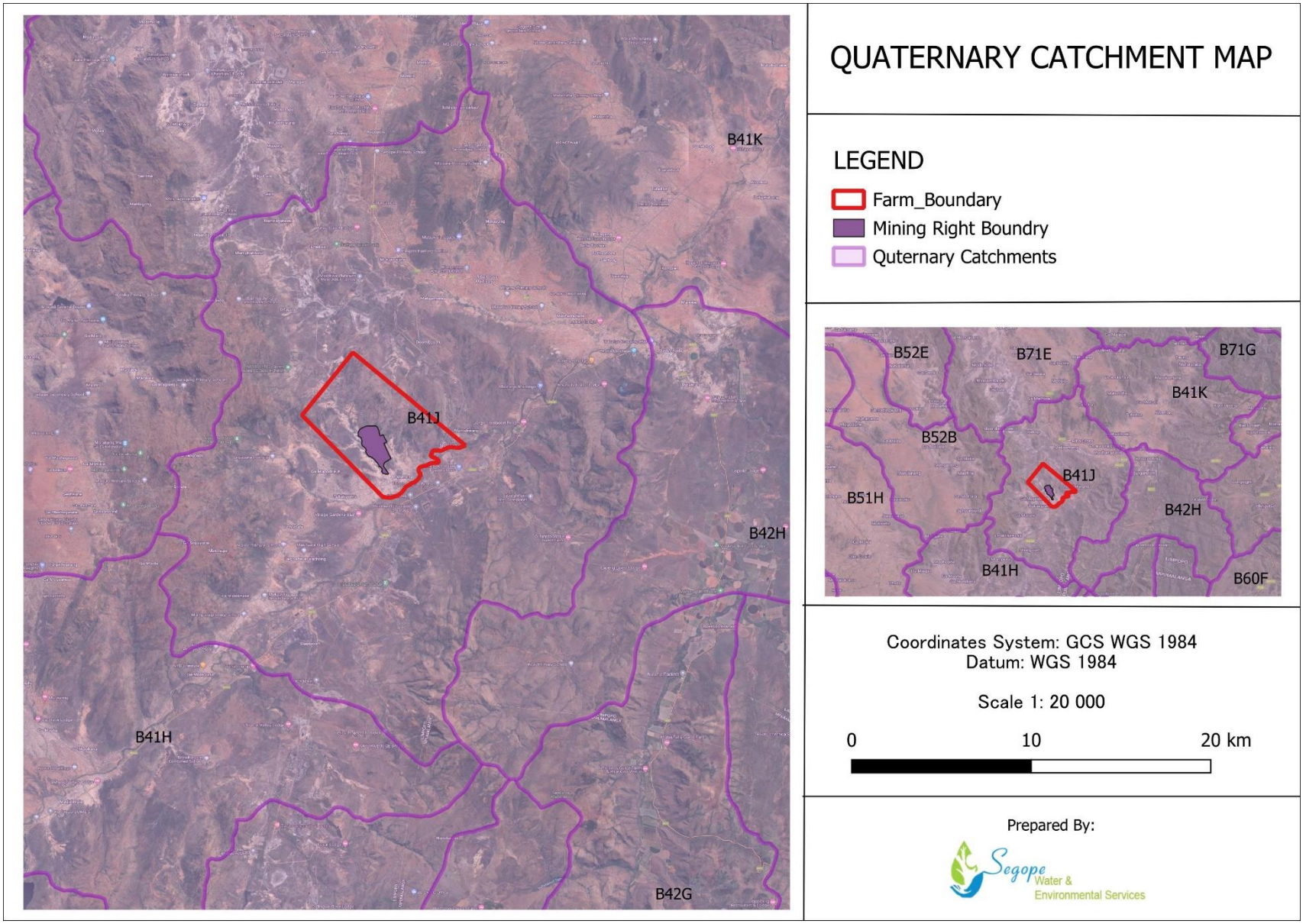


Figure 7: The quaternary catchment and water management map for the proposed project area *(Segope Consulting, 2024)*

2.6. Aquatic Biodiversity Indicators

The Hydrology Map shows that the project area does not contain any wetlands, however, the is an NFEPA river situated approximately 50 m from the mining right application boundary, refer to **Figure 9.**

