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Ummbila Emoyeni Borrow Pit Water Use Licence Technical Report

Report

Version -Final

15 August 2025

GCS Project Number:23-0766

Client Reference: Ummbila Emoyeni Borrow Pit

GCS Environment South Africa (Pty) Ltd **Reg No:** 2002/028494/07
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Executive Summary

Introduction

Stefanutti Stocks (Pty) Ltd (Stefanutti) proposed to establish a Borrow Pit to be used to abstract construction aggregate for the construction of the Seriti Green Developments South Africa (Pty) Ltd Ummbila Emoyeni Wind Energy Facility (WEF). The WEF is located in Mpumalanga Province and extends across the Lekwa, Govan Mbeki, and Msukaligwa Local Municipalities, all within the Gert Sibande District Municipality. The Borrow Pit is located approximately 15 kilometres (km) to the southeast of the town of Bethal along the R35 road between Bethal and Morgenzon within the Lekwa Local Municipality.

As a result of the Borrow Pit, the following water uses will be triggered and require a Water Use Licence Application (WULA) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) for Water Uses as defined in section 21(c) or section 21(i) (Government Notice Regulation (GN R.) R509 of 26 August 2016):

- Section 21(c) – Impeding or diverting the flow of water in a watercourse.
- Section 21(i) – Altering the bed, banks, course, or characteristics of a watercourse.

Regulatory Water Framework

This application is being submitted to the Department of Water and Sanitation (DWS) to obtain a Water Use Licence under section 21(c) and (i) of the NWA for the establishment of the Borrow Pit to be used to abstract construction aggregate for the construction of the Seriti Green Developments South Africa (Pty) Ltd Ummbila Emoyeni WEF.

The applicant has undertaken an Environmental Authorisation (EA) application through a Basic Assessment process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended. Environmental Authorisation [(MP)30/5/1/3/2/1/(14646) EA] has been granted for the Borrow Pit. The following listed activities in terms of the Environmental Impact Assessment Regulations, 2014 (as amended) have been authorised:

- Activity 21 of Listing Notice 1 (GN R.983): Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
- Activity 27 of Listing Notice 1 (GN R.983): The clearance of an area of 1 hectare or more of vegetation.

Baseline Environment

The climatic conditions for the study site are characterised by a humid subtropical climate with hot, humid summers and dry cold winters with frost regularly occurring in the valley bottoms and other low-lying areas. The project site is located on a low, east to west ridge line that forms the northern edge of the Heilvleispruit valley. The site is flat and drains in a

southerly direction. No significant topographical features occur on the site. The project area falls within Vaal Water Management Area in Quaternary Catchment C11H. The dominant river in the quaternary catchment is the Blesbokspruit that drains the catchment in a southerly direction, two unnamed tributaries and the Kwaggalaagte River are identified as National Freshwater Ecosystem Priority Areas Rivers in the catchment. All these rivers are non-perennial rivers. The land use surrounding the project site largely consists of agricultural activities made up of grazing of livestock and cultivation of maize, soyabeans and other crops in rotation.

The assessment of the Department of Forestry, Fisheries and Environment Online Screening Tool indicates that the Aquatic Theme sensitivity for the project area is rated as "LOW," which is supported by the absence of any aquatic features within the site or a 32-metre (m) radius. Additional watercourses in the area include the Heilvleispruit channel (180 m south), the Kwaggalaagte River (300 m west), and a small unnamed tributary (260 m east), all more than 100 m from the project boundary (Ecolink Consulting, 2024). These wetland areas are classified as Present Ecological State Class C, indicating moderate modification with relatively intact habitat conditions. The Ecological Importance and Sensitivity of these wetlands is considered medium for the Channelled Valley Bottom and Flood Plain wetlands and low for the Seep Wetland. The primary potential impact from the Borrow Pit relates to stormwater runoff, necessitating a Stormwater Management Plan to ensure proper control and separation. If managed appropriately, the risk to the ecological condition and service delivery of the aquatic features is considered LOW, in line with the DWS's Risk Assessment Matrix.

A Hydropedology Assessment undertaken by Eco-Assist Environmental Consultants identified four soil forms on site: Mispah (Orthic A-horizon over Hard Rock), Glenrosa (Orthic A-horizon over a Lithic horizon), Tukulu (Orthic A-horizon over a Neocutanic B-horizon, over a Soft Plinthic horizon) and Hydromorphic (wetland soils in valley bottoms). The site's hillslope catenae are generally convex, with interflow (soil/bedrock) conditions dominating the crest landscape positions and shallow responsive soils present on the scarp edges. The valley bottoms contain saturated responsive soils, indicating hydromorphic zones associated with wetland areas. The Borrow Pit will be located within shallow responsive and interflow zones, which are expected to have minimal impact on hydropedological functioning, though increased impervious surfaces may elevate runoff volumes and flow velocities (Eco-Assist Environmental Consulting, 2025). Recommended mitigation measures include maintaining a 40 m buffer from wetland systems and implementing stormwater controls to protect subsurface flow paths and wetland functioning (Ecolink Consulting, 2024).

Conclusion

This Draft Technical Report has been prepared in support of the WULA for the Borrow Pit, in

accordance with section 21(c) and (i) of the NWA. The report outlines the relevant water uses, describes the receiving environment and presents the findings of the Risk Assessment undertaken to inform water resource protection measures. Appropriate mitigation and management actions have been identified to minimise potential impacts on nearby watercourse. This Draft Technical Report will be made available to stakeholders and Interested and Affected Parties for review and comment. All comments received during this period will be considered and addressed, as well as documented in the public participation report that will form part of the Final Technical Report.

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LIST OF ABBREVIATIONS

Abbreviation	Description
BID	Background Information Document
CBO	Community-Based Organisation
CMS	Catchment Management Strategy
CVB	Channelled Valley Bottom
DEM	Digital Elevation Model
DFFE	Department of Forestry, Fisheries and the Environment
DTIC	Department of Trade, Industry and Competition
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ELWU	Existing Lawful Water Uses
EMPr	Environmental Management Programme
GA	General Authorisations
GCS	GCS Environment (Pty) Ltd
GN R	Government Notice Regulation
GHG	Green House Gas
HDI	Historically disadvantaged individuals
I&AP	Interested and Affected Parties
IPP	Independent Power Producer
IRP	Integrated Resource Plan
JET	Just Energy Transition
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:WA	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Areas
NGO	Non-Governmental Organisations
NWA	National Water Act, 1998 (Act No. 36 of 1998)
NWRCS	National Water Resource Classification System
ORASECOM	Orange-Senqu River Commission
PES	Present Ecological State
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RQO	Resource Quality Objectives
SADC	Southern African Development Community
SANBI	South African Biodiversity Institute
SED	Social and Economic Development

Abbreviation	Description
SMME	Small, medium, and micro enterprises
SMP	Stormwater Management Plan
SMME	Small, medium, and micro enterprises
VOCMA	Vaal-Orange Catchment Management Agency
WEF	Wind Energy Facility
WET-Health assessment	Wetland Health and Integrity Assessment
WMA	Water Management Area
WUL	Water Use Licence
WULA	Water Use Licence Application

UNITS OF MEASUREMENT

Unit of Measure	Description
^{0}C	Degrees Celcius
km	Kilometres
MAP	Mean Annual Precipitation
masl	Metres above sea level
cm	Centimetre
mm	Millimetre
m/a	Squared metres
m^2	Squared metres
m^3/a	Cubic metres per annum
m^3/d	Cubic metres per day
Mm^3/a	Million cubic metres per annum

1 INTRODUCTION

1.1 Activity Background

Stefanutti Stocks (Pty) Ltd (Stefanutti) plans to establish a Borrow Pit to be used to abstract construction aggregate for the construction of the Seriti Green Developments South Africa (Pty) Ltd Ummbila Emoyeni Wind Energy Facility (WEF). The WEF is located in Mpumalanga Province and extends across the Lekwa, Govan Mbeki and Msukaligwa Local Municipalities, all within the Gert Sibande District Municipality.

The application area is located approximately 15 kilometres (km) to the southeast of the town of Bethal along the R35 road between Bethal and Morgenzon within the Lekwa Local Municipality. The site is located close to the construction site where the material will be used, this will reduce the distance that the hauling trucks need to travel and a reduction in travel time and costs.

As a result of the Borrow Pit, the following water uses will be triggered and require a Water Use Licence Application (WULA) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) for Water Uses as defined in section 21(c) or section 21(i) (Government Notice Regulation (GN R) 509 of 26 August 2016):

- Section 21(c) – Impeding or diverting the flow of water in a watercourse.
- Section 21(i) – Altering the bed, banks, course, or characteristics of a watercourse.

A WULA has been initiated on the Electronic Water Use Licence Application and Authorisation System (e-WULAAs) and the assigned reference number for this application is WU41439.

1.2 Project Applicant and Environmental Consultant

The contact details of the operation and the consultant compiling this technical report can be seen in Table 1-1 and Table 1-2.

1.2.1 Details of the Applicant

Table 1-1: Applicant Details

Name of applicant:	Stefanutti Stocks Inland a division of Stefanutti Stocks (Pty) Ltd
Postal address:	P.O. Box 12394, Aston Manor, 1630
Physical address:	9 Palala Street, Chloorkop, Kempton Park, Johannesburg, 1619
Contact number:	078 456 3420
Contact person:	Joe Nell
E-mail address:	Joe.Nell@stefstocks.com

1.2.2 Environmental Consultant

Table 1-2: Details of the Environmental Consultant

Name of environmental consultant	GCS Water and Environment (Pty) Ltd
Postal address:	P.O. Box 2597, Rivonia, 2128

Physical address:	63 Wessel Road, Rivonia, 2128
Contact number:	011 803 5726
Contact person	Paula Tolksdorff
E-mail address	Paulat@gcs-sa.biz

The Curriculum Vitae and Qualifications of the Environmental Assessment Practitioner is attached to APPENDIX A.

1.3 Regional Setting and Location of Activity

The application area is located approximately 15 km to the south of the town of Bethal in the Lekwa Local Municipality within the Gert Sibande District Municipality in the Mpumalanga Province. The regional setting, local setting and site location of the project area are illustrated respectively in Figure 1-1, Figure 1-2 and Figure 1-3.

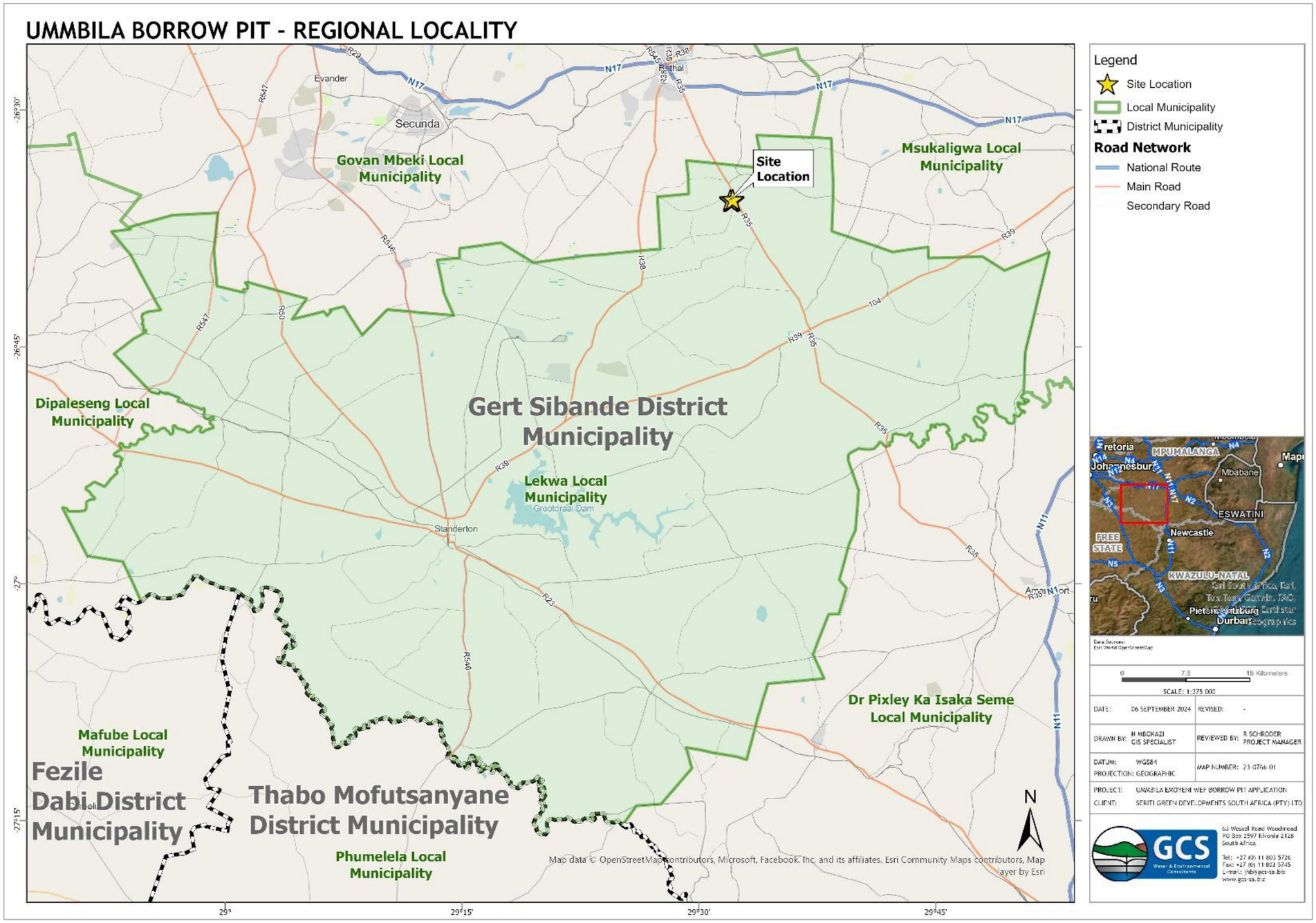


Figure 1-1: Regional Setting

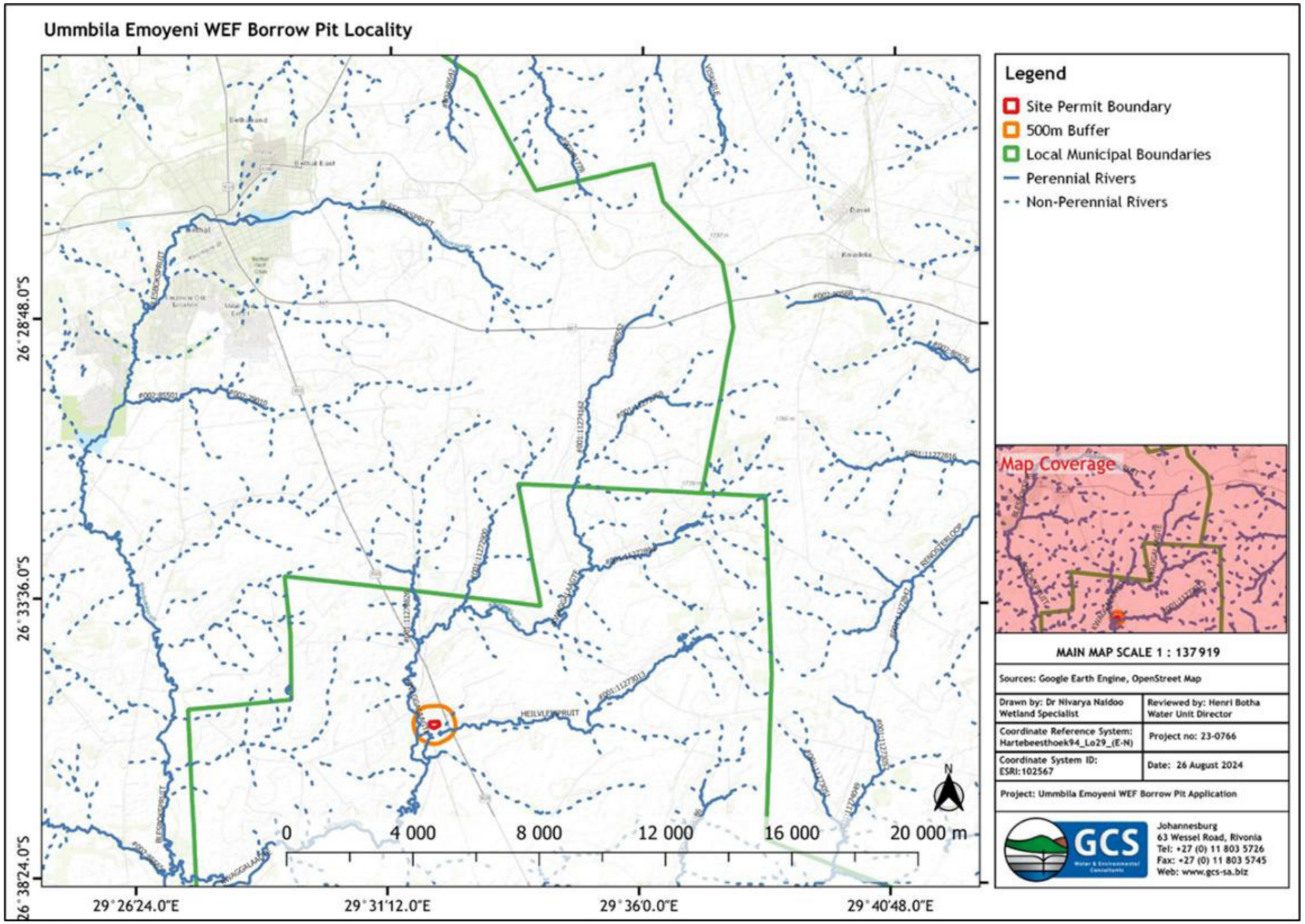


Figure 1-2: Local Setting

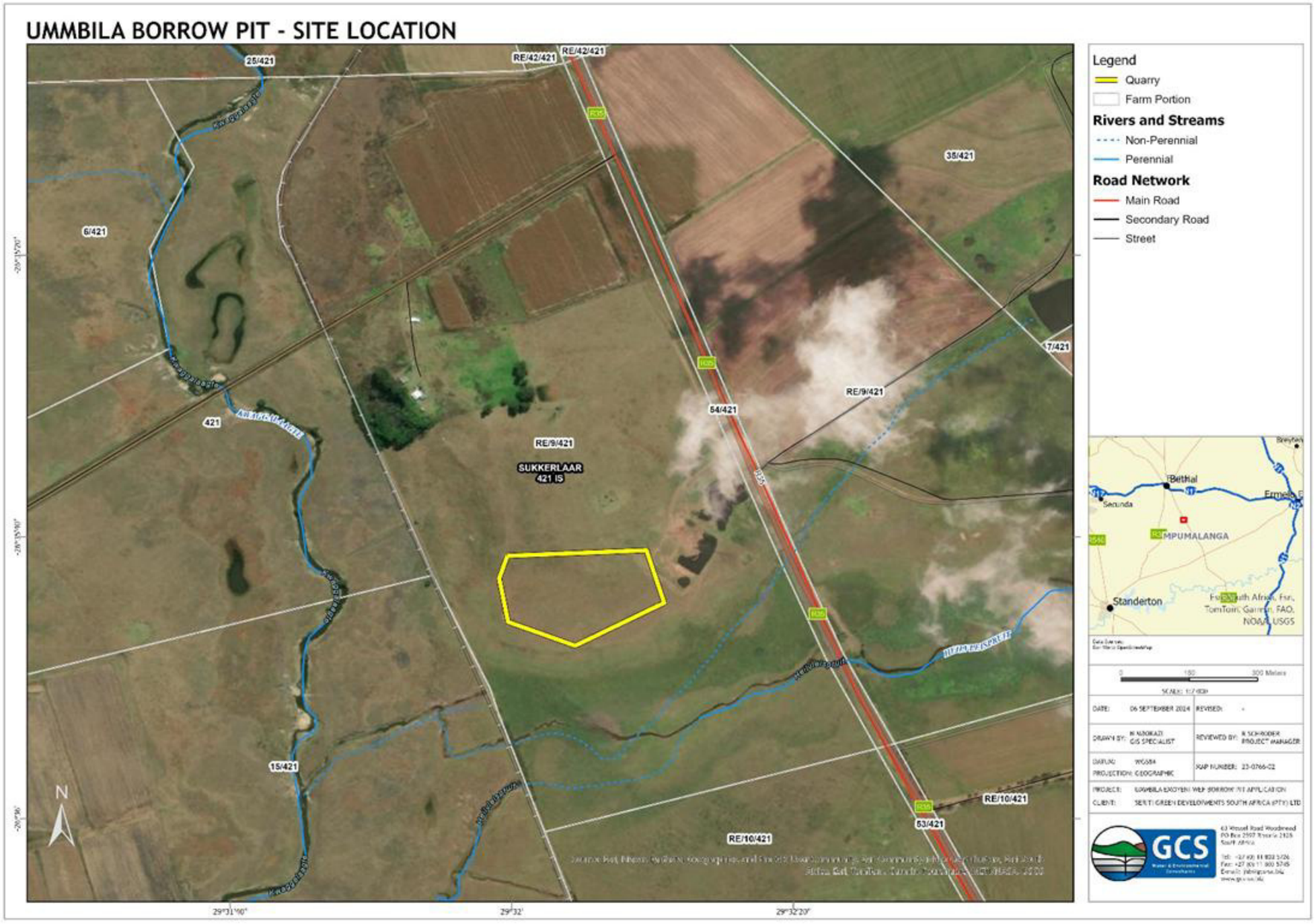


Figure 1-3: Site Location

1.4 Property Description

The project is located on Portion 9 of the Farm Sukkelaar 421. The cadastral details of the properties where the water uses will take place are listed in Table 1-3 and illustrated in Figure 1-4.

Table 1-3: Project Locality Details

Farm Name:	Sukkelaar 421 Portion 9
Application Area (ha):	4.9
Magisterial District:	Standerton
Distance and Direction from Nearest Town	15 km to the southeast of the town of Bethal
Title Deed Number	T36793/99
21 Digit Surveyor	T0IS00000000042100009

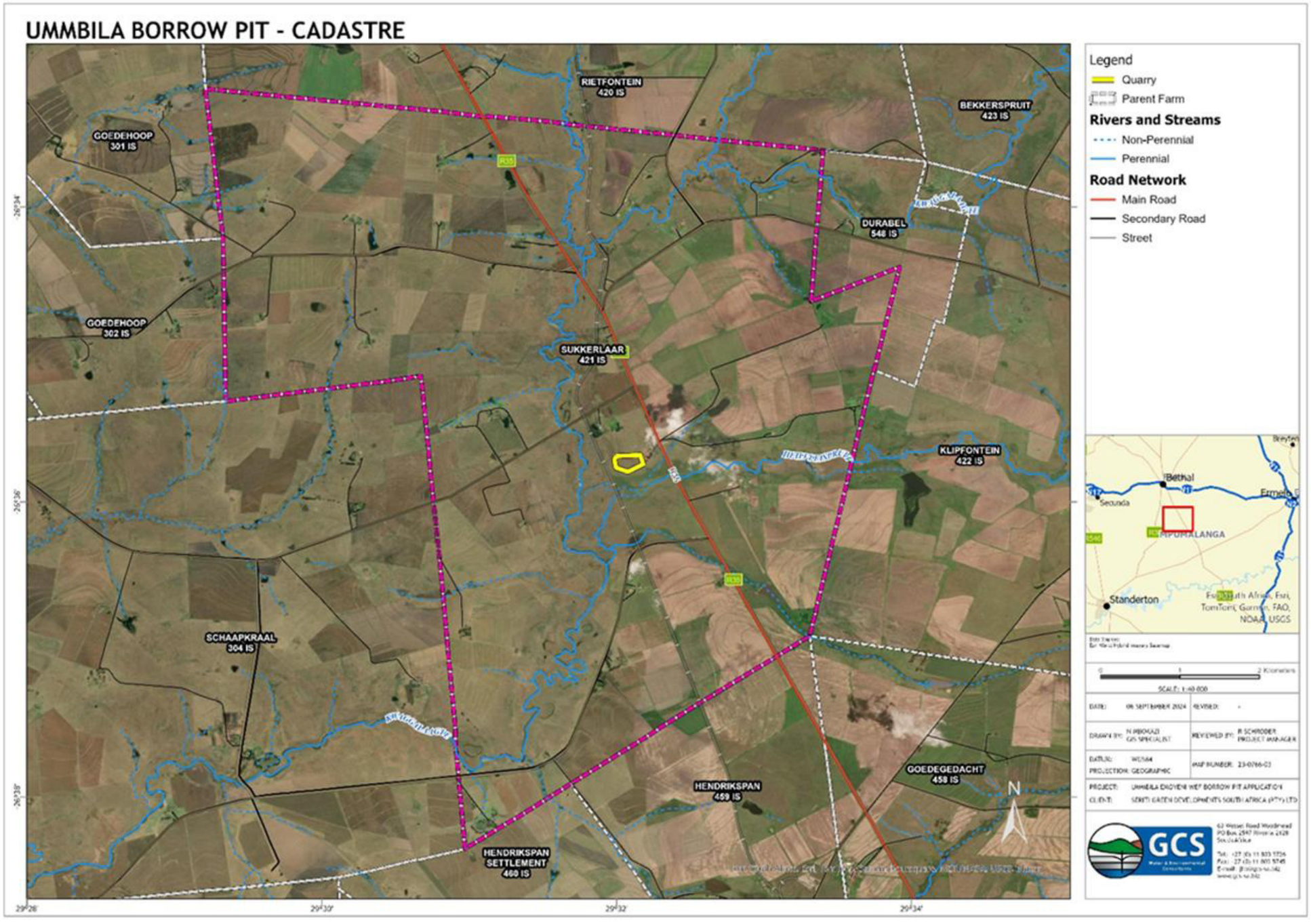


Figure 1-4: Cadastral Location of the Project

2 CONTEXTUALISATION OF ACTIVITY

2.1 Description of the Activity

The project involves the establishment of a Borrow Pit and associated infrastructure to supply construction materials for the Ummbila Emoyeni WEF. The WEF, located adjacent to the Borrow Pit, will generate renewable energy through the installation of wind turbines to supply power to the Seriti Coal Mines and other private off-takers, thereby reducing reliance on the national grid.

The Borrow Pit will provide aggregate for access roads, turbine foundations, and other WEF infrastructure. Activities will be undertaken in three phases:

2.1.1 Construction Phase – Preparing the Site for Mining Operations

This phase focuses on establishing the Borrow Pit and supporting infrastructure, ensuring compliance with design and environmental requirements before material extraction begins:

- Continuous engagement with affected landowners.
- Implementation of the approved construction methodology.
- Preparation of a detailed Mining Plan, including pit layout, fencing, access routes, stockpiles, storage areas, crushing/screening zones, support facilities, haul roads, and overburden placement.
- Implementation of site drainage measures in accordance with the Stormwater Management Plan (SMP).
- Site preparation, including vegetation clearing, topsoil removal and storage, installation of fencing, and establishment of temporary fuel storage and maintenance areas.

2.1.2 Extraction and Processing Phase – Supplying Construction Materials

This phase involves the controlled removal and processing of aggregate to meet project construction needs while maintaining safety and environmental controls:

- Aggregate extraction for road and infrastructure construction.
- Controlled blasting, if required, with prior notification to affected landowners.
- Regulation of pit depth, side slopes, and floor gradients to ensure stability.
- Temporary storage of topsoil and overburden for future rehabilitation.
- Crushing and screening of extracted material for use in earthworks.
- Use of inert and spoil material for landscaping and rehabilitation.

- Implementation of stormwater control measures to prevent water ponding, especially during summer rainfall periods.

2.1.3 Post-Mining Phase – Restoring the Site

Once mining activities conclude, the site will be rehabilitated to ensure long-term stability and environmental integrity:

- Grading of the site to restore natural contours.
- Removal of all mining-related infrastructure.
- Stabilisation, restoration, and rehabilitation of the Borrow Pit in accordance with the approved Closure Plan.

2.1.4 Mining Equipment – Plant and Machinery to be Utilised

The following machinery will be deployed as required during construction, extraction, and rehabilitation phases:

- Excavators.
- Bulldozers and front-end loaders.
- Tipper trucks.
- Graders.
- Water trucks.
- Low-bed trucks for transporting heavy machinery.

2.2 Project Description

The Borrow Pit will supply weathered dolerite, to be used exclusively for the construction of access and internal roads associated with the Ummbila Emoyeni WEF, which is located in the surrounding area.

The Borrow Pit is situated within an agricultural landscape characterised by grain cultivation and livestock farming. The site is readily accessible; however, a separate access point from the adjoining farm will be established to facilitate operations. No new access roads will be required.

The project will include the following components:

- Mining area – designated zone for the extraction of weathered dolerite.
- Topsoil stockpile area – for the temporary storage of stripped topsoil to be used in rehabilitation.
- Generator and fuel storage area – for the operation of site machinery.

- Crushing area – for processing the extracted material.
- Spoils area – for the temporary storage of inert material.
- Temporary sanitation facilities – for site personnel.

The site layout plan illustrating the Borrow Pit and its associated components is provided in Figure 2-1.

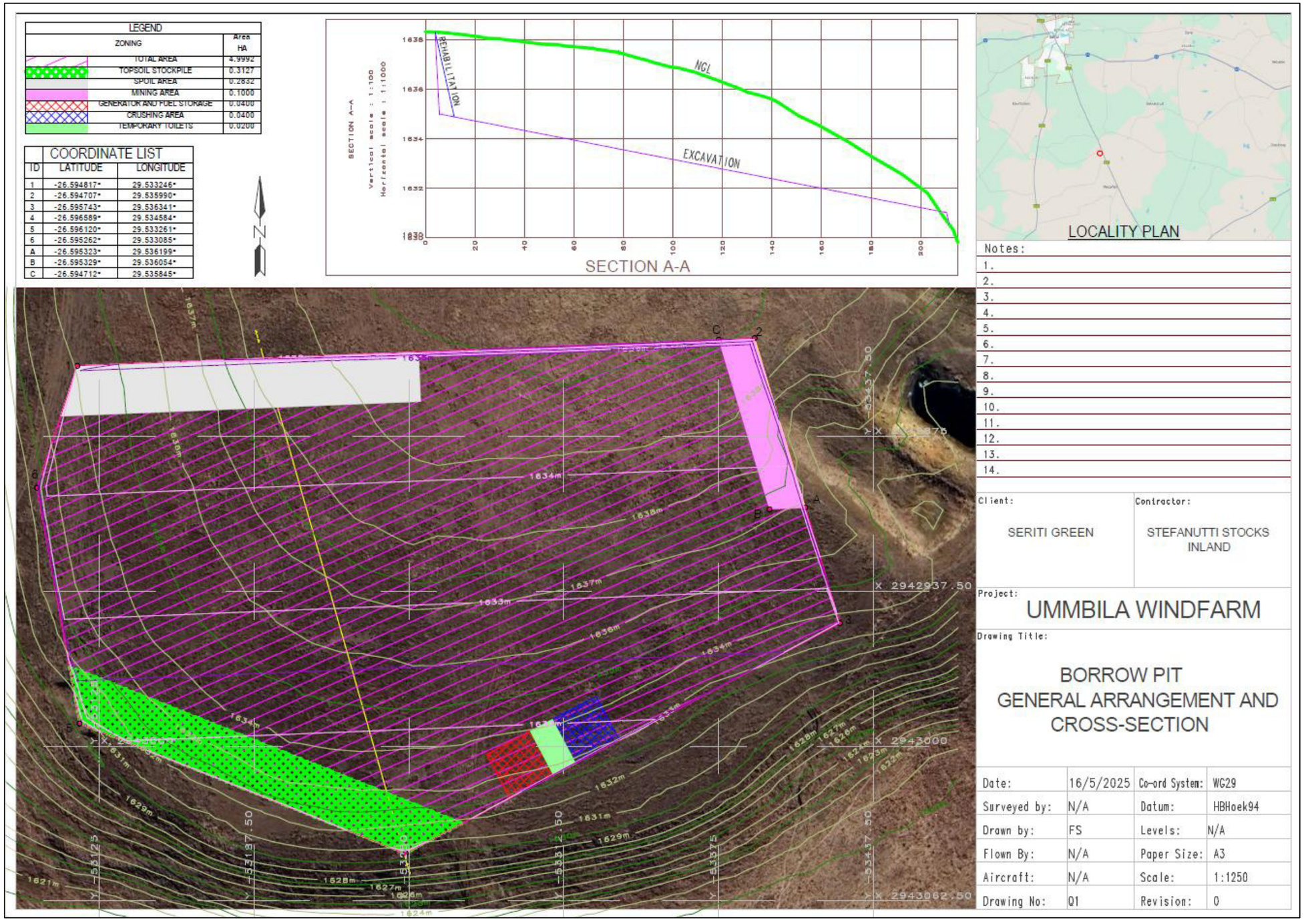


Figure 2-1: Site Layout Plan

2.3 Extent of the Activity

The Environmental Authorisation (EA) issued for the project allows for the development and operation of a Borrow Pit with a total footprint of 4.9 hectares.

2.4 Activity Life Description

The anticipated operational lifespan of the Borrow Pit is approximately five years.

3 REGULATORY WATER FRAMEWORK

Water management in South Africa is primarily regulated by the NWA. Section 19 of the NWA focuses on regulatory controls for pollution, while section 21 identifies 11 water uses that may require authorisation.

3.1 Summary of all Water Uses

Water resources in the Republic of South Africa are regulated under the NWA. The Minister of Water and Sanitation is the custodian of all water resources in the country, acting on behalf of the people of South Africa.

Under the NWA, it is an offence to pollute any water resource or render it unfit for use, including rainwater, seawater, and groundwater. Additionally, all water uses identified under section 21 must be authorised in accordance with section 40 of the Act. Details of the applicable water uses are provided in Table 3-1. Figure 3-1 depicts the water uses identified for the project.

Table 3-1: Summary of all Water Uses

Water Use(s) Activities	Purpose	Property Description	Co-ordinates	
			Longitude	Latitude
Section 21 (c) and (i)				
Borrow Pit within 500 m of a watercourse	Sourcing material for the construction of roads	Portion 9 of the Farm Sukkelaar No. 421 IS	26° 35' 40.97" S	29° 32' 09.55" E
Borrow Pit within 500 m of a watercourse	Sourcing material for the construction of roads	Portion 9 of the Farm Sukkelaar No. 421 IS	26° 35' 44.70" S	29° 32' 10.83" E
Borrow Pit within 500 m of a watercourse	Sourcing material for the construction of roads	Portion 9 of the Farm Sukkelaar No. 421 IS	26° 35' 47.72" S	29° 32' 04.48" E
Borrow Pit within 500 m of a watercourse	Sourcing material for the construction of roads	Portion 9 of the Farm Sukkelaar No. 421 IS	26° 35' 46.04" S	29° 31' 59.73" E
Borrow Pit within 500 m of a watercourse	Sourcing material for the construction of roads	Portion 9 of the Farm Sukkelaar No. 421 IS	26° 35' 42.99" S	29° 31' 59.09" E
Borrow Pit within 500 m of a watercourse	Sourcing material for the construction of roads	Portion 9 of the Farm Sukkelaar No. 421 IS	26° 35' 41.38" S	29° 31' 59.73" E

Figure 3-1: Water Uses Applicable to the Project

3.2 Existing Lawful Water Uses

In terms of section 32 of the NWA, a water use is considered an Existing Lawful Water Use (ELWU) if it was lawfully exercised during the two years preceding the commencement of the Act or subsequently authorised under legislation in force at the time. As the Borrow Pit is a proposed (future) activity, it does not meet the criteria for classification as an ELWU.

3.3 Relevant Exemptions

Under the NWA, exemptions apply in cases where specific water uses or activities are excluded from licensing requirements, provided that prescribed conditions are met. These provisions aim to streamline regulatory processes for low-impact or routine activities. No such exemptions apply to the proposed Borrow Pit.

3.4 Generally Authorised Water Uses

General Authorisations (GAs) permit certain low-impact water uses to be undertaken without a licence, provided all specified conditions are met. These serve as conditional exemptions from licensing. The water uses associated with the Borrow Pit do not meet the requirements of any applicable GA and, as such, will require a WUL.

3.5 New Water Uses to be Licenced

All the water uses that are applied for are indicated in section 3.1 of this report.

3.6 Waste Management Activity

The Borrow Pit will not involve any activities that trigger listed waste management activities under the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA). Therefore, no authorisation in terms of NEM:WA is required.

3.7 Other Authorisations

The following activities for the Borrow Pit were authorised under EA No. (MP)30/5/1/3/2/1/(14646), issued on 23 June 2025:

- Activity 21 of Listing Notice 1 (GN R.983): Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
- Activity 27 of Listing Notice 1 (GN R.983): The clearance of an area of 1 hectare or more of vegetation.

4 PRESENT ENVIRONMENTAL SITUATION

The information was obtained from the Wetland and Aquatic Assessment attached in APPENDIX B.

4.1 Climate

The climatic conditions for the study site are characterised by a humid subtropical climate with hot, humid summers and dry cold winters with frost regularly occurring in the valley bottoms and other low-lying areas. The mean summer temperature for the district is approximately 23 Degrees Celsius (ºC) with the mean winter temperature being 10 ºC. Annual rainfall is estimated at approximately 800 millimetre (mm) of rain that primarily falls during the summer months with drizzle characterising the rainfall during autumn and spring. A summary of the climatic conditions for the general area is provided in the Figure 4-1 below.

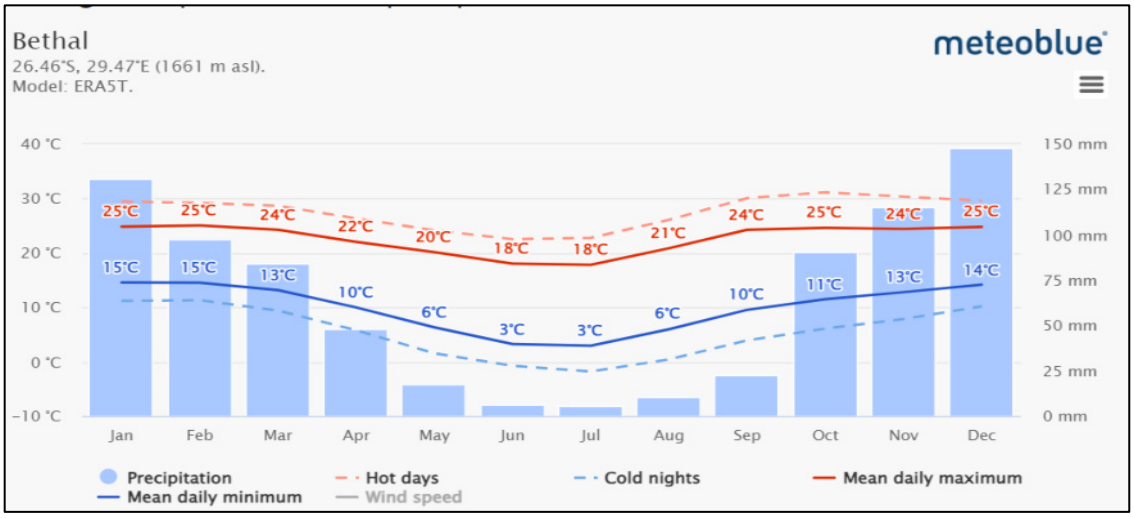


Figure 4-1: Average climatic conditions of the town of Bethal (source www.meteoblue.com)

4.2 Topography

The project site is situated on a low east-west ridge line forming the northern boundary of the Heilvleispruit Valley (Figure 4-2). The terrain is generally flat, with surface drainage flowing southwards. No significant topographical features are present on the site.

The proposed Borrow Pit is located immediately west of an older Borrow Pit, which was first opened around 1968 and shows evidence of activity as recently as 2017. Material from the historical Borrow Pit was likely used by the provincial roads authority for upgrading provincial district roads in the area.

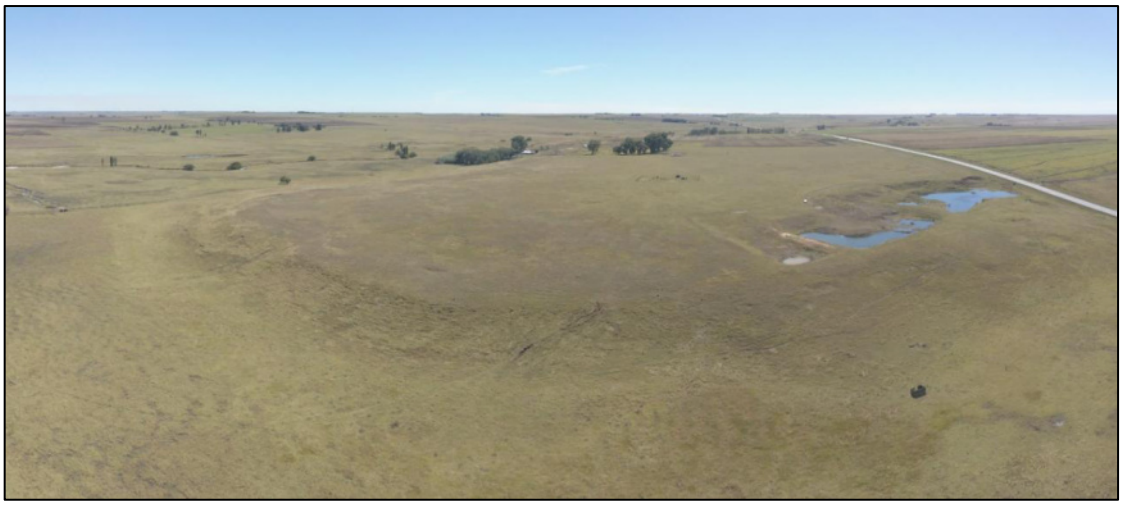


Figure 4-2: Aerial view of the project site showing the topography, looking in a northerly direction

4.3 Land Use and Land Capability

The land surrounding the project site is predominantly used for agricultural purposes, including livestock grazing and the cultivation of maize, soybeans, and other rotational crops (Figure 4-4). These farming practices have been established in the area for decades. The project site itself is currently used for grazing and has not been ploughed or planted, likely due to the presence of surface weathered dolerite (Figure 4-3), which covers much of the site.

Figure 4-3: View of the weathered dolerite at or near the surface in the project site

Figure 4-4: Dated aerial image (1979) of the project site showing the cultivated areas surrounding the site

4.4 Hydrological

The project area falls within Vaal Water Management Area in Quaternary Catchment C11H. The dominant river in the quaternary catchment is the Blesbokspruit that drains the catchment in a southerly direction, two unnamed tributaries and the Kwaggalaagte River are identified as National Freshwater Ecosystem Priority Areas (NFEPA) Rivers in the catchment. All these rivers are considered to be non-perennial rivers.

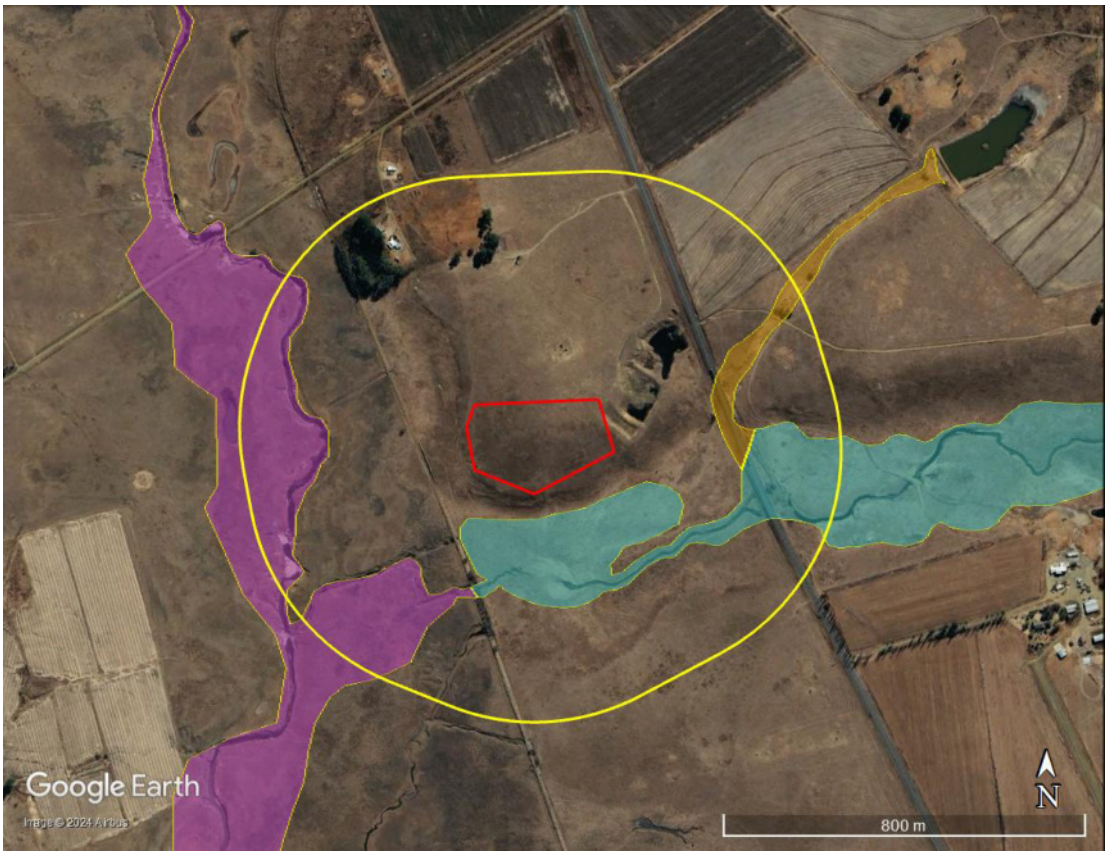
5 SPECIALIST FINDINGS

5.1 Wetlands and Aquatic Assessment

The section has been summarised from the Wetland and Aquatic Assessment attached in APPENDIX B.