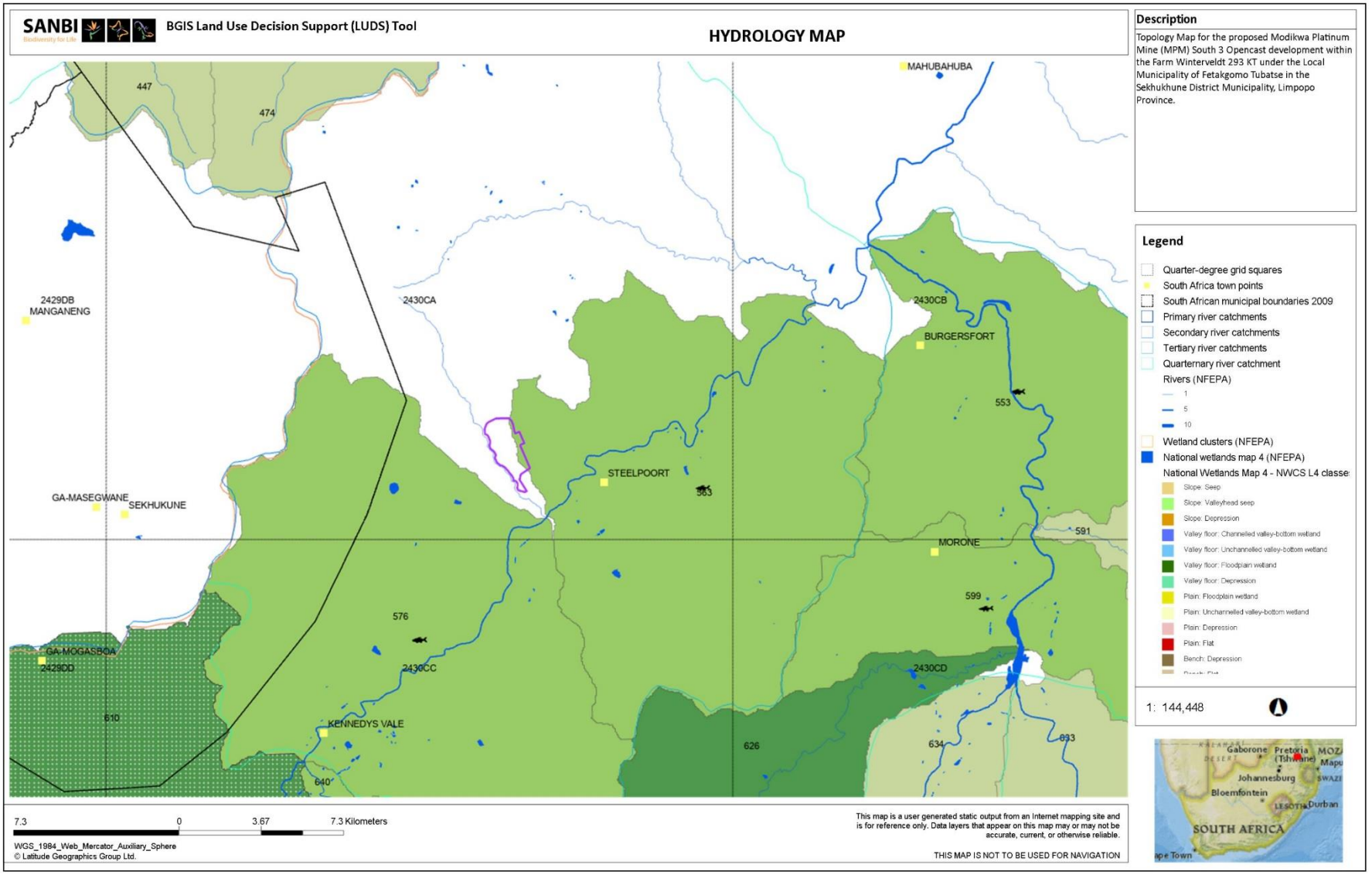


Figure 8: A freshwater map for the proposed project area *(Segope Consulting, 2024)*

3. METHODOLOGIES

The aim of the study was to identify and delineate all aquatic and wetland ecosystems within 500m of the project site that are going to be measurably impacted by the project activities, evaluate these in terms of their present functionality and health, and assess the potential impacts and risks associated with the proposed development. The following datasets and resources were utilized for the desktop assessment.

3.1. Delineation

The wetland areas are delineated in accordance with the DWAF (2005) guidelines, a cross-section is presented in **Figure 10** below.

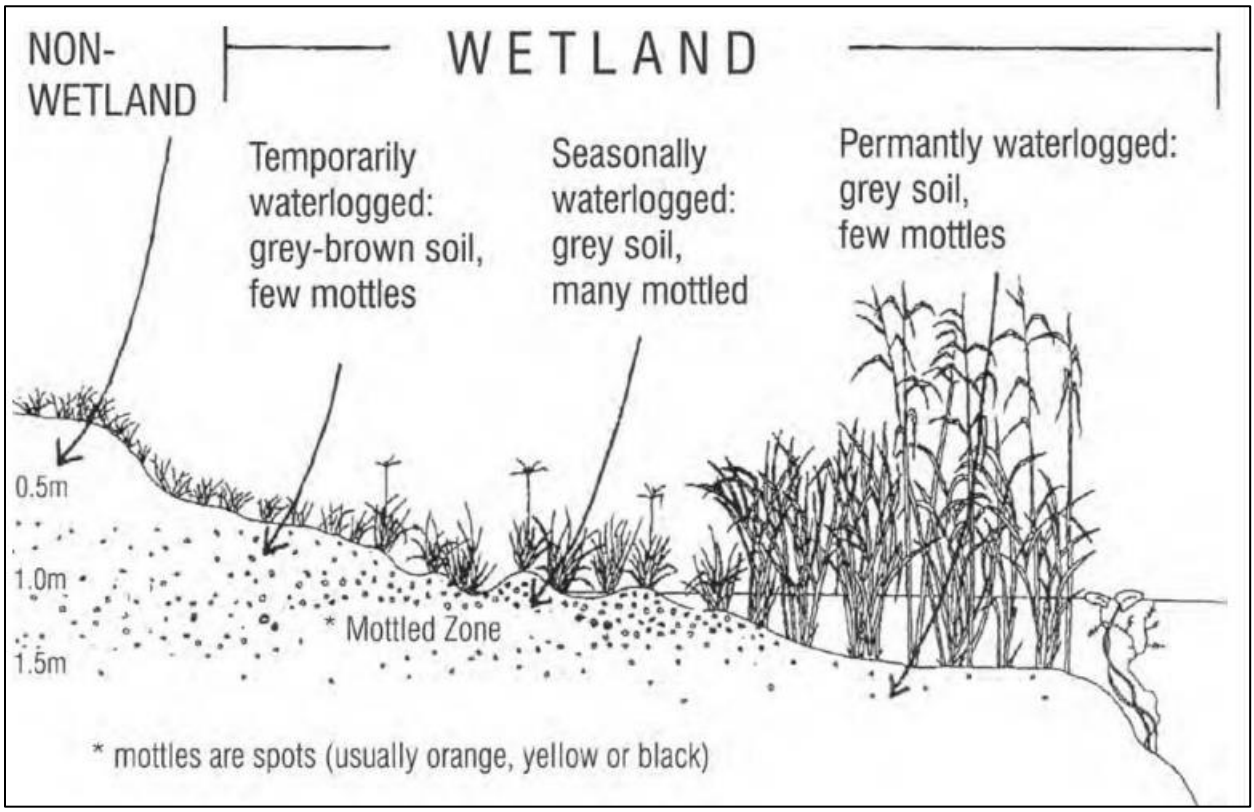


Figure 9: Cross section through a wetland, indicating how the soil wetness and vegetation indicators change as one moves along a gradient of decreasing wetness, from the middle to the edge of the wetland. *(Donovan Kotze, University of KwaZulu-Natal.)*

The outer edges of the wetland's areas were identified by considering the following four specific indicators:

3.1.1. Terrain Unit indicator

The indicator helps to identify those parts of the landscape where wetlands are more likely to occur. It should be noted that the terrain unit indicator is an important practical index for identifying those parts of the landscape where wetlands are likely to occur. Some wetlands occur on steep to mild slopes higher up

in the catchment, where groundwater discharge is taking place through seeps, which may not be recognizable as depression areas.

A wetland usually qualifies as a valley bottom unit (see **Figure 11**) as defined by (McVicar et al , 1977). However, Unit 5 may also occur as a depression on a crest (1), midslope (3), or foot slope (4), as depicted in Figure below, and can then be described as 1(5), 3(5), or 4(5) respectively.

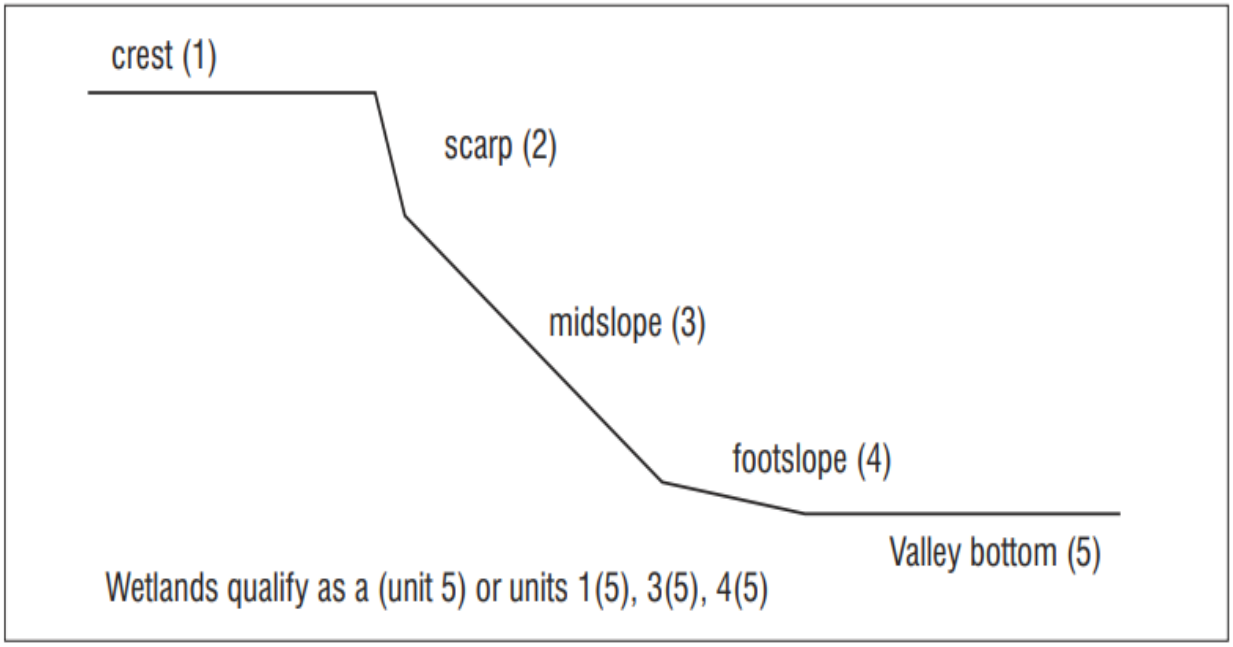


Figure 10: terrain Units *(Forestry, 2005)*

3.1.2. Soil Form Indicator

The soil form indicator identifies the soil forms, as defined by the (Soil Classification working , 1991) which are associated with prolonged and frequent saturation. Soil Forms are a particular level of a soil classification system that was developed to describe South African soils xi. The classification system uses the types and associations of soil and sub-soil layers (horizons) to classify different soil forms. Although primarily developed to assess agricultural potential, soil forms are useful indicators of possible wetland presence since there are **four soil forms** only associated with wetlands, and several that can be present in seasonal or temporary wetland areas.