5.1.1 Identification, Delineation and Mapping of Aquatic Features

The site assessment confirmed the absence of any natural wetland features within the boundaries of the project site. Furthermore, it identified three wetland features, one a Floodplain wetland associated with the Kwaggalaagte River, one a Channelled Valley Bottom (CVB) associated with the Heilvleispruit and a Seep Wetland within a 500 m radius of the project site. The location of these features is indicated in Figure 5-1.



Flood Plain; CVB = Channelled Valley Bottom; SP = Seep

Figure 5-1: Location of the Wetland Features Identified During the Field Assessment (In Green) Within a 500m Radius (In Yellow) of the Project Site (In Red)

Three seasonal watercourses were identified within a 500 m radius of the project site. The one is the Kwaggalaagte River that passes the project site to the west, the other is the Heilvleispruit that is located immediately to the south of the site and the third is the unnamed watercourse that is associated with the Seep. The latter forms a tributary of the Heilvleispruit, which in turn forms a tributary of the Kwaggalaagte River. The location of these watercourses is indicated in Figure 5-2.

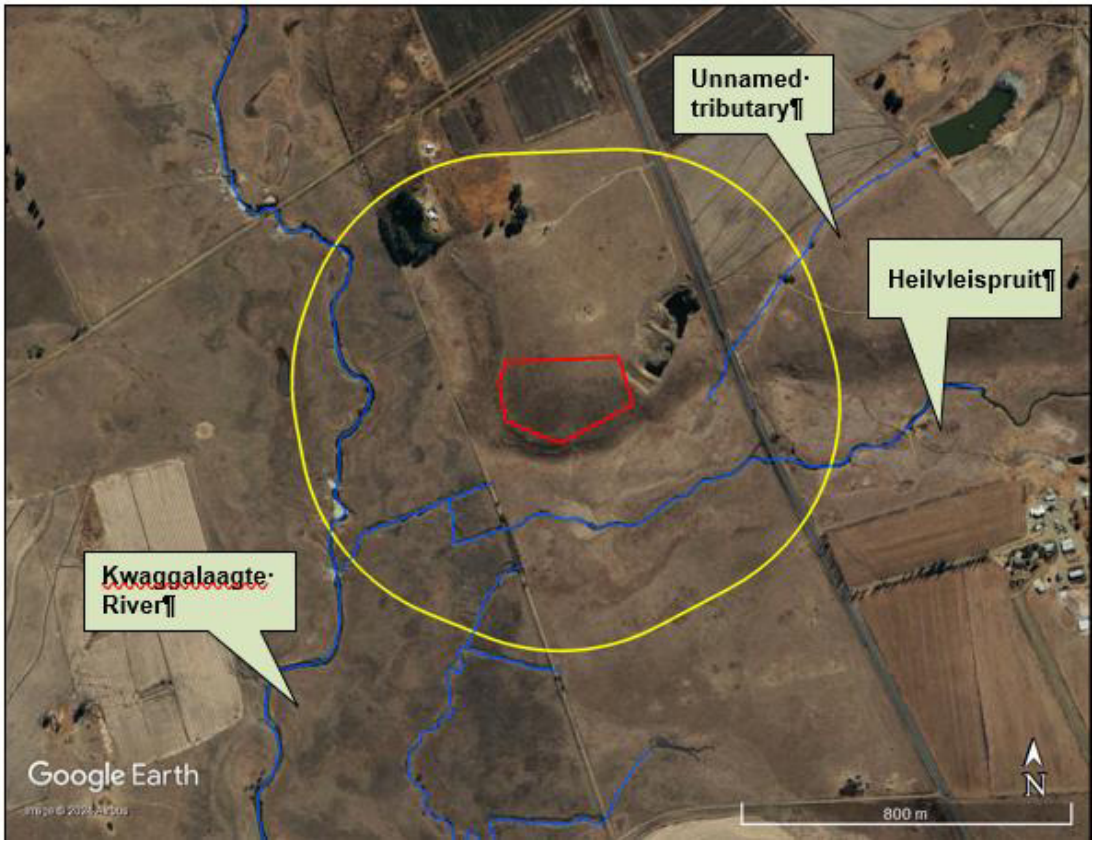


Figure 5-2: Location of the watercourses identified during the field assessment (shown in blue) within a 500m radius (shown in yellow) of the project site (shown in red)

5.1.2 Aquatic Feature Delineation

5.1.2.1 Wetness Indicators

All watercourses within the study area were delineated on site utilising the wetland delineation manual 'A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas' (Department of Water Affairs and Forestry, 2008). The following sections provide descriptions of the wetness indicators that were recorded during the field survey associated with the site in justification of the watercourse delineation.

5.1.2.2 Terrain Unit Indicator

In order to identify potential areas of wetness and accurately classify the delineated watercourses the terrain unit/profile within the study area must be characterised. The terrain of the study area was gently sloping with the highest elevations present within the northern portions of the study area and the lowest elevations present within the north-eastern and south-western portions of the study area. The topography slopes downwards in a south-easterly direction towards the perennial Heilvleispruit and downwards in a south-westerly direction towards the perennial Kwaggalaagte riverine systems. The perennial and associated non-perennial rivers were dry at the time of assessment.

5.1.2.3 Soil Wetness Indicator

In practice, the soil wetness indicator is used as the primary indicator of the presence of hydric soils, and thus a wetland or watercourse (Department of Water Affairs and Forestry, 2008). Various colour components of the soil profile provide evidence of hydric soils, which can be defined as soils that undergo repeated and prolonged periods of saturation (Department of Water Affairs and Forestry, 2008) These components include the presence of mottling (i.e. brightly coloured streaky, or specks of iron compounds), a greyed soil matrix (i.e. grey coloured soil) and iron or manganese concretions. It must be noted that the hydromorphic soils must exhibit signs of wetness within the top 50 centimetres (cm) of the soil profile to be classified as a wetland.

5.1.2.4 Vegetation Indicator

The infield assessment was undertaken during the dry season and the vegetation was either heavily grazed or invaded by invasive alien plant species. A small patch of *Typha latifolia* (Bulrush) was identified near the outlet of the culvert leading into the perennial Heilvleispruit. The vegetation was dominated by *Centaurea* (Yellow star-thistle), an invasive plant species. Significant encroachment by invasive alien plant species was also a confounding factor which limited the identification of a distinct riparian zone. However, the change in topographic setting in conjunction with changes in soil characteristics and landscape position were utilised when determining the riparian boundary of the perennial rivers.

5.1.3 Determining the Present Ecological State of an Aquatic

The Present Ecological State (PES) is a function of the impacts that are present within the footprint of the feature as well as the catchments associated with each of these features and how these impacts affect the drivers of the wetland and watercourse. The impacts that are present in the catchment of the identified wetlands and watercourses are provided in the Table 5-1 below.

Table 5-1: Identified Impacts on the Aquatic Features

HGM Unit	Impacts to the Catchment	Physical Impacts to the Wetland
Channelled Valley Bottom (Figure 5-3)	• Intensive commercial agriculture (cultivation) • Civil infrastructure (roads, railway line, power lines, etc.) • Stormwater discharge from the contoured commercial agricultural areas and infrastructure • Alien invasive plant species • Farm dams	• Alien invasive plant species • Several culvert and bridge crossings • Civil infrastructure (roads) • Dam and associated impoundment • Direct stormwater discharge from agricultural areas and infrastructure • Erosion Canalisation of water flow
Flood Plain (Figure 5-5	• Intensive commercial agriculture (cultivation) • Civil infrastructure (roads, railway line, power lines, etc.) • Stormwater discharge from the contoured commercial	• Alien invasive plant species • Several culvert and bridge crossings • Civil infrastructure (railway line, roads)

HGM Unit	Impacts to the Catchment	Physical Impacts to the Wetland
	agricultural areas and infrastructure • Alien invasive plant species • Farm dams	• Dam and associated impoundment • Direct stormwater discharge • Erosion • Canalisation of water flow
Seep (Figure 5-4)	• Intensive commercial agriculture (cultivation) • Civil infrastructure (roads, railway line, power lines, etc.) • Stormwater discharge from the contoured commercial agricultural areas and infrastructure • Alien invasive plant species • Farm dam	• Alien invasive plant species • Dam and associated impoundment • Direct stormwater discharge from agricultural areas and infrastructure • Erosion
Watercourses	• Intensive commercial agriculture (cultivation) • Civil infrastructure (roads, railway line, power lines, etc.) • Stormwater discharge from the contoured commercial agricultural areas and infrastructure • Alien invasive plant species • Farm dams	• Alien invasive plant species • Several culvert and bridge crossings • Civil infrastructure (railway line, roads) • Dam and associated impoundment • Direct stormwater discharge • Erosion • Canalisation of water flow

Figure 5-3: Aerial view of the road and culvert crossing through the Channelled Valley Bottom

Figure 5-4: Aerial view of the culvert and road crossing the Seep as well as the dam and impoundment area

Figure 5-5: Aerial view of the railway and culvert crossings in the Flood Plain as well as the canalised water flow

The impacts identified in the table above were used in the Level 1 Wetland Health and Integrity Assessment (WET-Health assessment) to determine the PES of the wetland system. The results of the Level 1 assessment are provided in the table below.

Table 5-2: Present Ecological State of the System

Hydrogeomorphic Unit	Driver			
	Hydrology	Geomorphology	Vegetation	Combined Score
Channelled Valley Bottom	3.1	4.2	4.7	3.3 = Class C Moderately modified
Flood Plain	3.5	4.1	4.2	3.8 = Class C Moderately modified
Seep	4.1	4.0	3.2	3.8 = Class C Moderately modified
Watercourses	4.2	4.3	3.2	3.9 = Class C Moderately modified

The PES of all the wetland features included in this study are classified as Class C features that are considered to be moderately modified as a result of the impacts within the catchments as well as within their physical footprints. The watercourses are classified as Class C features that have been moderately modified which has resulted in moderate changes to the ecosystem processes that has resulted in the loss of natural habitat and biota from the feature.

5.1.4 Determining the Ecological Importance and Sensitivity of Aquatic Features

The Ecological Importance of any aquatic feature is an expression of its importance to the maintenance of the ecological diversity and functioning within itself, as well as hydrologically downstream. Ecological Sensitivity is a function of the system's ability to resist disturbances on its drivers and its capability to recover from these disturbances once they have occurred. The status of the CVB wetlands as well as the watercourses within the study site is provided in the Table 5-3 below.

Table 5-3: Ecological Importance Sensitivity of the Aquatic System

Hydrogeomorphic Unit	Criteria	Importance	Ecological Importance Sensitivity Class	Overall Importance and Sensitivity
Channelled Valley Bottom	Ecological importance and sensitivity	2.0	M	**Medium**
	Hydrological/functional importance	2.3	M	
	Direct human benefits	0.5	L	
Flood Plain	Ecological importance and sensitivity	2.1	M	**Medium**
	Hydrological/functional importance	2.5	M	
	Direct human benefit	0.5	L	
Seep	Ecological importance and sensitivity	1.0	L	**Low**
	Hydrological/functional importance	2.0	M	
	Direct human benefits	0.5	L	
Watercourses	Ecological importance and sensitivity	2.2	M	**Medium**
	Hydrological/functional importance	2.0	M	
	Direct human benefits	0.5	L	

The overall Ecological Importance Sensitivity (EIS) of the aquatic features associated with the site are presented in Table 5-3. All the features except the Seep Wetland have medium importance and sensitivity with the Seep Wetland being classified to have a Low importance and sensitivity. This is a function of the moderately modified PES of the features and the associated intermediate levels of ecosystem services provision by the features.

5.1.5 Buffer Determination

Based on the findings of the assessment, the location and extent of the aquatic features, the PES of the aquatic features, the ecosystem services provided by the system and the EIS of the aquatic features, a buffer of 40 m around the edge of the wetland systems is recommended (Figure 5-6). This buffer must be in place for the duration of the operational phase of the Borrow Pit.

It is also important to note that in accordance with the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) no part of the Borrow Pit operations (stockpiles, crushers, plant parking, etc.) are allowed to be outside of the boundaries of the approved Borrow Pit area.

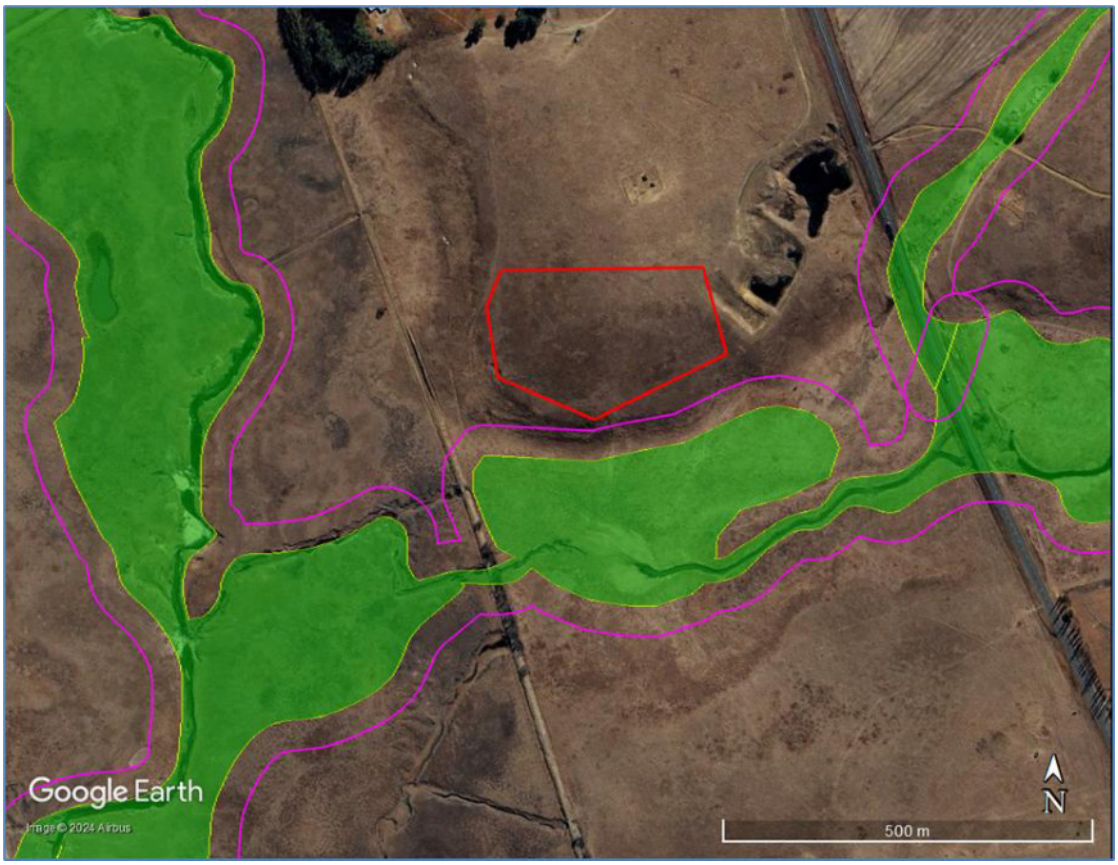


Figure 5-6: Location and extent of the applicable 40 m buffer (in purple) around the wetland features nearest to the project site (in red)

5.2 Section 21 (c) and (i) Department of Water and Sanitation Risk Assessment

Matrix

The section 21 (c) and (i) water uses are only applicable for activities that occur within the regulated area of a watercourse. To this end, the first step is conducting the DWS Risk Assessment to determine if any part of the Borrow Pit will occur within the regulated area of a watercourse. The extent of this regulated area of a watercourse as it pertains to the Risk Assessment is shown in Figure 5-7. It is clear that the entre Borrow Pit area falls within the regulated area of a watercourse as defined by the regulations.

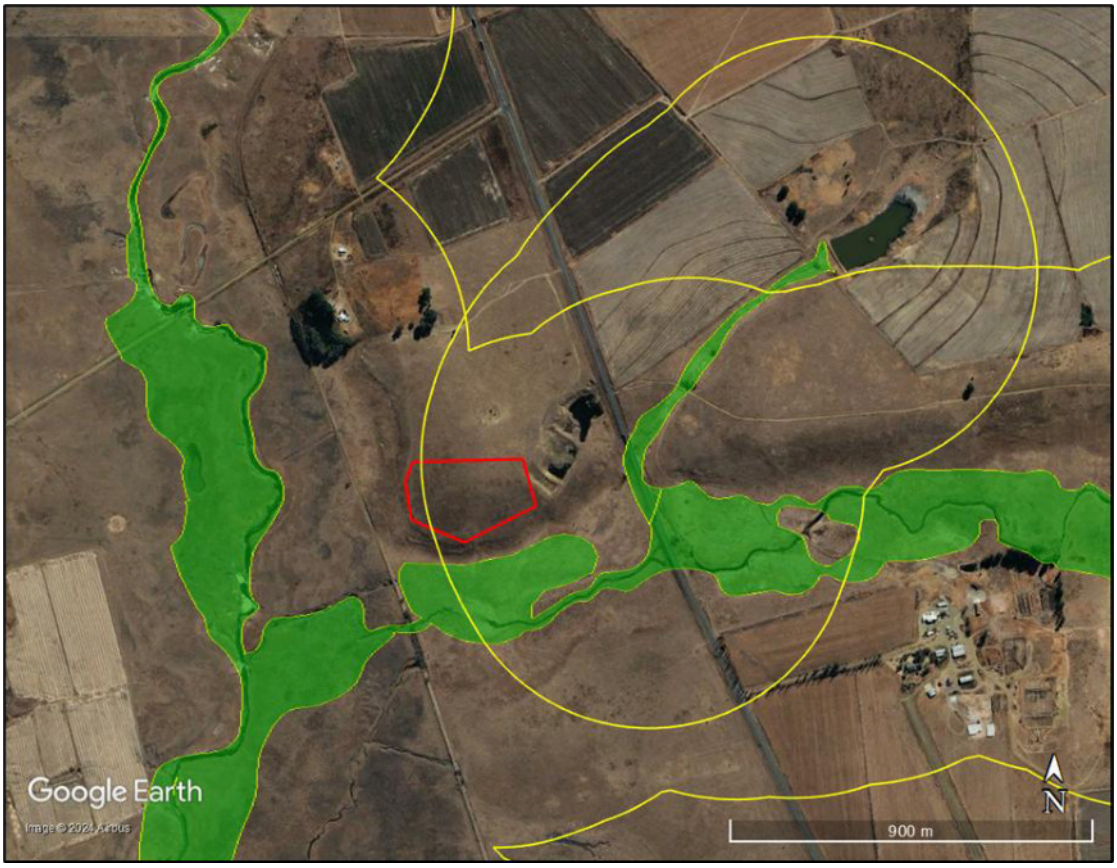


Figure 5-7: Extent of the "regulated area of a watercourse" shown in yellow around the wetland features nearest to the project site

5.2.1 Risk Assessment Matrix.

The impact assessment in this report aims to identify and assess the significance of the potential impacts associated with the establishment and operation of the Borrow Pit. For the purposes of this assessment, the Standardised Risk (or Impact) Assessment Matrix (RAM) as specified by the DWS will be used to assess the impacts in the "regulated area of the watercourse" as defined in the NWA. The "regulated area of a watercourse" as defined in the Act make provision for the following:

- The outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse or

a river, spring, natural channel, lake or dam;

- In the absence of a determined 1 in 100 year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or
- A 500 m radius from the delineated boundary (extent) of any wetland or pan. The extent of this "regulated area of a watercourse as it pertains to the Risk Assessment is shown in Figure 5-7 above. The Borrow Pit area falls within the regulated area of a watercourse as defined by the regulations.

The RAM makes provision for the identification of risks at the various phases applicable to the project and assesses these to determine the magnitude of the risk / impact to be low, medium or large. Provision is also made for pre- and post-mitigation assessment.

The results of the RAM are provided in Table 5-4. The full matrix is provided in APPENDIX C.

Table 5-4: Risk Assessment Matrix

No	Phase	Activity	Impact	Significance	Control Measures
Pre-mitigation	Establishment and Operational Phase	Inadequate stormwater management from the Borrow Pit area.	• The changes to the runoff from the areas subjected to the earthworks may impact on the hydrological driver of the aquatic features during the establishment period which could impact on the Present Ecological State (PES) of the features. • The removal of vegetation as a result of the earthworks may result in increased levels of silt that is washed into the aquatic features which may impact on the biota in the features. • The excavations that are made to open the Borrow Pit may decrease the amount of runoff from the Borrow Pit area as the water will accumulate in the excavations. This will impact the hydrological driver of the features which may impact the PES of the features. • Higher sediment loads washing of the stockpiles within the Borrow Pit site may result in an impact on the water quality in the aquatic features which will result in an impact on the PES of these features.	Low Risk	A Stormwater Management Plan (SMP) has been developed and will be implemented before construction begins. • Diversion berms and V-drains will be constructed to channel clean stormwater around disturbed areas, reducing runoff impact. • Silt traps and sediment control structures will be installed to capture eroded sediments and prevent contamination of downstream water bodies. • Vegetation clearing will be confined to active construction zones, with progressive rehabilitation through revegetation using indigenous species. • Stockpiles will be strategically located away from drainage lines and protected with berms and mitre drains to minimise sediment mobilisation. • Excavations will be designed to promote free drainage, preventing water pooling and associated risks. • Stormwater management structures will undergo weekly inspections and maintenance, especially following rainfall events, to ensure effectiveness. • Controlled discharge of accumulated stormwater from excavations, ensuring post-development runoff does not exceed pre-development levels. • Capture of any silt washing from material stockpile areas to prevent direct release into the environment.
Post-mitigation				Low Risk	
Pre-mitigation		Risk of hydrocarbon (fuels and oils) contamination of the aquatic features by leaking plant and equipment that will be used for the earthworks and operation of the Borrow Pit.	• Hydrocarbons are toxic to aquatic plants and animals and are readily spread by flowing water.	Low Risk	• Drip trays will be used under all plant, pumps, and generators during use and parking. • Leaking equipment will be removed and only returned after repairs. • Refuelling areas will be bunded with a concrete surface and a sump to contain spills.
Post-mitigation				Low Risk	
Pre-mitigation		Storage of hydrocarbons on site, and the inadequate management of petrochemical storage facilities will pose a risk.	• Leakages and spillages from the planned petrochemical storage facility may result in contamination of the existing water quality in the aquatic features.	Low Risk	• All storage facilities must be located on impermeable surfaces and be fully bunded. • Position storage areas outside of drainage lines and, where possible, on higher ground. • Bunds must include a drainage tap and capacity to retain at least 110% of total storage volume. • Any stormwater collected within bunds must be inspected and disposed of responsibly.
Post-mitigation				Low Risk	
Pre-mitigation		Risk of contamination of the aquatic features by the on site ablution facilities.	• Spillage or leakage could impact on the water quality that moves through the aquatic features, which could decrease the PES of the features.	Low Risk	• All portable ablution facilities that will be used on site must be located 40 m away from the edge of the delineated aquatic feature. If the edge is not clearly defined, this must be done by an aquatic specialist before implementation of the ablutions can take place. • The portable ablution facilities must be provided with sealed wells in which the sewage is collected. • The servicing of this portable ablution facilities must be conducted by a registered service provider who must dispose of the material at a registered facility.
Post-mitigation				Low Risk	

5.3 Hydropedology

This section has been summarised from the Hydropedology Assessment attached in APPENDIX D.

5.3.1 Terrain

The project relief shows that the elevation for the Borrow Pit ranges from 1630 metres above sea level (masl) to 1640 masl. The Borrow Pit is located on the crest landscape position, with the southern edge bordering the scarp landscape position. Slopes average around 4%. The terrain analysis was conducted using the processing tools within the ArcGIS mapping software. The spatial analyst terrain analysis tools were used to determine the Digital Elevation Model (DEM) (Figure 5-8).

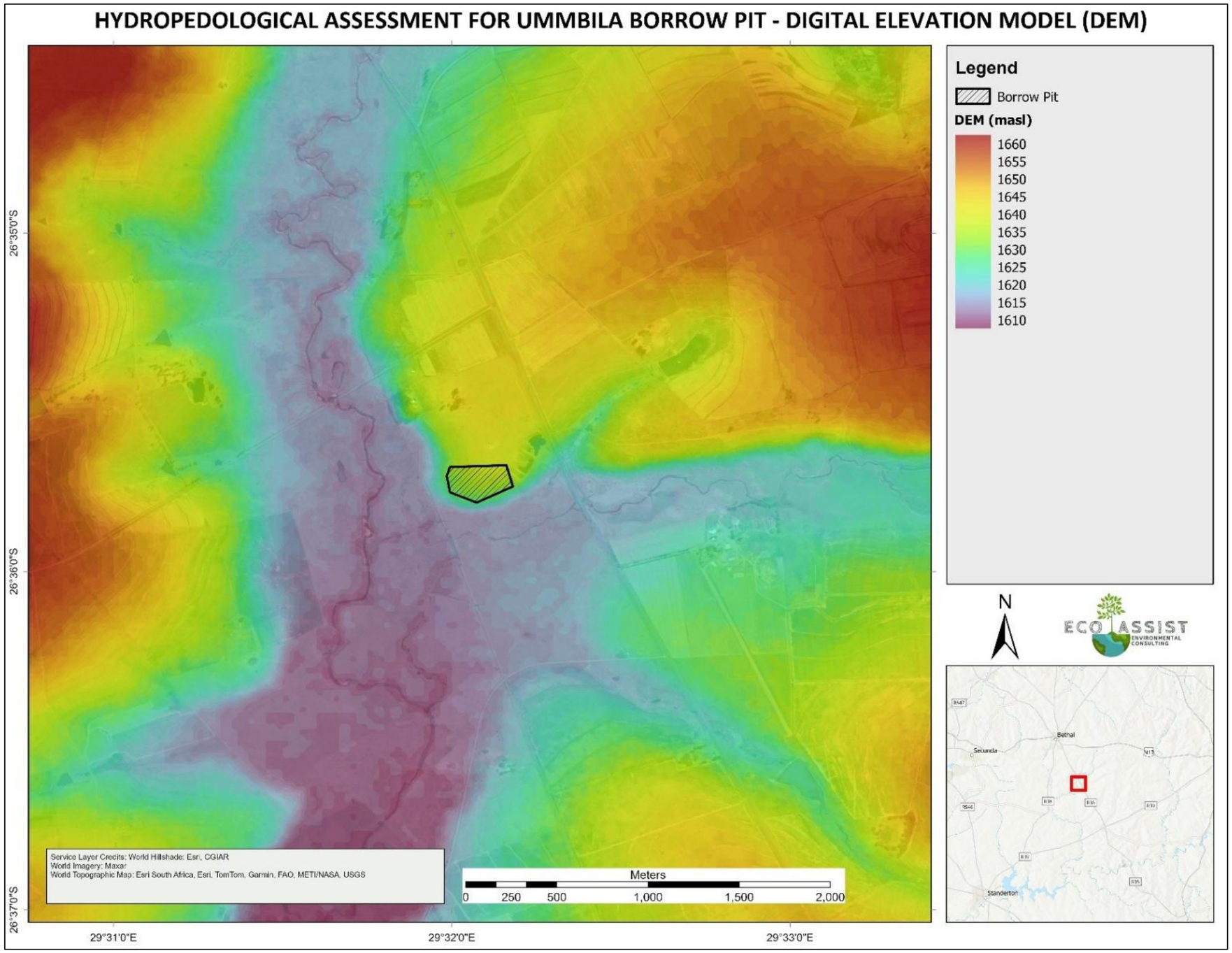


Figure 5-8: The Digital Elevation Model for the Project Area

5.3.2 Land Type

The land type data was used to obtain generalised soil patterns and terrain types for the site. Land Type data exists in the form of published 1:250 000 maps. These maps indicate delineated areas of similar terrain types, pedosystems (uniform terrain and soil pattern) and climate (Land Type Survey Staff, 1972 - 2006).

The project falls within land type Ea20 (Figure 5-10). The Ea20 land type is dominated by the crest (30%) and midslope (60%) landscape positions (Figure 5-9). The soil forms anticipated in this land type are the Glenrosa, Swartland, and Arcadia soil forms. The valley bottoms are expected to be dominated by the Willowbrooke soil form. The land type data suggests that the slopes in the area range from 0% to 8%. The soil depths range from 300 mm to 600 mm. The clay percentage ranges from 20% to 45%.

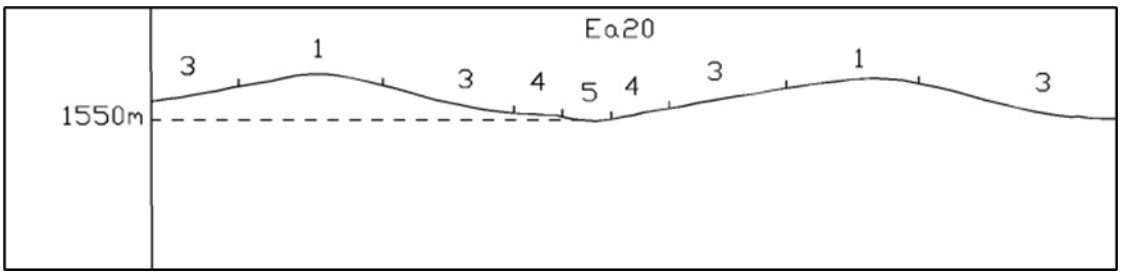


Figure 5-9: The hillslope catena of land type Ea20

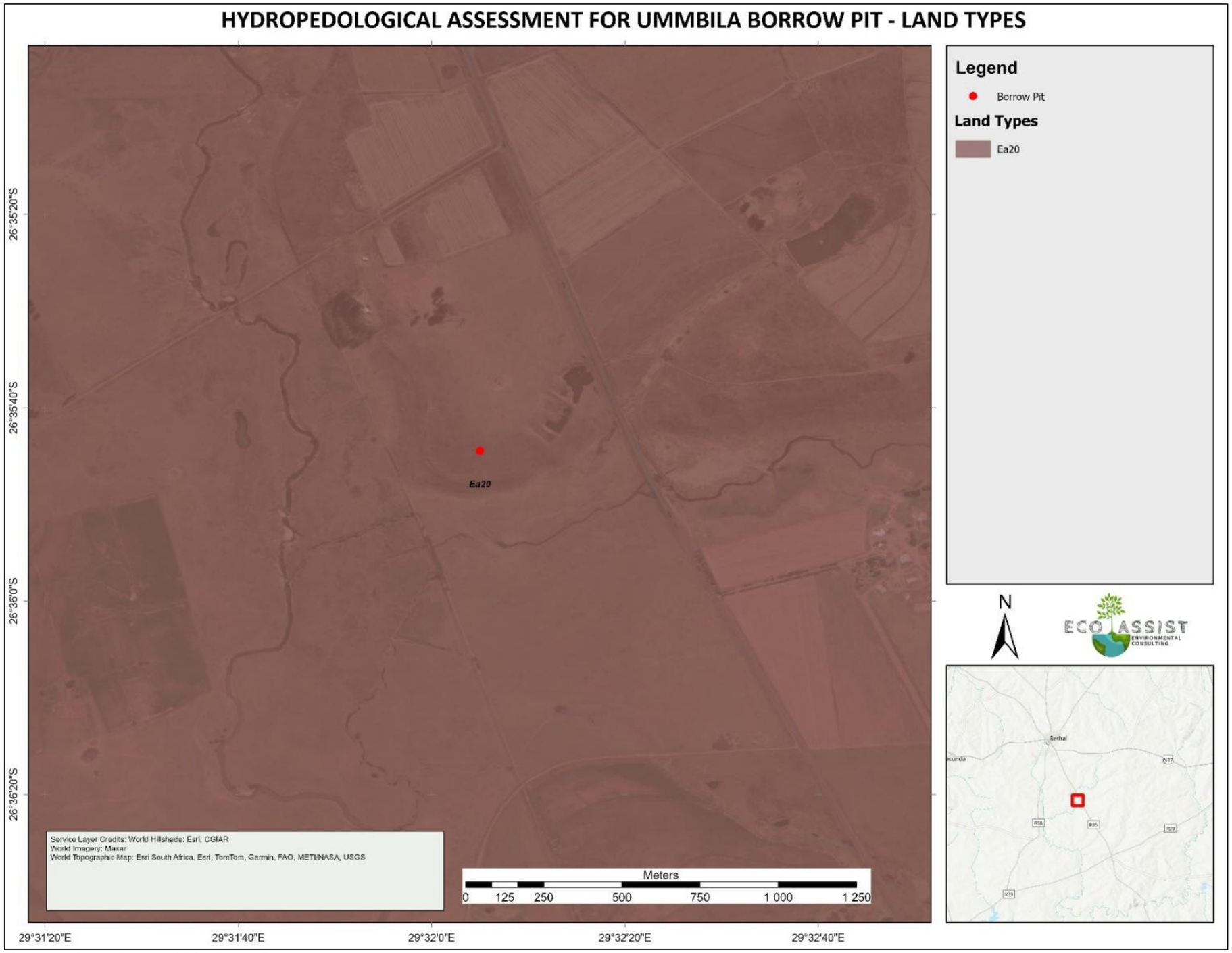


Figure 5-10: Land type within the project area

5.3.3 Soil Survey

A soil survey was conducted for the Ummbila Emoyeni using a hand-held auger and a GPS to log all information in the field. The soils were classified to the family level as per the "Soil Classification: A Natural and Anthropogenic System for South Africa" (Soil Classification Working Group, 2018).

Soil forms found are described in the subsequent sections.

5.3.3.1 Soil Forms and Hillslope Hydrology

The following soil forms were identified on site:

- Mispah (Orthic A-horizon over Hard Rock).
- Glenrosa (Orthic A-horizon over a Lithic horizon).
- Tukulu (Orthic A-horizon over a Neocutanic B-horizon, over a Soft Plinthic horizon).
- Hydromorphic (Wetland soils in valley bottom).

The hydropedological soil types were classified (Table 5-5) during the site assessment and are illustrated in Figure 5-11.

Table 5-5: Soil Form Descriptions and their Associated Hydropedological Classification

Soil Form	Hydropedological Group
Tukulu (Figure 5-12)	Interflow (Soil/Bedrock)
Glenrosa/Mispah (Figure 5-11)	Responsive (Shallow)
Hydromorphic (Figure 5-13)	Responsive (Saturated)

Figure 5-11: Mispah/Glenrosa Soil Profile

Figure 5-12: Plinthic Concretions in the Lower Soil Profile of the Tukulu soil

Figure 5-13: Hydromorphic Wetland System in Valley Bottom Landscape

5.3.3.2 Hillslope Hydrology

The hydropedology survey was conducted to obtain information regarding the soil morphology and hydropedological flow paths relevant to the hillslope by means of transects. The hydropedological soil types classified during the site assessment are illustrated in Figure 5-14.

The hillslope catenae from the top of the catchment right down to the valley bottoms have a general convex shape. The crest landscape position is relatively flat with water accumulating and slowly moving along the bedrock interface. These soils were the Tukulu soil form and classified as interflow (soil/bedrock). The soil become shallower and fractured once the specialist reached the edge of the scarp. These soils were the Mispah and Glenrosa soil forms. These were classified as responsive (shallow). The footslope and valley bottom soils were hydromorphic in nature and were classified as responsive (saturated). Water moves along the soil/bedrock interface and emerges in the responsive (saturated) class.

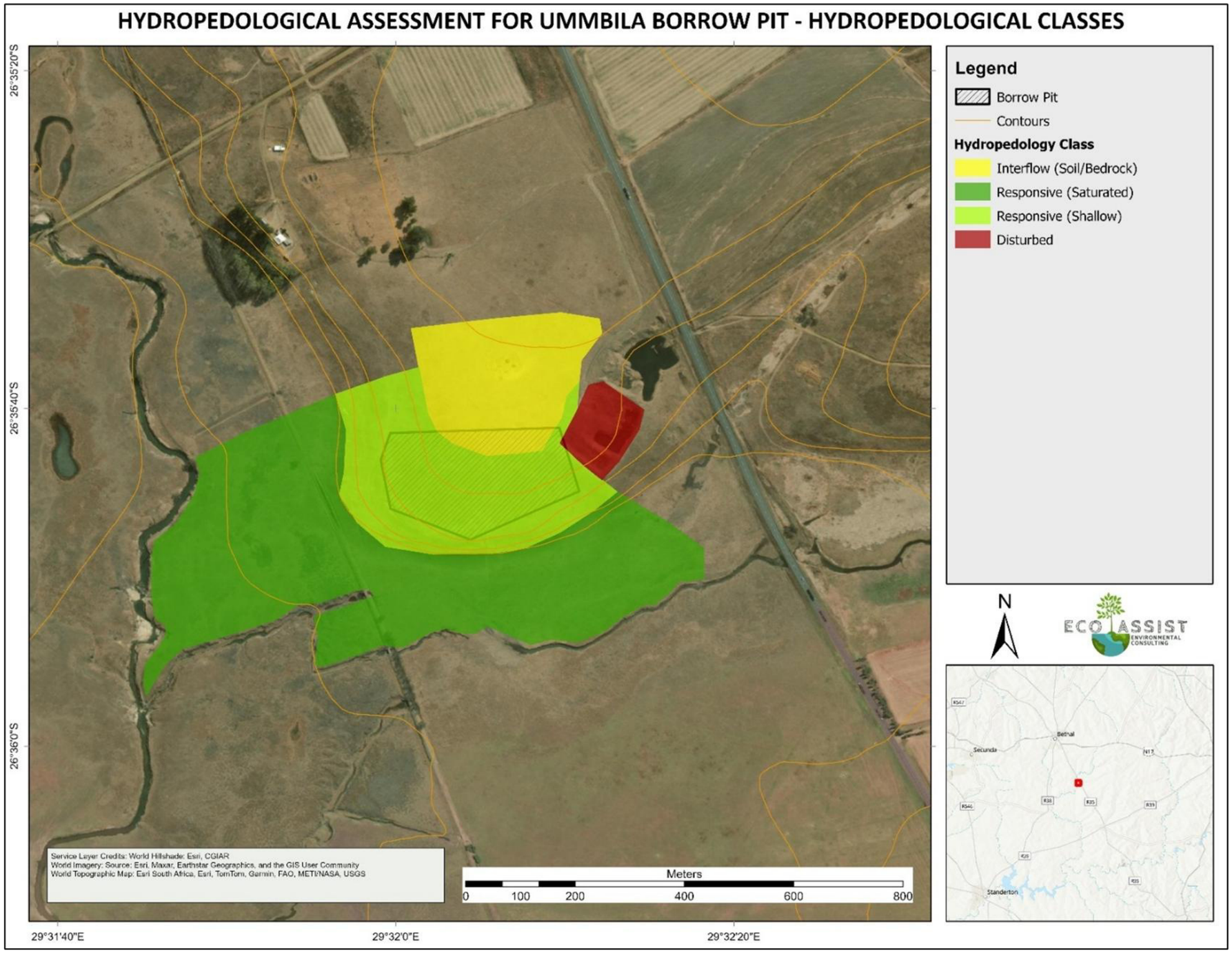


Figure 5-14: Hillslope Hydropedological Classification showing the Hydropedological Units for the Project Area

During the survey one dominant hillslope hydropedological hillslope was identified and is described in the section to follow.

Figure 5-12 shows the represented cross section for T1 (transect 1). The crest landscape positions were dominated by interflow and shallow responsive. The valley bottoms were found to be wet with Katspruit or Dundee soils. These soils indicate saturated responsive hydropedological zones. This is as a result of the flattening of the slope and the accumulation of water from the landscape into the lower landscape zones.

***Note**: The blue arrows indicate the dominant direction of flow. The size of the arrow indicates the dominance/intensity of flows.*

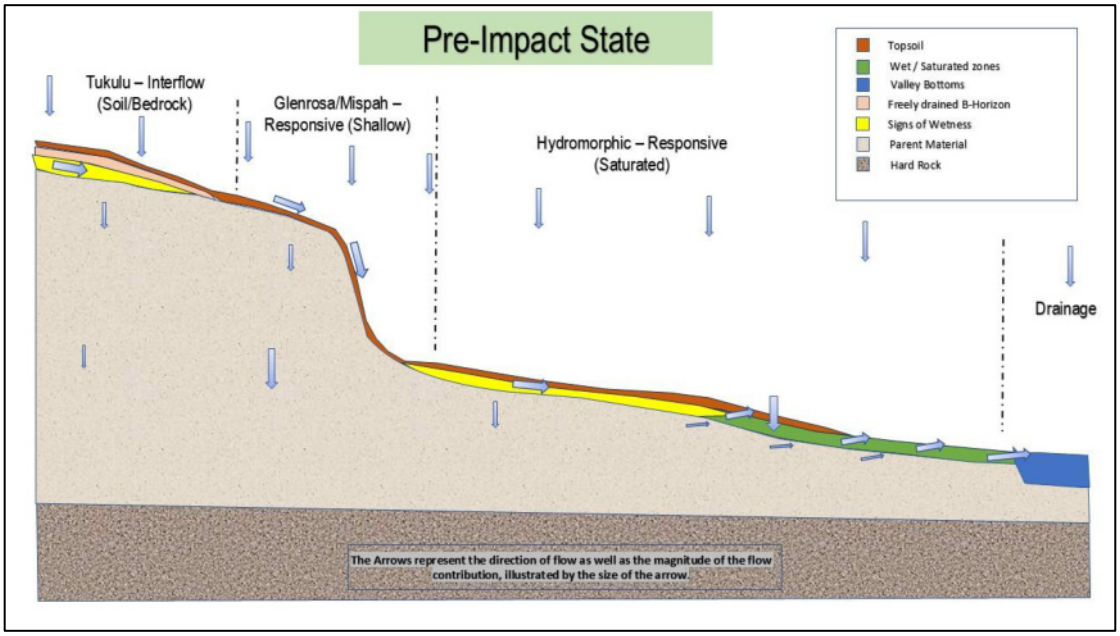


Figure 5-15: Hillslope Hydrology for Hydropedological Soil Catena T1 of the Project Area

6 RISK ASSESSMENT/BEST PRACTICE ASSESSMENT

6.1 Impact Assessment Methodology

Possible impacts are identified through comments from I&APs and specialist reports. The assessment of potential impacts was addressed in a standard manner to ensure that a wide range of impacts were comparable. The ranking criteria and rating scales were applied to all specialist studies for this project. To enable a scientific approach to the determination of the environmental significance (importance), a numerical value is linked to each rating scale.

Clearly defined rating and rankings (Table 6-1 to Table 6-6) scales were used to assess the impacts associated with the Borrow Pit activities. The impacts identified by each specialist study and through public participation were combined into a single impact rating table for ease of assessment.

Table 6-1: Severity or Magnitude of Impact

High	3
Moderate	2
Low	1
None	0

Table 6-2: Extent of Activity

International	6
National	5
Regional	4
Local	3
Site	2
Footprint	1

Table 6-3: Duration of Activity

Permanent / Beyond life of the activity	5
Long-term (more than 5 years)	4
Medium-term (18 months - 5 years)	3
Short-term (6-18 months)	2
Temporary (0-6 months)	1

Table 6-4: Reversibility of Impact

Low to non-reversible	3
Moderate	2
High	1

Table 6-5: Probability of Impact

Definite (75% to 100%)	2
Probable (50% to 75%)	1
Improbable (0-less than 50%)	0

Table 6-6: Loss of Irreplaceable Resources

Yes	1
No	0

Each impact identified must be assessed in terms of probability (likelihood of occurring); the consequence of the impact (spatial scale, severity and duration); and the associated risk

(impact significance).

Consequence was then determined as follows:

- CONSEQUENCE = (Duration + Extent + Irreplaceable Loss) x Severity
- SIGNIFICANCE = Consequence x Probability

Impacts were rated as either of high, medium or low significance on the basis provided in Table 6-7. Each impact was also assessed in terms of the level to which there is an irreplaceable loss of resources and its degree of reversibility. The ratings as described in Table 6-7.

The nature of the Impact is can be rated as positive or negative impacts. And the significance of the impacts are rated accordingly.

Nature
+
-

Table 6-7: Impact Significance Ratings

Risk Rating	*Significance*	*Colour Code*
High (positive)	49 to 72	H
Medium (positive)	25 to 48	M
Low (positive)	1 to 24	L
Neutral	0	N
Low (negative)	-1 to - 24	L
Medium (negative)	-25 to -48	M
High (negative)	-49 to -72	H

The significance of an impact gives an indication of the level of mitigation measures required in order to minimise negative impacts and reduce environmental damage during the construction, operational and decommissioning phases. Suitable and appropriate mitigation measures, to ensure avoidance, management and mitigation of impacts, were identified for each of the potential impacts based on specialist recommendations and GCS expertise.

6.2 Impact Assessment

The potential risks / impacts that were identified for the construction, operational and decommissioning phases, are discussed in Table 6-8.

Table 6-8: Environmental Impacts Associated with the Project, Rating and Proposed Mitigation and / or Management Measures

ACTIVITY(S)	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)
CONSTRUCTION PHASE: PREFERRED ALTERNATIVE																				
Air Quality and Climate																				
Dust from construction activities.	• Dust fallout	2	1	0	1	3	2	6	-	L	• Strict enforcement of speed limits on all site roads. • Routine water spraying of site roads and disturbed areas, increasing frequency in dry and windy conditions). • Removal of vegetation only if necessary. • Revegetation of disturbed areas once construction activities are complete.	2	1	0	1	3	1	3	-	L
Wetland																				
Inadequate stormwater management from the Borrow Pit area.	• The changes to the runoff from the areas subjected to the earthworks may impact on the hydrological driver of the aquatic features during the establishment period which could impact on the PES of the features. • The removal of vegetation as a result of the earthworks may result in increased levels of silt that is washed into the aquatic features which may impact on the biota in the features. • The excavations that are made to open the Borrow Pit may decrease the amount of runoff from the Borrow Pit area as the water will accumulate in the excavations. This will impact the hydrological driver of the features which may impact the PES of the features. • Higher sediment loads washing of the stockpiles within the Borrow Pit site may result in an impact on the water quality in the aquatic features which will result in an impact on the PES of these features.	3	2	1	2	12	2	24	-	L	A Stormwater Management Plan (SMP) has been developed and will be implemented before construction begins. • Diversion berms and V-drains will be constructed to channel clean stormwater around disturbed areas, reducing runoff impact. • Silt traps and sediment control structures will be installed to capture eroded sediments and prevent contamination of downstream water bodies. • Vegetation clearing will be confined to active construction zones, with progressive rehabilitation through revegetation using indigenous species. • Stockpiles will be strategically located away from drainage lines and protected with berms and mitre drains to minimise sediment mobilisation. • Excavations will be designed to promote free drainage, preventing water pooling and associated risks. • Stormwater management structures will undergo weekly inspections and maintenance, especially following rainfall events, to ensure effectiveness. • Controlled discharge of accumulated stormwater from excavations, ensuring post-development runoff does not exceed pre-development levels. • Capture of any silt washing from material stockpile areas to prevent direct release into the environment.	3	2	1	1	6	1	6	-	L
Risk of hydrocarbon (fuels and oils) contamination of the aquatic features by leaking plant and equipment that will be used for the earthworks and operation of the Borrow Pit.	Hydrocarbons are toxic to aquatic plants and animals and are readily spread by flowing water.	3	2	1	2	12	2	24	-	L	• Drip trays will be used under all plant, pumps, and generators during use and parking. • Leaking equipment will be removed and only returned after repairs. • Refuelling areas will be bunded with a concrete surface and a sump to contain spills.	3	2	1	1	6	1	6	-	L
Storage of hydrocarbons on site, and the inadequate management of petrochemical storage facilities will pose a risk.	Leakages and spillages from the planned petrochemical storage facility may result in the contamination of the existing water quality in the aquatic features.	3	2	1	2	12	2	24	-	L	• All storage facilities must be located on impermeable surfaces and be fully bunded. • Position storage areas outside of drainage lines and, where possible, on higher ground. • Bunds must include a drainage tap and capacity to retain at least 110% of total storage volume. • Any stormwater collected within bunds must be inspected and	3	2	1	1	6	1	6	-	L

ACTIVITY(S)	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)
											disposed of responsibly.									
Soils, Land Capability and Land Use																				
Movement of machinery, land preparation and excavations and other construction activities.	Soil Compaction and Erosion.	1	1	0	1	2	2	4	-	L	• Any recommendations provided in the SMP must be adhered to. Measures such as diversion berms and v-drains must be implemented to manage runoff and reduce erosion risk. • Stockpiles will be placed on flat areas and protected with berms (up- and downslope). • Vegetation clearing will be limited to necessary areas only. • Topsoil will be stored in covered stockpiles not exceeding 2 m. • V-drains and berms will control stormwater flow and reduce erosion. • Weekly inspections will ensure stormwater infrastructure is functioning. • All stockpiles created from the construction activities must be protected from erosion, stored on flat areas, where runoff will be minimised. • Stockpiles must also only be stored for the minimum amount of time necessary. Should contaminants enter the soil profile due to spillages or other unforeseen circumstances a rehabilitation/spill specialist must be consulted regarding implementation of suitable mitigation and/or rehabilitation measures. • Vehicles must be well maintained to reduce the risk of oil or fuel leaks. All fuel and oil must be stored in bunded, impermeable areas in line with the SMP. • The Environmental Management Programme (EMPr) must be implemented to ensure that all waste and pollutants are handled, stored, and disposed of correctly.	1	1	0	1	2	1	2	-	L
Movement of machinery, land preparation and excavations and other construction activities.	Soil Pollution Potential.	1	2	0	2	6	2	12	-	L		1	1	0	1	2	1	2	-	L
Loss of Agricultural Activities																				
Soil Compaction and Erosion.	Soil Compaction and Erosion.	1	1	0	1	2	1	2	-	L	• Only remove vegetation required for the construction.	1	1	0	1	2	1	2	-	L
Hydropedology																				
Construction activities.	Contamination of Water Resources	2	1	0	2	6	0	0	-	N	• All mitigation and recommendation measures outlined in section 9.5 of the Hydropedology Report attached in APPENDIX D should be adhered to.	2	1	0	2	6	0	0	-	N
	Loss of vadose zone flows feeding water resources	2	2	0	1	4	1	4	-	L	• All mitigation and recommendation measures outlined in section 9.5 of the Hydropedology Report attached in APPENDIX D should be adhered to.	2	2	0	2	4	1	4	-	L
OPERATIONAL PHASE																				
Air Quality																				
Dust from construction activities.	Dust fallout.	2	1	0	1	3	2	6	-	L	• Strict enforcement of speed limits on all site roads • Routine water spraying of site roads and denuded/disturbed areas (more frequent spraying may be necessary during dry, windy conditions) • Removal of vegetation only if necessary • Revegetation of disturbed areas once construction activities are complete.	2	1	0	1	3	1	3	-	L

ACTIVITY(S)	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)
Wetlands Impacts																				
Inadequate stormwater management from the Borrow Pit area.	• The changes to the runoff from the areas subjected to the earthworks may impact on the hydrological driver of the aquatic features during the establishment period which could impact on the PES of the features. • The removal of vegetation as a result of the earthworks may result in increased levels of silt that is washed into the aquatic features which may impact on the biota in the features. • The excavations that are made to open the Borrow Pit may decrease the amount of runoff from the Borrow Pit area as the water will accumulate in the excavations. This will impact the hydrological driver of the features which may impact the PES of the features. • Higher sediment loads washing of the stockpiles within the Borrow Pit site may result in an impact on the water quality in the aquatic features which will result in an impact on the PES of these features.	3	2	1	2	12	2	24	-	L	• Stormwater diversion berms, v-drains, and silt traps must remain in place and be maintained during operation. • Accumulated stormwater in excavated areas must be discharged in a controlled manner to ensure post-development runoff does not exceed pre-development conditions. • Regular inspections (weekly and post-rainfall) and maintenance of all stormwater infrastructure are required.	3	2	1	1	6	1	6	-	L
Risk of hydrocarbon (fuels and oils) contamination of the aquatic features by leaking plant and equipment that will be used for the earthworks and operation of the Borrow Pit.	Hydrocarbons are toxic to aquatic plants and animals and are readily spread by flowing water.	3	2	1	2	12	2	24	-	L	• Refuelling and servicing areas must be bunded and located on impermeable surfaces. • These areas must be situated outside of drainage lines and, where possible, on elevated ground. • Any stormwater runoff from these areas must be collected and directed to a sedimentation trap. • Regular inspection and cleaning of bunded areas are required. • No plant or equipment will be allowed to be parked overnight within a 40 m buffer from the delineated edge of any aquatic feature.	3	2	1	1	6	1	6	-	L
Storage of hydrocarbons on site, and the inadequate management of petrochemical storage facilities will pose a risk.	Leakages and spillages from the planned petrochemical storage facility may result in the contamination of the existing water quality in the aquatic features.	3	2	1	2	12	2	24	-	L	• All storage areas must be bunded and situated on impermeable surfaces (e.g., concrete). • They must be located outside of drainage lines and, if possible, on higher ground. • Rainwater accumulation in bunds must be drained via a valve and disposed of appropriately. • Spills must be cleaned immediately, and stormwater runoff must be managed through on site traps.	3	2	1	1	6	1	6	-	L
Soils, Land Capability and Land Use																				
Movement and operation of vehicles and machinery/equipment.	Soil Contamination.	5	1	0	2	12	2	24	-	L	• Restrict vehicles to travel only on designated roadways. • Ensure vehicles are in good condition and not leaking fuel or oil when entering the site.	5	1	0	1	6	1	6	-	L
Storage of general and hazardous		5	1	0	2	12	2	24	-	L		5	1	0	1	6	1	6	-	L

ACTIVITY(S)	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)
waste and substances.																				
Maintenance activities.		5	1	0	2	12	2	24	-	L	• All plant and equipment that make use of petrochemical substances must be checked leakages on a daily basis before operations commence. • Maintenance to be done in suitably designed and designated areas. • All plant and equipment that are found to be leaking must be removed and only returned once the leakages have been addressed. • All refuelling of plant and equipment must be conducted over a drip-tray or designated bunded areas. • If any plant or equipment is to be parked on the site, these must be parked within a demarcated and dedicated area which is appropriately protected (e.g. impermeable surface oil & silt traps, etc.). • Storage of hazardous substances must be done on an impermeable surface, protected from the elements, in a bunded area that makes provision for 110% of the volume of the substances containers that are stored. • The bunded area must consist of an impermeable floor, a sump, an oil trap as well as walls and be fitted with a valve that can be used to drain any spillages for appropriate disposal at a licenced facility. Release of effluent from these areas into the surrounding environment is strictly prohibited. • Suitable spill prevention measures to be in place and spills should be cleaned up on occurrence. • An integrated waste management approach, taking cognisance of the waste management hierarchy and other proposed mitigation measures, must be developed and implemented, including but not limited to the following aspects: • Skips must be made available on site as and where required. • The capacity of these skips must be monitored on a daily basis to ensure that a replacement skip can be arranged on the same day as the filled skips are removed. • The disposal of the content of these skips must be done at a licenced landfill site. No dumping, burning or burial of waste is allowed within the operation's site or in the surrounding areas. • Implement a waste management plan and monitor levels of litter constantly.	5	1	0	1	6	1	6	-	L
Operation of the generator.	Continued Soil Compaction and Erosion.	5	1	0	2	12	1	12		L	• Any recommendations provided by a SMP must be adhered to. • Should contaminants enter the soil profile due to spillages or other unforeseen circumstances a rehabilitation/spill specialist must be consulted regarding implementation of suitable mitigation and/or rehabilitation measures. • Vehicles are to be maintained in good working order so as to reduce the probability of leakage of fuels and lubricants. • A dedicated store with adequate concrete flooring or bermed area must be used to accommodate chemicals such as fuel, oil, paint etc. • An EMPr must be implemented to ensure that all waste and pollutants are handled, stored, and disposed of correctly.	5	1	0	1	6	1	6	-	L
Operation of the generator.	Continued Soil Pollution Potential.	5	2	0	2	14	2	28	-	M		5	1	0	1	6	2	12	-	L
Hydropedology																				

ACTIVITY(S)	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)		Duration	Extent	Irreplaceable Loss	Severity	Consequence	Probability	Significance	+/-	Risk Rating (C x S)
Operational Activities.	Contamination of Water Resources	1	1	0	2	4	0	0	-	N	• All mitigation and recommendation measures outlined in section 9.5 of the Hydropedology Report attached in APPENDIX D should be adhered to.	1	1	0	2	4	0	0	-	N
	Loss of vadose zone flows feeding water resources	2	2	0	1	4	1	4	-	L	• All mitigation and recommendation measures outlined in section 9.5 of the Hydropedology Report attached in APPENDIX D should be adhered to.	2	2	0	1	4	1	4	-	L
Decommissioning Phase																				
Site clearing and infrastructure removal.	Dust generation and air quality impacts	2	2	0	2	8	1	8	-	L	• All disturbed areas will be cleared of foreign material (e.g. waste, rubble). • Dust will be managed during clearance using best practices. • Areas will be prepared for rehabilitation immediately after clearing.	1	1	0	1	2	0	0	-	N
Soil disturbance during equipment removal.	Soil compaction, erosion, reduced land capability	3	2	0	3	15	1	15	-	L	• Areas will be levelled and shaped prior to topsoil placement. • Compacted areas will be scarified or lightly ripped (50–100 mm) to improve infiltration. • Drainage will be managed to avoid further erosion.	2	1	0	1	3	0	0	-	N
Removal of stockpiles and contaminants.	Sedimentation and water contamination	3	2	1	3	18	1	18	-	L	• Stockpiles will be removed from site and areas levelled. • Topsoil will be imported (75–150 mm depth) if needed. • Soil will be spread evenly and protected from erosion.	2	1	0	1	3	0	0	-	N
Hydrocarbon spills from equipment.	Soil and aquatic contamination	3	2	1	3	18	1	18	-	L	• Any contaminated soils identified during pre-rehab inspections will be treated or removed. • All remaining hazardous substances will be removed offsite. • A final environmental audit will confirm site condition.	2	1	0	1	3	0	0	-	N
Stormwater runoff post-rehab.	Altered runoff, erosion, water quality degradation	3	2	1	3	18	1	18	-	L	• Vegetated areas will be monitored after rehab. • Erosion control (e.g., vegetation cover, drainage lines) will be applied. • Repairs to erosion gullies or washouts will be made as needed.	2	1	0	1	3	0	0	-	N
Vegetation re-establishment.	Delayed recovery; spread of invasive species	3	2	0	2	10	1	10	+	L	• Indigenous species suited to local conditions will be planted. • Seeding will occur during optimal season (April–October). • Alien invasive species will be cleared in follow-up inspections.	2	1	0	1	3	1	3	+	L
Waste handling and removal.	Waste pollution from improper disposal	2	2	0	2	8	1	8	-	L	• All waste (hazardous and general) will be removed to licenced disposal facilities. • No waste will be buried or burned. • Final site inspection will verify removal.	1	1	0	1	2	0	0	-	N

7 STORMWATER MANAGEMENT

The SMP has been prepared to describe the works undertaken by the contractor during the construction period of the Ummbila Emoyeni WEF project and its associated quarries within the area. The SMP has been attached in APPENDIX F. The following section describes all the preventative measures and stormwater management tools that will be undertaken on site.

Many of these activities may result in either increased runoff and siltation or pollution of water bodies in the vicinity, several stormwater berms will be required to both divert clean runoff around the works, prevent runoff contamination with silts or sediments and temporarily retain such runoff to allow entrained silt to settle.

The SMP has been prepared to provide practical on site controls in the construction work areas to:

- Prevent damages to the works.
- Prevent contamination of the downstream watercourse during the project construction phase.
- Provide measures to address runoff from these disturbed areas within the construction footprint.
- Avoid unnecessary runoff of water and sedimentation into worked and prepared farmlands.

The plan must be reviewed/updated whenever any changes are made to any of the processes contained herein or whenever the client specifications are revised and thereafter it must be approved by the project manager. The following must be implemented to ensure the success of the plan:

- Weekly inspections or after significant rain events.
- Repair/ replace damaged silt traps, berms, trenches, etc., and removal of sediments where required.
- Record keeping of inspections.

7.1 Objectives of Measures to be Implemented

7.1.1 Control of Runoff Volume and Flow Rate

To mitigate the impacts of construction activities such as vegetation clearance, topsoil removal, and alterations to the natural ground profile through cut-and-fill operations, measures will be implemented to manage both the volume and flow rate of stormwater runoff. These include the installation of stormwater control features such as diversion berms and v-drains. These structures will interrupt long flow paths, thereby limiting the velocity

and concentration of stormwater runoff.

In addition, silt traps will be installed to minimise erosion and prevent sediment transport into nearby watercourses. These traps will also help to capture potential contaminants—such as hydrocarbons, chemicals and construction debris thereby reducing the risk of pollution in surrounding surface water bodies and on site farm or ground dams.

7.1.2 Stormwater Management Measures

At the Ummbila Emoyeni WEF, robust stormwater management practices are essential for protecting agricultural land and nearby water resources. The following measures form part of the comprehensive stormwater control strategy:

- V-Drains: Engineered v-drains are used to convey stormwater efficiently away from construction and agricultural areas, reducing the risk of erosion and sedimentation.
- Flow Diversion Structures: Diversion berms and channels are employed to redirect stormwater flows away from sensitive or vulnerable areas, ensuring controlled discharge into designated drainage pathways.
- Erosion and Sediment Control: Erosion control measures—including sediment basins and other containment systems—are implemented to prevent soil displacement and sediment transport into watercourses or productive farmland.
- Runoff Volume Reduction: By effectively managing stormwater on site, the volume of runoff entering adjacent water resources, including farm dams and groundwater-fed systems, is significantly reduced. This contributes to the protection of water quality and flood mitigation.

The stormwater management infrastructure at Ummbila Emoyeni has been designed to support sustainable land use, protect environmental receptors, and maintain the integrity of agricultural operations throughout the construction phase and beyond.

7.2 Preventative Measures and Stormwater Management Tools

7.2.1 Excavations

When excavated materials will be used for backfilling and where practicable, materials will be placed upstream of excavations to act as berms for redirecting stormwater runoff during rain events.

7.2.2 Borrow Areas

All borrow areas are to be protected from stormwater intrusion by way of placing berms on the upstream side of the Borrow Pits to direct any stormwater around the pit. The Borrow Pit will be constructed in a manner that allows the pit to drain freely toward the concrete pipes,

trapezoidal channels, and v-drains. This will ensure that the water does not pool in the pit.

7.2.3 Stockpile Areas

Stockpile protection will involve cutting mitre drains upstream of the stockpiles and constructing and maintaining protection berms both upslope and downslope of the stockpiles. Stockpiling must not take place in drainage lines or areas where it will impede surface water runoff.

7.2.4 Vegetation-cleared Areas

Vegetation clearance must be limited to areas where construction activities will occur, and mitigation measures must be implemented to reduce the risk of erosion and alien species invasion. Topsoil stockpiles shall be kept at a maximum height of 2 m and covered with indigenous vegetation to prevent soil erosion.

7.2.5 Construction Equipment

All construction equipment which includes plant, generators and water pumps will be provided with drip trays to be in place when in use or stored/parked, to contain any potential fuel/oil leaks interacting with surface water and soil.

7.2.6 Access Ramps

Access ramps over drains/berms will be reviewed and where possible, be provided with a pipe/portal.

7.2.7 Fuel, Oil Storage and Other Chemicals

Fuels are stored in tanks and bunded. The bunded area is provided with a concrete floor and has a capacity of more than 110% of the total storage capacity of all the tanks. Oil is stored in drums in a bunded area. Used oil is collected and recycled by registered service provider. The fuel filling area is provided with a solid concrete surface with a sump to collect spillage and water runoff.

7.2.8 Protection of Work When Contractor Offsite

Protection of works will be incorporated over recruitment and retention pay weekends, Easter and December breaks. Areas identified will be as far as reasonably practicable, managed, and maintained to avoid any overflow, diversion, or runoff to damage or contaminate any other streams, waterbodies, or work areas. Assessment of areas to be done by the personnel responsible mentioned above before the closure over long periods and pay weekends.

8 MANAGEMENT ACTION PLAN

The action plan for the management of water related aspects and impacts of and the project,

throughout its construction, operational and decommissioning phases, is presented in Table 8-1 below.

Table 8-1: Management Action Plan for the Project

Key Focus Area	Associated Risk / Aspect	Recommended Mitigation Measures	Responsibility
Construction Phase			
Aquatic Ecology	Inadequate stormwater management from the Borrow Pit area impacting hydrology, PES, and biota of aquatic features.	• Implement Stormwater Management Plan (SMP) before construction. • Construct diversion berms and V-drains to direct clean stormwater around disturbed areas. • Install silt traps and sediment control structures. • Restrict vegetation clearing to active areas and progressively rehabilitate with indigenous species. • Locate and protect stockpiles away from drainage lines with berms and mitre drains. • Design excavations for free drainage to prevent pooling. • Conduct weekly inspections and maintain stormwater structures. • Discharge accumulated stormwater in a controlled manner to maintain pre-development runoff levels. • Capture silt from stockpile areas before it reaches aquatic features.	Contractor / Site Manager / Environmental Control Officer (ECO)
Aquatic Ecology	Hydrocarbon contamination from leaking plant, pumps, generators, and refuelling activities.	• Use drip trays under all equipment during operation and parking. • Remove and repair leaking equipment before returning to service. • Refuel in bunded areas with impermeable concrete surfaces and sumps.	Contractor / Site Manager / ECO
Aquatic Ecology	Risk from petrochemical storage facility leaks/spills.	• Store on impermeable, bunded surfaces away from drainage lines and preferably on higher ground. • Bunds to have capacity for 110% of stored volume and a drainage tap. • Inspect and dispose of collected stormwater responsibly.	Contractor / Site Manager / ECO
Soil, land use and land capability	Soil compaction and erosion from machinery and earthworks.	• Follow SMP measures (diversion berms, V-drains). • Place stockpiles on flat areas and protect with berms. • Limit vegetation clearing. • Store topsoil in covered stockpiles ≤ 2 m. • Weekly inspection of erosion controls. • Protect stockpiles from erosion and minimise storage	Contractor / Site Manager / ECO

Key Focus Area	Associated Risk / Aspect	Recommended Mitigation Measures	Responsibility
		duration. • Maintain vehicles to prevent oil/fuel leaks. • Store fuels/oils in bunded, impermeable areas. • Implement waste and pollution control measures in Environmental Management Programme (EMPr).	
Hydropedology	Contamination of Water Resources and loss of vadose zone flows feeding water resources	• All mitigation and recommendation measures outlined in section 9.5 of the Hydropedology Report attached in APPENDIX D should be adhered to.	Contractor / Site Manager / ECO
Operational Phase			
Aquatic Ecology	Altered runoff and sedimentation from inadequate stormwater management.	• Maintain diversion berms, v-drains, and silt traps. • Discharge accumulated stormwater in a controlled manner. • Weekly and post-rainfall inspections of stormwater infrastructure.	Site Manager / Contractor / ECO
Aquatic Ecology	Hydrocarbon contamination from plant and equipment.	• Bund refuelling/servicing areas on impermeable surfaces outside drainage lines. • Collect runoff from these areas in sediment traps. • No parking of equipment within 40 m of aquatic features.	Site Manager / Site Manager / ECO Contractor
Aquatic Ecology	Contamination from petrochemical storage.	• Store in bunded, impermeable areas away from drainage lines. • Drain rainwater in bunds appropriately. • Clean spills immediately. • Manage stormwater through on site traps.	Site Manager / Contractor / ECO
Soil, land use and land capability	Soil contamination from vehicles/machinery.	• Restrict movement to designated routes. • Inspect equipment daily for leaks. • Maintain equipment in designated areas. • Bund hazardous substance storage (110% capacity). • Implement waste management hierarchy and licenced disposal. • Provide and manage waste skips.	Site Manager / Contractor / ECO
Soil, land use and land capability	Soil compaction and erosion from generator operation.	• Adhere to stormwater management measures. • Maintain vehicles to prevent leaks. • Store chemicals in dedicated, bunded areas. • Implement waste handling measures in EMPr.	Site Manager / ECO / Contractor

Key Focus Area	Associated Risk / Aspect	Recommended Mitigation Measures	Responsibility
Hydropedology	Contamination of Water Resources and loss of vadose zone flows feeding water resources	• All mitigation and recommendation measures outlined in section 9.5 of the Hydropedology Report attached in APPENDIX D should be adhered to.	Site Manager / ECO / Contractor
Decommissioning Phase			
Aquatic Ecology	Dust generation during site clearing.	• Remove all waste and rubble. • Manage dust during clearance. • Prepare areas for immediate rehabilitation.	Contractor / ECO/ Site Manager
Soil, land use and land capability	Soil compaction, erosion, reduced land capability.	• Level and shape areas. • Scarify/rip compacted areas to improve infiltration. • Manage drainage to avoid erosion.	Contractor / ECO / Site Manager
Aquatic Ecology	Sedimentation and contamination during stockpile removal.	• Remove stockpiles. • Import topsoil where required. • Protect soil from erosion.	Contractor / ECO / Site Manager
Aquatic Ecology and Wetlands	Hydrocarbon contamination from remaining equipment.	• Identify and treat contaminated soils. • Remove all hazardous substances. • Conduct final environmental audit.	Contractor / ECO / Site Manager
Aquatic Ecology and Wetlands	Stormwater runoff altering hydrology post-rehab.	• Monitor vegetation. • Maintain erosion control. • Repair erosion gullies as needed.	Contractor / ECO / Site Manager
Aquatic Ecology	Delayed vegetation recovery / invasive species spread.	• Plant indigenous species suited to local conditions. • Seed during optimal season. • Remove invasive species in follow-ups.	Contractor / ECO / Site Manager
Waste Management	Improper disposal of waste.	• Remove all waste to licenced facilities. • No burial or burning. • Verify removal during final inspection.	Contractor / ECO / Site Manager
All Phases of the Project			
Emergency Preparedness	Accidental spills, fires, and other incidents.	• Implement Emergency Preparedness and Response Plan. • Keep spill kits on site and train staff in use. • Maintain firefighting equipment. • Report and document all incidents. • Conduct regular drills.	Contractor / Site Manager / ECO / Safety Officer

9 REHABILITATION PROCEDURE FOR THE UMMBILA EMOYENI BORROW PIT

This section has been summarised from the Rehabilitation Procedure attached in APPENDIX G. Rehabilitation Procedure outlines the approach for restoring areas disturbed during the development of the Ummbila Emoyeni Borrow Pit. It aims to reinstate environmental integrity by addressing all affected areas, including access roads and the mining site, in line with environmental management standards and applicable environmental legislation. This section has been summarised from the Rehabilitation Procedure

9.1 Objectives of Rehabilitation

The rehabilitation objectives aim to restore disturbed areas and support environmental recovery. These objectives are as follows:

- Erosion Control: Prevent further erosion of soil, especially in areas vulnerable to wind or water erosion.
- Ecological Restoration: Promote the return of indigenous plant species and prevent the spread of alien invasive species.
- Soil Stability: Ensure that topsoil is replenished, and compacted areas are addressed to allow healthy root growth for revegetation.
- Long-term Sustainability: Minimise the long-term environmental impacts and foster ecological sustainability by applying best practices for soil stabilisation and vegetation re-establishment.

9.2 Rehabilitation Process

Table 9-1 highlights the procedures for rehabilitating disturbed areas within the project area. Rehabilitation will be monitored through regular inspections of revegetation success and erosion control measures.

Table 9-1: Rehabilitation Process

CLEARING AND CLEANING:
Clearance of Foreign Material
All disturbed areas must be cleared of foreign material such as construction debris, waste, invasive plant species, and any leftover construction materials. The area must be thoroughly cleaned to ensure that no remnants of construction activities remain.
Pre-Rehabilitation Inspection
Prior to initiating rehabilitation works, an inspection will be conducted to ensure the areas to be rehabilitated are free of any contamination or foreign materials, including large construction debris, machinery remnants, and waste.
TOPSOIL IMPORTATION:
Topsoil Importation Requirements
Where the existing topsoil is insufficient, additional topsoil will be imported to a minimum depth of 75mm and up to a maximum of 150mm. The topsoil must be of good quality, free of contaminants such as invasive plant species, and sourced from approved suppliers or nearby undisturbed areas where it will not lead to further ecological degradation.
Topsoil Handling and Protection
Stockpiled topsoil will be protected from erosion and contamination. During stockpiling, the shape

and slope of the stockpile will be designed to minimise soil loss. The topsoil will be stored in a manner that prevents the separation of finer and coarser particles, ensuring that it retains its fertility and structure.
Topsoil Application
Once levelling is complete, the imported topsoil will be spread evenly across the disturbed areas to the required depth (75mm to 150mm). This topsoil will be used to promote the successful growth of indigenous plant species, providing a healthy seedbed, and enhancing soil fertility.
REVEGETATION AND LANDSCAPING:
Site Preparation for Revegetation
After topsoil is applied, the area will be prepared for vegetation establishment. The soil will be scarified or lightly ripped to a depth of 50–100 mm to break any compacted layers and improve water infiltration and root penetration. This will be done in conjunction with the planting activities, ensuring that soil moisture levels are adequate for seed germination and plant growth.
Selection of Plant Species
Indigenous plant species that are appropriate for the local climate, soil type, and ecological conditions will be selected. Species should include a mix of grasses, forbs, and small shrubs, which are native to the area and provide habitat for local fauna. Species selected should be non-invasive and adapted to the specific environmental conditions of the rehabilitation areas.
Seeding and Planting
The seeding (if required) will be carried out using a mix of locally collected or commercial indigenous seeds that are suited to the various zones of the rehabilitation area. In addition, mechanical transplanting of local vegetation will be employed to speed up the process, especially in areas with high moisture content, such as wetlands or stream buffers.
Seeding Method
The seeding method will be adapted depending on the area's characteristics. A broadcast seeding method will be used for flat, low-lying areas, while seed drilling or row planting may be employed in more compact or uneven terrain.
Timing of Revegetation
Revegetation activities will be timed to coincide with optimal growing seasons, ideally between April and October, to allow for successful germination and establishment of vegetation.
WATER AND IRRIGATION MANAGEMENT:
Irrigation of Re-vegetated Areas
To support initial plant growth, irrigation may be required, especially in areas with insufficient natural rainfall. A temporary irrigation system may be installed, particularly in the early stages of rehabilitation, to ensure that newly planted vegetation receives adequate water for establishment.
Water Management
The rehabilitation areas will be monitored for water management issues, particularly during heavy rainfall events. Drainage channels may need to be installed or adjusted to ensure proper runoff control, reducing the potential for erosion and waterlogging.
ALIEN INVASIVE SPECIES MANAGEMENT:
Control of Invasive Species
Any alien invasive species present in the rehabilitation area must be identified and eradicated. This will include mechanical removal or controlled use of herbicides (where appropriate and approved). Follow-up clearing operations will be conducted to ensure that any regrowth of invasive species is controlled.
Post-Rehabilitation Monitoring
Ongoing monitoring will be conducted to assess the success of rehabilitation efforts. Any alien invasive species identified during the monitoring process will be promptly addressed to prevent encroachment into the rehabilitation area.

9.3 Monitoring and Reporting

9.3.1 Monitoring Procedures

Monitoring will be undertaken to ensure the effectiveness of rehabilitation efforts and to identify any areas requiring corrective action. The following procedures will be implemented:

- Regular Site Inspections: The Environmental Officer will carry out routine inspections of rehabilitated areas to monitor topsoil condition, vegetation health, the presence

of invasive species, and signs of erosion or soil degradation.

- Revegetation Success: The effectiveness of revegetation will be evaluated based on the establishment of healthy, diverse plant cover, with particular emphasis on indigenous species.
- Erosion Control Monitoring: The risk of erosion will be assessed during each inspection. Where necessary, additional interventions such as supplementary planting or erosion control materials will be implemented to stabilise affected areas.

9.3.2 Final Reporting

A final environmental audit report will be prepared and submitted to the relevant authorities within 30 days of completing the rehabilitation activities. The report will evaluate the effectiveness of the rehabilitation programme, highlight any challenges encountered, and recommend corrective actions where necessary.

10 PUBLIC PARTICIPATION

The sections below provide a summary of the public consultation activities that will be undertaken for the project.

10.1 Stakeholder Engagement Undertaken

10.1.1 Authority Pre-Application Consultation

A pre-application meeting with DWS was held on 24 March 2025. The purpose of the meeting was to engage with the relevant DWS officials to discuss the water uses and to determine the appropriate type of water use authorisation required for the project. In addition, the meeting served to clarify the information requirements, outline the application process and ensure alignment with the regulatory expectations prior to the formal submission of the WULA.

10.1.2 Stakeholder Identification Interested and Affected Parties

Existing stakeholder databases were sourced from the database used during the EA application phase. The following sectors of society will be included within the database which will be used to notify stakeholders of these applications:

- National, provincial and local government and tribal authorities.
- Landowners and neighbouring landowners.
- Agriculture, water bodies and farmers' organisations.
- National and local media.
- Neighbouring industry and mining, business and commerce.
- Conservation and environmental bodies, both as authorities and Non-Governmental

Organisations (NGOs).

- Community representatives, Community-Based Organisation (CBOs), development bodies.
- Representatives for disadvantaged people, women and youth.

10.1.3 Distribution of Notification Letters and Background Information Document

A notification letter and BID containing information about the project, its location, activities to be undertaken and the regulatory processes were sent by e-mail correspondence using database on 18 August 2025.

10.1.4 Site Notice Placements

Site notices will be erected in public places near the project area, to inform and encourage I&APs to register and comment on the Draft WULA Technical Report.

10.1.5 Newspaper Advertisements

Newspaper advertisement was published in the Ridge Newspaper in English and isiZulu. The advertisement aimed to notify I&APs of the project and comment on the Draft WULA Technical Report.

10.1.6 Public Comment Period on the Draft WULA Technical Report

The provides details of the public participation activities undertaken during the Draft WULA Technical Report Phase.

The WULA Technical Report will be made available for a 60-day public review and commenting period from 18 August 2025 to 18 October 2025 at the following places:

- Bethal Public Library: Danie Nortje Street, Bethal, 2310
- GCS Website: https://www.gcs-sa.biz/public-documents/

10.2 Issues and Responses from Public Consultation Process

A Comment and Response Report will be compiled capturing all stakeholder comments obtained during the public commenting period.

11 MOTIVATION IN TERMS OF SECTION 27(1) OF THE NATIONAL WATER ACT, 1998

In terms of section 27 of the NWA, a responsible authority must take into account all the relevant factors including:

11.1 Section 27 (a): Existing Lawful Water Use

In terms of section 32 of the NWA, a water use is considered an ELWU if it was lawfully

exercised during the two years preceding the commencement of the Act or subsequently authorised under legislation in force at the time. The Borrow Pit does not constitute an ELWU and therefore requires formal authorisation.

The Borrow Pit, to be established by Stefanutti, will supply construction aggregate for the development of the Ummbila Emoyeni WEF. The site is located on Portion 9 of the Farm Sukkelaar 421 IS, within the Lekwa Local Municipality, Mpumalanga. The site was selected for its proximity to the WEF, availability of suitable materials, and logistical efficiency.

Given the proximity to delineated watercourse within a 500 m radius, the activities trigger section 21(c) and (i) uses and must comply with the requirements for WULA.

11.2 Section 27 (b): The Need to Redress the Results of Past Racial and Gender Discrimination

11.2.1 Broad – Based Black Economic Empowerment Status

Stefanutti Stocks Inland, a division of Stefanutti (Registration No. 2003/022221/07), has achieved Level 1 Broad-Based Black Economic Empowerment (B-BBEE) Contributor status for the verification period ending 15 August 2025 (EmpowerLogic, 2024). This is the highest possible rating under the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003) and affirms full compliance with the Codes of Good Practice issued by the Department of Trade, Industry and Competition (DTIC, 2019) The rating was independently verified by EmpowerLogic (Pty) Ltd, based on the company's performance for the financial year ending 29 February 2024.

This Level 1 status confers a 135% procurement recognition level, significantly enhancing Stefanutti's positioning as a preferred supplier within both the public and private sectors (EmpowerLogic, 2024). The rating reflects the successful implementation of a broad-based transformation strategy, assessed across the five key scorecard elements: Ownership, Management Control, Skills Development, Enterprise and Supplier Development, and Socio-Economic Development (DTIC, 2019).

Under the Ownership element, Stefanutti reports 63.73% Black Ownership, demonstrating meaningful progress in transforming the company's equity and leadership structure (EmpowerLogic, 2024). While Stefanutti qualifies as a 51% Black-owned Designated Group Supplier, it has not participated in the Youth Employment Service Initiative, which could have contributed additional recognition points (EmpowerLogic, 2024) (DTIC, 2019).

The verification report indicates no score allocation for contributions towards Black unemployed persons, rural populations, or military veterans—highlighting key opportunities for future empowerment initiatives. Nonetheless, Stefanutti qualifies as an Empowering Supplier, enabling its clients to claim the full benefit of procurement recognition under the B-BBEE framework (EmpowerLogic, 2024) (DTIC, 2019).

11.2.2 Contribution to Socio-Economic Development

Stefanutti, a multidisciplinary construction Group, is one of South Africa's most prominent listed construction companies. It delivers infrastructure development projects, of any scale, to diverse sectors within the built environment across South Africa and neighbouring regions. Its decades of industry experience and steadfast delivery of excellence in execution has positioned Stefanutti as a premier brand that is built on innovation and a foundation of common values which include an uncompromising commitment to safety and quality. Stefanutti's operating model and project delivery approach indicate an alignment with the pillars of the B-BBEE Codes of Good Practice (DTIC, 2019) including:

- Procurement: Stefanutti strives to enable viable B-BBEE suppliers to participate in mainstream economy by facilitating access to Stefanutti's procurement activities pertaining to its needs and in line with its project requirements. The company actively promotes the participation of B-BBEE-compliant suppliers in its procurement processes. Stefanutti encourages vendors to achieve at least a Level 6 B-BBEE contributor status and supports small, medium, and micro enterprises (SMMEs) by considering them for procurement opportunities, provided they meet performance, quality, and safety standards (Stefanutti Stocks, 2024).
- Enterprise Development: The Group's strategy is to foster strong working relationships with competent Black-owned companies and to develop them in a tangible, meaningful way to ensure that they become sustainable while increasing their capacity to take on larger and more complex projects. Stefanutti has implemented several enterprise development initiatives to foster strong working relationships with competent Black-owned companies. These initiatives aim to develop these companies in a tangible and meaningful way, ensuring their sustainability and increasing their capacity to undertake larger and more complex projects (Stefanutti Stocks, 2024).
- Socio-Economic Development: The Group focuses on Social and Economic Development (SED) initiatives that address education in the communities surrounding its operations, with an emphasis on initiatives that promote mathematics and science. The company focuses on SED initiatives that address education in communities surrounding its operations, with an emphasis on promoting mathematics and science. These initiatives directly support local empowerment and contribute to the overarching national transformation goals under the B-BBEE framework (Stefanutti Stocks, 2024).
- Skills Development: Stefanutti invests in employee development as an important growth and retention strategy, but also, because it is essential to continually improve

the knowledge, skills and experience of its employees in order to achieve the Group's strategic objectives. A few of the recent SED initiatives are detailed below (Stefanutti Stocks, 2024) and (Stefanutti Stocks, 2023):

- Vision screening and spectacles for schoolchildren: Eye testing and spectacle fitment programme "Framing the Future" sees the Group partnering with approved optometrists who are active across the regions in which we operate. The beneficiary primary schools that form part of the programme are selected in liaison and consultation with each project's and community's stakeholders.
- Donation of sanitary packs to learners: 1 000 Komani period packs (consisting of four washable pads and a storage bag) to scholars.
- Construction of science labs in under-resourced schools: science laboratory at St David's Marist Inanda Alexandra Campus.

11.3 Section 27 (c): Efficient and Beneficial Use of Water in the Public Interest

Stefanutti has demonstrated a clear commitment to the efficient and sustainable use of water resources, particularly in the context of construction material sourcing through Borrow Pits. The operational planning for the Ummbila Emoyeni Borrow Pit integrates water conservation principles at every stage, as reflected in the project-specific Environmental Management Programme (EMPr).

The following water-efficient practices will be implemented during the life of the Borrow Pit:

- Water recycling and sedimentation systems will be employed.
- Closed-loop water systems will be adopted to limit water withdrawal and prevent discharge into the surrounding environment.
- Dust suppression techniques will prioritise the use of non-potable sources, with smart scheduling to reduce evaporation losses.

Additionally, no bulk water infrastructure or pipelines are required for the operation of the Borrow Pit. These site-specific practices ensure that the project's water footprint remains minimal and aligns with the principles of water stewardship under the NWA.

11.4 Section 27 (d) (I): The Socio-Economic Impact of the Water Use or Uses if Authorised

11.4.1 Public Benefit of the Water Use

The Ummbila Emoyeni is a strategic renewable energy infrastructure project and a key component of South Africa's transition to a low-carbon economy, as outlined in the Integrated Resource Plan (IRP), 2019 (DMRE, 2025) and the Just Energy Transition (JET) Framework (PPC, 2025). The authorised water use will support the local extraction of aggregate material

required to construct roads, foundations, and related infrastructure for the WEF. This will yield the following public benefits:

- Provision of clean, renewable electricity to the national grid, contributing to a reduction in greenhouse gas emissions and decreased reliance on fossil fuels.
- Promotion of energy security and diversification of the national energy mix.
- Local economic development, including the creation of employment opportunities and procurement of goods and services from local and historically disadvantaged businesses.
- Contribution to sustainable infrastructure development by reducing transport-related emissions through the use of a proximal aggregate source, thereby minimising the project's indirect water and fuel consumption.
- Support for community upliftment initiatives, such as bursaries, infrastructure support, and skills development programmes facilitated by the project proponent under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) guidelines.

The water use associated with the Borrow Pit is thus not only efficient but also aligned with national imperatives for economic development, social transformation, and climate resilience.

Sustainable Resource Management

The Borrow Pit's design, location, and operational procedures incorporate numerous mitigation measures to ensure the sustainable management of water and land resources throughout its lifespan. As documented in the Basic Assessment Report and EMPr (GCS, 2024) the following safeguards will be implemented:

- Surface runoff will be managed through berms and diversion channels to prevent erosion and sedimentation in nearby non-perennial watercourses.
- Topsoil will be stripped and stockpiled separately for use during rehabilitation to ensure vegetation regrowth and ecological recovery.
- Stormwater management infrastructure (e.g. contour drains, silt fences, sediment traps) will be maintained and inspected regularly to prevent degradation of downstream aquatic environments.
- The project will be governed by an ISO 14001-certified Environmental Management System, ensuring continuous monitoring, impact minimisation, and compliance with DWS requirements.

Importantly, the close proximity of the Borrow Pit to the construction site reduces the need to import aggregate from distant commercial quarries. This not only cuts down on transport-related emissions but also lowers water use associated with long-distance haulage operations and aggregate processing at industrial sites.

In conclusion, the water use demonstrates efficient utilisation, delivers measurable public benefits, and adheres to recognised environmental management best practices. It is therefore in the public interest to authorise the section 21(c) and (i) water uses associated with the Ummbila Emoyeni Borrow Pit.

11.5 Section 27 (d) (II): The Socio-Economic Impact of the Failure to Authorise the Water Use or Uses:

11.5.1 Of the Water if Authorised

Economic Impact

Authorising the water uses for the Ummbila Emoyeni Borrow Pit will result in measurable socio-economic gains, particularly by enabling the development of the Ummbila Emoyeni WEF, a strategic renewable energy initiative in Mpumalanga Province.

The Borrow Pit will provide a cost-effective, geographically proximate, and environmentally responsible source of aggregate required for the WEF's foundational structures, internal roads, hardstands, and ancillary infrastructure. This eliminates the need for long-haul material transport from distant quarries, which would otherwise inflate project costs and carbon emissions.

During the construction phase, the project is anticipated to create significant short-term employment opportunities for local labourers, plant operators, and supporting service providers. Stefanutti, a Level 1 B-BBEE contributor, is committed to maximising local participation by engaging SMMEs, and procuring services and materials from local suppliers and historically disadvantaged individuals. This aligns with the company's broader transformation and SED strategy.

In addition to job creation, a local source of materials supports the broader economic development of the area, potentially stimulating further infrastructure and industrial activities. These procurement activities will inject capital into the regional economy, supporting entrepreneurship and strengthening local supply chains.

Furthermore, the economic contribution extends to increased municipal revenue through business rates and taxes, enabling improved public service delivery and infrastructure development within the host municipality. By supporting the timely and cost-efficient delivery of a large-scale renewable energy facility, the water use authorisation will also contribute to national economic resilience and energy security, in alignment with government

priorities under the IRP, 2019 (DMRE, 2025) and the JET Framework (PPC, 2025).

Social Impact

From a social development perspective, the Ummbila Emoyeni WEF with Stefanutti Stocks as the lead contractor, presents a meaningful opportunity to support inclusive, long-term upliftment of surrounding communities. In alignment with the REIPPPP guidelines, the project will implement a range of SED initiatives designed to address local needs and promote equity. These initiatives will include investments in local infrastructure upgrades, such as roads and community facilities, as well as targeted educational support through bursaries, the provision of school resources, and the promotion of science, technology, engineering, and mathematics education to empower future generations. In addition, the project will contribute to improved access to basic services, including clean water and primary healthcare support, particularly in underserved areas.

A central focus will be placed on skills development and the training of local labour, enabling long-term employability in the construction and renewable energy sectors. This approach will not only support job creation during the construction phase but also provide community members with transferable skills that extend beyond the life of the project. Moreover, the project will promote local economic inclusion by actively engaging SMMEs and historically disadvantaged individuals in procurement and supply chain opportunities. All social development initiatives will be implemented in consultation with local stakeholders, including ward councillors, traditional authorities, and community forums, to ensure that project benefits are inclusive, relevant, and sustained. Through these initiatives, Stefanutti aims to foster social cohesion, economic participation, and meaningful empowerment for communities within the Mpumalanga region.

11.5.2 Of the Failure to Authorise the Water Use or Uses

Failure to authorise the section 21(c) and (i) water uses associated with the Borrow Pit would jeopardise the viability and efficiency of the Ummbila Emoyeni WEF. The project would be forced to rely on commercial quarries located significantly farther away, increasing logistical costs, traffic emissions, and construction timelines.