The **permanent zone** will always have **Champagne, Katspruit, Willowbrook,** and **Rensburg** soil forms as they ALWAYS denote wetlands as defined by the (Soil Classification working , 1991). These soil forms are diagnostic of wetlands and are associated with permanently or seasonally saturated wetlands. However, the **seasonal and temporary zones** will have one or more of the following soil forms present:

Table 2: Soil Forms found within the seasonal and temporary zones.

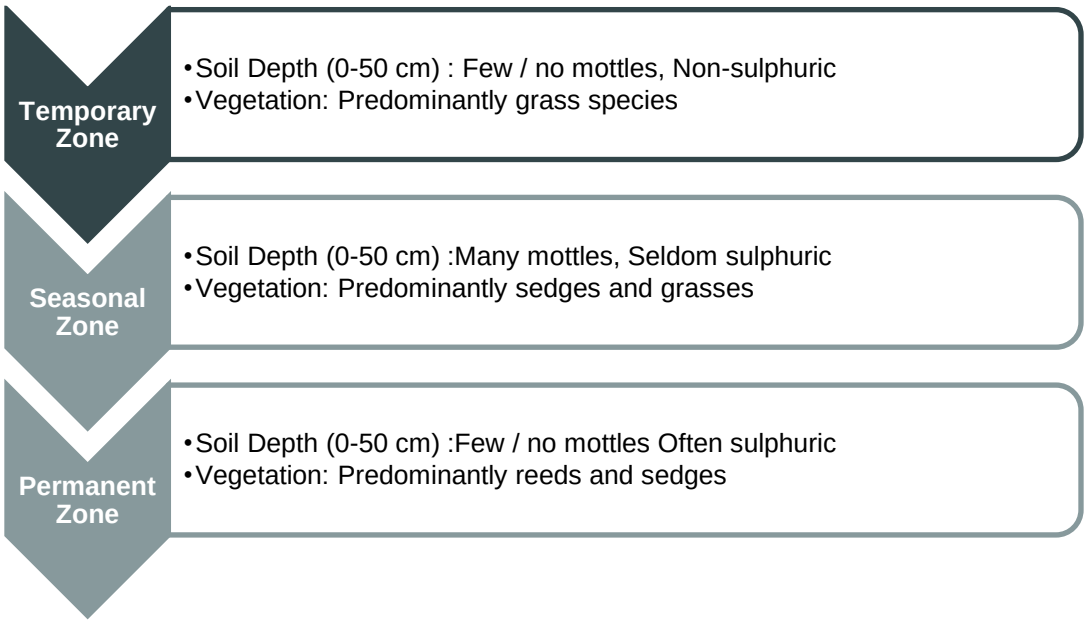
Signs of wetness incorporated at the form level	Kroonstad, Longlands, Wasbank, Lamotte, Estcourt, Klapmuts, Vilafontes, Kinkelbos, Cartref, Fernwood, Westleigh, Dresden, Avalon, Glencoe, Pinedene, Bainsvlei, Bloemdal, Witfontein, Sepane, Tukulu, Montagu
Signs of wetness incorporated at the family level	Inhoek, Tsitsikamma, Houwhoek, Molopo, Kimberley, Jonkersberg, Groenkop, Etosha, Addo, Brandvlei, Glenrosa, Dundee.

3.1.3. Soil Wetness Indicators

Soil Wetness Indicators identify the morphological signatures developed in the soil profile as a result of prolonged and frequent saturation. Wetland soils can be permanently, seasonally, or temporarily saturated. The colors of various soil components are often the most diagnostic indicator of hydromorphic soils. The colors of these components are strongly influenced by the frequency and duration of soil saturation. Generally, the higher the duration and frequency of saturation in a soil profile, the more prominent grey colors become in the soil matrix.

Where the soil is only saturated on a seasonal basis (at least 3 months per year); the greying may not be extensive. Instead, due to alternating periods of iron being dissolved and then oxidized, a mottled appearance develops in the soil. Consequently, it is possible to identify wetland areas based on soil color, while mottle hue and chroma initially increase and then decrease the more saturated the soils become (see **Table 3** below)

Table 3: Relationship between degree of wetness (wetland zone) and vegetation *(Kotze et al, 1994)*



3.1.4. Vegetation Indicator

Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils. When using vegetation indicators for delineation, emphasis is placed on the group of species that dominate the plant community, rather than on individual indicator species. Thus, the presence of scattered individuals of an upland plant species in a community dominated by hydrophilic species is not sufficient to conclude that the area is not a wetland. Likewise, the presence of a few individuals of a hydrophilic species in a community dominated by upland species is not a sufficient basis for concluding that the area is a wetland. A more precise method for employing vegetation as an indicator of wetland conditions uses a broad classification prepared by (Kotze and Marneweck, 1999) see **Table 4** below.