This would also reduce the opportunity for local job creation, economic participation, and skills development within host communities, undermining key objectives of the IRP, 2019 (DMRE, 2025) and the JET Framework (PPC, 2025), both of which emphasise inclusive development, infrastructure transformation, and climate resilience.

Additionally, increased transport of materials from offsite quarries would elevate environmental risks (e.g. dust, noise, road degradation) and greenhouse gas emissions, contrary to the sustainability goals of a renewable energy facility. The potential delay in project implementation could jeopardise financial close deadlines and grid connection

timelines, leading to broader economic losses and energy security risks.

Moreover, as the Borrow Pit location has been carefully assessed and designed to avoid permanent watercourse alteration or abstraction, rejecting the water use application offers limited environmental gain while imposing high social and economic costs.

11.6 Section 27 (e): Any Catchment Management Strategy Applicable to the Relevant Water Resource

The Ummbila Emoyeni Borrow Pit is located within Quaternary Catchment C11H of the Vaal-Orange Water Management Area (WMA), which falls under the jurisdiction of the Vaal-Orange Catchment Management Agency (VOCMA). This positions the project squarely within the strategic framework of VOCMA's Catchment Management Strategy (CMS), currently under development for the 2025–2028 cycle as outlined in its Annual Performance Plan (VOCMA, 2025). The CMS is designed to promote integrated and sustainable water resource management by coordinating across sectors and land uses, with a particular focus on addressing pollution from industrial, mining, agricultural, and urban sources. The strategy also emphasises participatory governance and the promotion of catchment-wide water quality planning through inclusive stakeholder engagement.

Key strategic focus areas of the CMS include the improvement of water use authorisation processes through robust validation, registration, and enforcement systems. It also supports infrastructure alignment with major regional developments, such as Phase II of the Lesotho Highlands Water Project, and advances climate change adaptation through water conservation and demand management interventions. Stakeholder involvement is central to the CMS, with efforts underway to establish collaborative forums that foster transparency, community ownership, and improved water governance.

The CMS sets out specific performance targets for the 2025–2028 period, including the finalisation of a draft CMS by the end of the 2025/26 financial year, full implementation of the River Eco-status Monitoring Programme across 11 key rivers, and improved regulatory compliance. Notably, VOCMA aims to register at least 75% of authorised waste related discharges on the Water Authorisation and Registration Management System by 2025/26, increasing to 85% by 2027/28. The strategy also includes response targets for pollution events, committing to address at least 80% of reported incidents within 78 hours, while simultaneously accelerating the verification and validation of existing water users.

In response to critical risks such as illegal water abstraction, contaminated return flows, and institutional fragmentation, VOCMA is investing in capacity-building, strengthening intergovernmental coordination, and upgrading data management systems. These initiatives are designed to ensure reliable water quality monitoring, informed decision-making, and improved service delivery. Additionally, the CMS ensures alignment with South Africa's

transboundary water obligations, particularly in relation to the Orange-Senqu River Basin, as governed by the Orange-Senqu River Commission (ORASECOM). Through this strategic framework, VOCMA aims to enable sustainable, equitable, and resilient management of water resources within the Vaal-Orange WMA; a goal that is directly supported by the responsible and regulated implementation of water uses associated with the Ummbila Emoyeni Borrow Pit.

11.7 Section 27 (f): The Likely Effect of the Water Use to be authorised on the Water Resource and on Other Water Users

Table 11-1 presents the quantity component of the Reserve determination (DWS, 2020), while Table 11-2 outlines the groundwater quality parameters for Quaternary Catchment C11H.

Table 11-1: Reserve determination of Quaternary Catchment C11H

Area (km)	Recharge (Mm/a)	Population	Basic Human Needs (Mm^3/a)	Groundwater Component of Baseflow (Mm^3/a)	Total Reserve (Mm^3/a)	Allocable Groundwater Total (Mm^3/a)	MAP (mm)	Current Ground Water Use (Mm/a)
1103	40.16	33924	0.31	6.76	7.07	31.71	664	1.38

Note/s:
MAP - mean annual precipitation
[m/a] - metres per annum
[m^2] - squared metres
[m^3/d] - cubic metres per day
[m^3/a] - cubic metres per annum
[Mm^3/a] - mega cubic metres per annum

Table 11-2: Groundwater quality of Quaternary Catchment C11H (DWS, 2020)

Chemical Parameter	Unit	Vaal WMA – Quaternary catchment: *C11H			
		[A]	[B]	[C]	[D]
		No. of Samples	GW quality (median value)[1]	BHN Limit[2]	Groundwater Quality Reserve[3]
pH		37	8.20	9.5 – 5.0 (±0.05)	9.5 – 5.0 (±0.05)
Electrical Conductivity	mS/m	37	79.70	<150	88
Calcium as Ca	mg/l	37	78.65	<150	87
Magnesium as Mg	mg/l	37	36.28	<70	39
Sodium as Na	mg/l	37	48.76	<200	54
Potassium as K	mg/l	37	4.24	<50	4.7
Total Hardness as $CaCO_3$	mg/l	37	345.8	<300	380
Chloride as Cl	mg/l	37	32.32	<200	36
Sulphate as SO_4	mg/l	37	61.58	<400	68
Nitrate as NO_x-N	mg/l	37	4.75	<10	5.2
Fluoride as F	mg/l	37	0.35	<1.0	0.39
				Water Quality Class	Class 1

[1] Based on long-term groundwater quality datasets (DWS Water Management System). Minimum number of analyses used for the statistical evaluation is nine (9);
[2] Upper limit of Class I water quality [Drinking] (WRC *et al.* 2nd Edition, 1998, Volume 1: Assessment Guide); and
[3] Median value plus 10% (with the exception of pH).
* Indicates that only post-1995 hydrochemical datasets for the specific quaternary catchment were used.

Although direct surface water abstraction is not a primary component of the Ummbila Emoyeni Borrow Pit's water use, the project's location within Quaternary Catchment C11H in the semi-arid Mpumalanga region necessitates the implementation of a robust stormwater management strategy to protect nearby non-perennial watercourses. Effective stormwater control is essential to preventing erosion, sedimentation, and deterioration of water quality, thereby safeguarding the ecological functioning of the broader Vaal-Orange catchment.

The SMP has been prepared to provide practical on site controls in the construction work areas to:

- Prevent damages to the works.
- Prevent contamination of the downstream watercourse during the project construction phase.
- Provide measures to address runoff from these disturbed areas within the construction footprint.
- Avoid unnecessary runoff of water and sedimentation into worked and prepared farmlands.

To further safeguard quality and prevent contamination, the project will incorporate bunding and containment systems for any hazardous materials or potential contaminant sources. These measures will ensure that spills or leaks are contained and do not infiltrate the underlying aquifer system. Regular inspections and maintenance of bunded areas will be conducted throughout the project lifecycle, reinforcing the commitment to protect groundwater resources.

Impact on the Water Resource:

- The Borrow Pit is located within Quaternary Catchment C11H, which is characterised by moderate recharge rates and a relatively stable groundwater system. Water use volumes are anticipated to be small relative to the catchment's total recharge and ecological reserve requirements.
- With proper management, including water recycling, minimisation of surface runoff, and control of sedimentation, the project is unlikely to cause significant depletion of groundwater or surface water resources.
- Monitoring and adaptive management will ensure that any potential changes in groundwater levels or quality are detected early and mitigated promptly, maintaining compliance with ecological water requirements and the Reserve.

Impact on Other Water Users:

- Given the temporary and limited scale of water use, no significant negative impacts on downstream or adjacent water users are expected.
- Local water users, including agricultural, domestic, and environmental users, will continue to have sufficient access to water resources without conflict or significant reduction in availability.
- Stefanutti' commitment to water efficiency and responsible resource management aligns with the national objectives of equitable and sustainable water use.

11.8 Section 27 (g): The Class and the Resource Quality Objectives of the Water Resource

The project falls within Quaternary Catchment C11H, located in the Vaal-Orange WMA. This catchment has been classified under the National Water Resource Classification System as a Class II water resource, indicating that it requires a moderate level of protection to support both ecological sustainability and SED (DWS, 2016).

The Resource Quality Objectives (RQOs) for this catchment aim to ensure the protection of water quantity, water quality, habitat integrity, and biotic components of the aquatic ecosystem. Specific objectives typically include maintaining natural flow variability, limiting increases in sediment loads, and avoiding deterioration in water chemistry parameters such as pH, electrical conductivity, and nutrient levels.

Given that the Borrow Pit will be active for a limited duration and is designed with integrated stormwater management and erosion control measures (as outlined in the site-specific SMP), the water uses are not expected to compromise the RQOs of Catchment C11H. Furthermore, the non-perennial nature of the nearby watercourses and the absence of direct abstraction

or discharge into these systems reduce the risk of long-term ecological degradation.

All activities will adhere to the mitigation measures set out in the EMPr to ensure ongoing compliance with the catchment's classification and RQOs.

11.9 Section 27 (h): Investments Already made and to be made by the Water User in Respect to the Water Use in Question

To date, substantial financial and technical investments have been made by Stefanutti Stocks in preparation for the development and regulatory approval of the Ummbila Emoyeni Borrow Pit. These investments reflect the applicant's commitment to responsible environmental planning, legal compliance, and sustainable water use. Key completed investments include:

- Basic Assessment and EA Process: Preparation of the Basic Assessment Report and EMPr, as required under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), including specialist input to ensure environmental risks were fully identified and mitigated.
- Geotechnical and Specialist Studies: Engagement of qualified specialists to undertake geotechnical, soil, heritage, botanical, and wetland assessments to inform environmentally suitable Borrow Pit siting, access routes, and management interventions.

Looking ahead, future investments will be directed toward the construction, commissioning, and responsible operation of all water related infrastructure associated with the Borrow Pit. These will include stormwater diversion measures, sediment control installations, bunding for hydrocarbon storage, dust suppression systems, and site rehabilitation infrastructure. All measures will be implemented and monitored in accordance with the conditions of the WUL.

11.10 Section 27 (i): The Strategic Importance of the Water Uses to Be Authorised

The authorisation of the proposed water uses under section 21(c) and (i) of the NWA is of substantial strategic importance, as these activities directly enable the construction of the Ummbila Emoyeni Borrow Pit; a nationally significant renewable energy project located in Mpumalanga Province. These temporary water uses, associated with the establishment and operation of a Borrow Pit, are integral to sourcing construction materials for foundational infrastructure and access roads.

The Ummbila Emoyeni WEF aligns closely with South Africa's IRP, which outlines the country's long-term strategy for securing a reliable, diversified energy mix. The IRP, 2019 (DMRE, 2025) emphasises the accelerated integration of renewable energy to reduce dependency on coal, mitigate greenhouse gas (GHG) emissions, and address the ongoing challenges of energy supply stability and affordability. By facilitating the delivery of this wind energy project, the

water uses proposed serve a foundational role in supporting this national policy objective.

In parallel, the project contributes to the realisation of South Africa's JET Framework (PPC, 2025), which seeks to shift the national energy system toward low-carbon alternatives while promoting social equity, employment creation, and inclusive economic development (PCC, 2022). The Borrow Pit's localised material sourcing supports this transition by minimising the carbon footprint associated with long-haul transportation of aggregates and reducing indirect water consumption linked to industrial processing in commercial quarries. This results in a more efficient, climate-resilient construction process that aligns with both environmental sustainability and social upliftment principles.

Furthermore, the timely execution of the Ummbila Emoyeni WEF is crucial to meeting key grid integration milestones and ensuring compliance with the Independent Power Producer Office procurement timelines. Delays in water use authorisation could significantly impact the project's ability to meet its commercial operation date and power purchase agreement obligations, thereby undermining energy security objectives at a national level.

From a climate policy perspective, the project will contribute directly to South Africa's obligations under the Paris Agreement, including its Nationally Determined Contributions, by displacing fossil fuel-based energy generation with clean, renewable power) (DFFE, 2021). This contribution reinforces South Africa's international commitments to carbon reduction while advancing domestic energy resilience.

In summary, the authorisation of the temporary water uses for the Borrow Pit is not only environmentally responsible and locally efficient but also strategically critical. It underpins national energy policy goals, supports international climate commitments, enables infrastructure investment, and drives socio-economic transformation in a region traditionally dependent on carbon-intensive industries.

11.11 Section 27 (j): The Quality of Water in the Water Resource Which May Be Required for the Reserve and for Meeting International Agreements

The Ummbila Emoyeni Borrow Pit is located within Quaternary Catchment C11H of the Vaal-Orange WMA, which forms part of the broader Lower Orange River system—a strategic transboundary watercourse shared by South Africa, Namibia, Botswana, and Lesotho. The Lower Orange River is managed in terms of international water governance frameworks, most notably the Orange-Senqu River Commission (ORASECOM) Agreement (2000) and the Revised Southern African Development Community (SADC) Protocol on Shared Watercourses (2000).

Given this context, the quality of water in Catchment C11H must support both the ecological Reserve—which defines the water quantity and quality needed to sustain aquatic ecosystems—and South Africa's international obligations to maintain downstream water quality for shared use. The DWS has classified Catchment C11H as a Class II resource, which

denotes a requirement for moderate protection, balancing ecological integrity with Socio-Economic Development (DWS, 2016).

As part of this classification, RQOs have been developed to safeguard critical water quality parameters, including:

- pH.
- Electrical conductivity.
- Total dissolved solids.
- Nutrient concentrations (nitrates, phosphates).
- Turbidity and sediment loads.

The Borrow Pit activities do not involve direct abstraction from or discharge into surface water bodies. Rather, the associated water uses trigger section 21(c) and (i) of the NWA due to the temporary alteration of flow and potential modification of the bed and banks of a delineated watercourse within 500 m of the site. These water uses are low risk in terms of water quality degradation and will be strictly managed through the implementation of mitigation measures outlined in the approved EMPr. These include:

- Stormwater diversion structures to separate clean and dirty water streams.
- Sediment control features such as silt fences and berms.
- Bunded storage for hazardous substances.
- Progressive rehabilitation of exposed surfaces to prevent erosion and surface runoff.

Furthermore, the Borrow Pit is not located near the mainstem of the Orange River or any designated international boundary water points and therefore poses no direct risk to transboundary water flow or quality. Even under a worst-case scenario, the limited, localised nature of the activity, combined with the non-consumptive and non-discharge-based water uses, renders the likelihood of any downstream impact on international obligations under ORASECOM or SADC protocols negligible.

The water use activities will not compromise the quality of water required for the Reserve, nor will they hinder South Africa's ability to meet its international water-sharing responsibilities. The design, operation, and closure of the Borrow Pit are underpinned by principles of precautionary environmental management, regulatory compliance, and alignment with both national and transboundary water governance frameworks.

11.12 Section 27 (k): The Probable Duration of Any Undertaking or which a Water Use is to be Authorised

The Borrow Pit is expected to be temporary and project-specific, with a defined operational

lifespan aligned to the construction phase of the Ummbila Emoyeni Borrow Pit. The Borrow Pit is anticipated to be active for a period of approximately five years, during which construction aggregate will be sourced, processed, and transported to the WEF site.

12 CONCLUSION

This WULA Technical Report has been compiled in support of the WULA and provides the DWS and I&APs with the required information regarding the water uses in terms of section 21 of the NWA.

12.1 Regulatory Status of Activity

12.1.1 Environmental Authorisation

The applicant has undertaken an EA application through a Basic Assessment process in terms of the NEMA, as amended. Environmental Authorisation [(MP)30/5/1/3/2/1/(14646) EA] has been granted for the Borrow Pit. The following listed activities in terms of the EIA Regulations, 2014 (as amended) have been authorised:

- Activity 21 of Listing Notice 1 (GN R.983): Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the MPRDA.
- Activity 27 of Listing Notice 1 (GN R.983): The clearance of an area of 1 hectare or more of vegetation.

12.1.2 Water Use Licence

There is currently no existing WUL for the project. The WULA is currently progress with the reference number WU41439.

12.2 Statement of Water Uses Requiring Authorisation, Dispensing with Licensing Requirement and Possible Exemption from Regulation

All water uses are applied for under section 21 of the NWA. Section 3.5 depicts all the water uses applied for during this application.

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APPENDIX A: CURRICULUM VITAE AND QUALIFICATIONS

Paula Tolksdorff

SENIOR TECHNICAL MANAGER

CORE SKILLS

- Environmental Legislation
- Equator Principles, IFC Performance Standards, World Bank EHS Guidelines
- Environmental and Social Impact Assessments
- Stakeholder Engagement and Management
- Environmental Management Programmes
- Operation and Construction Environmental Management Plans and Procedures
- Management Systems and Frameworks incl. ISO 14001
- Compliance Auditing, Due Diligence & Project Management
- Waste & Water Management

DETAILS

Academics

- Baccalaureus Technologiae (B-Tech), Engineering Civil, Urban and Rural Development, University of the Witwatersrand, 1997
- National Higher Diploma: Civil Engineering, University of the Witwatersrand, 1994
- National Diploma: Civil Engineering, University of the Witwatersrand, 1993
- MSc. Environmental Management, University of North West (two years course work complete 2011/2012)

Short Courses

- Certificate in Public Participation, International Association of Public Participation
- Centre of Environmental Management SAATCA approved course in Implementing Environmental Management Systems (ISO 14001)
- IEMA Approved Foundation course in Environmental Auditing
- IEMA Approved Carbon Footprint Management Course
- CESA, Developing Mentorship Skills for Management and Professionals
- Water Governance Course, Carin Bosman Sustainable Solutions

Languages

- English
- Afrikaans

Countries Worked In

Botswana, Democratic Republic of the Congo, Guinea, Liberia, Mozambique, Russia, Saudi Arabia, South Africa, Tanzania, Zambia and Zimbabwe

PROFILE

Paula brings over 30 years of specialised experience in the environmental sector, working across various industries, including global industrial and mining clients, as well as commercial developments. Her career has taken her through significant projects across Africa, where she has gained a deep understanding of how environmental and social licenses to operate impact both operations and project outcomes.

With a strong foundation in sustainability, Paula applies her expertise to integrate and maintain effective, sustainable practices across a wide range of operational contexts. As an Environmental Assessment Practitioner and Professional Natural Scientist, her skills are both robust and multifaceted. She excels in conducting environmental and social (E&S) impact assessments and in developing comprehensive E&S management programs tailored to the specific needs of each project. Her work includes crafting and implementing E&S management systems for both construction and operational phases, ensuring they adhere to international standards, as well as local regulatory requirements.

Paula is also highly experienced in stakeholder engagement, ensuring clear communication and collaboration across all parties involved in a project. Her capabilities extend to due diligence and compliance auditing, where she provides critical oversight to ensure regulatory compliance and operational integrity. Additionally, she has extensive experience managing water and waste resources, promoting responsible and sustainable practices.

Through her well-honed project management skills, Paula effectively leads complex projects, consistently ensuring that sustainability goals are met. Her career and diverse background demonstrate a deep commitment to advancing environmental stewardship and sustainable development across challenging and diverse environments.to advancing environmental stewardship and sustainable development across challenging and diverse environments.

Professional Affiliations:

- Environmental Assessment Practitioners Association of South Africa (2019/509)
- South African Council for Natural Scientific Professions (152904)
- International Association for Impact Assessment South Africa (1745)
- International Association Public Participation (IAP2SA014)

Work Experience

Period	Employer	Position	Role/ Responsibility
Oct 24 – Current	GCS	Senior Technical Manager – Environmental Group	As Technical Manager, Paula is responsible for overseeing the development and growth of environmental services. She leads business development efforts, builds and maintains client relationships, and develops and implements business strategies to drive the organisation's success. Paula manages a wide range of responsibilities, including overall project management, team leadership, and financial oversight, ensuring that projects are delivered on time and within budget while aligning with the organisation's long-term goals. In her technical capacity, Paula conducts environmental and social impact assessments, designs and implements environmental management programmes, and develops operational and construction environmental management plans and procedures. She plays a key role in establishing environmental management systems and engages with stakeholders to foster collaboration and ensure compliance. Her duties also include conducting compliance audits, due diligence assessments, and managing water and waste programs. Additionally, Paula provides environmental training and oversees project management from inception to completion. Her combined experience in technical and managerial roles equips her with a deep understanding of environmental practices and strategic leadership in various operational contexts.
Sep 2023 – Jun 2024	OMI Solutions (Pty) Ltd, Pretoria	Principal Environmental Assessment Practitioner	As a Principal Environmental Assessment Practitioner, Paula was responsible for leading business development efforts, managing client relationships, and developing business strategies to ensure the growth and success of the environmental services offered. She oversaw project management, guiding teams through the delivery of projects, and maintained financial oversight to ensure budgets and timelines were adhered to. In her technical capacity, Paula's role as an Environmental Assessment Practitioner and Professional Natural Scientist involved conducting environmental and social impact assessments, designing environmental management programmes, and developing both operational and construction environmental management plans. She was also responsible for implementing environmental management systems, managing stakeholder engagement, conducting compliance audits, performing due diligence assessments, and overseeing water and waste management. Her work included delivering environmental training and managing projects through their entire lifecycle, providing strategic guidance and ensuring regulatory compliance throughout.
Nov 2022 – Aug 2023	Digby Wells Environmental (Pty) Ltd	Principal Environmental Assessment Practitioner	

Period	Employer	Position	Role/ Responsibility
Nov 2019-Aug 2022	Current Hatch Africa (Pty) Ltd, Johannesburg	Regional Director Africa for the Environmental Services Group	As Regional Director, Paula was tasked with leading the development and growth of the Environmental Services Group across Africa. This role involved overseeing business development efforts, building and maintaining client relationships, and developing and implementing the business strategy to drive the organisation's success in the region. She managed a broad spectrum of responsibilities, including overall project management, team leadership, and financial oversight, ensuring that projects were delivered on time and within budget, while aligning with the group's long-term goals. In her role as an Environmental Practitioner, Paula was deeply involved in conducting environmental and social impact assessments, designing and implementing environmental management programmes, and developing operational and construction environmental management plans and procedures. She also played a key role in establishing environmental management systems and engaging with stakeholders to foster collaboration and ensure compliance. Her duties further extended to conducting compliance audits, due diligence assessments, and managing water and waste programs. Paula's work also encompassed delivering environmental training and overseeing the management of various projects from inception to completion. Her experience in both technical and managerial capacities equipped her with a comprehensive understanding of environmental practice and strategy in diverse operational contexts.
2005-2019	Terra Pacis Environmental (Pty) Ltd	Managing Director (founding member)	As a Director of Terra Pacis, Paula was responsible for the development of the Environmental Impact Assessment discipline, the management of business development, client relationship management, the development of the business strategy, overall project management, team management and financial management. As an Environmental Practitioner, Paula duties included: environmental and social impact assessments, environmental management programmes, operation and construction environmental management plans and procedures, environmental management systems, stakeholder engagement and stakeholder management, compliance auditing, due diligence, water and waste management, environmental training and project management.
2006-2009	Cymbian Environmental and Social Consulting Services	Director (founding member)	As a Director of Cymbian, Paula was responsible for the development of the Environmental Impact Assessment discipline, the management of

Period	Employer	Position	Role/ Responsibility
			business development, client relationship management, the development of the business strategy, overall project management, team management and financial management. As an Environmental Practitioner, Paula duties included: environmental and social impact assessments, environmental management programmes, operation and construction environmental management plans and procedures, environmental management systems, stakeholder engagement and stakeholder management, compliance auditing, due diligence, water and waste management, environmental training and project management.
2005-2008	Contract to: Golder Associates Africa Pty Ltd	Environmental Consultant	Paula assisted on environmental and social impact assessments and environmental management programmes.
2005	ERM Southern Africa, Johannesburg	Snr Environmental Consultant	As an Environmental Practitioner, Paula duties included: environmental and social impact assessments, environmental management programmes, operation and construction environmental management plans and procedures, environmental management systems, stakeholder engagement and stakeholder management, compliance auditing, due diligence, water and waste management, environmental training and project management.
1998-2005	Contract to Anglo Gold Ashanti Limited, Johannesburg	Environmental Consultant	As an Environmental Practitioner, Paula duties included: environmental and social impact assessments, environmental management programmes, operation and construction environmental management plans and procedures, environmental management systems, stakeholder engagement and stakeholder management, compliance auditing, due diligence, water and waste management, environmental training and project management.
1996–1998	Anglo American, Johannesburg	Civil Engineering Technician and Environmental Consultant	As an Environmental Practitioner, Paula duties included: environmental and social impact assessments, environmental management programmes, operation and construction environmental management plans and procedures, environmental management systems, stakeholder engagement and stakeholder management, compliance auditing, due diligence, water and waste management, environmental training and project management.
1996–1996	Hamilton Associates, Rosebank	Civil Engineering Technician	Assisted civil engineers plan, design, and build residential development projects including services (access roads/ water/sewage/stormwater).

Period	Employer	Position	Role/ Responsibility
1990-1996	Stuart Scott Incorporated, Sandton	Civil Engineering Technician	Assisted civil engineers plan, design, and build highways, bridges, and services (water/sewage/stormwater). Worked on the site of a large highway construction project and a infrastructure development project.

Key Experience

Environmental and social impact assessments (including the development of environmental and social management programmes/plans/systems)

- Environmental Management Plan Update for North Mara Gold Mine Limited, Tanzania, Barrick Gold Corporation.
- Environmental Impact Study and Management Plan Kisanfu Project, Democratic Republic of the Congo, Phelps Dodge Congo SPRL.
- Environmental and Social Impact Assessment for the Proposed Chirundazi Dam and Associated Supporting Infrastructure, Karo Platinum, Zimbabwe.
- Environmental and Social Impact Assessment for the Opencast Expansion Project, Karo Platinum, Zimbabwe.
- Scoping and Environmental Impact Assessment for the Sasol Destoning Project, Mpumalanga Province, South Africa.
- Scoping and Environmental Impact Assessment for the Sasol Syferfontein Tweedraai Expansion, Mpumalanga Province, South Africa.
- Scoping and Environmental Impact Assessment for the 100 MW Namane Solar PV Plant, South Africa, Namane Generation (Pty) Ltd.
- Environmental Authorisation and Atmospheric Emissions Licence for the Copper Nickel Recovery Plant, Rand Refinery Limited, South Africa.
- Environmental Authorisation and Water Use Licence (by way of a Basic Assessment) for the Light Industrial Development on proposed Kya Sand Extension 104, Randburg, South Africa.
- Environmental Authorisation and Atmospheric Emissions Licence (by way of Scoping and Environmental Impact Assessment) for Mamatwan Mine New Sinter Plant, Samancor Manganese (Pty) Limited (BHP Billiton), South Africa.
- Environmental Authorisation, Waste Management Licence and Atmospheric Emissions Licence (by way of Scoping and Environmental Impact Assessment) for the M14 Furnace, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton), South Africa.
- Environmental Authorisation and Waste Management Licence (by way of Scoping and Environmental Impact Assessment) for the upgrade of the existing Pelletising Plant to an Agglomeration Plant, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton), South Africa.
- Environmental Authorisation and Atmospheric Emissions Licence (by way of Scoping and Environmental Impact Assessment) for the Medium Carbon Ferro Manganese Converter Project, Transalloys (Pty) Ltd, South Africa.
- Environmental Authorisation and Atmospheric Emissions Licence (by way of Scoping and Environmental Impact Assessment) for the Construction and Operation of Two Furnaces and Associated Infrastructure, Transalloys (Pty) Ltd.
- Environmental Authorisation and Atmospheric Emissions Licence (by way of Scoping and Environmental Impact Assessment) for Proposed Phosphoric Acid Plant, Hi-Fos (Pty) Ltd, South Africa.
- Waste Management Licence (by way of a Basic Assessment) for the Refurbishment of West Plant Sludge Dam 3 and Associated Mixing facility, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton).
- Water Use Licences for the Nyakallong and Virginia Wastewater Treatment Works Upgrade, Matjhabeng Local Municipality, Free State, South Africa.
- Water Use License Application, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton), South Africa.

Risk assessments

- Environmental Risk Assessment for the Hard Ice Plant at Mponeng Mine, AngloGold Ashanti, South Africa.
- Environmental Risk Assessment for the Surface Cooling System Expansion for Ventersdorp Contact Reef B120 Level Project, West Wits Mponeng Mine, AngloGold Ashanti, South Africa.
- Dam Risk Assessment Goedgevonden Colliery, Xstrata Coal, South Africa.
- Environmental Risk Assessment for the Coal fired boilers, Newlands, SAB Miller, South Africa.

Feasibility studies

- Zimplats Selous Base Metals Refinery (BMR) Feasibility Study; Supporting Environmental Studies (environmental legal opinion and permitting requirements, environmental impact analysis, energy management and GHG emissions reduction study, water management study), Zimplats, Zimbabwe.
- Water Supply Feasibility Study (environmental legal opinion and permitting requirements), for Mondi South Africa (Pty) Ltd, South Africa.
- Port Durnford Prefeasibility Study Project, Tronox KZN Sands (Pty) Ltd, Richards Bay, South Africa.
- Prefeasibility study for the construction of a new converting facility, (environmental design criteria, regulatory review and permitting requirements, emissions

modelling for technology selection, opportunities to improve GHG emissions and energy management), Confidential Project, South Africa.
- Establishment of an Aluminium Recycling Plant (site sensitivity analysis, regulatory review and permitting requirements, provision of cost estimates to obtain environmental permits and licences), (Confidential Project), South Africa.
- Feasibility study for the processing of a by-product in the platinum industry, (environmental design criteria, environmental legal opinion and permitting strategy, environmental legal register, environmental and human health impact analysis, water management, contractor social management plan, construction environmental management plan), Confidential Project, South Africa.

Environmental engineering and monitoring

- Review of Environmental Design Criteria for the Development of an Iron Ore Mine in Mauritania, El Aouj Mining Company, Northern Africa.
- Review of the Environmental Protection Measures developed for the construction and operation of a Gold Mine in Russia with particular focus on identifying relevant monitoring requirements, Kinross Gold.
- Environment Design Criteria for an SO2 Abatement Plant, Anglo American Platinum, South Africa.
- Sustainable design options study for the Nimba Iron Ore Project, Société des Mines de Fer de Guinée (SMFG) Guinea and Liberia.
- Onshore and offshore environmental baseline studies, compilation of environmental monitoring/management plans and procedures, and environmental compliance monitoring for the construction of a LNG plant in the Afungi Peninsula in the Palma District of Cabo Delgado Province, CCSJV, Mozambique.
- Product and waste storage areas upgrade project at the Port of Durban, Bidvest Tank Terminals, KwaZulu-Natal, South Africa.
- Salvage Yard Layout, Detailed Design and Stormwater Management, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton), South Africa.
- Development of Water Balances for 1) Free State Operations, 2) Vaal River Operations and 3) West Wits Operations, AngloGold Ashanti, South Africa.
- Clean and Dirty Water Separation Studies for 1) Vaal River Operations (Mines and Processing Plants) and 2) West Wits Operations (Mines and Processing Plants), AngloGold Ashanti, South Africa.

Circular economy

- Scoping exercise to develop and Extended Producer Responsibility Scheme for a multi-national drink and brewing company (Confidential Project), South Africa.
- Concept Study for the Hillside Used Beverage Can (UBC) Recycling Project, South32, South Africa.

Environmental management systems and auditing

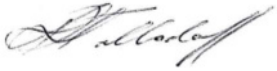
- Development of an Environmental Management System at Lumwana Mine, Zambia, Barrick Gold Corporation.
- Development of an Environment Management System (ISO 14001) including assurance of certification for ERGO, Anglogold Ashanti
- Environmental Management System (ISO 14001) development for Scaw Metals.
- Development of an Environment Management System (ISO 14001), Kimberley Mines, De Beers Consolidated Mines.
- Review and updating of the Environmental Management System (ISO 14001) at Newlands, SAB Miller.
- The Development and Implementation of processes and tools to comply with conditions defined in the Waste Management Licences, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton).
- Vegetation Control Procedure; Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton).
- The Development of Standard Operating Procedures for the Materials Management Department, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton).
- Admox Bagging Plant, Admox Bagging Plant, Admox Pelletising Plant and OBC Fume Extraction Operation Environmental Management Plan; Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton).
- Internal ISO 14001 Audit, Venetia Mine, De Beers Consolidated Mines.
- Internal ISO 14001 Audit, Voorspoed Mine, De Beers Consolidated Mines.
- Internal ISO 14001:2015 Audit Report for Harmony Central Gold Plant in the Free State Province.
- Internal ISO 14001:2015 Audit Report for Harmony One Gold Plant in the Free State Province.

Environmental policy and legislation
• Review the NEOM Environmental Standards and Policies, Saudi Arabia. • Developing a Greenhouse Gas reporting framework for Department of Mineral Resources and the Department of Energy, Northern Cape Province, South Africa. • Legal Opinion on Requirement for Environmental Authorisation of the Proposed Emergency Diesel Power Generation Project at Wessels Mine, Samancor Manganese (Pty) Limited (BHP Billiton), South Africa. • Environmental Legal Opinion Proposed Soya and Sunflower Bean Operations, Boksburg, South Africa. • Strategic Planning on New Furnace Location, Samancor Manganese (Pty) Ltd (BHP Billiton), South Africa.
Due diligence and technical advisory
• Independent Expert Report Roggeveld Wind Farm Phase 1 And Associated Infrastructure, South Africa. • Technical Advisory services for a Power Purchase Agreement (PPA) for a gas to power plant near Maputo, Mozambique (Confidential Project). • Environmental Due Diligence for an in-land and port side bauxite facility, Republic of Guinea (Confidential Project). • Environmental Due Diligence for the Brush-Arc UG2 Smelting at Richards Bay Alloys, Anglo American Marketing Ltd. • Environmental component of the Independent Engineering Review, for the New Generation Capacity Under the Risk Mitigation IPP Procurement Program (Confidential Project).
Auditing
• Bi-annual Environmental Performance Assessment Audit of the Tailings Facility and associated infrastructure at Harmony Kareerand Operations, Harmony Gold Mining. • Water Use Licence Compliance Audit at Farms K/Kraal 342 JQ, Rooikoppies 297 JQ and Elandsdrift 467 JQ, south of Marikana in the North West Province, Tharisa Minerals (Pty) Ltd. • Peer Review of Audits on the Construction Environmental Management Programme for Anglo American Platinum's Polokwane Metallurgical Complex within the province of Limpopo. • Audit of the Waste Management Practice at Mponeng and Kopanang Mine, AngloGold Ashanti. • External Audit Reports for the Waste Management Licences, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton). • Audit of the Water Use Licence held by Goedgevonden Colliery, Xstrata Coal South Africa. • Annual Internal Audit of the Water Use Licence for Xstrata Coal South Africa (Pty) Ltd Tweefontein Division. • Annual External Water Use Licence Audit, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton). • Annual Audit of the Record of Decision and Environmental Management Plan for the Fouriespruit Stream Diversion and Old Slag Area, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton). • Annual Environmental Performance Audit for the Pelletising Plant, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton). • Environmental Legal Compliance Assessment for the Construction Phase of the M14 Furnace Project Environmental Authorisation, Metalloys Samancor Manganese (Pty) Ltd (BHP Billiton). • Waste Management License Audit for the Slagment Operation, AfriSam Southern Africa (Pty) Ltd. • Environmental-Legal Compliance Assessment Report SCE Ashman (Proprietary) Limited: Vanderbjilpark Plant. • Environmental-Legal Compliance Assessment of the Waste Management Licence and Atmospheric Emission Licence for A-Thermal Retort Technologies (Pty) Ltd.

DECLARATION

I, Paula Tolksdorff hereby declare that the details furnished above are true and correct to the best of my knowledge and belief and I

undertake to inform you of any changes therein, immediately. In case any of the above information is found to be false or untrue or misleading or misrepresenting, I am aware that I may be held liable for it.

Signature:  Date: 17 March 2025

Environmental Assessment Practitioners Association of South Africa

Registration No. 2019/509

Herewith certifies that

Paula Jane Tolksdorff

is registered as an

Environmental Assessment Practitioner

Registered in accordance with the prescribed criteria of Regulation 15. (1) of the Section 24H Registration Authority Regulations (Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).

Effective: 01 March 2024

Expires: 28 February 2025

Chairperson

Registrar

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

BD No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

SAQA

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Paula Jane Tolksdorff

Registration Number: 152904

is a registered 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 1 of the Act)

Environmental Science (Professional Natural Scientist)

Effective **12 June 2024** Expires **31 March 2025**

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

BD No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

Chairperson

Chief Executive Officer

To verify this certificate scan this code

TECHNIKON WITWATERSRAND

BACCALAUREUS TECHNOLOGIAE

ENGINEERING: CIVIL (URBAN) INGENIEURSWESE: SIVIEL (STEDELIK)

is awarded to / word toegeken aan

PAULA-JANE LEWIS

Date of Birth / Geboortedatum

1971-01-24

Student Number / Studentenommer

8913463

with effect from / met ingang van

1997-07-01

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

SO No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

H.W. van Eyk

Vice-Chancellor & Principal
Visekanselier & Prinsipaal

Deputy Vice-Chancellor & Vice-Principal
Adjunkvisekanselier & Viseprinsipaal

Issued with the approval of the Certification Council for Technikon Education (SERTEC) in terms of section 9 of The Certification Council for Technikon Education Act 1986 (Act 88 of 1986)
Uitgereik met die goedkeuring van die Sertifiseringsraad vir Technikononderwys (SERTEC) ingevolge artikel 9 van die Wet op die Sertifiseringsraad vir Technikononderwys, 1986 (Wet 88 van 1986)

No. / Nr. B 0524

NORTH-WEST UNIVERSITY ®
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOM CAMPUS

Private Bag X6001, Potchefstroom
South Africa, 2520

Tel: (018) 299-1111/2222
Web: http://www.nwu.ac.za

MRS PJ TOLKSDORFF
P O BOX 41409
CRAIGHALL
2024

2011/12/14

23119128 - 2011

Dear MRS TOLKSDORFF

EXAMINATION RESULTS

Web address: http://www.nwu.ac.za/admin/index.html

NB Any errors and/or omissions on your 2011 record must be reported before 17 February 2012.

Herewith the results of the past examination. We trust that you were rewarded for your effort and hard work.

Qualification : 2181061 M IN ENVIRON MAN
Curriculum Code : N824P ENVIRONMENTAL ANALYSIS AND MANAGEMENT

Date	Module Name	Module Code	Module Type	Mark	Result
201111	ENVIRONMENTAL MANAGEMENT II	OMBO 8 78	Core module	69	Passed

2012 Graduate students: In the case of an exception, if we have to re-schedule your ceremony, we will inform you in February per SMS and letter.

DIRECTOR : ACADEMIC ADMINISTRATION

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

ID No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

NORTH-WEST UNIVERSITY ®
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOM CAMPUS

Private Bag X6001, Potchefstroom
South Africa, 2520

Tel: (018) 299-1111/2222
Web: http://www.nwu.ac.za

MRS PJ TOLKSDORFF
P O BOX 41409
CRAIGHALL
2024

2012/12/11

23119128 - 2011

Dear MRS TOLKSDORFF

EXAMINATION RESULTS

Web address for examination results: http://www.nwu.ac.za/content/exam-results

Herewith the results of the past examination. We trust that you were rewarded for your effort and hard work.

Qualification : 2181061 M IN ENVIRON MAN
Curriculum Code : N824P ENVIRONMENTAL MANAGEMENT
Method of Delivery : PART TIME

Date	Module Name	Module Code	Module Type	Mark	Result
201211	ENIVORMENT ANALYSIS 2	OMBO 8 79	Core module	75	Distinction

Registration schedule 2013:
Undergraduate and Honours students see :
http://www.nwu.ac.za/content/nwu-potchefstroom-campus-current-students-intranet-and-portal

NB: Any errors and/or omissions on your 2012 record must be reported before 18 January 2013.

CAMPUS REGISTRAR

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

BO No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT

CEM

SAATCA D15

Centre for Environmental Management

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

ID No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

This is to certify that

PJ TOLKSDORFF
7101240049089

successfully completed and
passed SAATCA approved examination

Implementing Environmental Management Systems (ISO 14001)

CEM-03.1/0117/2011

22-24 June 2011

NQF Level: 7

Prof. JG Nel
Executive Manager:
Centre for Environmental Management
Course Leader

Prof. JJ Pienaar
Dean Faculty of Natural Science

Carin Bosman
Sustainable Solutions

This Certificate is issued to
certify that

Paula Tolksdorff

has attended a 3 day Training Workshop entitled

Water Governance in South Africa

held on

9-11 May 2023

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

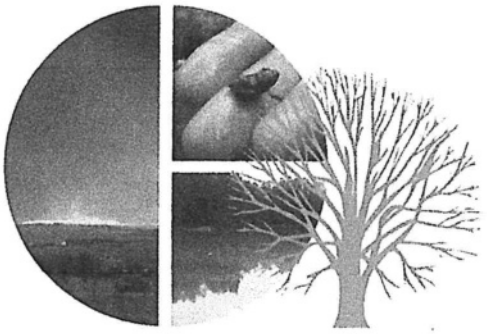
SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

BD No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

WISA
Water Institute of Southern Africa



Carin Bosman, Director: CBSS
SACNASP: WISA2023-0412-002542
ECSA: WISA2023-0412-002542 (3pt)

Our environmental- and water governance solutions help you to take sustainable management decisions

CESA

Consulting Engineers South Africa

This is to acknowledge that

Paula Tolksdorff

Attended the Online

Developing Mentorship Skills for

Management and Professionals

On 21-22 February 2022

This qualifies for 2 CPD Points
for Continuing Professional Development
CESA-2049-11/2024

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

Chris Campbell
School of Consulting Engineering
Signed on 22 February 2022
Certificate number 29764

NETWORX
For Career Development

Certificate of Competence

This is to certify that

Paula Jane Tolksdorff

ID Number: 7101240049089

Has successfully completed the

Assessor Course

115753 Conduct outcomes-based assessment NQF Level 5 Credits 15

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

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Commissioner of Oaths - Ryan Harold Curle

ID No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

Mylet Ursula Bhengu
Chief Executive Officer

29 November 2019

Date

ETDP SETA

SAQA

Certificate Number: NETW/00001902/2019

ETDP SETA Accreditation Number: 10222

LEGISLATIVE COMPLIANCE SPECIALISTS

REG NO. 2006/014854/07

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Commissioner of Oaths - Ryan Harold Currie

ID No: 38272 Date: 15 Sept 2021

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

This is to certify that

P. Tolksdorff

Name

710124 0049 089

ID Number

Has successfully completed the following LCS course

Legal Liability

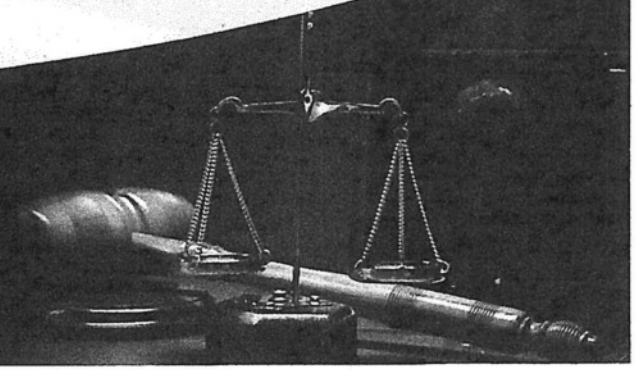
31 May 2021

Date

Facilitator / Assessor

ETDP SETA, SOR No: 61101, US Code: 7978, Endorsement No: US-10

OHS-ACT No. 85 of 1993



Aspects International

IEMA Approved Foundation Course in Environmental Auditing (South Africa)

This is to certify that

Paula Tolksdorff

Attended and Successfully Completed
the above Training Programme on
19 - 23 October 2009
and achieved 87% at Examination

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

BD No: 38232 Date: 7/9/2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

Signed ..... Chief Examiner

Certificate No: SA/0911/9
Issue Date 05/11/09

iema Approved Training Provider

Signed ..... Course Tutor

ASP/FLEA/01109/SOUTH AFRICA

Aspects International Ltd. Trelawna, Daleside Park, Darley, Harrogate, North Yorkshire, HG3 2PX. United Kingdom. T: +44 (0)1423 781 218 E: info@aspexint.com W: www.aspexint.com

Aspects International

IEMA Approved Carbon Footprint Management Course : An Introductory Programme

This is to certify that

Paula Jane Tolksdorff

Attended and Successfully Completed the above Training Programme on

6-7 July 2009

Certificate No: PubCF2/SA/0907/23

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Commissioner of Oaths - Ryan Harold Curtis

CO No: 38232 Date: 25 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

Signed .....

Chief Examiner

iema Approved Training Provider

Signed .....

Course Tutor

Aspects International Ltd. Trelawna, Daleside Park, Darley, Harrogate, North Yorkshire, HG3 2PX. United Kingdom. T: +44 (0)1423 781 218 E: info@aspexint.com W: www.aspexint.com

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

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Commissioner of Oaths - Ryan Harold Curtis

ID No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

The International Association for Public Participation

Certificate in Public Participation awarded to

Paula Tolksdorff

October 2009

iap2

International Association for Public Participation

President, IAP2

Training Committee Chair, IAP2

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Commissioner of Oaths - Ryan Harold Currie

BD No: 38232 Date: 9 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

The International Association for Public Participation

Paula Tolksdorff

has completed IAP2's

Communication for Effective Public Participation

October 2009

iap2

International Association for Public Participation

President, IAP2

Training Committee Chair, IAP2

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SIGNATURE

Commissioner of Oaths - Ryan Harold Curtis

ID No: 38232 Date: 7 Sept 2024

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The International Association for Public Participation

Paula Tolksdorff

has completed IAP2's

Techniques for Effective Public Participation

October 2009

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International Association for Public Participation

President, IAP2

Training Committee Chair, IAP2

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SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

ID No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

The International Association for Public Participation

Paula Tolksdorff

has completed IAP2's

Planning for Effective Public Participation

October 2009

iap2

International Association for Public Participation

President, IAP2

Training Committee Chair, IAP2

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

Certificate of Attendance

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SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

Faculty of Engineering and the Built Environment
(School of Mining Engineering)

This is to certify that

P Tolksdorff

during the period

16 January 2007

has attended and participated in the course

1 Day Report Back from the 1st International Seminar on Mine Closure, Perth Australia 2006

Huw R Phillips

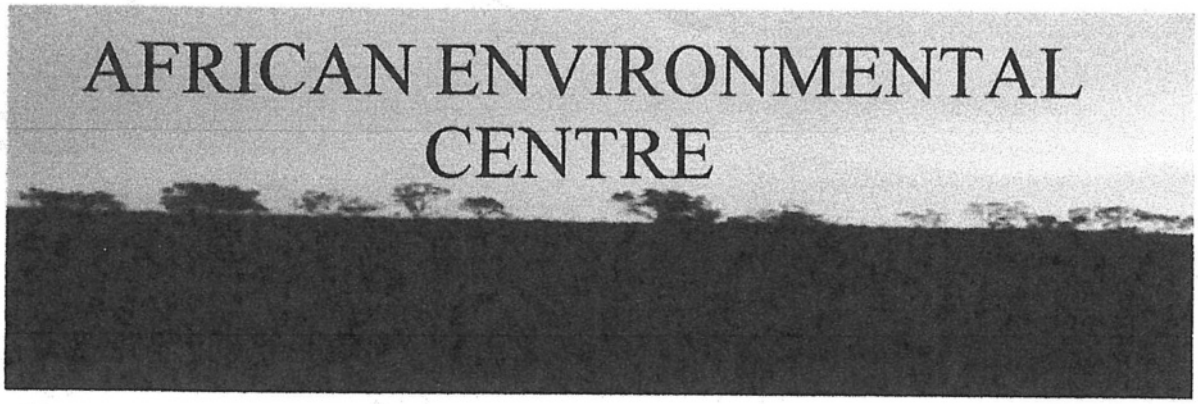
Head, School of Mining Engineering

B Mhacquel

Dean, Faculty of Engineering & the Built Environment

Date of Issue: 16th January 2007

AFRICAN ENVIRONMENTAL CENTRE



This is to certify that

Paula Tolksdorff

has successfully completed
the following short course

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

ID No: 38232 Date: 7 Sept 20xx

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

NEMA EIA Regulations

on the

23 October 2006

Director

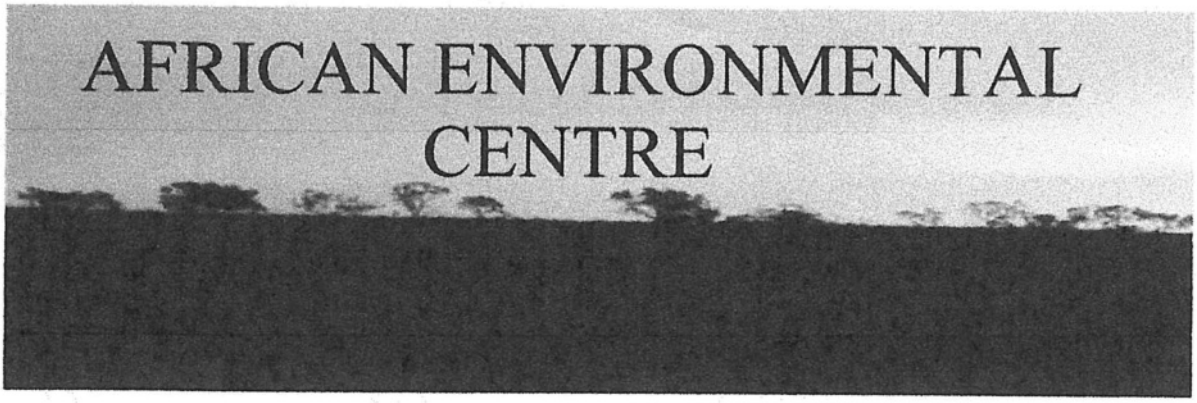
AFRICAN ENVIRONMENTAL CENTRE • FOR TRAINING RESEARCH AND CONSULTING •

certificate number

2006/10/001/008

CC reference number 2006/212059/23

AFRICAN ENVIRONMENTAL CENTRE



This is to certify that

Paula Tolksdorff

has successfully completed
the following short course

NEMA EIA Regulations

on the

23 October 2006

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SIGNATURE

Commissioner of Oaths - Ryan Harold Currie

No: 38232 Date: 7 Sept 2024

New Life Church, 1 Grosvenor Road, Bryanston, Johannesburg, 2191

Director

AFRICAN ENVIRONMENTAL CENTRE FOR TRAINING RESEARCH AND CONSULTING

certificate number

2006/10/001/008

CC reference number 2006/212059/23

APPENDIX B: WETLAND AND AQUATIC ASSESSMENT

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WETLAND AND AQUATIC ASSESSMENT ASSOCIATED PROPOSED BORROW PIT NEAR THE TOWN OF BETHAL, MPUMALANGA PROVINCE

Version – Final

August 2024

Project Number: 24-0016

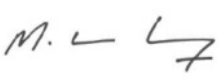
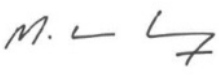
Client Reference:

WETLAND AND AQUATIC ASSESSMENT ASSOCIATED PROPOSED BORROW PIT NEAR THE TOWN OF BETHAL, MPUMALANGA PROVINCE

Version – Final

August 2024

DOCUMENT ISSUE STATUS

Report Issue	Final		
Ecolink Reference Number	24-0016		
Client Reference	23-0766		
Title	**WETLAND AND AQUATIC ASSESSMENT ASSOCIATED PROPOSED BORROW PIT NEAR THE TOWN OF BETHAL, MPUMALANGA PROVINCE**		
	Name	**Signature**	**Date**
Author	Magnus van Rooyen		August 2024
Director	Magnus van Rooyen		August 2024

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Declaration

I, Magnus van Rooyen, in my capacity as a specialist consultant, hereby declare that I:

- Act as an independent consultant;
- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act (Act No. 107 of 1998);
- Have and will not have vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act (Act No. 107 of 1998);
- As a registered member of the South African Council for Natural Scientific Professions, will undertake my profession in accordance with the Code of Conduct of the Council, as well as any other societies to which I am a member;
- Based on information provided to me by the project proponent and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of my professional ability; and
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field.

Magnus van Rooyen (Pr.Sci.Nat) August 2024

SACNASP reg. no. 400335/11 Date

WETLAND AND AQUATIC ASSESSMENT ASSOCIATED PROPOSED BORROW PIT NEAR THE TOWN OF BETHAL, MPUMALANGA PROVINCE

1 INTRODUCTION

Ecolink Consulting has been appointed by GCS (Pty) Ltd to conduct a Wetland and Aquatic Assessment associated with the proposed operation of a borrow pit near the town of Bethal in the Mpumalanga Province. The material sourced from the borrow pit will be used in the construction of the Ummbila Emoyeni Wind Energy Facility (WEF) that is being developed in the surrounding area.

The assessment will be submitted in support of the Application for Environmental Authorisation in accordance with the National Environmental Management Act (Act No. 107 of 1998): Environmental Impact Assessment Regulations (2014), as amended and the Water Use Licence Application in accordance with the National Water Act (Act No. 36 of 1998).

2 PROJECT BACKGROUND

2.1 Project location and extent

The proposed borrow pit is located approximately 16km to the southeast of the town of Bethal along the R35 road between Bethal and Morgenzon (see Figure 2-1). To meet the requirements for a Mining Permit Application in accordance with the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002), the extent of the borrow pit is limited to maximum area of 5ha. The corner point coordinates of the borrow pit is provided in Table 2-1 with the extent shown in Figure 2-2.

Table 2-1: Borrow pit corner point coordinates

Coordinate	Latitude	Longitude
A	26° 35' 40.97" S	29° 32' 09.55" E
B	26° 35' 44.70" S	29° 32' 10.83" E
C	26° 35' 47.72" S	29° 32' 04.48" E
D	26° 35' 46.04" S	29° 31' 59.73" E
E	26° 35' 42.99" S	29° 31' 59.09" E
F	26° 35' 41.38" S	29° 31' 59.73" E

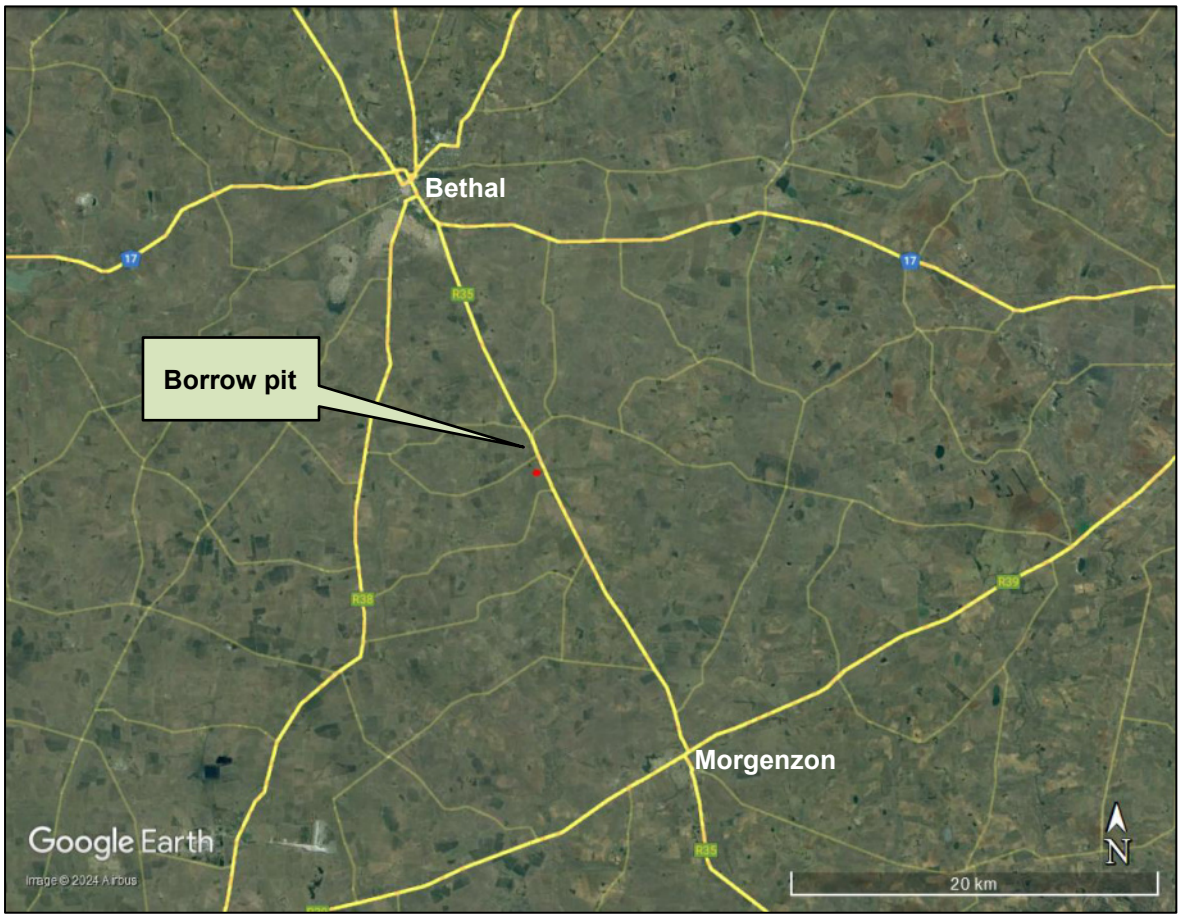


Figure 2-1: Location of the proposed borrow pit between the towns of Bethal and Morgenzon

Figure 2-2: Extent of the borrow pit

2.2 Project description

The proposed borrow pit is located on a ridge line on portion 9 of the Farm Sukkelaar No. 421 IS above and to the north of the Heilvleispruit that is a tributary of the Kwaggalaagtespruit. The borrow pit is located in an area that is typically used for agricultural purposes which include the growing of grains and the farming of livestock.

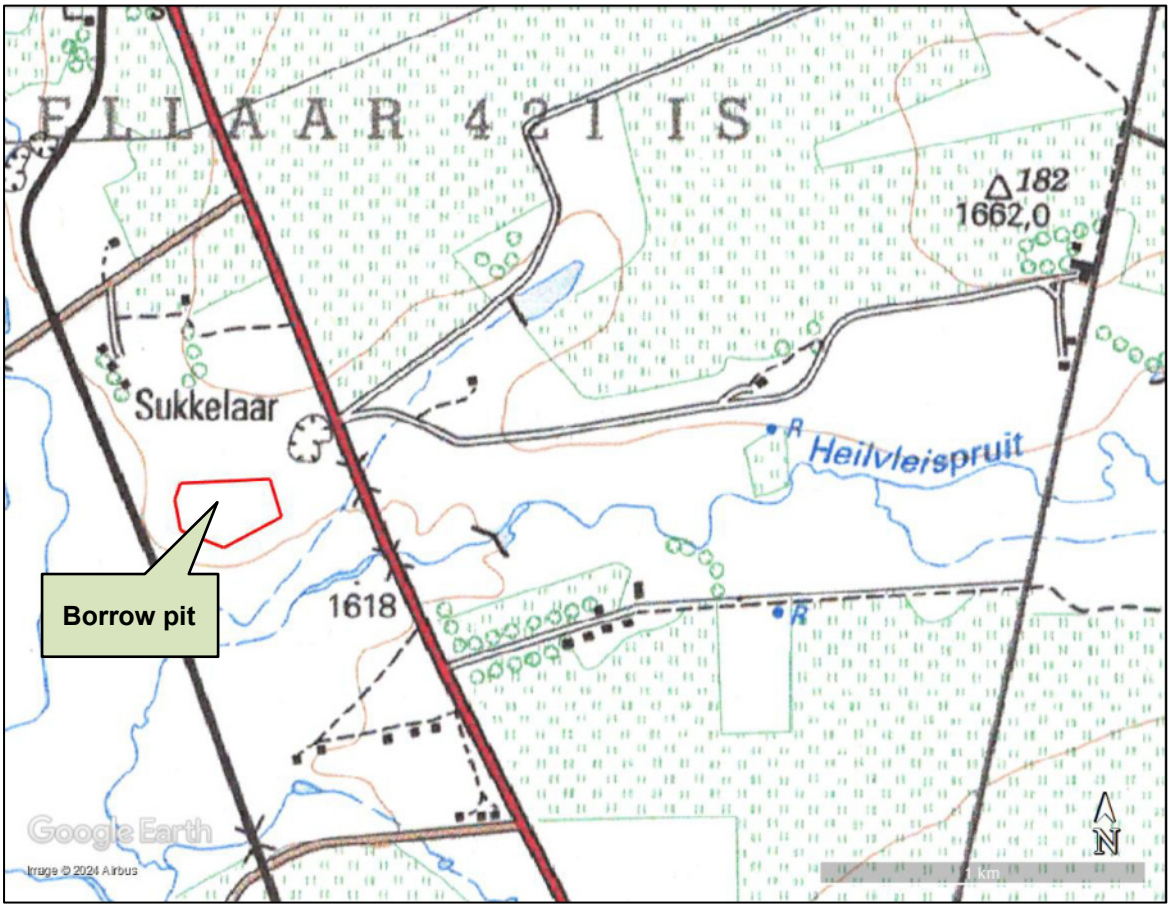


Figure 2-3: Location of the borrow pit area on the ridge line above the Heilvleispruit (extract from the 1 in 50 000 map sheet 2629DA)

The proposed borrow pit is located immediately to the west of an old borrow pit area that was opened *circa* 1968 (see Figure 2-4) and showing signs of use as recent as 2017 (see Figure 2-5). The material sourced from the borrow pit area was likely used for the upgrading of the provincial district roads in the area by the provincial roads' authority.

The material that will be sourced from the borrow pit consists of weathered dolerite and will be used solely for the construction of the roads associated with the Ummbila Emoyeni WEF that is located in the areas surrounding the borrow pit.

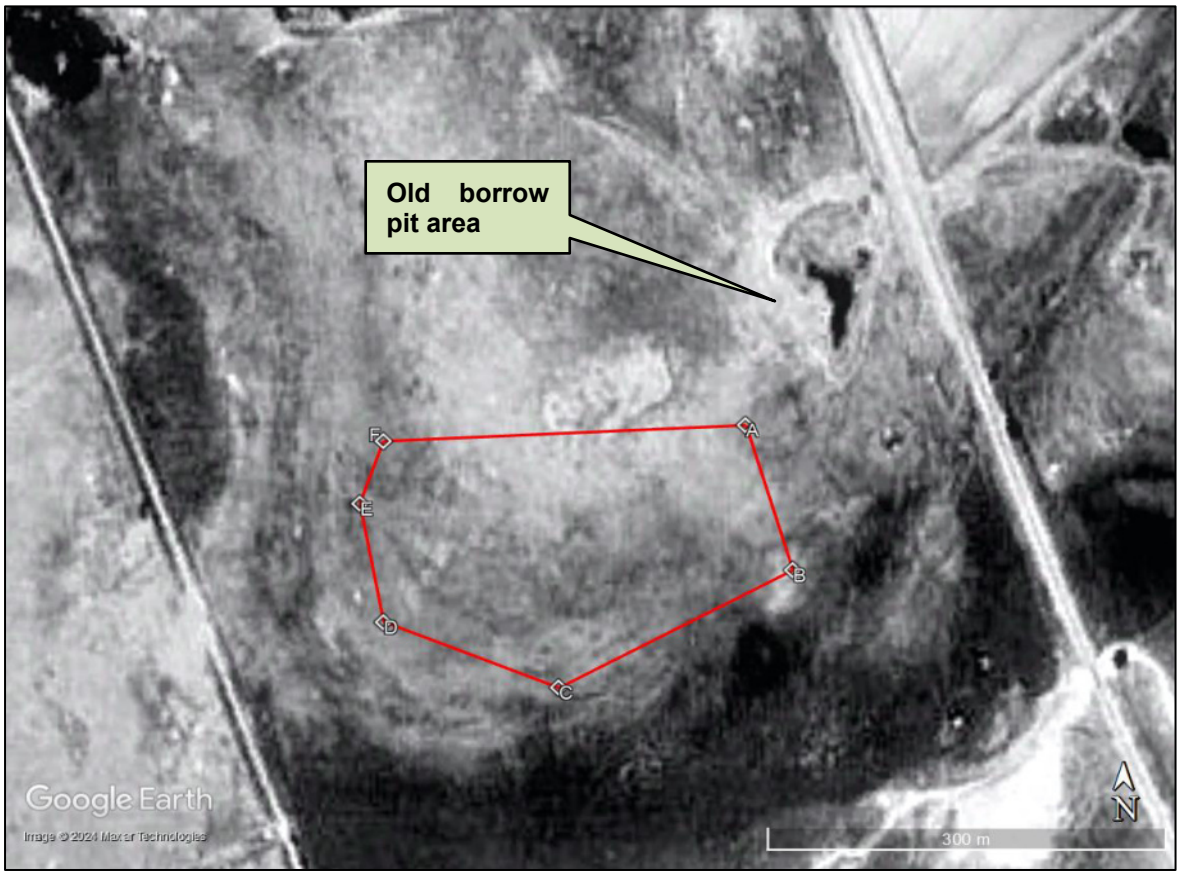


Figure 2-4: Dated aerial image (1968) of the existing borrow pit (supplied by the Surveyor General)

Figure 2-5: Aerial image (2017) in which the old borrow pit area shows signs of use

Plate 2-1: View of the existing old borrow pit area, looking in a southerly direction

3 APPLICABLE SOUTH AFRICAN LEGISLATION

The national and provincial legislation briefly described in this section relates directly with the legal aspects associated with the biodiversity associated with the project.

3.1 Applicable National Legislation

The project applicable environmental related National Legislation is provided in Table 3-1.

Table 3-1: Applicable National Legislation

Legislation	Description
Constitution of the Republic of South Africa (Act No. 108 of 1996)	According to the South African Constitution, South African citizens have the right to have the environment protected for the benefit of the present and future generations.
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	This Act includes the use and protection of land, soil, wetlands and vegetation and the control of weeds and invader plants. In the regulations published in 1984 under the Act, which declared approximately 50 plant species as "weeds" or "invader plants". This list was further expanded on 30 March 2001 to now contain a comprehensive list of declared weed and invader plant species.
White Paper on Environmental Management Policy for South Africa (1998)	Through this Policy, the government of South Africa commits to give effect to the many rights in the Constitution that relate to the environment.
National Veld and Forest Fire Act (Act No. 101 of 1998)	The purpose of the Act is to prevent and combat veld fires in the country. The Act was amended by the National Forest and Fire Laws Amendment Act (Act No. 12 of 2001).
National Water Act (Act No. 36 of 1998)	This Act recognises that water is a scarce and unevenly distributed natural resource that should be equitably utilised in a sustainable manner. The Act ensures that water resources are protected, used, developed, conserved and controlled in ways that take into account a range of needs and obligations, including the need to "protect aquatic and associated ecosystems and their biological diversity". The Act further specifies the water uses that must be authorised and it details the authorisation procedures as well as the minimum requirements for evaluation and decision-making by the relevant authority.
National Forests Act (Act No. 84 of 1998)	An objective of the Act is to provide special measures for the protection of certain forest and tree species, and to promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. In terms of Section 15(1) of the Act, forest trees or Protected Tree Species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by the relevant authority. Government Notice 35648 of 2012 provides the latest List of Protected Tree Species within the borders of South Africa.
National Environmental Management Act (Act No. 107 of 1998)	The Act is an umbrella act covering broad principles of environmental management which makes provision for three main areas, namely Land Planning and Development, Natural and Cultural Resources Use and Conservation and Pollution Control and Waste Management. In accordance with the Act, sustainable development requires the consideration of all relevant factors, including: • That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;

Legislation	Description
	• That the use and exploitation of non-renewable natural resources are conducted in a responsible and equitable manner and takes into account the consequences of the depletion of the resource; and • That the development, use and exploitation of renewable resources and the ecosystems of which they are part of do not exceed the level beyond which their integrity is jeopardised. According to Section 2(r) of the Act, sensitive, vulnerable, highly dynamic or stressed ecosystems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	The Act focuses on the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural land-and seascapes. The Act addresses inter alia: • The protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural land- and seascapes; • The establishment of a national register of all national, provincial and local protected areas; • The management of those areas in accordance with national standards; and • Inter-governmental co-operation and public consultation in matters concerning protected areas.
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	The main objective of the act is to provide for the management and conservation of South Africa's biodiversity and to ensure the sustainable use of indigenous biological resources. In addition to regulations on Threatened, Protected, Alien and Invasive Species in South Africa, the Act also identifies Terrestrial and Aquatic Priority Areas and Threatened Ecosystems for biodiversity conservation.

4 TERMS OF REFERENCE

It is understood that the assessment will be submitted as part of the Application for Environmental Authorisation in accordance with the National Environmental Management Act (Act No. 107 of 1998): Environmental Impact Assessment (EIA) Regulations (2014), as amended. As such, the assessment report is completed in accordance with the minimum requirements for specialist assessments as included in Appendix 6 of the EIA Regulations (2014) as well as the protocol requirements associated with Aquatic Assessments. In addition, the assessment will be submitted in support of a Water Use Licence Application in accordance with the National Water Act (Act No. 36 of 1998).

As such, the assessment will be completed in accordance with the requirements of the abovementioned Acts and will focus on the potential impacts that the project may have on the identified aquatic features within the study site. The assessment will make provision for the following regulated requirements:

- Location of the activity within the "regulated area of a watercourse" as defined by the Act;

- An identification of all the aquatic features within the determined “regulated area of a watercourse”;
- A delineation of all these identified aquatic features to determine their extent, the delineation will be conducted in accordance with the Department of Water Affairs and Sanitation’s guideline on the delineation of these features;
- An assessment of the identified aquatic features to determine their hydrogeomorphic classification, their present ecological state (PES), the ecosystem services they provide as well as their ecological importance and sensitivity (EIS);
- Identification of the potential impacts of the proposed activity on the identified aquatic features;
- An impact assessment with the provision of management and mitigation measures; and
- A Risk Assessment Matrix that follows the Department of Water and Sanitation protocols.

In brief, these requirements have as an outcome to achieve the following:

- A methodology of the site visit and techniques used to assess the specific aspects of the site;
- Details of the assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of site plan identifying site alternatives (where applicable);
- An indication of any areas that are to be avoided, including provision of buffers;
- A description of any assumptions made and any uncertainties or gaps in knowledge;
- A description of the findings and potential implications of such findings on the impact of the proposed activities;
- Any mitigation measures for inclusion in the Environmental Management Programme Report (EMPr);
- Any conditions for inclusion in the Environmental Authorisation and the Water Use Licence;
- Any monitoring requirements for inclusion into the EMPr or Water Use Licence; and
- A reasoned opinion whether the activity should be authorised based on the findings of the assessment.

5 ASSUMPTIONS AND KNOWLEDGE GAPS

The following are assumptions made in the completion of the report:

- The assessment of the potential impacts of the proposed development on the aquatic features on the development site is based on the development layout that has been provided. If the development layout is amended, the impact identification and assessment contained in this report may also change.
- The findings of the report are limited to a single day long site visit conducted on 10 April 2024 which is considered to be autumn to early winter. No provision has been made for seasonal visits to the site and is not considered a shortcoming of the report.
- The identification and delineation of the aquatic features that have been assessed within the study area was conducted in terms of the procedures as specified by the Department of Water and Sanitation.
- The classification of any identified aquatic features has been conducted in accordance with the classification system of inland aquatic ecosystem as prescribed by Ollis *et al.,* 2013.
- The following desktop information was used to augment the finding of the assessment:
    - Electronic biodiversity databases managed by the South African National Biodiversity Institute (SANBI);
    - Available provincial electronic biodiversity databases;
    - Wetland and Riparian Habitat Delineation Document (Department of Water and Sanitation report); and
    - Classification system for wetlands and other aquatic ecosystems in South Africa (Inland Systems) (Ollis *et al.*, 2013 – SANBI Biodiversity Series 22).

6 REPORTING CONDITIONS

The following conditions apply to the report in part or as a whole:

- The findings and conclusion of this report are based on the author's scientific and professional knowledge as well as available information at the time of the assessment. In addition, the recommendations made are considered to be the best, implementable actions that can be taken to alleviate the identified impacts.

- As such, the author accepts no liability for any actions, claims, demands, losses, liabilities, costs, damages, and expenses that may arise from or in connection with the services rendered, and by any use of the information contained in this document.
- No part of this report may be amended without written consent from the author.

7 EXPERTISE OF THE SPECIALIST

Mr Magnus van Rooyen is a registered natural scientist with the South African Council of Natural Scientific Professions (SACNASP) and holds a Master's degree in Environmental Management, a BSc Honours degree in Botany and a BSc degree in Botany and Zoology from the University of Stellenbosch. Mr van Rooyen has in excess of 25 years' experience in the field of wetland and terrestrial ecological studies in Southern and Western Africa. The *curriculum vitae* of the specialist, Mr Magnus van Rooyen is attached in Appendix A.

8 METHODOLOGY

The methodology that was followed in completing this study is in line with the requirements and specifications of the Department of Water and Sanitation. In addition, provision was made to conduct an assessment to meet the extended aspects included in the Scope of Works.

8.1 Identification of aquatic features and mapping

The initial identification process for aquatic features was conducted at a desktop level during which available GIS databases were interrogated to determine the presence of any wetland and watercourse areas that have been determined in the past. The key database that was interrogated was the National Freshwater Ecosystem Priority Area (NFEPA) as managed and updated by the South African National Biodiversity Institute (SANBI) as well as the updated version of this dataset, the Wetland MAP5 (2018).

In addition to the database interrogation, the most recent Google Earth and Zoom Earth Imagery of the site was considered to see if any wetland areas or "anomalies" within the site are visible.

Following the desktop assessment of the site, a site visit was conducted on 10 April 2024. During the site visit, the potential aquatic features identified through the desktop assessment were verified and any other aquatic features were identified and their boundaries accurately delineated.

8.2 Aquatic feature delineation

The delineation of these wetlands areas was conducted in accordance with the Department of Water and Sanitation, *"A practical field procedure for identification and delineation of wetlands and riparian areas"* (2005).

This field guide makes use of several specific indicators which show the presence and the boundaries of wetlands. The presence of the following indicators was used during the identification and delineation of the site:

- ***Terrain Unit Indicator*** – Identification of the part of the landscape where wetlands are more likely to occur;
- ***Soil Form Indicator*** – Identification of the soil types which are associated with prolonged and frequent saturation;
- ***Soil Wetness Indicator*** – Identification of the morphological signatures that develop in soil profiles as a result of prolonged and frequent saturation; and
- ***Vegetation Indicator*** – Identification of the hydrophilic vegetation associated with frequently saturated soil.

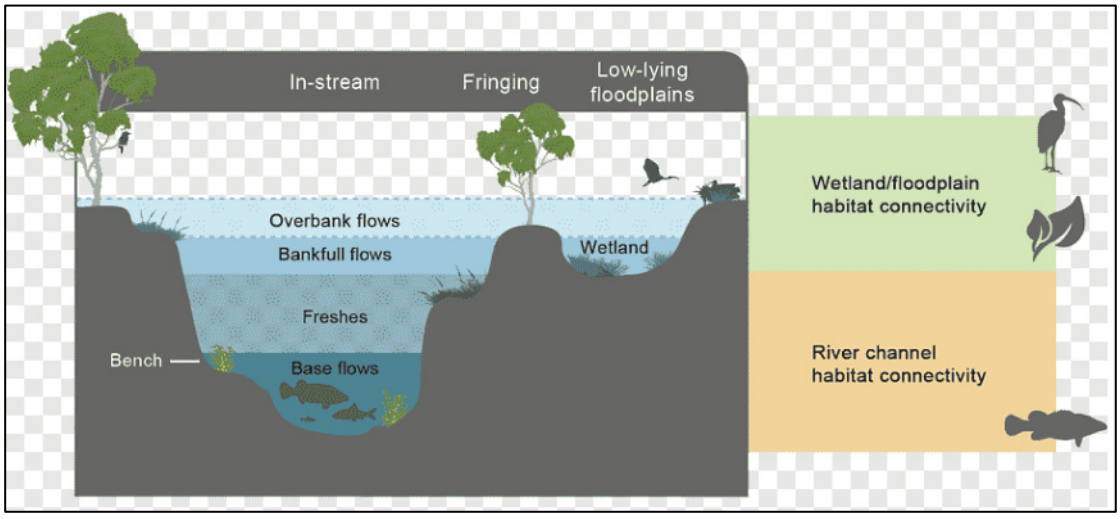
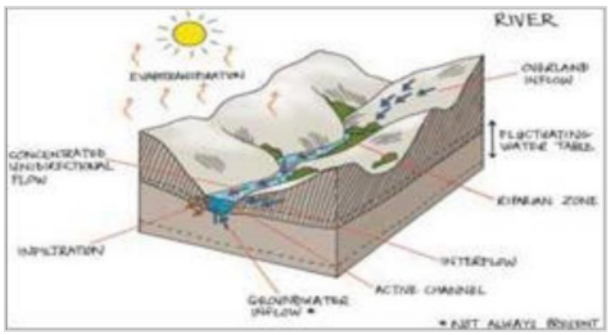
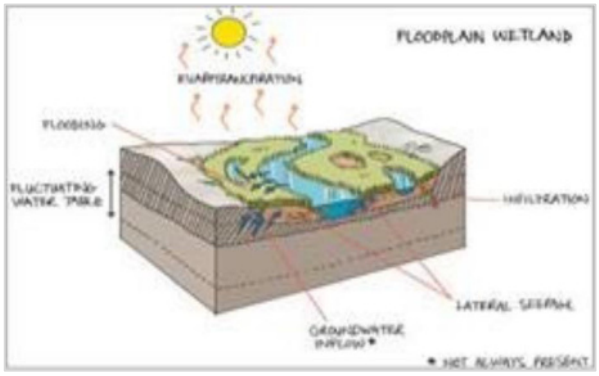
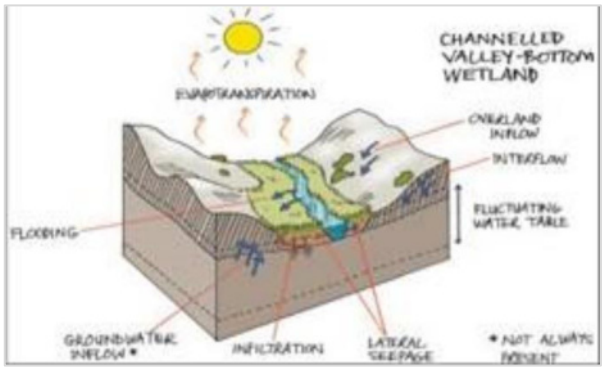
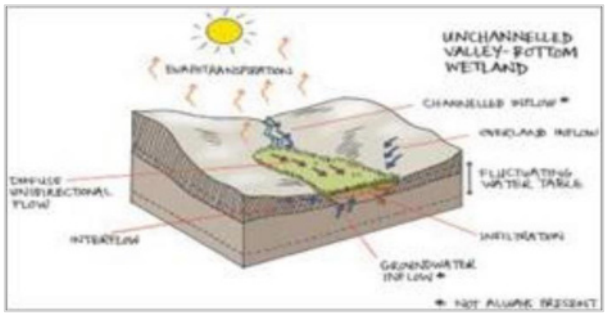
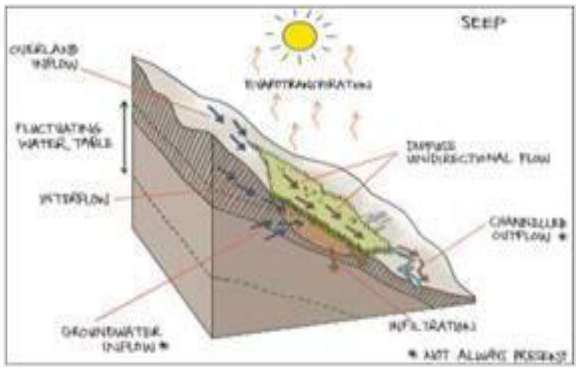
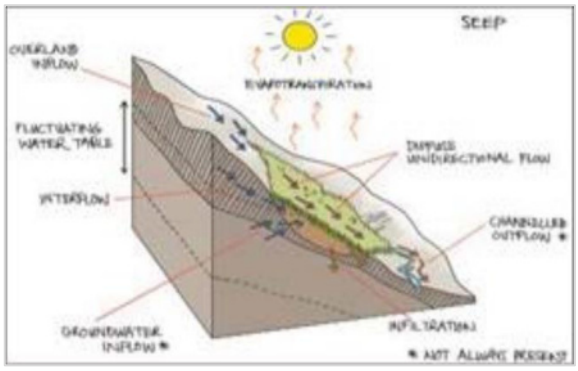
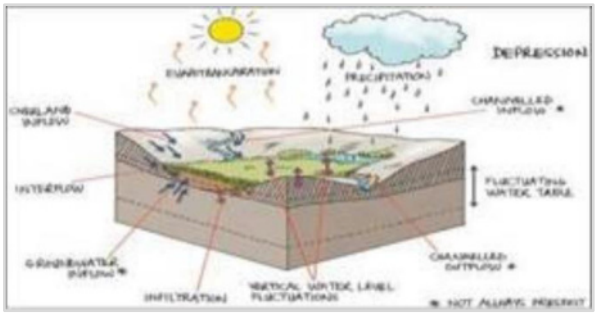
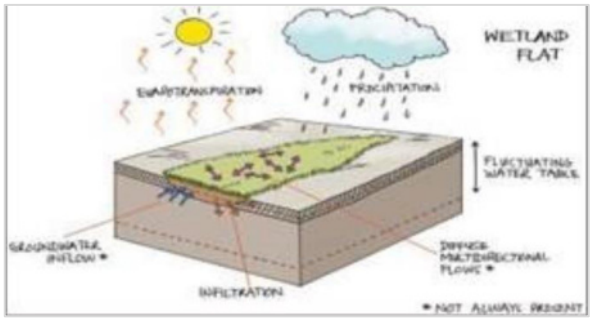


Figure 8-1: Cross section through a typical drainage basin (www.pngegg.com)

Following the identification of the aquatic features on the study site, these are then classified into specific hydrogeomorphic (HGM) units according to the Classification System for Wetlands and other Aquatic Ecosystems in South Africa (inland systems) (Ollis *et al*., 2013).

Table 8-1: Wetland hydrogeomorphic (HGM) types typically supporting inland wetlands in South Africa (Ollis *et al.*, 2013)

Hydrogeomorphic types		Description
River		Rivers are linear landforms with clearly discernible banks and a channel, which permanently or periodically, carries a contained and defined flow of water. A river is taken to include both the active channel and the riparian zone.
Floodplain		Valley bottom areas with a well-defined stream channel, gently sloped and characterised by floodplain features such as oxbow depressions 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 channel		Valley bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterised by the net accumulation of alluvial deposits or may have steeper slopes and be characterised by the net loss of sediment. Water inputs from 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 characterised by alluvial sediment deposition generally leading to a net accumulation of sediment. Water inputs mainly from channel entering the wetland and also from adjacent slopes.

Hydrogeomorphic types		Description
Hillslope seepage linked to a stream channel		Slopes on hillsides, which are characterised by the colluvial (transported by gravity) movement of materials. Water inputs are mainly sub-surface flow and outflow is usually via a well-defined stream channel connecting the area directly to a stream channel.
Isolated Hillslope seepage		Similar to other hillslope seeps but with no direct surface water connection to a stream channel. Slopes on hillsides, which are characterised by the colluvial (transported by gravity) movement of materials. Water inputs mainly from sub-surface flow and outflow primarily by diffuse sub-surface and/or limited surface flow.
Depression (includes Pans)		A basin shaped area with a closed elevation contour that allows for the accumulation of surface water (i.e. it is inward draining). It may also receive sub-surface water. An outlet is usually absent, and therefore this type is usually isolated from the stream channel network.
Wetland Flat		A flat wetland with no apparent inlet or outlet points. Water is obtained from surface or near surface flows and is lost either by downward percolation or evapotranspiration. May be only seasonal in terms of its wetness and hydromorphic soils may be only weakly developed or else be absent. Vegetation may be the strongest indicator.

8.3 Riparian Delineation

The delineation of the riparian areas was conducted in accordance with the Department of Water and Sanitation document, “A practical field procedure for identification and delineation of wetlands and riparian areas” (2005).

Like wetlands, riparian areas have their own unique set of indicators. It is possible to delineate riparian areas by checking for the presence of these indicators. The riparian delineation process takes the following physical aspects into consideration:

- ***Topography associated with the watercourse*** – The topography is a good rough indicator of the outer edge of the riparian area as the riparian edge is the same as the edge of the macro channel bank.
- ***Vegetation*** – The delineation of riparian areas relies primarily on the vegetative indicators. Using vegetation, the outer boundary of a riparian area must be adjacent to a watercourse and can be defined as the zone where a distinctive change occurs:
    - In species composition relative to the adjacent terrestrial area; and
    - In the physical structure, such as vigour or robustness of growth forms of species similar to that of adjacent terrestrial areas. Growth form refers to the health, compactness, crowding, size, structure and/or numbers of individual plants.
- ***Alluvial soils and deposited material*** – Alluvial soils can be defined as relatively recent deposits of sand, mud, etc. set down by flowing water, especially in the valleys of large rivers. Riparian areas often, but not always, have alluvial soils.

8.4 Aquatic features functional Assessment

Once the aquatic features have been identified and their boundaries determined, the assessment of the ecosystem services these features provide to the hydraulic system that they contribute to, as well as the immediate natural and social environment, was undertaken. An understanding of this functionality of these features contributes directly to the level of importance that is attributed to the specific feature that is developed. The assessment was conducted by using a modelling tool that forms part of the WET-Management Series (issued by the Water Research Commission), WET-EcoServices (Kotze *et al*., 2008).

The WET-EcoServices tool makes provision for the rapid assessment of the ecosystem services provided by an aquatic feature. The process of applying the tool is based on the characterisation of hydrogeomorphic aquatic feature types based on desktop and field assessment and observations of identified and delineated aquatic features. This model, furthermore, considers the biophysical and social conditions around a feature and converts these considerations into a fixed score for a series of defined ecosystem services that the wetland delivers.

- Flood Attenuation
- Streamflow regulation

- Sediment trapping
- Nitrate Assimilation
- Erosion control
- Maintenance of biodiversity
- Provision of harvestable resources
- Cultural significance
- Education and research
- Phosphate assimilation
- Toxicant Assimilation
- Carbon storage (sequestration)
- Provision of water for human use
- Provision of cultivated food
- Tourism and recreation

The maximum score for any service is a value of 4 and the rating of the probable extent of the service is shown in the table below.

Table 8-2: Ecoservices rating of the probable 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

8.5 Determining the Present Ecological State of a water resource

The determination of the present ecological state (PES) of a water resource was conducted by using a tool from the WET-Management Series (issued by the Water Research Commission), the WET-Health (Macfarlane *et al.*, 2008).

This tool is designed to assess the health or integrity of an aquatic feature. The health of the aquatic feature is defined as a measure of the deviation of feature in structure and function from the it's natural reference condition. The tool therefore attempts to assess the hydrological, geomorphological and vegetation impacts that has been imparted on the wetland at the time of assessment.

The overall approach is to quantify the impacts of human activity or clearly visible impacts on the health of the aquatic feature, and then to convert the impact scores to a 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 impact scores and Present State categories are provided in the tables below.

Table 8-3: The magnitude of impacts on wetland functionality (Macfarlane *et al.*, 2008)

Impact Category	Description	Score
None	No Discernible modification or the modification is such that it has no impacts on the wetland integrity	0 to 0.9
Small	Although identifiable, the impact of this modification on the wetland integrity is small.	1.0 to 1.9
Moderate	The impact of this modification on the wetland integrity is clearly identifiable, but limited.	2.0 to 3.9
Large	The modification has a clearly detrimental impact on the wetland integrity. Approximately 50% of wetland integrity has been lost.	4.0 to 5.9
Serious	The modification has a highly detrimental effect on the wetland integrity. More than 50% of the wetland integrity has been lost.	6.0 to 7.9
Critical	The modification is so great that the ecosystem process of the wetland integrity is almost totally destroyed, and 80% or more of the integrity has been lost.	8.0 to 10

The level of impacts on these three parameters is a direct indication of the PES of the aquatic feature as well as its functionality. An aquatic feature that has undergone severe impacts on its hydrology, geomorphology or vegetation or a combination of all three will reflect a low present ecological state while the converse is also true for pristine features. Since hydrology, geomorphology and vegetation are interlinked in the model, their scores are aggregated to obtain the overall PES health score using the formula:

Health = ((Hydrology value x 3) + (Geomorphology value x 2) + (Vegetation value x 2))/7

Table 8-4: Definitions of the PES categories (Macfarlane *et al.*, 2008)

Impact 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	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	F

8.6 Determining the Ecological Importance and Sensitivity of aquatic features

The outcomes of the implementation of the WET-EcoServices tool discussed above, is key in the determination of the ecological importance and sensitivity of aquatic features as the results is a direct indication of the contribution that the feature is making to the hydraulic system with which it is linked. This contribution is linked to the sensitivity of this feature to any possible change and how this will impact on the hydraulic system it is linked to.

8.7 Ecological Classification and Description

The ecological classification and description are direct results of the implementation of the methodology and tools described above as the results of these determinations contribute to the understanding of the ecology of the aquatic feature. The description of the aquatic feature will therefore make provision for a description of the physical attributes of the feature (location, size, etc.), the ecosystem services that it provides, the current ecological state of the feature and the importance of the feature and its sensitivity.

9 DESCRIPTION OF THE STUDY SITE

9.1 Climate

The climatic conditions for the study site are characterised by a humid subtropical climate with hot, humid summers and dry cold winters with frost regularly occurring in the valley bottoms and other low-lying areas. The mean summer temperature for the district is approximately 23ºC with the mean winter temperature being 10ºC. Annual rainfall is estimated at approximately 800mm of rain that primarily falls during the summer months with drizzle characterising the rainfall during autumn and spring. A summary of the climatic conditions for the general area is provided in the figure below.