Table 4: Relationship between wetness zones and vegetation types *(Forestry, 2005)*

Vegetation Types	Zones		
	Temporary	**Seasonal**	**Permanent/Semi-permanent**
If herbaceous	Predominantly grass species; a mixture of species that occur extensively in non-wetland areas, and hydrophilic plant species which are restricted largely to wetland areas	Hydrophilic sedge and grass species are restricted to wetland areas.	Dominated by: ❖ emergent plants, including reeds (Phragmites australis), a mixture of sedges and bulrushes (Typha capensis), usually >1m tall; or ❖ (2) floating or submerged aquatic plants
If woody	A mixture of woody species which occur extensively in non-wetland areas, and hydrophilic plant species which are restricted largely to wetland areas.	Hydrophilic woody species, which are restricted to wetland areas	❖ Hydrophilic woody species, which are restricted to wetland areas. ❖ Morphological adaptations to prolonged wetness (e.g. prop roots)

3.2. Present Ecological Status (PES)

The overall approach is to quantify the impacts of human activity or visible impacts on wetland health, and then convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of the impact of individual activities/occurrences and then separately assessing the intensity of the impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The Present State categories are provided in **Table 5** below.

Table 5: The PES categories *(Macfarlane et. al.,, 2009)*

Impact Category	Present State Category	Description	Impact Score Range
None	A	Unmodified, natural	0 to 0.9
Small	B	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
Moderate	C	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
Large	D	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4.0 to 5.9
Serious	E	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
Critical	F	Critical 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

3.3. Ecosystem Services

The assessment of the ecosystem services supplied by the identified wetlands was conducted as per the guidelines as described in Wet-Ecoservices (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 in **Table 6.**

Table 6: 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 - 3.0	Moderately High
> 3.0	High

3.4. Ecological Importance and Sensitivity (EIS)

The method used for the EIS determination was adapted from the method 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**.

Table 7: Description of EIS Categories.

Recommended Ecological Management Class	EIS Category	Range of Mean
A	Very High	3.1 to 4.0
B	High	2.1 to 3.0
C	Moderate	1.1 to 2.0
D	Low Marginal	< 1.0

3.5. Buffer Zone Determination

A buffer zone is defined as “A strip of land with a use, function or zoning specifically designed to protect one area of land against impacts from another.” (Macfarlane, et al.,, 2014). Buffer zones protect water resources in a variety of ways, such as;

- Maintenance of basic aquatic processes;
- The reduction of impacts on water resources from activities and adjoining land uses;
- The provision of habitat for aquatic and semi-aquatic species;
- The provision of habitat for terrestrial species; and
- The provision of societal benefits.

The “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries” (Macfarlane, et al., 2014) was used to determine the appropriate buffer zone for the proposed activity.

3.6. Field survey

A field survey was conducted to assess the project area and soil samples were evaluated in hand for soil composition, color, number, size, and chroma of mottles as well as wetness, after which they were discarded. The following equipment was used:

The equipment used included:

- Auger
- Plastics,
- Measuring Tape,
- GPS
- Buff tags
- Sampling forms
- Cable ties
- Telephone (Plant Net, Google Maps and SW Maps)

Table 8: Site pictures and description

Description	Site pictures and equipment
The soil auger was used to extract the cores to a depth of 50cm	Auger
The depth of the hole is measured using the measuring tape after identifying the different layers of soil.	Measuring Tape
Soil samples were collected in plastics and marked with a buff tag. The location of each soil core was marked using a handheld GPS	Plastics, Buff Tags, and Cable ties
Some of the vegetation species were identified using the Plant Net website and also a Google KML was used to find the project area.	Plant Net and Google Maps Website

4. LIMITATIONS

It is important to note that this assessment was undertaken in a short period, with limited field verification. The following limitations were encountered during this study:

- Wetland boundaries are estimated primarily using desktop data and limited field verification.
- The assessment of impacts and potential rehabilitation outcomes is guided by a structured process, but it is based on opinion rather than exact science.