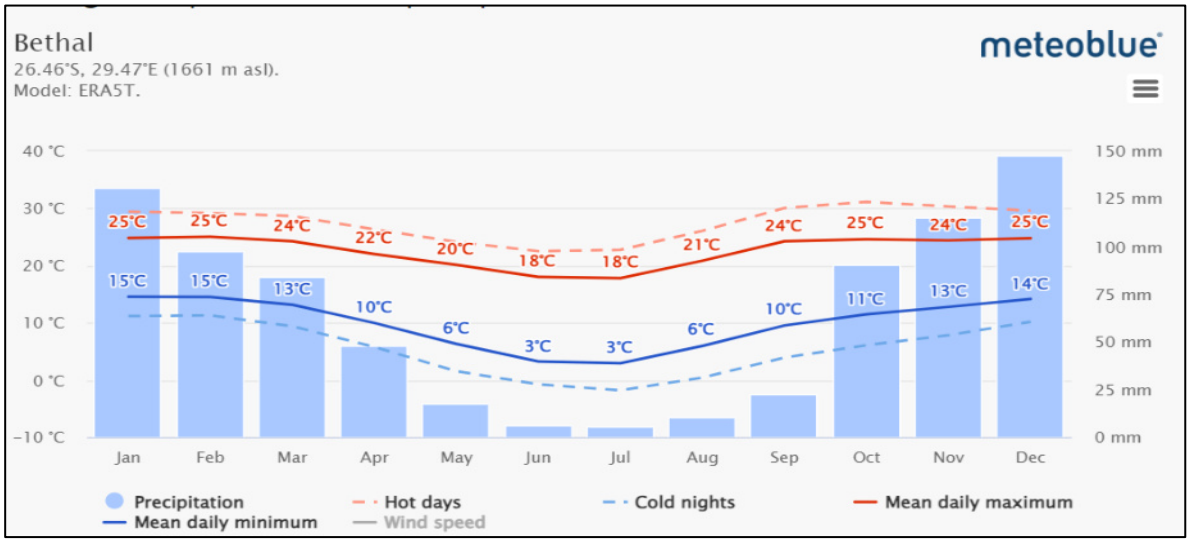


Figure 9-1: Average climatic conditions of the town of Bethal (source www.meteoblue.com)

9.2 Vegetation

The project site is located in the Soweto Highveld Grassland (Gm8) that extends between Ermelo and Johannesburg in the north, Perdekop in the southeast and the Vaal River in the south and westwards as far as Randfontein (see Figure 9-2).

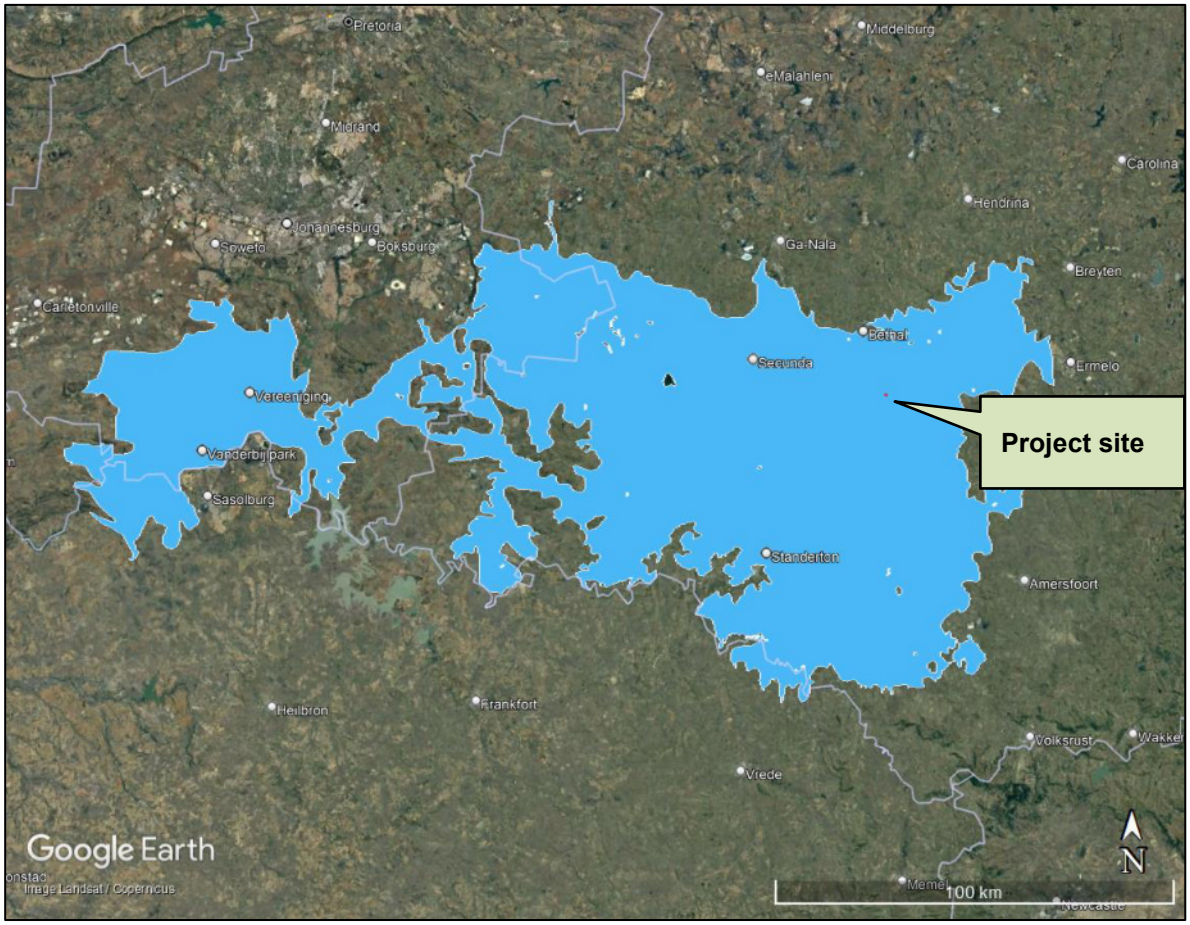


Figure 9-2: Extent of the Soweto Highveld Grassland (Gm8)

The vegetation typically consists of short to medium-high, dense, tufted grassland dominated by *Themeda triandra* (Red Grass) in its pristine state. Other grasses that occur in the vegetation type consists of common *Elionurus muticus* (Wire Grass), *Eragrostis racemosa* (Narrow Heart Love Grass), *Heterpogon contortus* (Spear Grass) and *Tristachya leucothrix* (Hairy Trident Grass).

The vegetation type has an “endangered” classification due to the relatively small percentage (approximately 24%) of the vegetation type that is statutorily conserved. The impacts on the vegetation type are directly linked to cultivation, urban sprawl, mining and building of road infrastructure.

The vegetation on the project site show signs of transformation due to livestock grazing activities and possibly activities associated with the working of the old borrow pit immediately next to the project site. The dominant grass species consists of *Elionurus muticus* (Wire Grass) and *Tristachya leucothrix* (Hairy Trident Grass).

Plate 9-1: View of the vegetation on the project site, looking in a southerly direction

9.3 Topography

The project site is located on a low, east to west ridge line that forms the northern edge of the Heilvleispruit valley. The site is flat and drains in a southerly direction. No significant topographical features occur on the site.

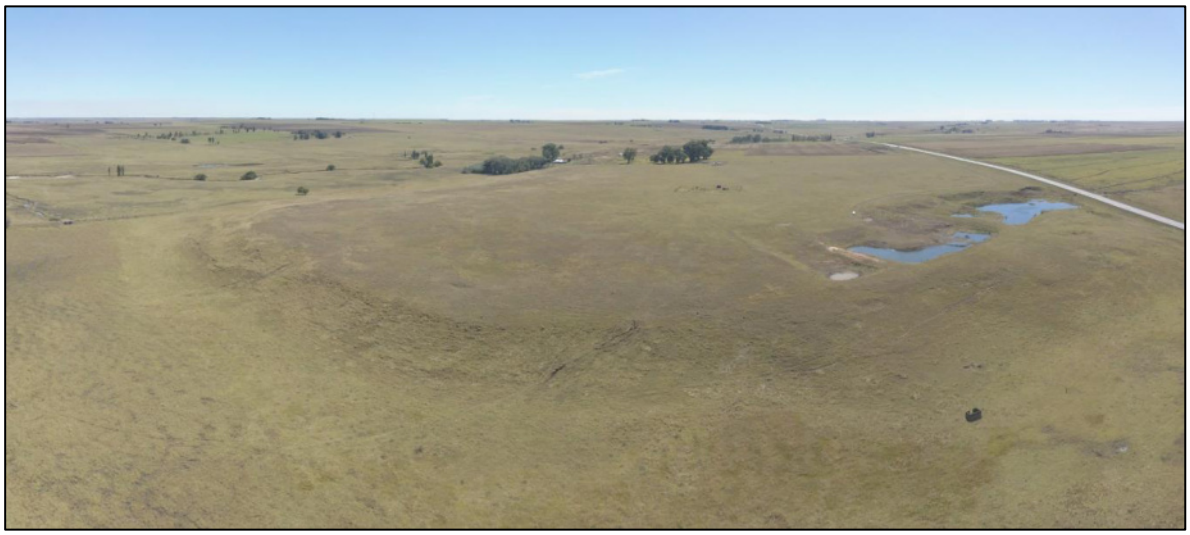


Plate 9-2: Aerial view of the project site showing the topography, looking in a northerly direction

9.4 Land cover and land use

The land use surrounding the project site largely consists of agricultural activities made up of veldt grazing of livestock and cultivation of maize, soyabeans and other crops in rotation. These practices have been present in the surrounding areas for decades. The land use on the project site consists of open veldt grazing. The area has not been ploughed and planted likely due to the presence of the weathered dolerite at surface that covers the majority of the site.

Plate 9-3: View of the weathered dolerite at or near the surface in the project site

Figure 9-3: Dated aerial image (1979) of the project site showing the cultivated areas surrounding the site

10 DESKTOP ASSESSMENT FINDINGS

The findings relating to the terrestrial ecology is based on the desktop assessment of available databases as well as site investigations.

10.1 Department of Forestry, Fisheries and Environment (DFFE) Online Screening Tool

The results generated by the DFFE Online Screening Tool has classified the Aquatic Theme sensitivity to be “LOW” due to the absence of any aquatic features within the project boundaries.

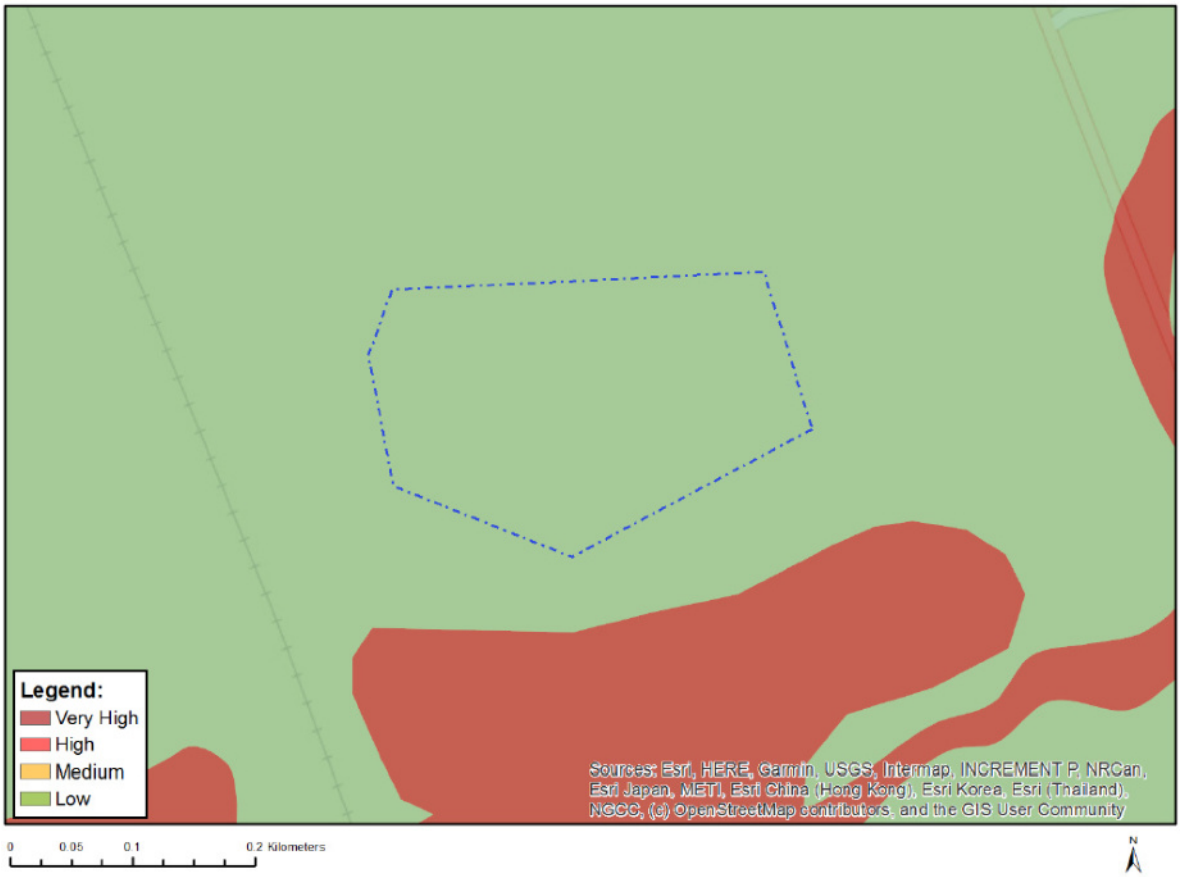


Figure 10-1: Location of the project site in a LOW sensitivity area as per the DFFE Online Screening Tool

10.2 Hydrological setting

The results of the desktop assessment of the hydrological characteristics of the study site are provided in the table below.

Table 10-1: Desktop hydrological characteristics of the study site

Hydrological characteristic	Result	Comment
Water Management Area	Vaal	
Primary Catchment	Primary region C	

Hydrological characteristic	Result	Comment
Tertiary Catchment	C11	
Quaternary Catchment	C11H	The dominant river in the Quaternary Catchment is the Blesbokspruit that drains the catchment in a southerly direction, two unnamed tributaries and the Kwaggalaagte River are identified as NFEPA Rivers in the catchment (see Figure 10-2). All these rivers are considered to be non-perennial rivers. All these NFEPA Rivers are classified as Class C rivers which means that they are considered to be Moderately Modified.

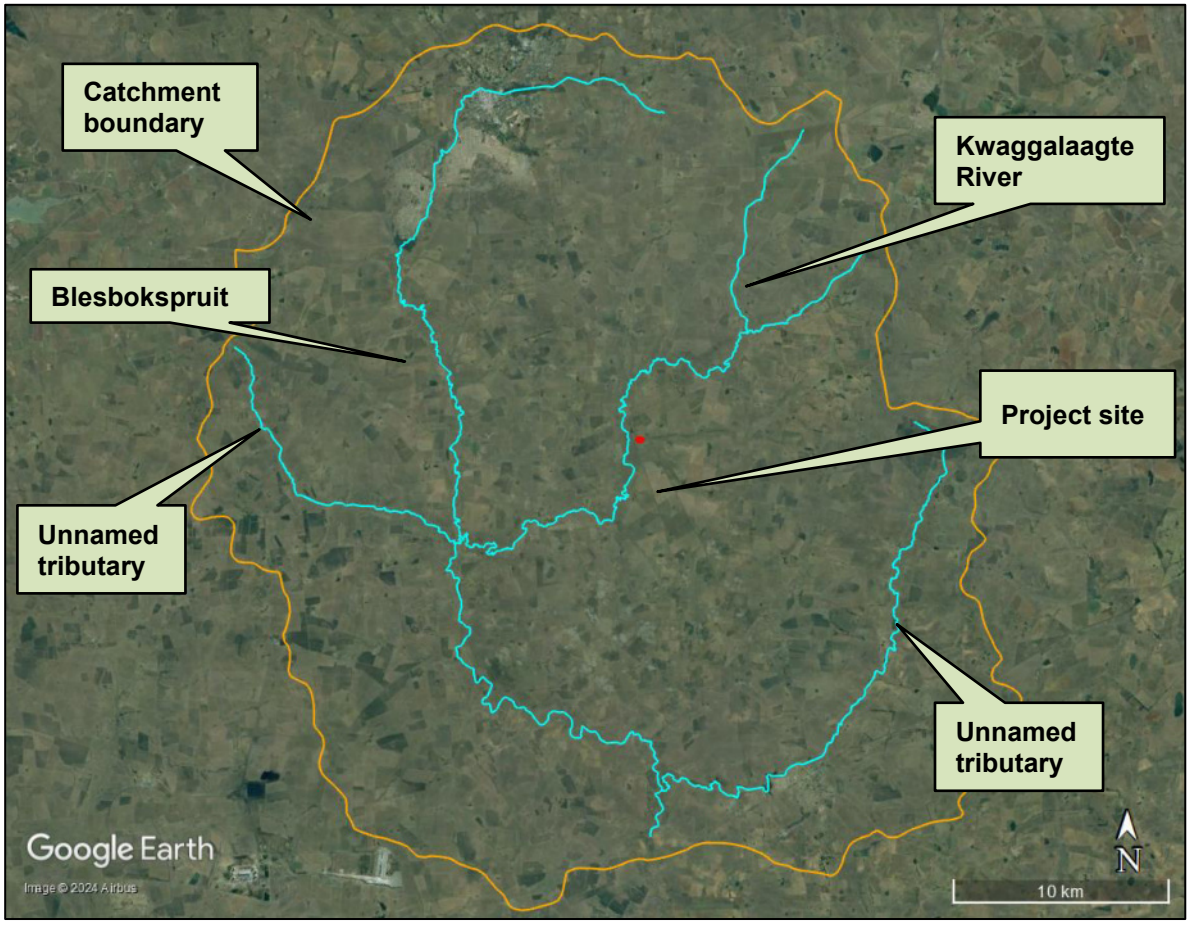


Figure 10-2: Location of the NFEPA Rivers identified in the NFEPA Database for Quaternary Catchment C11H

No NFEPA Rivers were identified to be within the boundaries of the project site.

10.3 National Freshwater Ecosystem Priority Areas (NFEPA)(2014):

The National Freshwater Ecosystem Priority Areas (NFEPA) project provides strategic spatial priorities for conserving South Africa's freshwater ecosystems and supports sustainable use of water resources. The priority areas are called Freshwater Ecosystem Priority Areas, or "FEPAs". The FEPAs were identified based on:

- Representation of ecosystem types and flagship free-flowing rivers;
- Maintenance of water supply areas in areas with high water yield;
- Identification of connected ecosystems;
- Representation of threatened and near-threatened fish species associated with migration corridors;
- Preferential identification of FEPAs that overlapped with:
    - Any free-flowing river;
    - Priority estuaries identified in the National Biodiversity Assessment (2011); and
    - Existing protected area and focus area for protected area expansion identified in the National Protected Area Expansion Strategy.

Based on the above criteria, the database has identified the absence of any wetland features within a 500m radius of the project site. The location of the nearest NFEPA wetland features to the project site is shown in Figure 10-3. Please note that no features are within the boundaries of the project site or within a 500m radius of the project site.

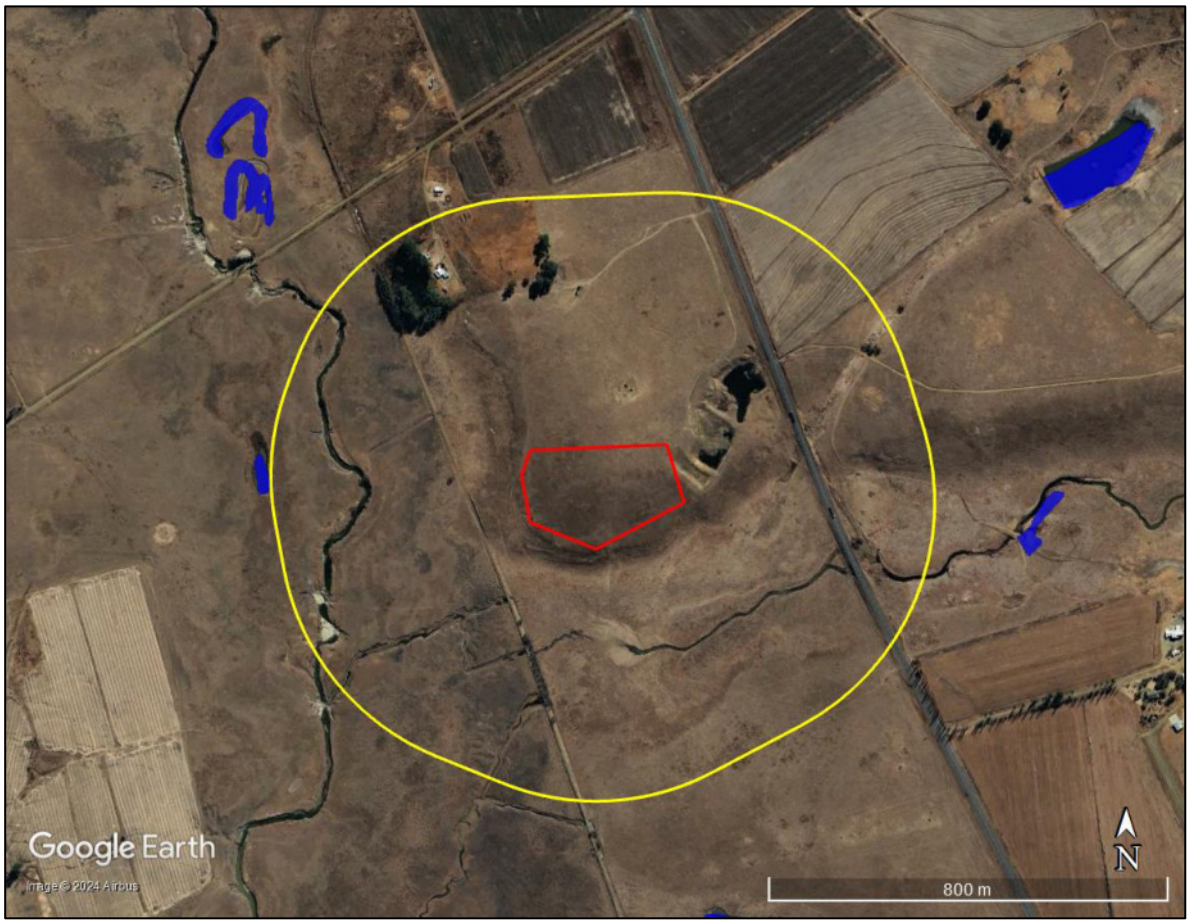


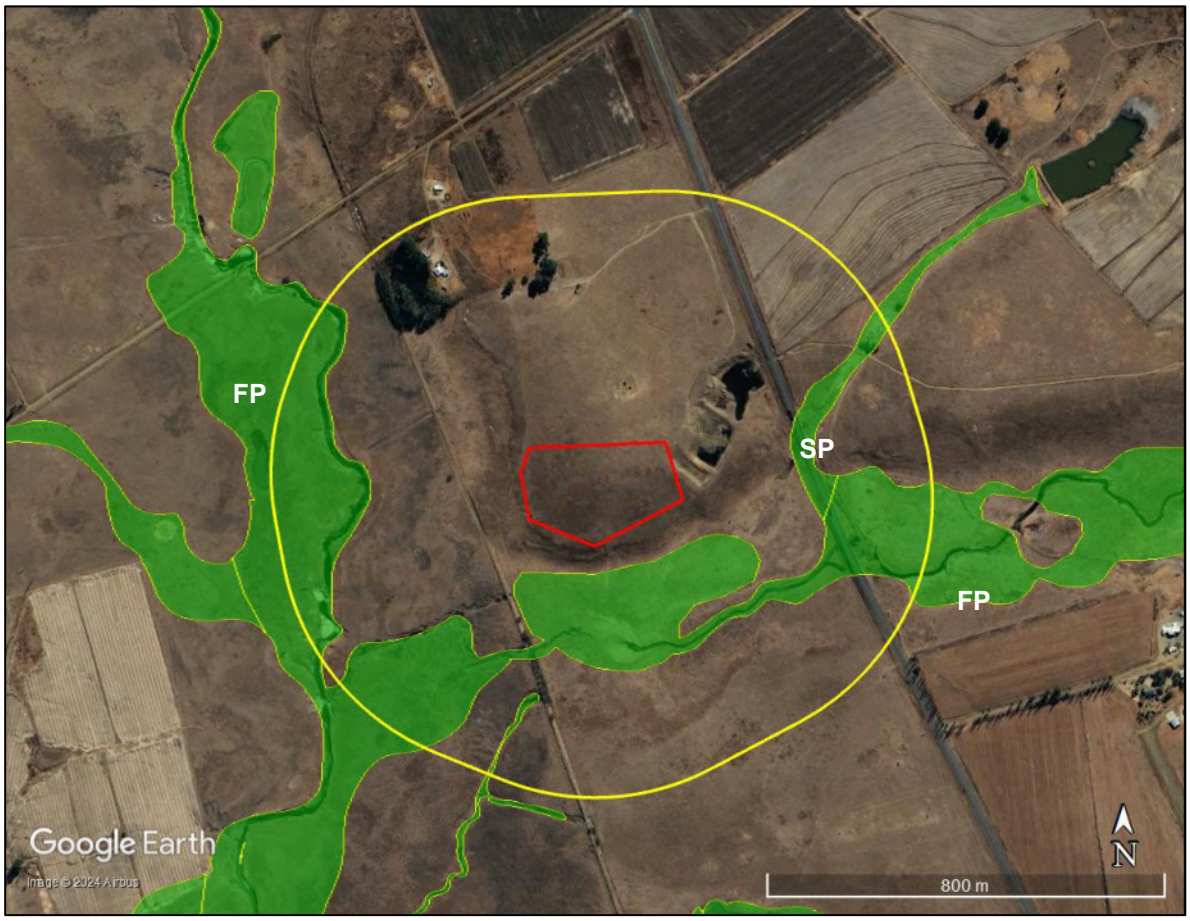
Figure 10-3: Location of the wetland features identified in the NFEPA Dataset (shown in blue) in relation to a 500m radius (shown in yellow) of the project site (shown in red)

10.4 South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (2018)

A South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the National Biodiversity Assessment of 2018 (NBA 2018). The SAIIAE offers a collection of data layers pertaining to ecosystem types and pressures for both rivers and inland wetlands.

The SAIIAE builds on previous efforts while also introducing improvements and several new elements. An inventory of inland aquatic ecosystems responds to a multi-stakeholder need for the planning, conservation and management of these systems, as mandated by a number of Legislative Acts, including the South African National Water Act (NWA) and the National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act 10 of 2004), as amended.

The dataset has indicated the presence of two Flood Plain wetlands one associated with the Heilvleispruit and the other with the Kwaggalaagte River within a 500m radius of the project site. In addition, a small Seep wetland is located to the east of the project site. The location of these features in relation to the project site is shown in Figure 10-4. It is important to note that no wetland features have been identified within the boundaries of the project site.

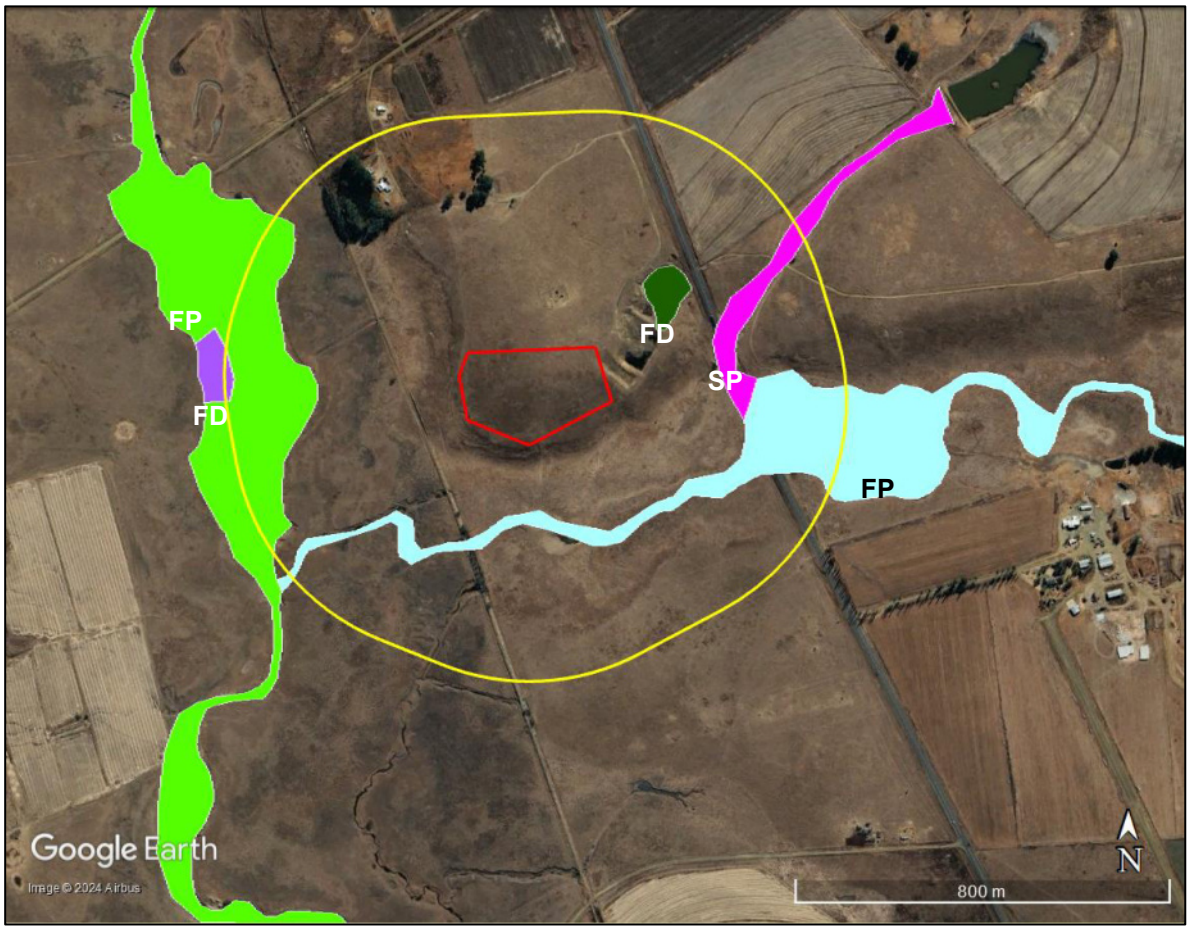


FP = Flood Plain; SP = Seep

Figure 10-4: Location of the wetland features identified in the SAIIAE Dataset (shown in green) in relation to a 500m radius (shown in yellow) of the project site (shown in red)

10.5 Mpumalanga Highveld Wetland Study (2015)

The Mpumalanga Highveld Wetland (MPHG) Wetland map provides that spatial extent of the delineated wetland features in the Mpumalanga Province. This dataset has not identified any wetland features within the boundaries of the project site, but has identified a number of natural and artificial features within a 500m radius of the project site. The natural wetlands are classified as two Flood Plain wetlands and one Seep wetland with the artificial wetlands features consisting of farm dams. The location of these features is shown in Figure 10-5.



FP = Flood Plain; SP = Seep; FD = Farm Dam

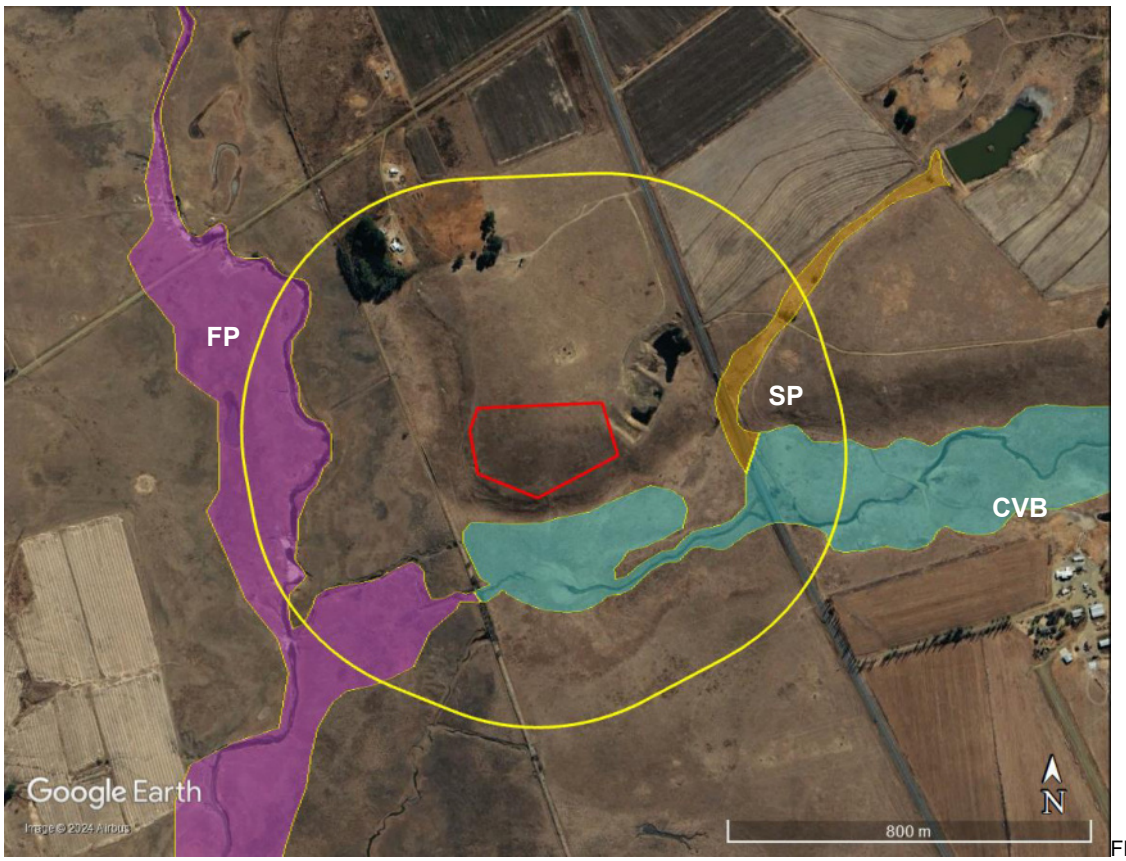
Figure 10-5: Location of the wetland features identified in the MPHG Wetland Dataset (2015)

11 FIELD ASSESSMENT FINDINGS

The findings presented in this section are based on the desktop assessment of the proposed project site.

11.1 Identification, delineation and mapping of aquatic features

The site assessment confirmed the absence of any natural wetland features within the boundaries of the project site. Furthermore, it identified three wetland features, one a Floodplain wetland (FP) associated with the Kwaggalaagte River, one a Channelled Valley Bottom wetland (CVB) associated with the Heilvleispruit and a Seep wetland (SP) within a 500m radius of the project site. The location of these features is indicated in Figure 11-1.



FP = Flood Plain; CVB = Channelled Valley Bottom; SP = Seep

Figure 11-1: Location of the wetland features identified during the field assessment (shown in green) within a 500m radius (shown in yellow) of the development site (shown in red)

Plate 11-1: Aerial view of the Channelled Valley Bottom (CVB) associated with the Heilvleispruit

Plate 11-2: Aerial view of the Flood Plain (FP) associated with the Kwaggalaagte River

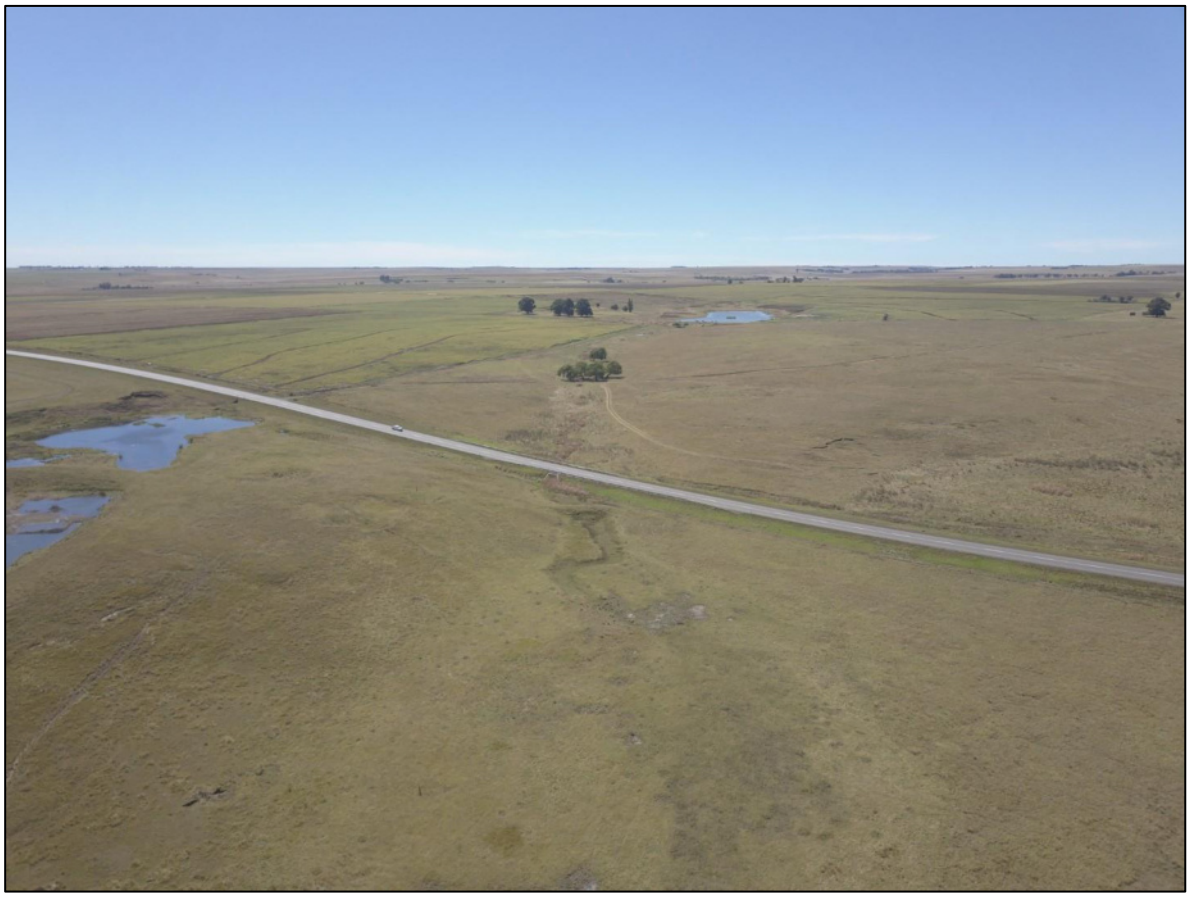


Plate 11-3: Aerial view of the Seep (SP)

No watercourses were identified within the boundaries of the project site. Three seasonal watercourses were identified within a 500m radius of the project site. The one is the Kwaggalaagte River that passes the project site to the west, the other is the Heilvleispruit that is located immediately to the south of the site and the third is the unnamed watercourse that is associated with the Seep. The latter forms a tributary of the Heilvleispruit, which in turn forms a tributary of the Kwaggalaagte River. The location of these watercourses is indicated in Figure 11-2.

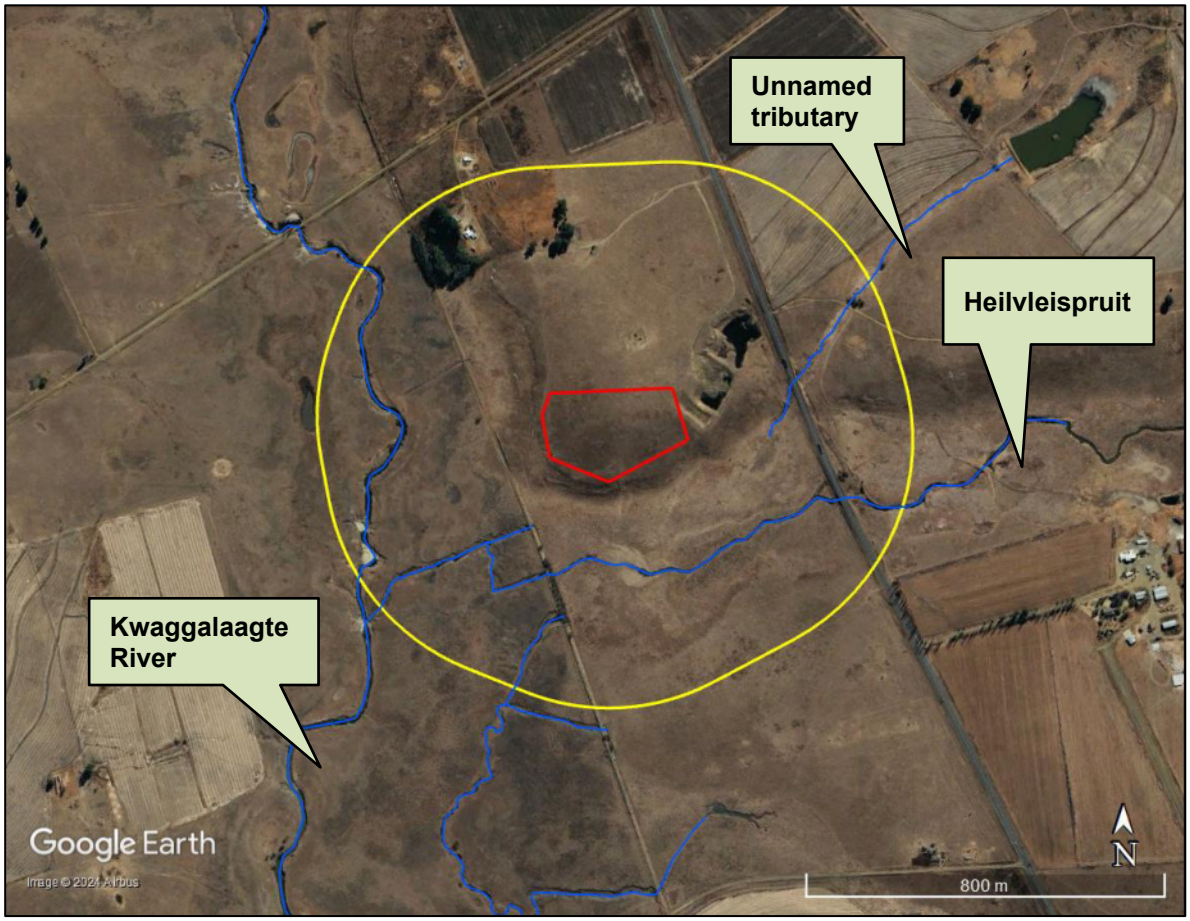


Figure 11-2: Location of the watercourses identified during the field assessment (shown in blue) within a 500m radius (shown in yellow) of the development site (shown in red)

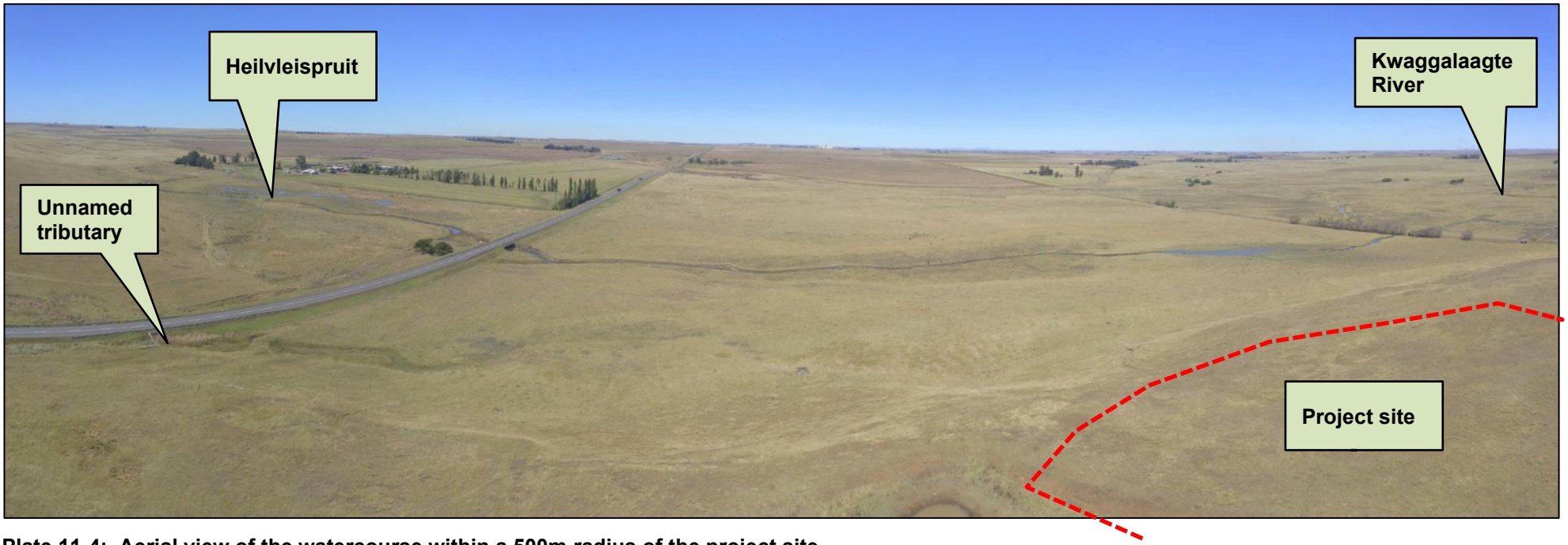


Plate 11-4: Aerial view of the watercourse within a 500m radius of the project site

11.2 Aquatic features functional assessment

The functional assessment of the wetland features all relates to the HGM Unit classification of the wetlands.

Flood Plain wetlands are typical depositional features directly associated with river channels. As such, regular water and sediment contributions from the associated river channel characterises the dynamic nature of these wetlands. The water inputs into these features are largely from the river channel, but also consists of groundwater infiltration where the water table is near the surface. Water loss from these features is via evaporation (and transpiration *via* the plants in the features) as well as infiltration.