5. SITE ASSESSMENT AND RESULTS

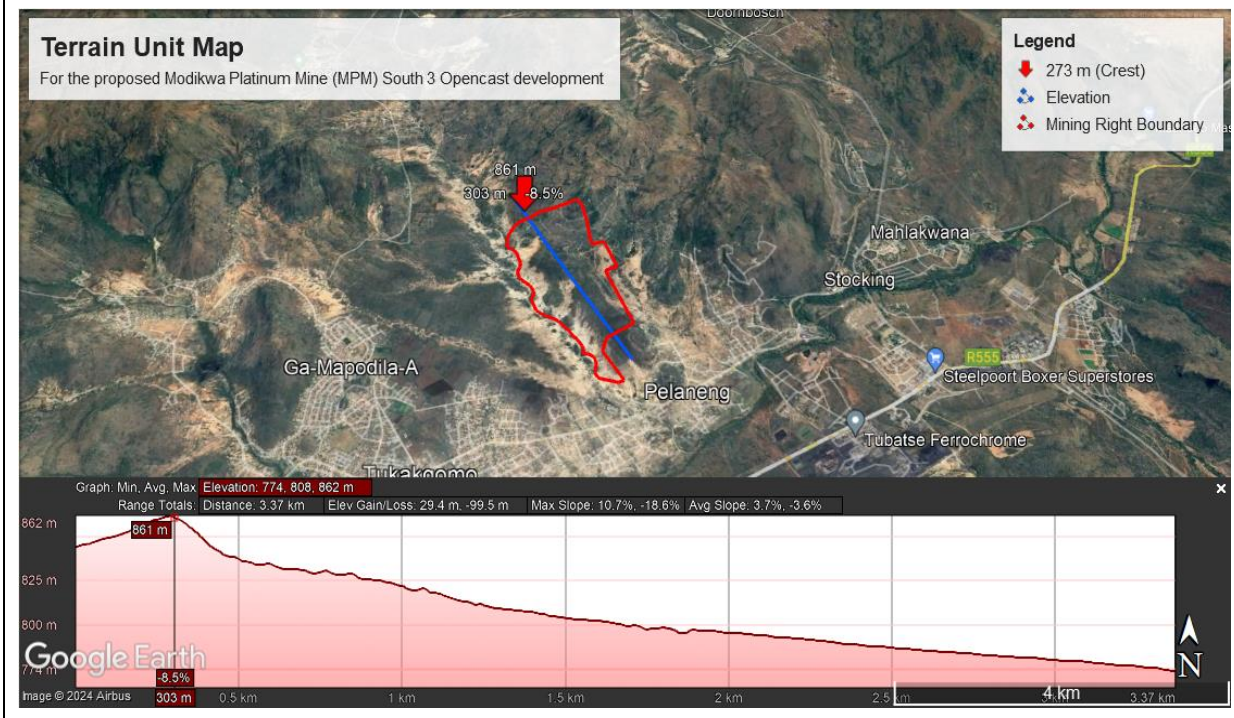
4.1. Wetland delineation

The wetland delineation was completed with the aid of aerial imagery, as well as verification in the field. The project area covers approximately 273 hectares and no wetlands were spotted or observed onsite. The delineation was conducted using the four specific indicators as mentioned in Section 3 namely Terrain Unit, Soil form, Vegetation, and Hydrology indicators.

4.1.1. Terrain Unit Indicator

The project area consists of three terrain units namely scarp, midslope, and foot slope and as shown under section 3.1.1 above, the mentioned terrain unit alone does not qualify for the wetland to be formed. **Figure 12** below shows that the crest unit is situated outside the project area, together with the valley bottom unit which is at the western part of the project area where the Tubatsane River is passing through.

It should be noted that the terrain unit indicator is an important practical index for identifying those parts of the landscape where wetlands are likely to occur.



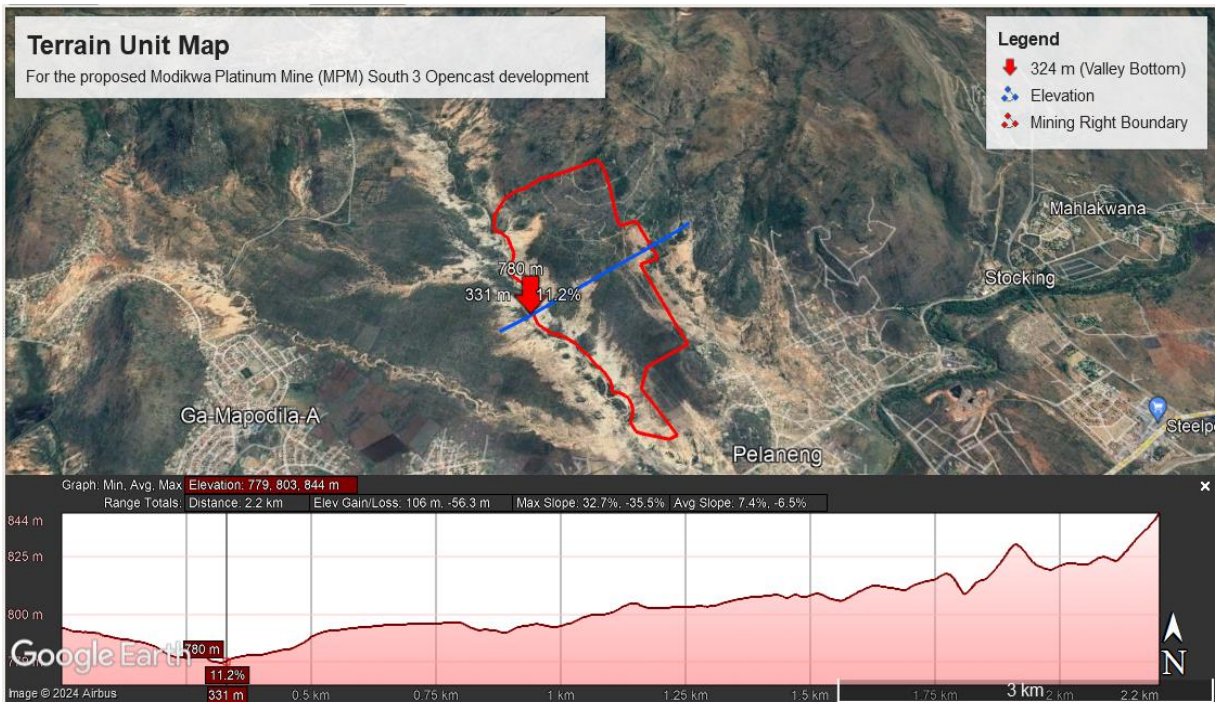
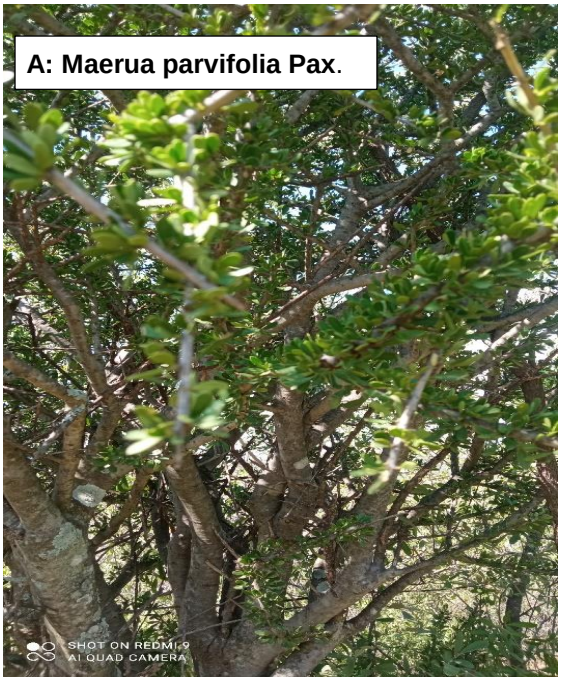