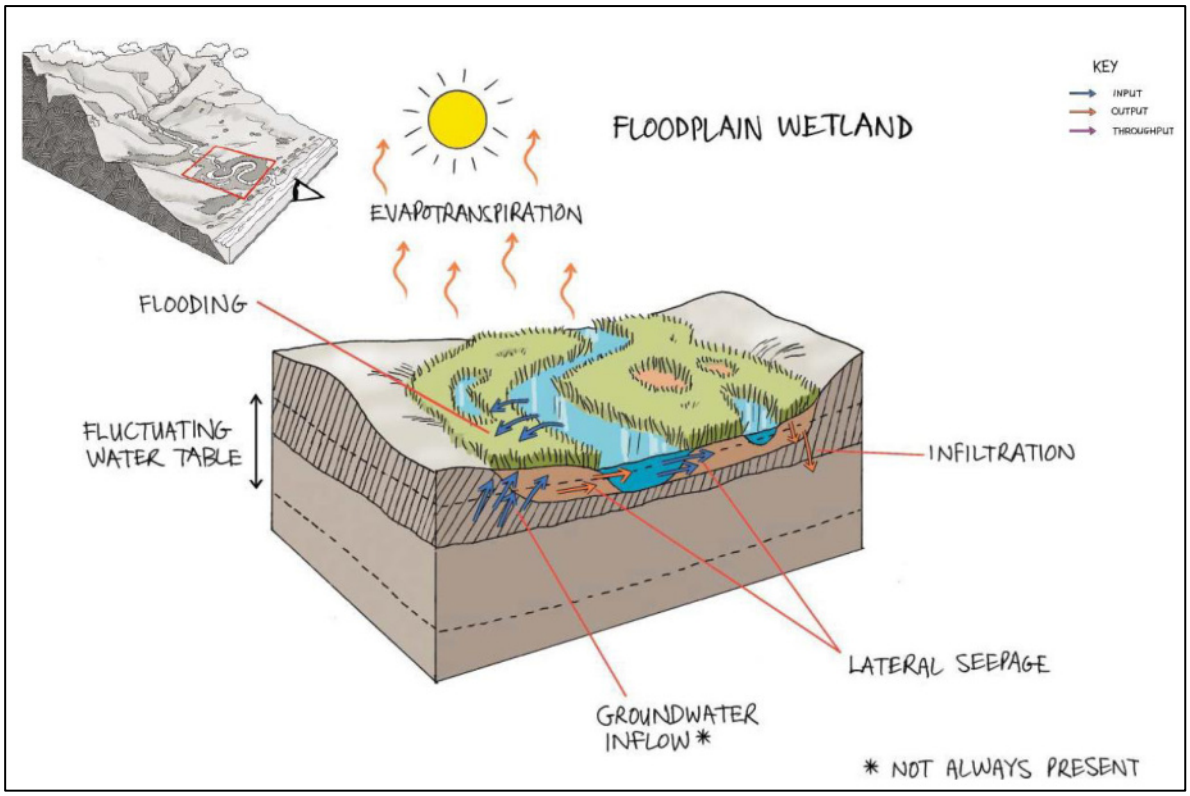


Figure 11-3: Conceptual illustration of a floodplain wetland, showing the typical landscape setting and the dominant inputs, throughputs and outputs of water.

Based on the key features of how water moves in and out of the Flood Plain, these features provide key functions in terms of sediment trapping, toxicant and nutrient assimilation, stream flow control and flood attenuation. The presence of geomorphic features such as oxbow lakes and its direct relationship with a river is a key differentiating feature of these Flood Plains and Channelled Valley Bottom wetlands.

Channelled Valley Bottom wetlands must be considered as wetland ecosystems that are distinct from, but sometimes associated with, the adjacent river channel itself, which must be classified as a 'river'. These wetlands are characterised by their location on valley floors, the absence of characteristic floodplain features and the presence of a river channel flowing through the wetland.

Figure 11-3 is a conceptual diagram of a Channelled Valley Bottom wetland, showing the dominant inputs and outputs of water. Dominant water inputs to these wetlands are from the river channel flowing through the wetland, either as surface flow resulting from flooding or as sub- surface flow, and/or from adjacent valley-side slopes (as overland flow or interflow). Water generally moves through the wetland as diffuse surface flow, although occasional, short-lived concentrated flows are possible during flooding events

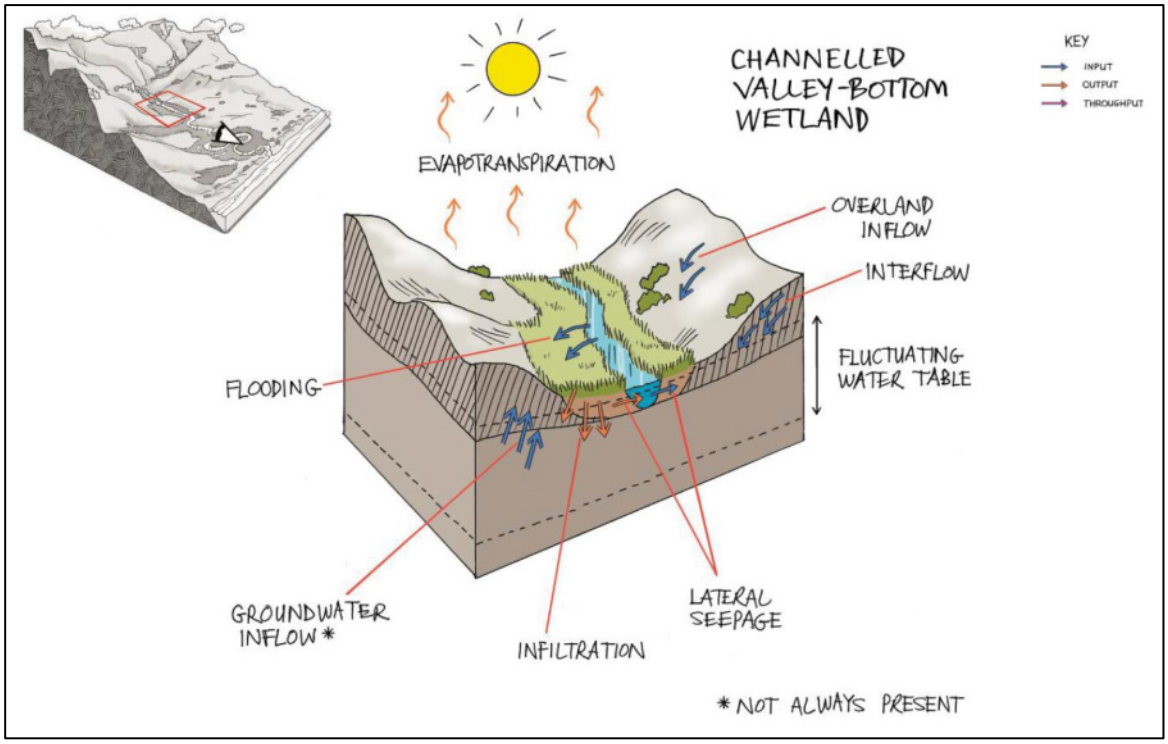


Figure 11-4: Conceptual illustration of a Channelled Valley Bottom wetland, showing the typical landscape setting and the dominant inputs, throughputs and outputs of water

Water generally exits a Channelled Valley Bottom wetland in the form of diffuse surface or subsurface flow into the adjacent river, with infiltration into the ground and evapotranspiration of water from these wetlands also being potentially significant.

Seep wetlands are typically located on gentle slopes and contain no water inflow channels. Water will typically collect in these Seep areas and due to the dense vegetation within the footprint will have a relatively high roughness coefficient that slows the movement of water to a point that infiltration into the soils is a prominent feature of these wetlands. The key water inputs into these Seeps are the interflow from the near surface groundwater that moves down the slopes as well as overland surface flow down the slopes. Evaporation and channelled outflow are key water releases from the features.

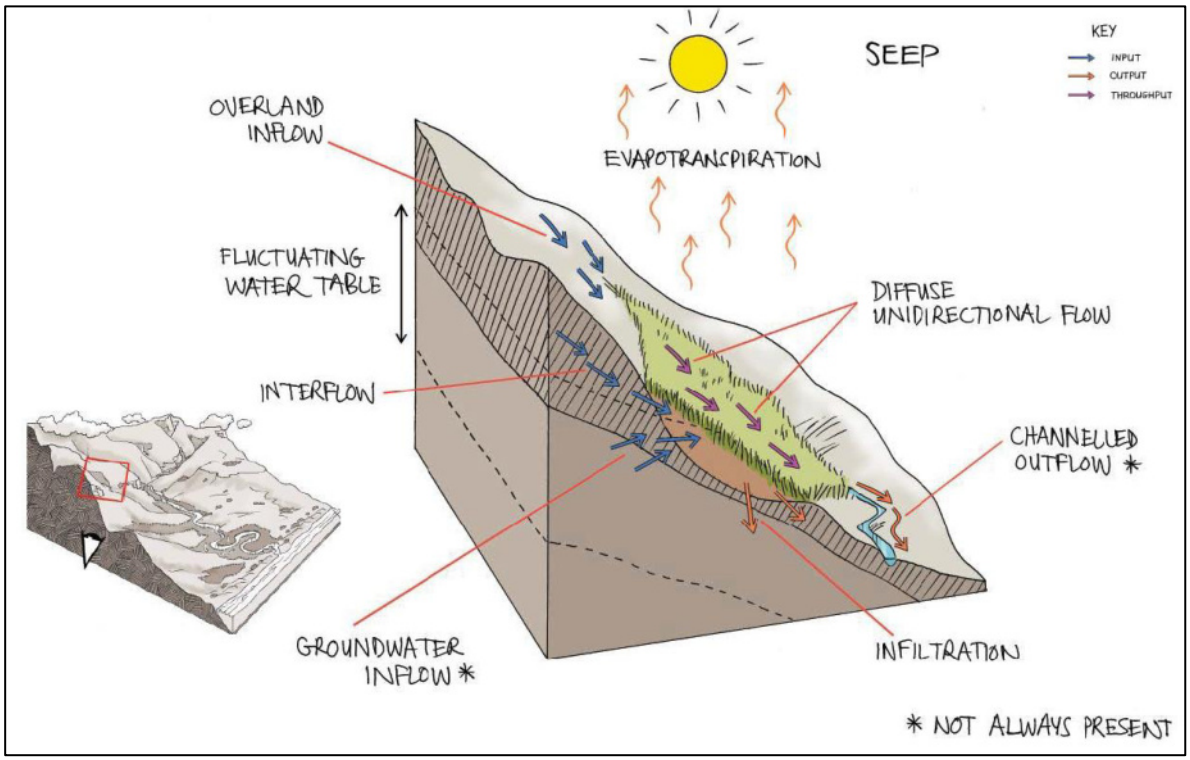


Figure 11-5: Conceptual illustration of a Seep wetland, showing the typical landscape setting and the dominant inputs, throughputs and outputs of water

Based on the hydrological characteristics of these wetlands they provide sediment, toxicant and nutrient storage functions as well as water supply particularly during the dry seasons.

Table 11-1: Ecosystem service provision by the Channelled Valley Bottom Wetlands associated with the project site

Wetland Unit					CVB	FP	SP
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits	Flood attenuation		2.2	3.2	1.0
			Streamflow regulation		2.4	2.8	0.9
			Water Quality enhancement benefits	Sediment trapping	2.6	3.1	2.2
				Phosphate assimilation	2.2	2.0	2.7
				Nitrate assimilation	2.3	2.0	2.6
				Toxicant assimilation	2.2	2.1	2.4
				Erosion control	2.3	1.8	2.0
			Carbon storage		2.4	2.8	2.4
	Direct Benefits	**Biodiversity maintenance**					
		Provisioning benefits	Provisioning of water for human use		1.8	1.8	1.6
			Provisioning of harvestable resources		0.0	0.0	0.0
			Provisioning of cultivated foods		0.0	0.0	0.0
		Cultural benefits	Cultural heritage		0.0	0.0	0.0
			Tourism and recreation		0.0	0.0	0.0
			Education and research		1.0	1.0	1.0
Overall					**21.4**	**22.6**	**18.8**
Average					**1.53**	**1.61**	**1.34**

FP = Flood Plain; CVB = Channelled Valley Bottom; SP = Seep

The level of service provision by the wetland areas is a direct function of the impacts that are present within and within the catchment that provides water to the wetland. As a result of the impacts to the catchment of the wetland features, the level of ecosystem provision is considered to be of medium importance.

The key ecosystem services provided by the wetland features relate directly their ability to assimilate various substances that move through the catchment. These include nitrates, phosphates and toxicants while the wetlands trap sediment from the catchment which allows for the establishment of dense wetland vegetation that in turn limits the erosion in the features.

11.3 Determining the Present Ecological State of an aquatic feature

The PES of an aquatic feature is a function of the impacts that are present within the footprint of the feature as well as the catchments associated with each of these features and how these impacts affect the drivers of the wetland and watercourse. The impacts that are present in the catchment of the identified wetlands and watercourses are provided in the table below.

Table 11-2: Identified impacts on the aquatic features

HGM unit	Impacts to the catchment	Physical impacts to the wetland
Channelled Valley Bottom	• Intensive commercial agriculture (cultivation) • Civil infrastructure (roads, railway line, power lines, etc.) • Stormwater discharge from the contoured commercial agricultural areas and infrastructure • Alien invasive plant species • Farm dams	• Alien invasive plant species • Several culvert and bridge crossings • Civil infrastructure (roads) • Dam and associated impoundment • Direct stormwater discharge from agricultural areas and infrastructure • Erosion • Canalisation of water flow
Flood Plain	• Intensive commercial agriculture (cultivation) • Civil infrastructure (roads, railway line, power lines, etc.) • Stormwater discharge from the contoured commercial agricultural areas and infrastructure • Alien invasive plant species • Farm dams	• Alien invasive plant species • Several culvert and bridge crossings • Civil infrastructure (railway line, roads) • Dam and associated impoundment • Direct stormwater discharge • Erosion • Canalisation of water flow
Seep	• Intensive commercial agriculture (cultivation) • Civil infrastructure (roads, railway line, power lines, etc.) • Stormwater discharge from the contoured commercial agricultural areas and infrastructure	• Alien invasive plant species • Dam and associated impoundment • Direct stormwater discharge from agricultural areas and infrastructure • Erosion

HGM unit	Impacts to the catchment	Physical impacts to the wetland
	• Alien invasive plant species • Farm dam	
Watercourses	• Intensive commercial agriculture (cultivation) • Civil infrastructure (roads, railway line, power lines, etc.) • Stormwater discharge from the contoured commercial agricultural areas and infrastructure • Alien invasive plant species • Farm dams	• Alien invasive plant species • Several culvert and bridge crossings • Civil infrastructure (railway line, roads) • Dam and associated impoundment • Direct stormwater discharge • Erosion • Canalisation of water flow

Plate 11-5: Aerial view of the road and culvert crossing through the Channelled Valley Bottom

Plate 11-6: Aerial view of the culvert and road crossing the Seep as well as the dam and impoundment area

Plate 11-7: Aerial view of the railway and culvert crossings in the Flood Plain as well as the canalised water flow

Present PES and EIS assessments of watercourses were constrained as no technique is currently suitable for their assessments. Professional opinion and an extrapolation of principles from other methods were used to approximate PES and EIS for watercourse that is present on the study site.

The impacts identified in the table above were used in the Level 1 WET-Health assessment to determine the PES of the wetland system. The results of the Level 1 assessment are provided in the table below.

Table 11-3: Present Ecological State (PES) of the system

HGM Unit	Driver			
	Hydrology	Geomorphology	Vegetation	Combined score
Channelled Valley Bottom	3.1	4.2	4.7	**3.3 = Class C Moderately modified**
Flood Plain	3.5	4.1	4.2	**3.8 = Class C Moderately modified**
Seep	4.1	4.0	3.2	**3.8 = Class C Moderately modified**
Watercourses	4.2	4.3	3.2	**3.9 = Class C Moderately modified**

The PES of all the wetland features included in this study are classified as Class C features that are considered to be moderately modified as a result of the impacts within the catchments as well as within their physical footprints.

The watercourses are classified as Class C features that have been moderately modified which has resulted in moderate changes to the ecosystem processes that has resulted in the loss of natural habitat and biota from the feature.

11.4 Determining the Ecological Importance and Sensitivity of aquatic features

The Ecological Importance of any aquatic feature is an expression of its importance to the maintenance of the ecological diversity and functioning within itself, as well as hydrologically downstream. The Ecological Sensitivity is a function of the system's ability to resist disturbances on its drivers and its capability to recover from these disturbances once they have occurred. The status of the Channelled Valley Bottom wetlands as well as the watercourses within the study site is provided in the table below.

Table 11-4: Ecological importance and sensitivity of the aquatic system

HGM Unit	Criteria	Importance	EIS Class	Overall importance and sensitivity
Channelled Valley Bottom	Ecological importance and sensitivity	2.0	M	**Medium**
	Hydrological/functional importance	2.3	M	
	Direct human benefits	0.5	L	
Flood Plain	Ecological importance and sensitivity	2.1	M	**Medium**

HGM Unit	Criteria	Importance	EIS Class	Overall importance and sensitivity
	Hydrological/functional importance	2.5	M	
	Direct human benefit	0.5	L	
Seep	Ecological importance and sensitivity	1.0	L	**Low**
	Hydrological/functional importance	2.0	M	
	Direct human benefits	0.5	L	
Watercourses	Ecological importance and sensitivity	2.2	M	**Medium**
	Hydrological/functional importance	2.0	M	
	Direct human benefits	0.5	L	

The overall Ecological Importance and sensitivity of the aquatic features associated with the site are presented in Table 11-4. All the features except the Seep wetland have Medium importance and sensitivity with the Seep wetland being classified to have a Low importance and sensitivity. This is a function of the moderately modified PES of the features and the associated intermediate levels of ecosystem services provision by the features.

11.5 Buffer determination

Based on the findings of the assessment, the location and extent of the aquatic features, the PES of the aquatic features, the ecosystem services provided by the system and the EIS of the aquatic features, a buffer of 40m around the edge of the wetland systems is recommended. This buffer must be in place for the duration of the operational phase of the borrow pit.

It is also important to note that in accordance with the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) no part of the borrow pit operations (stockpiles, crushers, plant parking, etc.) is allowed to be outside of the boundaries of the borrow pit.

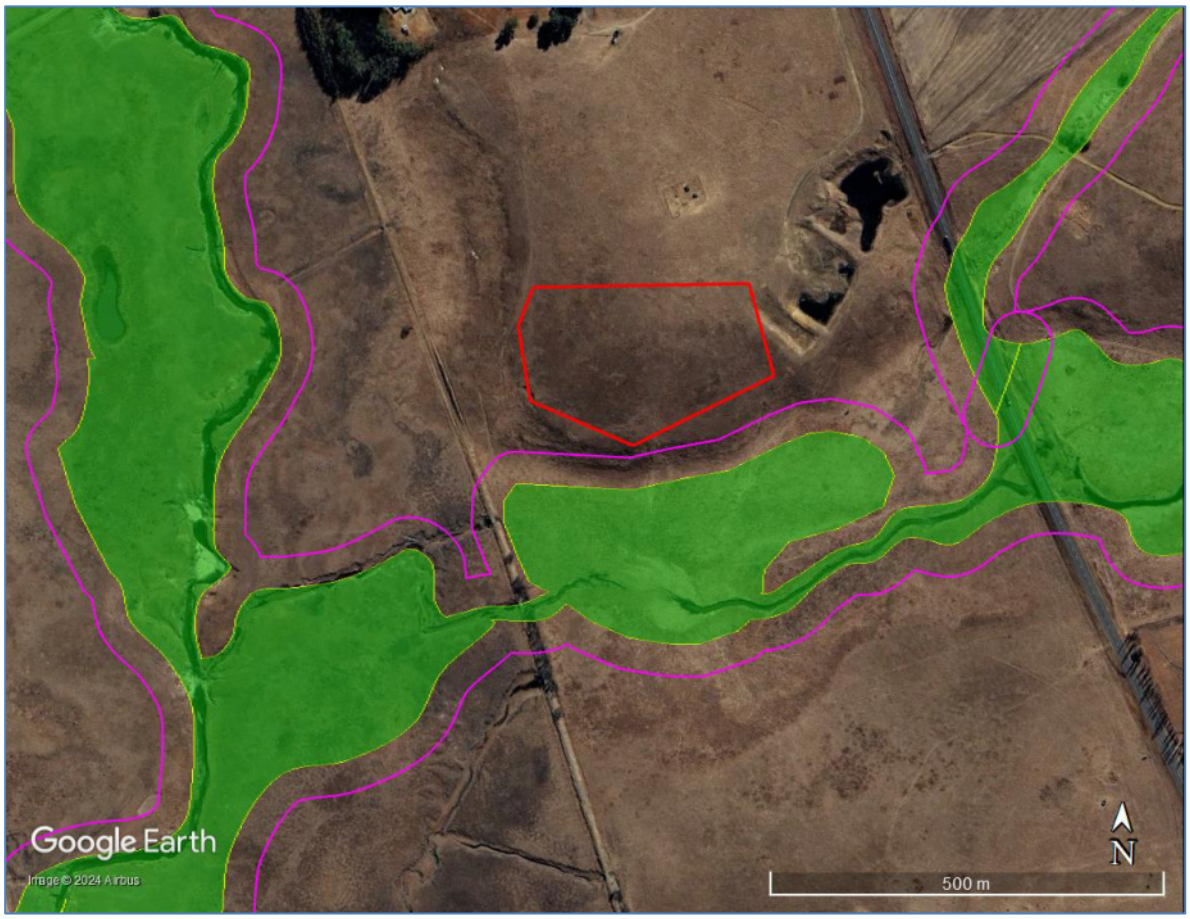


Figure 11-6: Location and extent of the applicable 40m buffer (in purple) around the wetland features nearest to the project site (shown in red)

12 RISK / IMPACT ASSESSMENT

The impact assessment in this report aims to identify and assess the significance of the potential impacts associated with the establishment and operation of the borrow pit. For the purposes of this assessment, the Standardised Risk (or Impact) Assessment Matrix as specified by the Department of Water and Sanitation will be used to assess the impacts in the “regulated area of the watercourse” as defined in the National Water Act (Act No. 36 of 1998).

The ”regulated area of a watercourse” as defined in the Act make provision for the following:

a) The outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse or a river, spring, natural channel, lake or dam;

b) In the absence of a determined 1 in 100 year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or

c) A 500m radius from the delineated boundary (extent) of any wetland or pan.

The extent of this “regulated area of a watercourse as it pertains to the Risk Assessment is shown in Figure 12-1. It is clear that the entire borrow pit area falls within the “regulated area of a watercourse” as defined by the regulations.

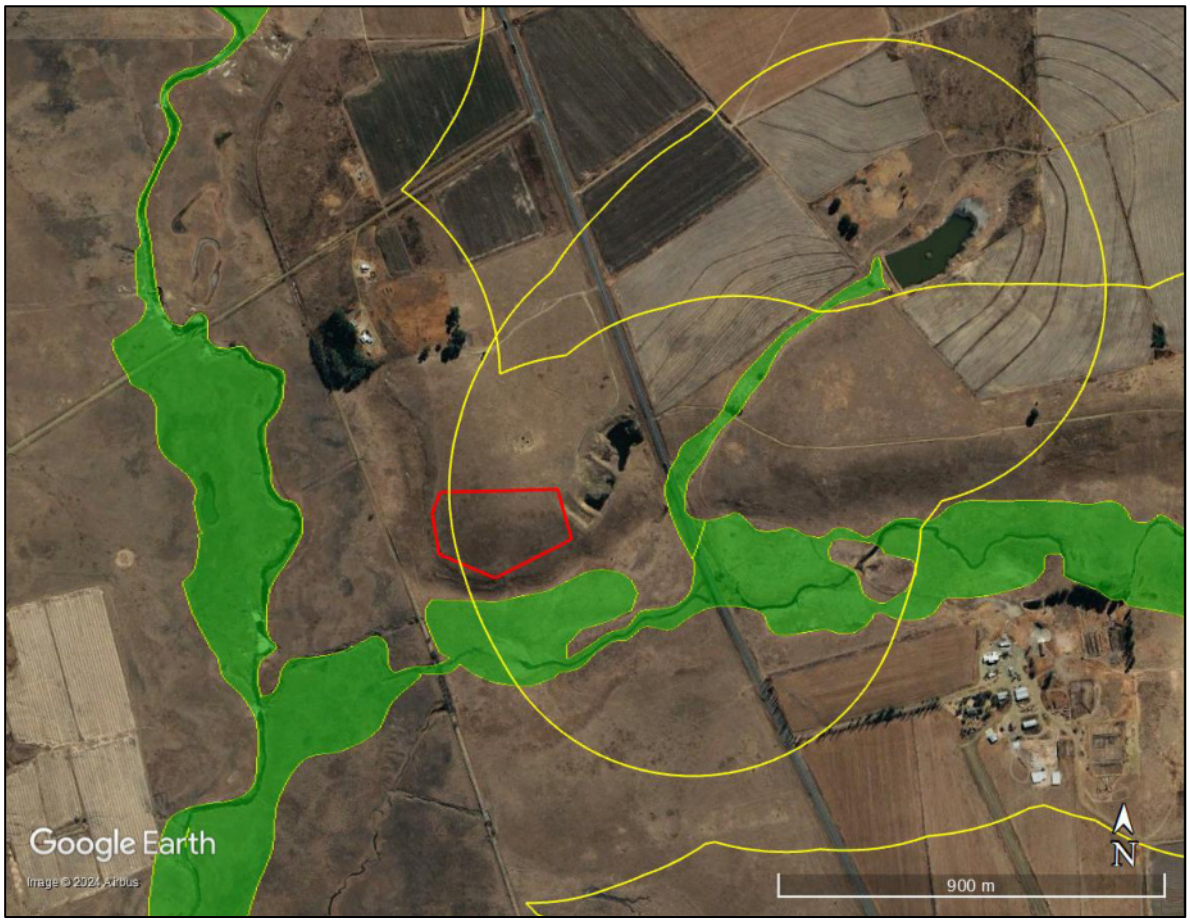


Figure 12-1: Extent of the “regulated area of a watercourse” shown in yellow around the wetland features nearest to the project site

The Risk Assessment Matrix makes provision for the identification of risks at the various phases applicable to the project (establishment and operational) and assesses these to determine the magnitude of the risk / impact to be low, medium or large. Provision is also made for pre- and post-mitigation assessment.

The results of the Risk (or Impact) Assessment Matrix are provided in Table 12-1. The full matrix is provided in Appendix B.

Table 12-1: Results of the Department of Water and Sanitation Risk Assessment Matrix

No.	Phase	Activity	Impact	Risk Rating	Control measures
Pre-mitigation	Establishment and operational	Inadequate stormwater management from the borrow pit area	(1) The changes to the runoff from the areas subjected to the earthworks may impact on the hydrological driver of the aquatic features during the establishment period which could impact on the PES of the features. (2) The removal of vegetation as a result of the earthworks may result in increased levels of silt that is washed into the aquatic features which may impact on the biota in the features. (3) The excavations that are made to open the borrow pit may decrease the amount of runoff from the borrow pit area as the water will accumulate in the excavations. This will impact the hydrological driver of the features which may impact the PES of the features. (4) Higher sediment loads washing of the stockpiles within the borrow pit site may result in an impact on the water quality in the aquatic features which will result in an impact on the PES of these features.	Low Risk	A Stormwater Management Plan must be developed before the establishment of the borrow pit can commence. This management plan must make provision for the following key principles: (1) Diversion of all stormwater runoff from above (north) the borrow pit area around the borrow pit. (2) All stormwater that accumulates in the excavated areas within the borrow pit after rainfall events must be discharged in a controlled manner into the environment. The discharge must be controlled to ensure that the pre-development runoff does not exceed the post-development runoff. (3) Provision must be made for the capturing of any silt that may wash from the material stockpile areas to ensure that the silt is not released directly into the environment. (4) No uncontrolled stormwater runoff must be allowed to the south, east and west of the borrow pit area. (5) The stormwater management plan must be submitted for approval by the Seriti Green.
Post-mitigation				Low Risk	
Pre-mitigation		Risk of hydrocarbon (fuels and oils) contamination of the aquatic features by leaking plant and equipment that will be used for the earthworks and operation of the borrow pit.	Hydrocarbons are toxic to aquatic plants and animals and are readily spread by flowing water.	Low Risk	(1) All plant and equipment that will be used in the construction activities must be inspected on a regular basis to ensure that any leaks are detected as soon as possible. (2) Any leaking plant and equipment must be removed from the construction site and only be allowed to return when the leaks have been addressed. (3) A Spill Contingency Plan must be in place for the duration of the construction phase that details the steps that needs to be taken if spills of various sizes are to occur. (4) No plant or equipment will be allowed to be parked overnight within a 40m buffer from the delineated edge of any aquatic feature.
Post-mitigation				Low Risk	

No.	Phase	Activity	Impact	Risk Rating	Control measures
Pre-mitigation		Storage of hydrocarbons on site, and the inadequate management of petrochemical storage facilities will pose a risk.	Leakages and spillages from the planned petrochemical storage facility may result in the contamination of the existing water quality in the aquatic features	Low Risk	(1) In the event that any hydrocarbon materials are to be stored within the site during the operational phase, provision must be made that the storage facility is fully bunded in a bund that has a volume of 110% of the total volume of hydrocarbons that are stored. (2) The bund must be provided with a closable drainage tap for use when fluid needs to be drained from the bund. (3) The hydrocarbon storage facility may not be located within the 35m buffer from the delineated edge of any aquatic feature. If the edge is not known during the establishment of the storage feature, this must be delineated by an aquatic specialist before implementation. (4) A Spill Contingency Plan must be in place for the construction phase that details the management and mitigation actions that needs to be undertaken in the event of any spillages from the hydrocarbon storage facility.
Post-mitigation				Low Risk	
Pre-mitigation		Risk of contamination of the aquatic features by the on-site ablution facilities.	Spillage or leakage could impact on the water quality that moves through the aquatic features, which could decrease the PES of the features.	Low Risk	(1) All portable ablution facilities that will be used on site must be located 40m away from the edge of the delineated aquatic feature. If the edge is not clearly defined, this must be done by an aquatic specialist before implementation of the ablutions can take place. (2) The portable ablution facilities must be provided with sealed wells in which the sewage is collected. (3) The servicing of these portable ablution facilities must be conducted by a registered service provider who must dispose of the material at a Municipal facility. (4) A Spill Contingency Plan must be put in place to provide the appropriate management and mitigation measures to be implemented in the event of any spillages from these ablution facilities.
Post-mitigation				Low Risk	

13 MANAGEMENT AND MITIGATION MEASURES

The management and mitigation measures as they relate to the risks associated with the aquatic features are provided in Table 12-1. These measures must be included in the Environmental Management Programme Report and Operational Management Plan for the construction and operational phases of the borrow pit.

14 MONITORING REQUIREMENTS

It is recommended that an Environmental Control Officer, who meets the requirements of the NEMA: EIA Regulations (2014) as amended, be appointed to conduct monthly audits of the establishment of the project. An audit report must be completed for each monthly audit and be submitted to the relevant authority.

15 CONCLUSION

The assessment of the DFFE Online Screening Tool has indicated that the Aquatic Theme for the project area has a sensitivity rating of “LOW”. This sensitivity rating can be confirmed as there are no aquatic features within the boundaries of the project site or within a 32m radius of the site.

The entire project site is located within the “regulated area of a watercourse” as defined by the National Water Act (Act No. 36 of 1998). The aquatic features that enact this “regulated area of a watercourse” consist of a Channelled Valley Bottom wetland approximately 55m to the south, a Flood Plain wetland approximately 300m to the west and southwest and a Seep wetland approximately 250m to the east of the project site boundaries. All the watercourses that have been identified in the vicinity of the project site are in excess of 100m from the boundary of the site. The Heilvleispruit channel is approximately 180m to the south of the site, the Kwaggalaagte River approximately 300m to the west and the small unnamed tributary approximately 260m to the east.

The PES of all the wetland areas were classified to be Class C features, which indicates a moderate modification of the features which impacts on their ecosystem service delivery. The habitat within these features is relatively intact and will stay in the same state in the absence of any interventions. The EIS of the features are classified to be of medium (Channelled Valley Bottom and Flood Plain wetlands) and low (Seep wetland) significance and is aligned with the Class C PES.

The potential risks/impacts related to the establishment and operation of the borrow pit are primarily associated with the management of any stormwater runoff from the borrow pit site and as such, the requirement for a Stormwater Management Plan ensuring stormwater separation and control must be put in place. If these risk/impacts are managed appropriately, the risk of the project impacting on the current PES, EIS and ecosystem service status of the features has been determined to be “LOW” risk in accordance with the Department of Water and Sanitation Risk Assessment Matrix as updated in December 2023.

Based on the findings of the assessment, it is the opinion of the specialist that there is no fatal flaw linked to the aquatic features assessed that will prevent the project from being approved. In addition, with the implementation of the control measures (management and mitigation) into the Environmental Management Program Report and Operational Management Plan, any threat that the development may pose to the aquatic environment is nullified.

16 REFERENCES

Department of Water and Sanitation Report – Wetland and riparian habitat delineation document;

Department of Water and Sanitation Report – Risk Assessment Protocol and associated Matrix;

MUCINA, L. and RUTHERFORD, M.C. (eds.), 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia Publishers.

South African National Biodiversity Institute – Wetland buffer guideline document;

South African National Biodiversity Institute – Classification System for Wetlands and other Aquatic Ecosystems in South Africa (Ollis *et al.*, 2013)

Water Research Commission Report TT659/16 – High Risk Wetland Atlas;

Water Research Commission Report TT339/08 – WET-EcoServices a technique for rapidly assessing ecosystem services supplied by wetlands; and

Water Research Commission Report TT340/08 – WET-Health a technique for rapidly assessing wetland health.

APPENDIX A
SPECIALIST CURRICULUM VITAE

Magnus van Rooyen

Technical Director - Environment

CORE SKILLS

- Environmental Impact Assessment
- Specialist Ecological (Terrestrial and Aquatic) Assessment
- Environmental Screening Assessment
- Due Diligence Assessment and Feasibility Studies
- Mining Applications
- Environmental Management Programmes and Plans
- Strategic Environmental Assessments
- Wildlife Management Plans

DETAILS

Qualifications

- MPil. Environmental Management
- BSc (Hon) Botany
- BSc (Botany and Zoology)
- Post Graduate Certificate in Education (Science and Biology)

Memberships

- South African Council for Natural Scientific Professions (Pr. Sci. Nat. 400335/11)
- International Association of Impact Assessors (Ref No. 1839)

Languages

- Afrikaans - fluent
- English - fluent
- German - fair
- Zulu - communication

Countries worked in:

South Africa, Namibia, Lesotho, Mozambique, Botswana, Guinea, Liberia, United States, United Kingdom

PROFILE

Mr van Rooyen is currently a Technical Director – Environment and the Branch Manager of the KwaZulu-Natal Office of GCS in Durban.

In addition to holding a Masters degree in Environmental Management, he also holds a BSc degree in Botany and Zoology, an Honors degree in Botany and a Post Graduate Certificate in Education. He has in excess of 18 years' experience in the environmental consulting field through conducting and managing Environmental Impact Assessments, Specialist Terrestrial and Aquatic Ecology Assessments and Strategic Environmental Management inputs into various project feasibility studies.

Through these services, he has been exposed to projects in a range of sectors which include the general public infrastructure sector (national and provincial roads, harbour and rail developments, water (dams and supply) and wastewater (treatment works and reticulation), private infrastructure sector (small and large scale housing developments, lodges, private dams, etc.), agricultural sector (dams, establishment of orchards, plantations and feedlots), mining sector (coal mines, gold mine, manganese mines, aggregates and associated mining infrastructure) and the industrial sector (light and heavy industrial infrastructure development).

In addition, Mr van Rooyen has extensive experience in conducting specialist terrestrial and aquatic ecological assessments for various infrastructure (roads, dams, ports) and industrial (smelters, power plants) development projects in a number of diverse ecosystems across Africa. He has experience in the compilation of Resettlement Policy Framework Plans, Due Diligence Assessments and Feasibility Studies associated with infrastructure development projects. Mr van Rooyen has experience in working on various private and public sectors as well as rural and urban environments in various countries

Previous Experience

Client	Project Description	Role/ Responsibility
Private client	**Wetland Assessment for the farm dam on the Farm Compentation near Matatiele** Undertaking of the wetland assessment for the development of an irrigation dam on the Farm Compensation near Matatiele in KwaZulu-Natal.	Wetland Specialist
Senekal Boerdery	**Wetland and Biodiversity Assessment for the Mkuze Township Establsishment** Undertaking of the wetland and biodiversity assessment associated with the township establishment in the town of Mkuze, KwaZulu-Natal.	Wetland and Biodiversity Specialist
WSP Consulting	**Wetland Assessment associated with the establishment of a flood protection berm at the SAPPI Saiccor Mill** Undertaking of the wetland assessment for the construciton of a flood protection berm between the uMkomaas River and the SAPPI Saiccor Mill in KwaZulu-Natal.	Wetland Specialist
Transnet National Ports Authority	**Forest mapping within the Port of Richards Bay** Undertaking of the mapping and classification of all the indigenous forest areas withini the Port of Richards Bay, KwaZulu-Natal.	Biodiverstiy Specialist
RHDHV	**KwaMathanya Water Supply Scheme Wetland Assessment** Undertaking of the wetland assessment of the KwaMathanya water supply scheme near town of Ixopo in KwaZulu-Natal.	Wetland Specialist
Private client	**Brownsdrift Hydropedological Assessment** Undertaking of the wetland and hydropedological assessment associated with the proposed residential developmnet on the site in Browndrift, eThekwini Municipality, KwaZulu-Natal.	Wetland Specialist
GreenScene Environmental	**Wetland and Biodiversity Assessment for a residential property in Pumula** Undertaking of the wetland and biodiversity assessment for the residential development on Lot 967 Pumula, KwaZulu-Natal.	Wetland and Biodiversity Specialist
GreenScene Environmental	**Wetland and Biodiversity Assessment for Lot 962 and 965 Port Edward** Undertaking of the wetland and biodiversity assessment for the residential development on Lot 962 and 965 Port Edward, KwaZulu-Natal.	Wetland and Biodiversity Specialist
Msunduzi Municipality	**Wetland and Biodiversity Assessment for various Military Veterans Housing sites within the Msuduzi Municipality** Undertaking of the wetland and biodiversity assessment for the various sites earmarked for the establishment of residential houses for the Military Veterans in the Msunduzi Municipality, KwaZulu-Natal.	Wetland and Biodiversity Specialist
Private client	**Forest delineation of a private property in Munster** Undertaking of the delineation of the forest margins on the residential property in Munster, KwaZulu-Natal.	Biodiverstiy Specialist

Previous Experience

Client	Project Description	Role/ Responsibility
JG Afrika (Pty) Ltd	**Gunyana Water Supply Scheme Wetland and Biodiviersity Assessment** Undertaking of the wetland and biodiverstiy assessment of the Gunyana community water supply scheme near town of Pomeroy in KwaZulu-Natal.	Wetland and Biodiversity Specialist
GreenScene Environmental	**Wetland and Vegetation Assessment associated with the construction of the Ingwebaba Pedestrian Bridge near Shelly Beach** Undertaking of the wetland and vegetaiton assessment for the construction of the Ingwebaba Pedestrian Bridge near Shelly Beach in KwaZulu-Natal.	Wetland and Biodiversity Specialist
Terratest (Pty) Ltd	**Wetland and Vegetation Assessment associated with the construction of the KwaHlokohloko Rural Water Supply Scheme near Eshowe** Undertaking of the wetland and biodiverstiy assessment of the KwaHlokoloko community water supply scheme near town of Eshowe in KwaZulu-Natal.	Wetland and Biodiversity Specialist
Coastal Macadamias	**Wetland Assessment associated with the development of an irrigation dam for Coastal Macadamias near Ramsgate** Undertaking of the wetland assessment for the development of an irrigation dam for the Coastal Macadamias property near Ramsgate, KwaZulu-Natal.	Wetland Specialist
South African National Roads Agency Limited	**Ballito to Tinley Manor Wetland and Biodiveristy Assessment** Undertaking of the wetland and biodiversity study to support the preliminary design for the upgrade of the N3 between Ballito and Tinley Manor.	Wetland and Biodiversity Specialist
Vale Limitada	**Biodiversity Assessment for the alternative water supply pipeline** Undertaking of the biodiversity assessment to suport the preliminary design of the proposed alternative water supply pipeline at the Moatize Mine in Tete, Mozambique.	Biodiversity Specialist
GIB Consulting Engineers	**Aquadene Wetland Assessment** Undertaking of the wetland assessment for the Aquadene housing development in Richards Bay.	Wetland Specialist
JG Afrika (Pty) Ltd	**Wetland Assessment for the pipeline route for the drought relief pipeline in Laingsburg** Undertakaing of the wetland assessment assocaited with the 25km pipeline route from the watersource to the town of Laingsburg in the Western Cape.	Wetland Specialist
Seche International	**Wetland and Biodiversity Assessment for the proposed new uMgungundlovu Landfill Site** Preliminary wetland and biodiversity assessment for the proposed new uMgungundlovu Landfill site outside of Pietermaritzburgg.	Wetland and Biodiversity Specialist
South African National Roads Agency Limited	**Wetland and Vegetation Assessment associated with the upgrading of the N1 between Heuningspruit and Koppies** Undertaking of the wetland and biodiversity assessment for the upgrading of the N1 between Heuningspruit and Koppies in the Freestate Province.	Wetland and Biodiversity Specialist

Previous Experience

Client	Project Description	Role/ Responsibility
Terratest (Pty) Ltd	**Wetland and Vegetation Assessment associated with the upgrading of the Nelson Mandelar Museum at Qunun** Undertaking of the wetland and vegetation assessment associated with the upgrading of the Nelson Mandela Museum in Qunu in the Eastern Cape Province.	Wetland and Biodiversity Specialist
GreenScene Environmental	**Wetland and Vegetation Assessment associated with the construction of the Ulundi Water Supply Scheme** Undertaking of the wetland and biodiverstiy assessment of the Ulundi water supply scheme near town of Eshowe in KwaZulu-Natal.	Wetland and Biodiversity Specialist
MOZAL	**Biodiversity Assessment for the raw water supply pipeline for the Mozal Aluminium Smelter in Mozambique** Undertkaing of the biodiversity assessment for the raw water supply pipeline from the desalination plant in the Port of Matola to the MOZAL smelter int Boane, Maputo, Mozambique.	Biodiversity Specialist
JG Afrika (Pty) Ltd	**Wetland and Biodiveristy Assessment for various water supply schemes in the Cedarberg Municpality** Undertaking of the wetland and biodiversity assessments for the water supplys schemes for the town of Whupperthal, Clanwilliam and Citrusdal in the Western Cape.	Biodiversity Specialist
uKhozi Environmentalists	**Phalanndwa Coal Mine Biodiversity and Wetland Assessment** Undertaking the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the Phalanndwa Coal Mine Expansion near Delmas.	Wetland and Biodiversity Specialist
Kongiwe Environmental Consultants	**Lephalale Coal Mine Biodiversity and Wetland Assessment** Undertaking the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the Lephalale Coal Mine near Lephalale.	Wetland and Biodiversity Specialist
Nzingwe Consultancy	**Riversdale Coal Mine Wetland Assessment** Undertaking the wetland specialist study in support of the Application for Environmental Authorisation and the Water Use Licence Application for the Riversdale Coal Mine near Vryheid.	Wetland Specialist
WSP Environmental	**SAPPI Saiccor Wetland Assessment** Undertaking the wetland specialist study in support of the Application for Environmental Authorisation for the construction of flood protection	Wetland Specialist

Client	Project Description	Role/ Responsibility
	measures associated with the SAPPI Saiccor Mill, uMkomaas.	
WSP Environmental	**11th Avenue Interchange Wetland Assessment** Undertaking the wetland specialist study in support of the Application for Environmental Authorisation for the construction of the 11th Avenue Interchange, Durban	Wetland Specialist
WSP Environmental	**SAPPI Saiccor Alien Invasive Plant – Risk Assessment** Undertaking of the risk assessment of the presence of various listed category I and II alien invasive plant species on the SAPPI Saiccor Mill site, uMkomaas.	Vegetation Specialist
Environmental Resources Management	**Bhangazi Community Tented Camp Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the establishment of the Bhangazi Community Tented Camp in the isiMangoliso Wetland Park, St. Lucia.	Wetland and Biodiversity Specialist
South African National Roads Agency Limited	**N3 – Market Road Interchange Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the upgrading of the N3 – Market Road Interchange, Pietermaritzburg.	Wetland and Biodiversity Specialist
ESKOM SOC	**ESKOM 22 kVA Lines Vegetation Assessments** Undertaking of vegetation assessments for the establishment of various 22kVA electrification lines in KwaZulu-Natal.	Vegetation Specialist
ESKOM SOC	**Tombo to Mafini 300kVA Line Vegetation Assessments** Undertaking of vegetation assessment for the route alignment of the 300kVA high voltage electricity line from the Tombo Substation to Mafini, Port St. Johns.	Vegetation Specialist
Element Consulting Engineers	**Port St. Johns Water Treatment Works Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the establishment of the Port St. Johns Water Treatment Works, Port St. Johns.	Wetland and Biodiversity Specialist
South African National Roads Agency Limited	**N2 – uMgeni Road Interchange Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the upgrading of the	Wetland and Biodiversity Specialist

Client	Project Description	Role/ Responsibility
	N2 – uMgeni Road Interchange, Durban.	
South African National Roads Agency Limited	**N2 – Mt Edgecombe Interchange Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the upgrading of the N2 – Mt Edgecombe Interchange, Durban.	Wetland and Biodiversity Specialist
Afrimat	**Ladysmith Quarry Wetland and Biodiversity Assessment** Undertaking the wetland and biodiversity specialist study in support of the Mining Right Application for the establishment of the Afrimat Quarry, Ladysmith.	Wetland and Biodiversity Specialist
South African National Roads Agency Limited	**N3 – Epworth Road Interchange Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the upgrading of the N3 – Epworth Road Interchange, Pietermaritzburg	Wetland and Biodiversity Specialist
Millennium Challenge Account - Mozambique	**Nacala Dam rehabilitation Biodiversity Assessment** Undertaking of the biodiversity specialist study in support of the Application for an Environmental Permit for the rehabilitation and raising of the Nacala Dam, Mozambique.	Biodiversity Specialist
WSP Environmental	**SAPPI Ngodwana Mill Expansion Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the expansion of the Ngodwana Mill, Waterval Boven.	Wetland and Biodiversity Specialist
South African National Roads Agency Limited	**N3 – Chota Motala Road Interchange Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the upgrading of the N3 – Chota Motala Road Interchange, Pietermaritzburg.	Wetland and Biodiversity Specialist
South African National Roads Agency Limited	**R30 Glen Lyon to Brandfort Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the upgrading of the R30 between Glen Lyon and Brandfort.	Wetland and Biodiversity Specialist
South African National Roads Agency Limited	**R30 Virginia to Beatrix Mine Wetland and Biodiversity Assessment** Undertaking of the wetland and biodiversity specialist study in support of the Application for Environmental Authorisation for the upgrading of the R30 between Virginia and Beatrix Mine.	Wetland and Biodiversity Specialist

Previous Experience

Client	Project Description	Role/ Responsibility
Miranda Minerals	**Sesikhona Colliery Wetland and Biodiversity Assessment** Undertaking the wetland and biodiversity specialist study in support of the Mining Right Application for the establishment of the Sesikhona Colliery, Dannhauser.	Wetland and Biodiversity Specialist
Miranda Minerals	**Uithoek Colliery Wetland and Biodiversity Assessment** Undertaking the wetland and biodiversity specialist study in support of the Mining Right Application for the establishment of the Uithoek Colliery, Dundee.	Wetland and Biodiversity Specialist
Miranda Minerals	**Burnside Colliery Wetland and Biodiversity Assessment** Undertaking the wetland and biodiversity specialist study in support of the Mining Right Application for the establishment of the Burnside Colliery, Dundee.	Wetland and Biodiversity Specialist
Ultimate Goal	**Ultimate Goal Colliery Biodiversity Assessment** Undertaking the wetland and biodiversity specialist study in support of the Mining Right Application for the establishment of the Ultimate Goal Colliery, Dundee.	Biodiversity Specialist
Canton Trading	**Taylors Halt Quarry Wetland and Biodiversity Assessment** Undertaking the wetland and biodiversity specialist study in support of the Mining Right Application for the establishment of the Taylor Halt Quarry, Pietermaritzburg.	Wetland and Biodiversity Specialist
South African National Roads Agency Limited	**uMtamvuna Quarry Biodiversity Assessment** Undertaking the biodiversity specialist study in support of the Mining Right Application for the establishment of the SANRAL Quarry, Kokstad.	Biodiversity Specialist

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Magnus van Rooyen

Registration Number: 400335/11

is a registered 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 1 of the Act)

Environmental Science (Professional Natural Scientist)

Effective **31 August 2011** Expires **31 March 2024**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

APPENDIX B
FULL DWS RISK ASSESSMENT

PROJECT: **Ummbila Emoyeni Borrow Pit**

RISK ASSESSMENT MATRIX for Section 21 (c) and (i) Water Use activities - Version 2.1

Name of Assessor: Magnus van Rooyen

SACNASP Registration Number: 400335/11

Date of assessment: Aug-24

Signature: 

Risk to be scored for all relevant phases of the project (**factoring in specified control measures**). MUST BE COMPLETED BY SACNASP PROFESSIONAL MEMBER REGISTERED IN AN APPROPRIATE FIELD OF EXPERTISE.