Figure 11: Terrain Unit Map for the proposed mining right project *(Segope Consulting, 2024)*

4.1.2. Wetland plants (Hydrophytes)

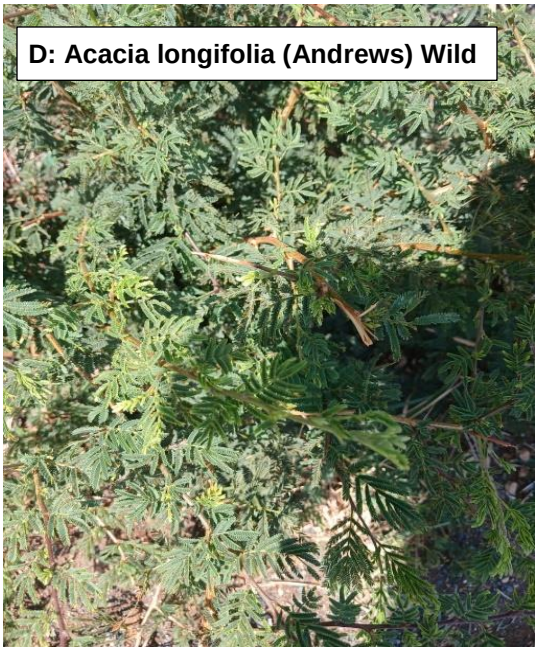
The proposed project area is situated within the Sekhukhune Plains Bushveld ecosystem which is considered Endangered according to the South African National Biodiversity Institute (SANBI) 2022 Ecosystem Red list. The ecosystem consists of predominantly short, open-to-closed thornveld with an abundance of Aloe species and other succulents. Heavily degraded in places and overexploited by man for cultivation, mining, and urbanization. Both man-made and natural erosion dongas occur in areas containing clays rich in heavy metals. Encroachment by indigenous microphyllous trees and invasion by alien species is common throughout the area.

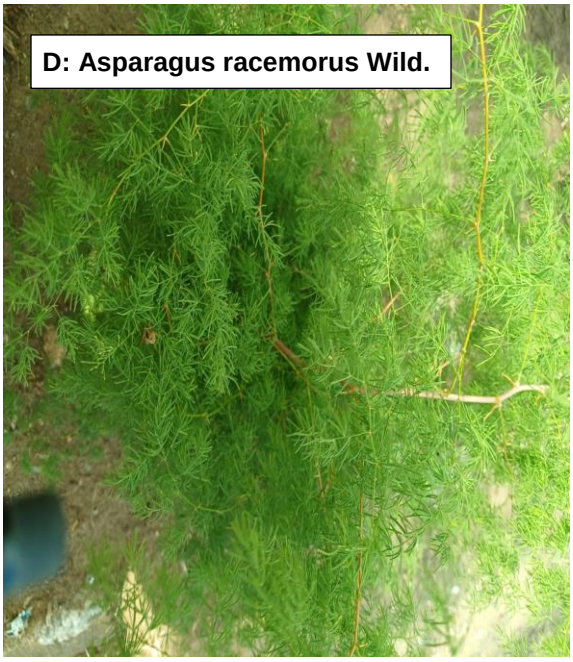
The vegetation types that have been observed within the area of the proposed site are Sekhukhune Plains Bushveld. The total of plant species that were identified during the site visit was 34 of these species 27 fell into the category of least concern, while 3 were not evaluated as they are naturalized exotic species. One protected species was identified as well as one which is considered threatened and none of the species observed were hydrophytes (Ecology Study by Segope Consulting , 2024).



A: Maerua parvifolia Pax.

B: Aloe chabaudii Schonland





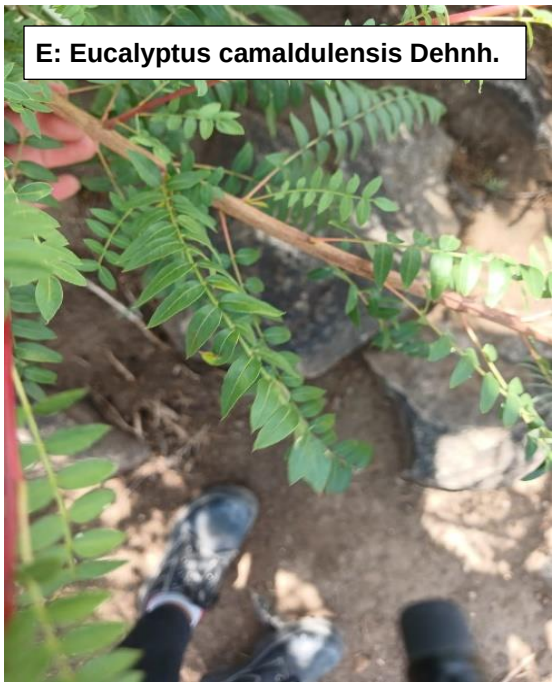


Figure 12: Some of the vegetation species that were pronominally found onsite *(Segope Consulting, 2024)*

4.1.3. Wetland Soils (Hydromorphic)

During the site assessments, the soil was assessed using the auger to check the soil composition, color, number, size, and chroma of mottles as well as wetness to confirm the zone of the wetlands. Some parts of the project area consisted of the Mispha/Glenrosa and Coega soil forms are shallow and characterized by an orthic horizon underlain by lithic or hard rock material and hard carbonate horizons, respectively. The rocky outcrops are associated with the mountainous areas with miscellaneous soils, refer to **Figure 14** (Hydropedology Study by Enviro-Solum Consulting, 2024)

Figure 13: The responsive (shallow) hydropedological soil type associated with the study area *(Enviro-Solum Consulting, 2024).*

The majority of the study area is covered with Bonheim/Abbotspoort and Witbank soils **(Figure 15)**. Bonheim/Abbotspoort soils are deep, dark-colored, clayey, and structured with pedocutanic and neocutanic characteristics. The highly intensive rainfall events of short duration and the clayey nature of these soils promote surface runoff and discourage infiltration, sometimes leading to erosion gullies which ultimately act as preferential flow path drainage lines. In the event of no internal drainage impediments, these soils may allow water percolation downward through the profile to weather rock and lime-rich subsoil horizons. Witbank soils are disturbed anthrosols that have not undergone intentional transportation. The disturbance is such that the diagnostic horizons are no longer arranged in any discernible order or recognizable heroization. As in the case of the anthrosols identified on site, they have undergone significant disturbance (Hydropedology Study by Enviro-Solum Consulting, 2024)

A: Bonheim/Abbotspoort Soils

B: Witbank Soils

Figure 14: The soil types observed within the proposed mining right boundary *(Enviro-Solum Consulting, 2024)*

4.1.4. Hydrology

The hydrology is the primary driving force behind all wetlands is water. However, due to its dynamic nature varying daily, seasonally, and annually, it is not a very useful parameter for accurately identifying the outer boundary of a wetland. Although for the proposed project area water was also used as one of the indicators for delineation as the is a perennial river observed onsite approximately 50 m away from the project's boundary **(Figure 16)**.

Figure 15: Tubatsane River observed in proximity to the project area *(Segope Consulting, 2024)*

6. CONCLUSION AND RECOMMENDATIONS

This study aims to provide sufficient transparent and technically robust information on the impacts of mining to enable informed decision-making by the authorities. The proposed project encompasses an area of approximately 273 Hectors hectares, located within the endangered ecosystem vegetation biome known as SVcb 27 Sekhukhune Plains Bushveld. The project area is located within B41J Quaternary Catchments in the Olifants Water Management Area. The Olifants region has been largely modified due to the cumulative impacts of mining. Despite the poor condition of the catchments, further impacts on these water resources are considered highly significant due to the connectivity of the watercourses associated with these catchments to the Olifants River.

During the ground truthing process, only the Tubatsane River was observed on-site at the study area boundary, and no wetlands were observed. The findings of the Aquatic Biodiversity Specialist Assessment must be included in the Environmental Impact Assessment Report, along with the identified mitigation and monitoring measures that are to be included in the Environmental Management Plan (EMPr).

The identified river showed a largely natural level of importance in terms of sensitivity. It is recommended to establish a scientific buffer zone along the stream. The operation and infrastructure layout plan must continue to exclude areas up to the proposed scientific buffer around the river to alleviate pressure on the river and buffer zone. All the mitigation measures provided below are to be implemented in the operation and decommission phase of the project activity, the following recommendations apply to this project:

- The infrastructure layout plan must exclude areas from the scientific buffer around the river area. Further to this, decant points should be kept outside of the scientific buffer.
- The dirty water trenches should be lined to avoid contamination of soil, surface and underground water. No dirty water should be channeled to the river area to avoid contaminating the river.
- Adhere to stormwater management design measures to be provided during the issuance of a water use license.
- Stormwater infrastructure must be developed, maintained, and monitored for effectiveness in controlling and minimizing erosion and sedimentation of watercourses.
- Diversion berms and the placement of sediment traps in obvious low points should be conducted to contain the extent of erosion and deposition reducing the scale of the impacts to the site itself.
- All removed soil and material must not be stockpiled within watercourse systems. Stockpiles should be protected from erosion, stored in flat areas to minimize runoff, and surrounded by bunds.
- All contaminated materials should be disposed of at permitted waste disposal facilities.
- A water quality monitoring and biomonitoring program must be implemented for the water resources within the area before and during the mining process.
- A rehabilitation plan must be created and executed to prevent further degradation of the buffer zone

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