No.	Phase	Activity	Impact	Potentially affected watercourses			Intensity of Impact on Resource Quality					Overall Intensity (max = 10)	Spatial scale (max = 5)	Duration (max = 5)	Severity (max = 20)	Importance rating (max = 5)	Consequence (max = 100)	Likelihood (Probability) of impact	Significance (max = 100)	Risk Rating
				Name/s	PES	Overall Watercourse Importance	Abiotic Habitat (Drivers)			Biota (Responses)										
							Hydrology	Water Quality	Geomorph	Vegetation	Fauna									
Pre-mitigation	Establishment and operational	Inadequate stormwater management form the borrow pit area	(1) The changes to the runoff from the areas subjected to the earthworks may impact on the hydrological driver of the aquatic features during the establishment period which could impact on the PES of the features. (2) The removal of vegetation as a result of the earthworks may result in increased levels of silt that is washed into the aquatic features which may impact on the biota in the features. (3) The excavations that are made to open the borrow pit may decrease the amount of runoff from the borrow pit area as the water will accumalate in the excavations. This will impact the hydrological driver of the features which may impact the PES of the features. (4) Higher sediment loads washing of the stockpiles within the borrow pit site may result in an impact on the water quality in the aquatic features which will result in an impact on the PES of these	Channelled Valley Bottom, Flood Plain, Seep and Watercourses	C	Moderate	2	2	2	2	2	**4**	3	2	**9**	**3**	**27**	40%	**10.8**	**L**
Post-mitigation				Channelled Valley Bottom, Flood Plain, Seep and Watercourses	C	Moderate	2	2	2	2	2	**4**	3	2	**9**	**3**	**27**	40%	**10.8**	**L**
Pre-mitigation		Risk of hydrocarbon (fuels and oils) contamination of the aquatic features by leaking plant and equipment that will be used for the earthworks and operation of the borrow pit.	Hydrocarbons are toxic to aquatic plants and animals and are readily spread by flowing water.	Channelled Valley Bottom, Flood Plain, Seep and Watercourses	C	Moderate	2	2	2	2	2	**4**	3	2	**9**	**3**	**27**	40%	**10.8**	**L**
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Pre-mitigation		Inadequate management of petrochemical storage facilities	Leakages and spillages from the planned petrochemical storage facility may result in the contamination of the existing water quality in the aquatic features	Channelled Valley Bottom, Flood Plain, Seep and Watercourses	C	Moderate	2	2	2	2	2	**4**	3	2	**9**	**3**	**27**	40%	**10.8**	**L**
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Pre-mitigation		Risk of contamination of the aquatic features by the on-site ablution facilities.	Spillage or leakage could impact on the water quality that moves through the aquatic features, which could decrease the PES of the features.	Channelled Valley Bottom, Flood Plain, Seep and Watercourses	C	Moderate	2	2	2	2	2	**4**	3	2	**9**	**3**	**27**	40%	**10.8**	**L**
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Pre-mitigation		Risk of increasing sediment loads within the aquatic features as a result of runoff from the material stockpiles within the borrow pit site.	Higher sediment loads could impact on the aquatic biodata in the aquatic features which can further reduce the PES of these features.	Channelled Valley Bottom, Flood Plain, Seep and Watercourses	C	Moderate	2	2	2	2	2	**4**	3	2	**9**	**3**	**27**	40%	**10.8**	**L**
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APPENDIX C: RISK ASSESSMENT MATRIX

PROJECT: **Ummbila Emoyeni Borrow Pit**

RISK ASSESSMENT MATRIX for Section 21 (c) and (i) Water Use activities - Version 2.1

Name of Assessor: Magnus van Rooyen

SACNASP Registration Number: 400335/11

Date of assessment: Aug-24

Signature: 

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APPENDIX D: HYDROPEDOLOGY ASSESSMENT

www.eco-assist.co.za
info@eco-assist.co.za

HYDROPEDOLOGICAL IMPACT ASSESSMENT FOR THE WATER USE LICENCE APPLICATION FOR THE UMMBILA EMOYENI BORROW PIT, MPUMALANGA

Date
28 July 2025

Client

GCS Environment (Pty) Ltd

SPECIALIST ASSESSMENT DETAILS & DECLARATION OF INDEPENDENCE

Document Title	**HYDROPEDOLOGICAL IMPACT ASSESSMENT FOR THE WATER USE LICENCE APPLICATION FOR THE UMMBILA EMOYENI BORROW PIT, MPUMALANGA**	
Report No.	**W220**	
Version	**V3**	
Date	**28 July 2025**	
Report Completed By	**Wayne Jackson** *SACNASP. (Registration 119037)*	
Client	**GCS Environment (Pty) Ltd**	
Fieldwork and Report Writing	**Wayne Jackson**	

I, Wayne Jackson, hereby declare that this report has been prepared independently of any influence or prejudice as may be specified by the Department of Environmental Affairs.

Wayne Jackson

Soils & Wetland Specialist

Eco-Assist

28th July 2025

Specialist Details

Specialist	Role	Details
Wayne Jackson *SACNASP (Registration 119037)*	**Field work and author (Soils)**	Wayne Jackson graduated from the University of KwaZulu-Natal, Pietermaritzburg, with a BSc. degree in Soil Science & Hydrology. Wayne has 15 years' experience in Wetlands & Soils Scientist with a demonstrated history of working in the environmental services industry. He is skilled in Soil Classification, Wetlands, Hydropedology, and Surface Water Hydrology. He has a strong environmental mitigation and rehabilitation knowledge. He has also gained experience in large post-mining rehabilitation projects, providing specialist inputs on land capability and soil utilisation. He has extensive exposure to a wide range of projects in many sectors across South Africa, and parts of Africa. He is knowledgeable on how soils, wetlands, and hydrological systems are linked in the landscape and how activities could impact all these aspects. Wayne is a registered Natural Scientist with the South African Council for Natural Scientific Professionals (SACNASP) – Registration No. 119037.

The relevant experience of specialist team members involved in the compilation of this report are briefly summarised above. Curriculum Vitae of the specialist team are available on request.

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Table of Abbreviations

DEM	Digital Elevation Model
EIA	Environmental Impact Assessment
ET	Rate of Evaporation
GPS	Global Position Satellite
masl	metres above sea level
mm	Millimetres
sp	Soft Plinthic
T1	Transect 1

Table of Units of Measure

mm	Millimetres
m	Metres
masl	Metres Above Sea Level

Executive Summary

Eco-Assist Environmental Consultants were appointed by GCS Environment (Pty) Ltd to conduct a Hydropedology Assessment study in support of a Water Use Licence Application for the Ummbila Emoyeni Borrow Pit.

The site is located alongside the R35 in the Lekwa Local Municipality of the Gert Sibande District Municipality in Mpumalanga.

The following soil forms were identified on-site;

- Mispah (Orthic A-horizon over Hard Rock);
- Glenrosa (Orthic A-horizon over a Lithic horizon);
- Tukulu (Orthic A-horizon over a Neocutanic B-horizon, over a Soft Plinthic horizon); and
- Hydromorphic (Wetland soils in valley bottom).

The hillslope catenae from the top of the catchment right down to the valley bottoms have a general convex shape. The crest landscape position is relatively flat with water accumulating and slowly moving along the bedrock interface. These soils were the Tukulu soil form and classified as interflow (soil/bedrock). The soils become shallower and fractured once we reach the edge of the scarp. These soils were the Mispah and Glenrosa soil forms. These were classified as responsive (shallow). The footslope and valley bottom soils were hydromorphic in nature and were classified as responsive (saturated). Water moves along the soil/bedrock interface and emerges in the responsive (saturated) class.

The crest landscape positions were dominated by interflow and shallow responsive. The valley bottoms were found to be wet with Katspruit or Dundee soils. These soils indicate saturated responsive hydropedological zones. This is as a result of the flattening of the slope and the accumulation of water from the landscape into the lower landscape zones.

The Borrow Pit construction and operation takes place on two hydropedological soil units. These include shallow responsive and the interflow (soil/bedrock) zones. The impacts were assessed by activity as each activity will have a varied impact on the hydropedological flow drivers either in impact type or impact magnitude.

1. Borrow Pit excavation and operation.

The activities impact on the small portion of interflow which will have little to no impact on the overall hydropedological functioning of the landscape. The shallow responsive zones will also not be impacted as the Borrow Pit will have a similar hydrological response as the shallow response soils. The Borrow Pit creates a large area of impervious surfaces which promote runoff. This increases peak flows of storm events as well as discharge volumes into a concentrated area potentially increasing erosion risk. The quantity of water that would previously have potentially infiltrated into the landscape is now redirected on the surface to specified storm water discharge points.

The responsive zone impacts are associated with increased flow velocity and flow volume from the runoff created by the activity's upslope.

The overall impacts are considered Neutral to Low from a hydropedological perspective.

The following recommendations have been made to minimise threats to sensitive receptors (subsurface flow paths) and wetland functioning;

- A buffer of 40m around the edge of the wetland systems is recommended. This buffer must be in place for the duration of the operational phase of the Borrow Pit (EcoLink Consulting, 2024).

The impacts to the flow drivers include the increased runoff from the Borrow Pit upslope within the interflow and shallow responsive zones. These stem from the increased impervious surfaces which promote runoff from the impervious surfaces.

It is the opinion of the Specialist that the proposed Borrow Pit may proceed, this is based on the above recommendations and mitigation measures.

1 INTRODUCTION

Eco-Assist Environmental Consultants (here after Eco-Assist) were appointed by GCS Environment (Pty) Ltd to conduct a Hydropedology Assessment study in support of a Water Use Licence Application for the Ummbila Emoyeni Borrow Pit.

Of key importance is the impact of the proposed development on wetlands flow drivers that feed them. Any impacts and subsequent risks need to be identified to allow for mitigation measures to be put in place.

It is understood that the Hydropedology Assessment will be submitted in support of a Water Use Licence Application in accordance with the requirements of the National Water Act, 1998 (Act No. 36 of 1998).

1.1 Project Location

The site is located alongside the R35 in the Lekwa Local Municipality of the Gert Sibande District Municipality in Mpumalanga (Figure 1-1). The project footprint is shown in Figure 1-2.

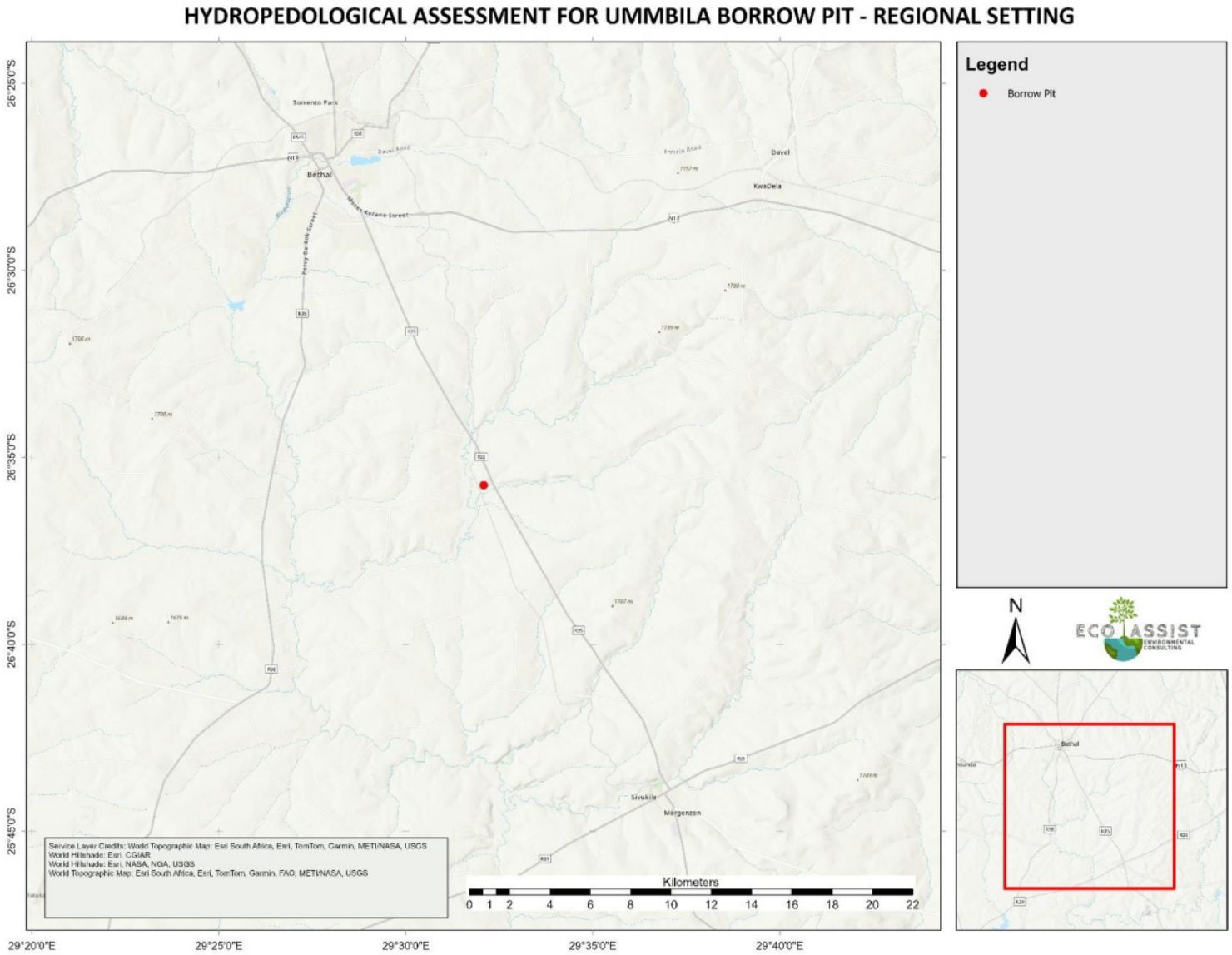

Figure 1-1: Local setting of the study.

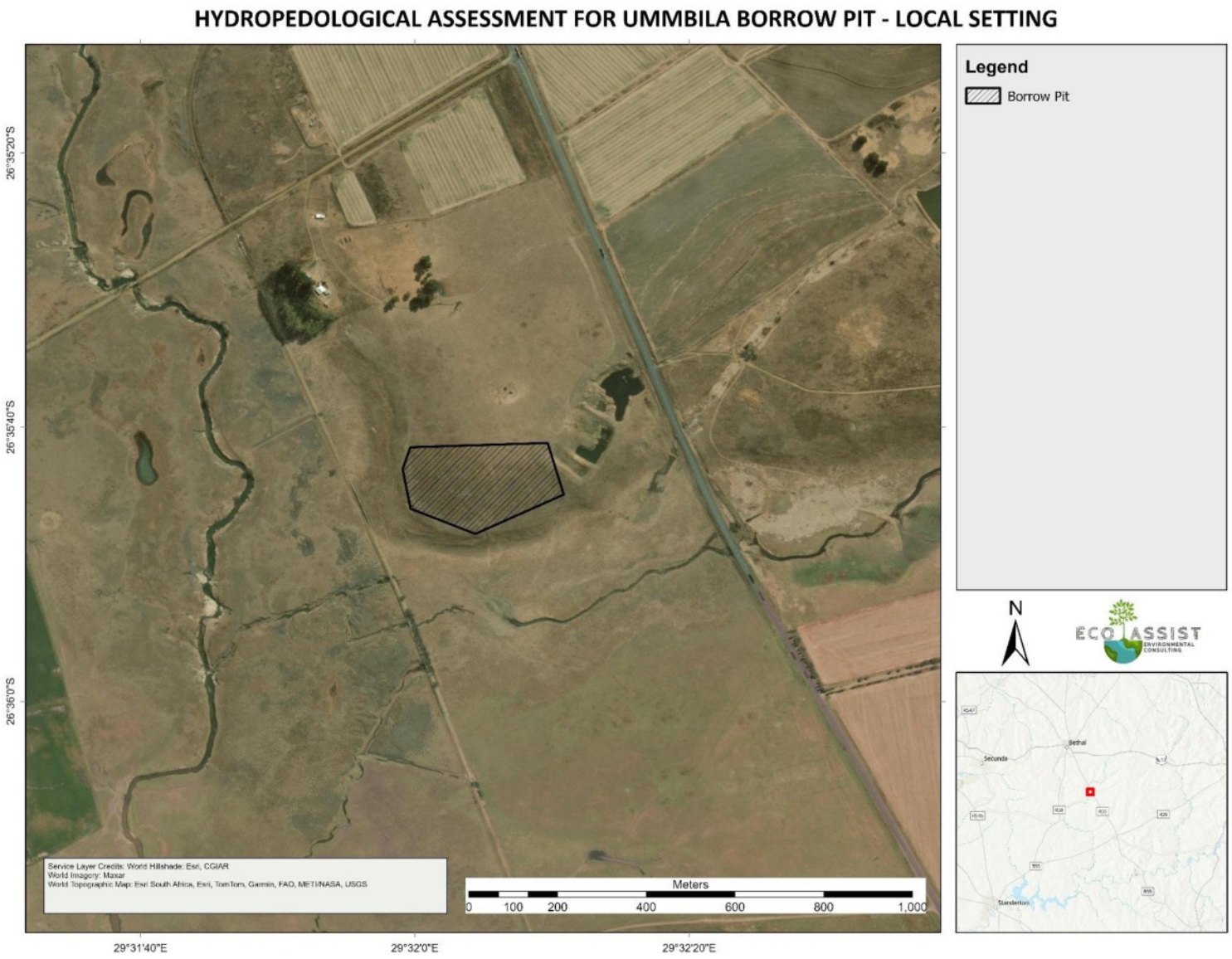

Figure 1-2: Project layout

2 TERMS OF REFERENCE

Step 1: Identification of the representative hillslope/s.

- Identify land types (Land Type Survey Staff, 1972 - 2006) within the study area.
- Identify dominant hillslopes (from crest to stream) of the study area using terrain analysis.
    - There should be at least one hillslope in each land type of the study area.
- Hillslopes should be representative of the topography (e.g. slope, aspect and curvature) and land types.
    - For example, where the site is divided by a stream, a representative hillslope should be identified on both sides of the stream.

Step 2: Conceptualise hillslope Hydropedological responses.

Transect survey:

- Transect soil survey should be conducted on each of the identified hillslope.
- Soil observations should be made at regular intervals, not exceeding 100 metres (m), on the transect.
- Observation depth should be until refusal. Where the soil depth exceeds 2 metres, auger observations must be made in the bottom of the pit in order to describe soil/saprolite/bedrock transition.

Soil description and classification

- Soils should be described and classified in accordance with the South African Soil Classification system up to family level (Soil Classification Working Group, 2018).
- The following morphological properties should be described:
    - Thickness of horizons;
    - Structure (size, grade, type);
    - Estimated texture;
    - Matrix Munsell colour (moist and dry);
    - Mottles (colour, size, frequency, prominence and type);
    - Concretions (colour, size, frequency, prominence and type);
    - Precipitation of carbonates, gypsum or salts;
    - Roots (abundance);
    - Macropores (frequency and size); and
    - Nature of transition between horizons/bedrock/saprolite.
- Profile should then be regrouped into one of the seven hydropedological groups (Hydropedological grouping of South African soil forms, 2019).

Conceptual hillslope hydropedological response

- The occurrence, sequence and coverage of the different hydropedological groups on a transect must then be used to describe the hydrological behaviour of the hillslope.

- This will include a graphical representation of the dominant and sub-dominant flowpaths at hillslope scale prior to development. This will include:
    - Overland flow;
    - Subsurface lateral flow;
    - Bedrock flow;
    - Return flow; and
    - Storage mechanisms.
- The impact of the proposed development on the hydropedological behaviour should also be graphically presented. This should typically include the location of the development on the hillslope and the anticipated impact of the development on water flows.

3 KEY LEGISLATION

Relevant environmental legislation pertaining to the protection and use of water resources in South Africa has been included in Table 3-1.

Table 3-1: Relevant Legislation.

Legislation	Description of relevant portions
The National Water Act 36 of 1998.	This Act imposes 'duty of care' on all landowners, to ensure that water resources are not polluted. The following Clause in terms of the National Water Act is applicable in this case: **19 (1)** *"An owner of land, a person in control of land or a person who occupies or uses the land on which (a) any activity or process is or was performed or undertaken; which causes, has caused or likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring"* Chapter 4 of the National Water Act is of particular relevance to wetlands and addresses the use of water and stipulates the various types of Licenced and unlicensed entitlements to the use water. Water use is defined very broadly in the Act and effectively requires that any activities with a potential impact on wetlands (within a distance of 500m upstream or downstream of a wetland) be authorised.
General Authorisations (GAs).	These have been promulgated under the National Water Act and were published under Government Notice Regulations (GNR) 398 of 26 March 2004. Any uses of water which do not meet the requirements of Schedule 1 or the GAs, require a Licence which should be obtained from the Department of Water and Sanitation.
Environmental Impact Assessment (EIA) Regulations.	New regulations have been promulgated in terms of Chapter 5 of National Environmental Management Act (NEMA) and were published on 4 December 2014 in Government Notice No. R. 32828. In addition, listing notices (GN 983-985) lists activities which are subject to an environmental assessment.
National Environmental Management Act 107 of 1998.	This is a fundamentally important piece of legislation and effectively promotes sustainable development and entrenches principles such as the 'precautionary approach', 'polluter pays', and requires responsibility for impacts to be taken throughout the life cycle of a project.
South African Constitution 108 of 1996.	This includes the right to have the environment protected through legislative or other means.
National Environmental Management: Biodiversity Act No. 10 of 2004.	The intention of this Act is to protect species and ecosystems and promote the sustainable use of indigenous biological resources. It addresses aspects such as protection of threatened ecosystems and imposes a duty of care relating to listed invasive alien plants.

4 METHODOLOGY

4.1 Desktop Assessment

The following data layers were assessed to determine whether the development could have an impact on important national & provincial feature:

- Aerial imagery (Google Earth™);
- Land Type Data (Land Type Survey Staff, 1972 - 2006);
- Topographical data; and
- Contour data (5 m).

4.2 Literature Review

The literature review lists and discusses other sources of information including previous assessments conducted on the project area (if available).

Hydropedological Flow Paths

Given that hydropedology is a relatively new field, a short literature review has been added on this interdisciplinary research field. This literature is an excerpt from (Van Tol, et al., 2017).

Soil physical properties and hydrology play significant roles in the fundamentals of hydropedology. Physical properties including porosity, hydraulic conductivity, infiltration etc. determine micro preferential flow paths through a soil profile. The hydrology in turn is responsible for the formation of various morphological processes in soil, including mottling, colouration, and the accumulation of carbonate.

These processes are used to construct models illustrating subsurface flow paths, storage, and interconnection between these flow paths. Hydropedology can therefore be used for a variety of functions. These functions include process-based modelling, digital soil mapping, pollution control management, impact of land use change on water resources, wetland protection, characterising ground, and subsurface flows as well as wetland protection and rehabilitation, of which the latter will be the focus during this report (Figure 4-1). The latter mentioned enables effective water resource management regarding wetlands and subsurface flows in general.

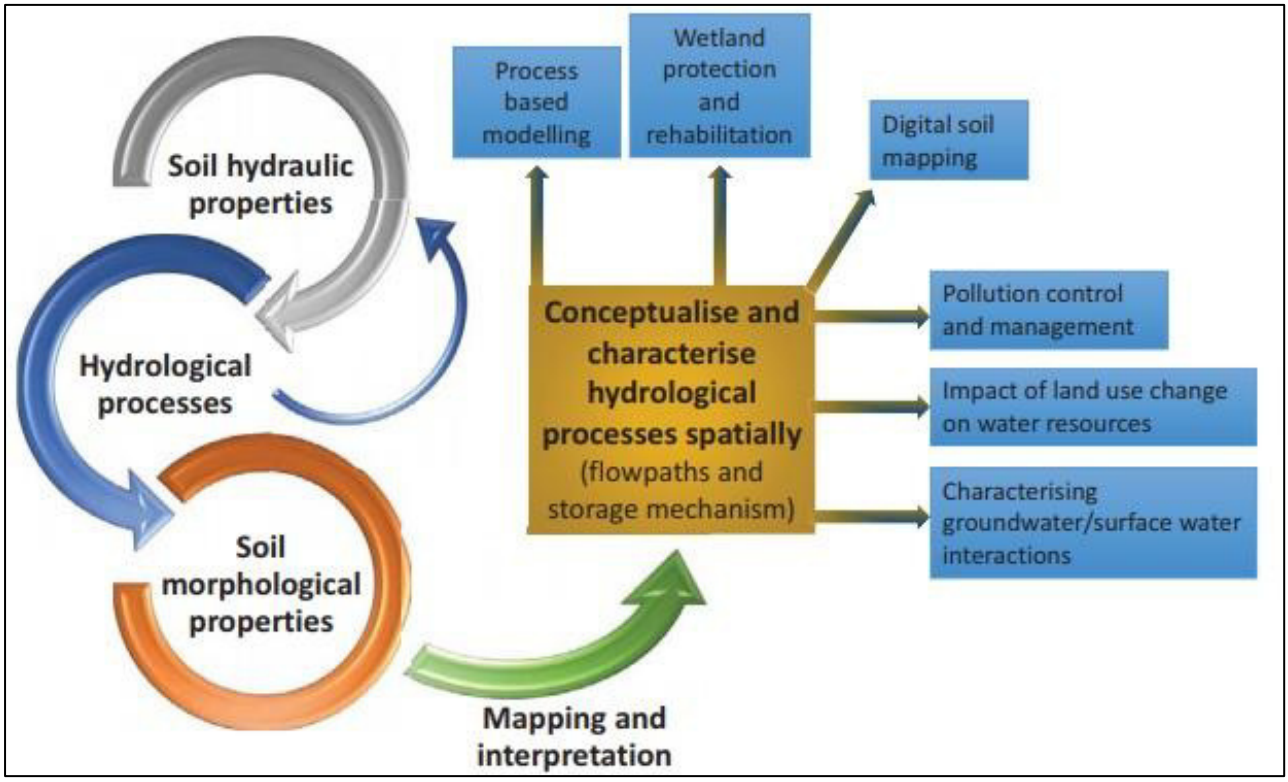

Figure 4-1: Illustration of the interactive nature of hydropedology and its potential applications (Van Tol, et al., 2017).

As can be seen in Figure 4-2, the hydropedological behaviour of soil types can differ significantly. Figure 4-2 (a) illustrates a typical red coloured soil (top and sub-soil). This soil type will typically have a vertical flow path throughput the soil profile. Water will therefore infiltrate the topsoil and freely drain into the profile to such an extent that the water rapidly reaches the bedrock. After reaching this layer, water will penetrate the ground water source or be transported horizontally towards lower laying areas. This soil type is known as a recharge soil, given its ability to recharge ground and surface water sources.

Figure 4-2 (b) illustrates interflow soils. Lateral flows are dominant in this soil type and occurs due to differences in the hydraulic conductivity of soil horizons. The Soft Plinthic (sp) soil horizon restricts vertical movement and promotes lateral flows at the A/B interface. The lighter colour in this profile indicates leaching which is caused by lateral flows which often occurs on top of a bedrock layer due to the impermeable nature thereof. Mottles often occur above this impermeable layer due to fluctuating water levels, refer to the magnified illustration in Figure 4-2 (b-i).

Figure 4-2 (c) illustrates responsive soils. This hydropedological soil type is characterised (in this case) by a dark topsoil and a grey coloured sub-soil. Other indicators include mottling and gleying. These soil types are saturated for very long periods. Therefore, rainfall is unlikely to infiltrate this layer and would likely be carried off via overland flow and are mostly fed by lateral subsurface flows. Shallow soils are equally responsive in the sense that the soil profile will rapidly be saturated during precipitation, after which rainfall will be carried off by means of overland flows.

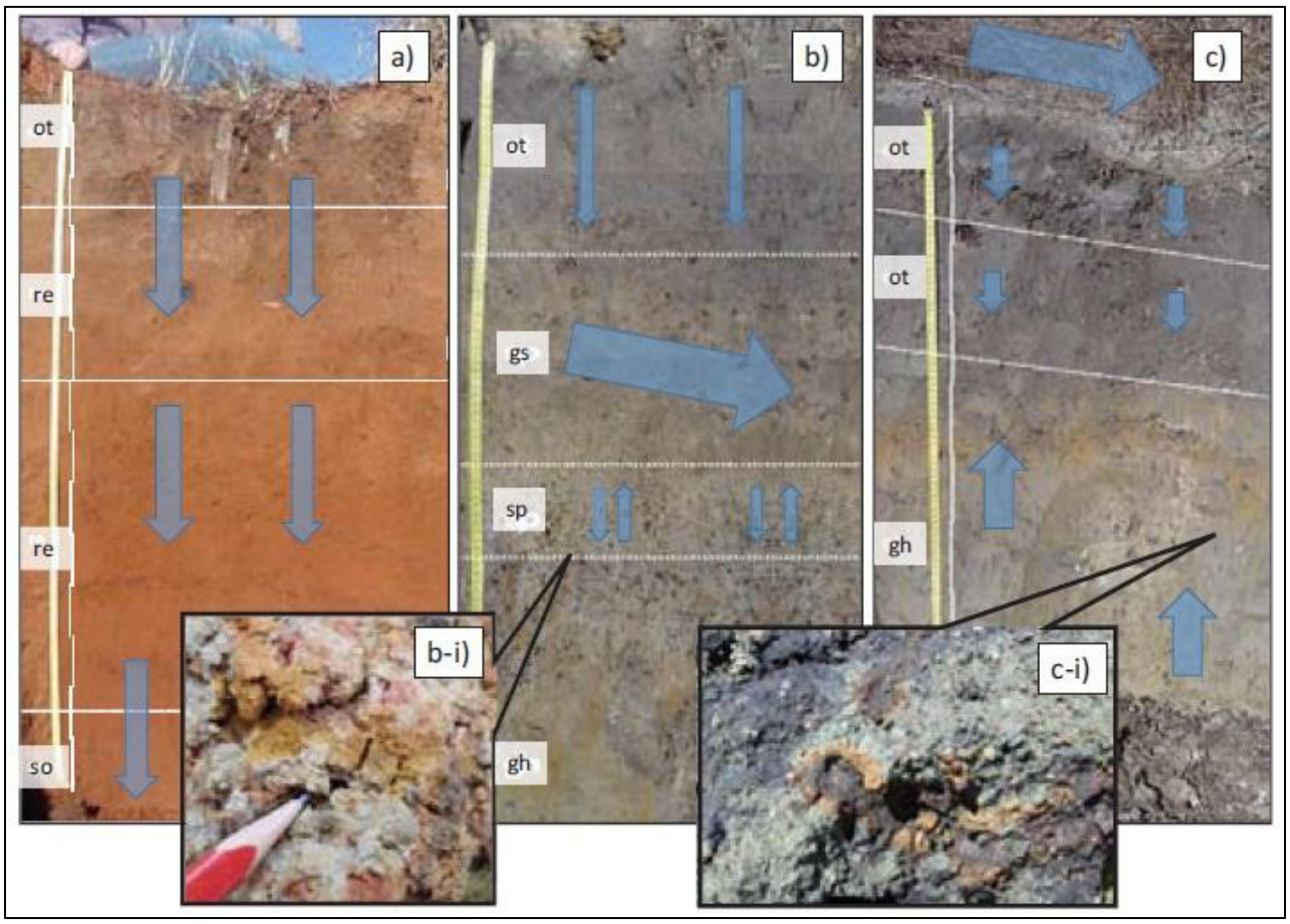

Figure 4-2: Illustration of different hydropedological soil types (Van Tol, et al., 2017).

A typical example of the hydropedological processes through a hillslope is illustrated in Figure 4-3. In this example, a recharge soil type is located at the upper reaches of the slope. Rainfall infiltrates this soil type and percolates vertically towards the bedrock. Water then, infiltrates into this bedrock given the permeability thereof and could now recharge groundwater or return to the soil in lower lying positions. The second soil type (the interflow zone) indicates lateral flows at the A/B interface and again at the soil/bedrock interface which feeds the responsive zone. The responsive zone is then simultaneously fed by lateral subsurface flows and ground water recharge.

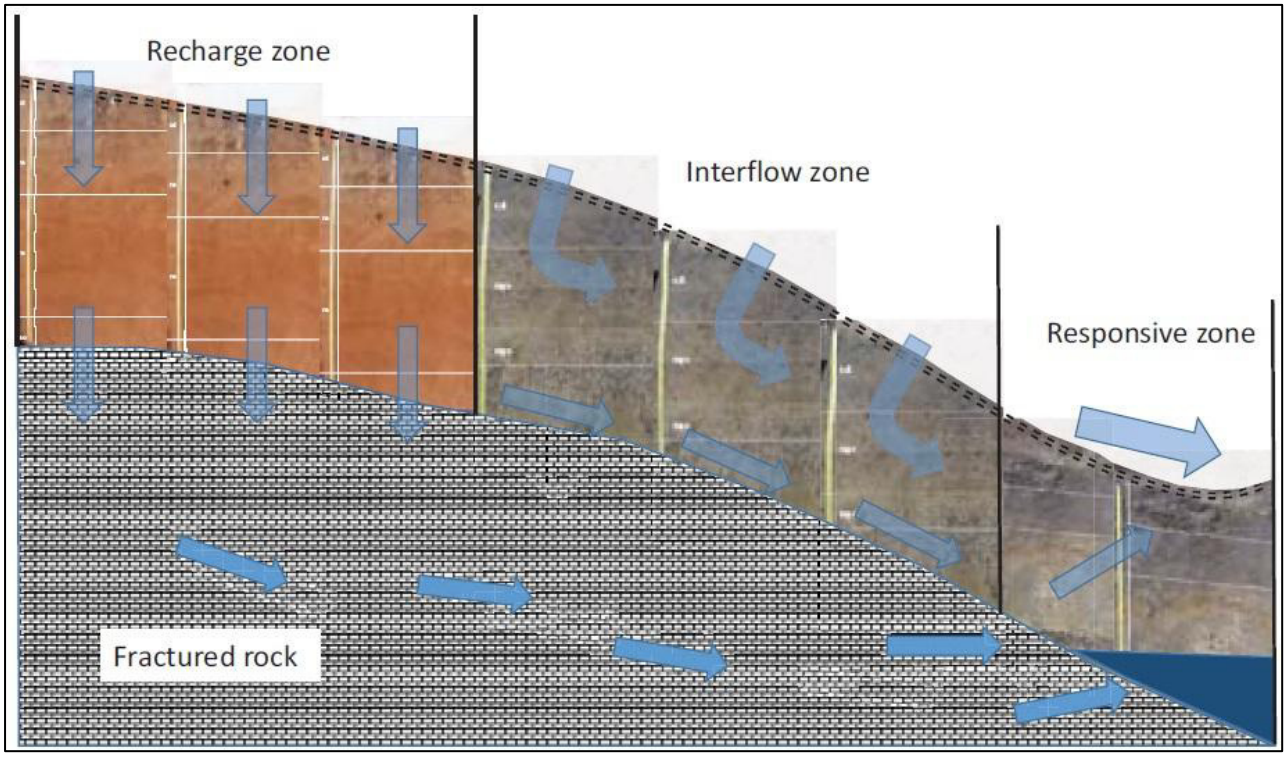

Figure 4-3: Theoretical example of various subsurface flow paths (Van Tol, et al., 2017).

The methodology of (Van Tol, et al., 2017) has since been updated to include a "stagnant" hydropedological type. According to (Hydropedological grouping of South African soil forms, 2019), four different hydropedological types exist, namely;

- Recharge;
- Interflow;
- Responsive; and
- Stagnating.

These soil types are divided into seven subgroups depending on the morphology of the relevant soil form. The latest addition to this methodology, as mentioned, is known as a stagnating hydropedological type.

This soil type is characterised by restrictive movement of water through profiles (both laterally and vertically) and is dominated by evapotranspiration. The A- and B-horizon of such a soil type usually has a high permeability with morphological indicators indicating very little movement through the profile. Lime and iron concretions as well as cementation of silica are typical indicators of such a soil form.

4.2.1 Field Procedure

The slopes within the project area have been assessed during the desktop assessment to identify possible transects that will represent typical terrain and soil distribution patterns. These locations were then altered slightly during the survey depending on the extent of vegetation, slopes, access and any features that will improve the accuracy of data acquired.

4.2.2 Identification of Soil Types and Hydrological Soil Types

Soil types have been identified according to the South African Soil Classification system (Soil Classification Working Group, 2018) after which the link between soil forms and hydropedological response were established (Hydropedological grouping of South African soil forms, 2019), and the soils regrouped into various hydropedological soil types as shown in Table 4-1.

Table 4-1: Hydrological soil types of the studied hillslopes (Hydropedological grouping of South African soil forms, 2019).

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

4.3 Field Procedure

The site was traversed by vehicle and on foot. A soil auger was used to determine the soil form/family and depth. The soil was hand augured to the first restricting layer. Soil survey positions were recorded as waypoints using a Global Position Satellite (GPS) device.

Soils were identified to the soil family level as per the “Soil Classification: A Natural and Anthropogenic System for South Africa” (Soil Classification Working Group, 2018). Landscape features such as existing open trenches were also helpful in determining soil types and depth.

5 LIMITATIONS

The following limitations are applicable to this project:

- It has been assumed that the extent of the development area provided by the responsible party is accurate;
- The GPS used for ground truthing is accurate to within 5 m. Therefore, the observation site's delineation plotted digitally may be offset by up to 5 m to either side;
- Only the slopes affected by the proposed development have been assessed;
- Only a soil auger was used for this assessment, no open pits were dug; and
- The assessment of potential impacts was informed by site-specific environmental conditions at the time of the site visit and ecological concerns based on the investigator's working knowledge and experience with similar projects.

6 RESPONSES TO INTERESTED AND AFFECTED PARTIES

To this point no concerns have been raised as yet. If any concerns are raised with regards to the hydropedological impact assessment it will be addressed in this report.

7 RESULTS FROM DESKTOP ASSESSMENT

7.1 Climate

This region is characterised by summer rainfall, with a mean annual precipitation of approximately 662 millimetres (mm). Cool-temperate climate with thermic continentality. High extremes between maximum summer and minimum winter temperatures, frequent occurrence of frost, large thermic diurnal differences, especially in autumn and spring (Mucina, et al., 2006).

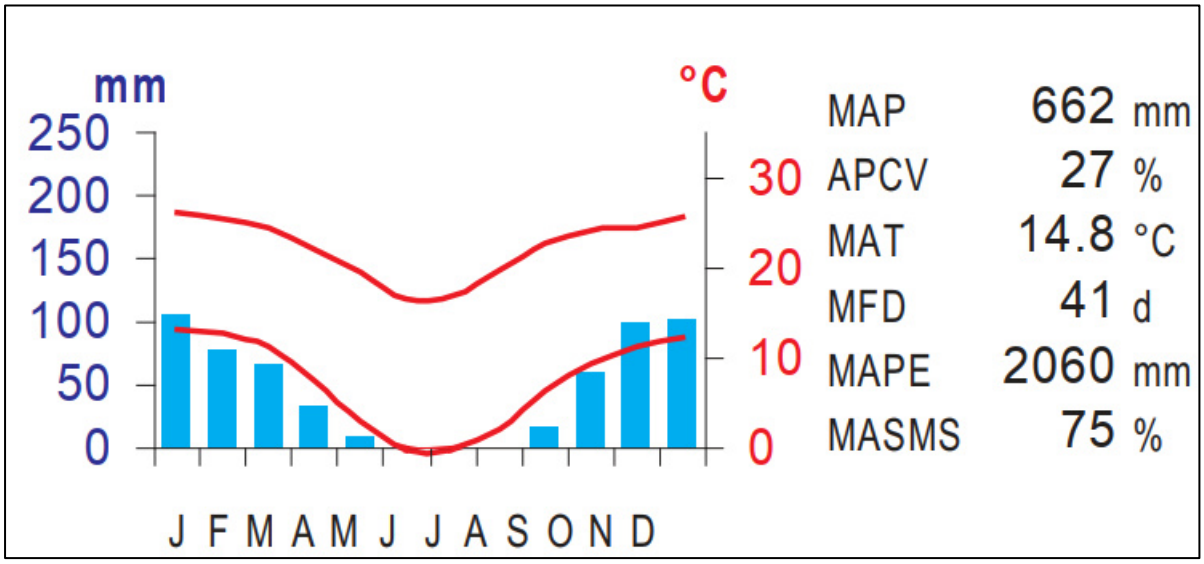

Figure 7-1: Climatic conditions for the area (Mucina, et al., 2006).

7.2 Terrain

The terrain analysis was conducted using the processing tools within the ArcGIS mapping software. The spatial analyst terrain analysis tools were used to determine the Digital Elevation Model (DEM) (Figure 7-2).

The project relief shows that the elevation for the Borrow Pit ranges from 1630 metres above sea level (masl) to 1640 masl. The Borrow Pit is located on the crest landscape position, with the southern edge bordering the scarp landscape position. Slopes average around 4%.

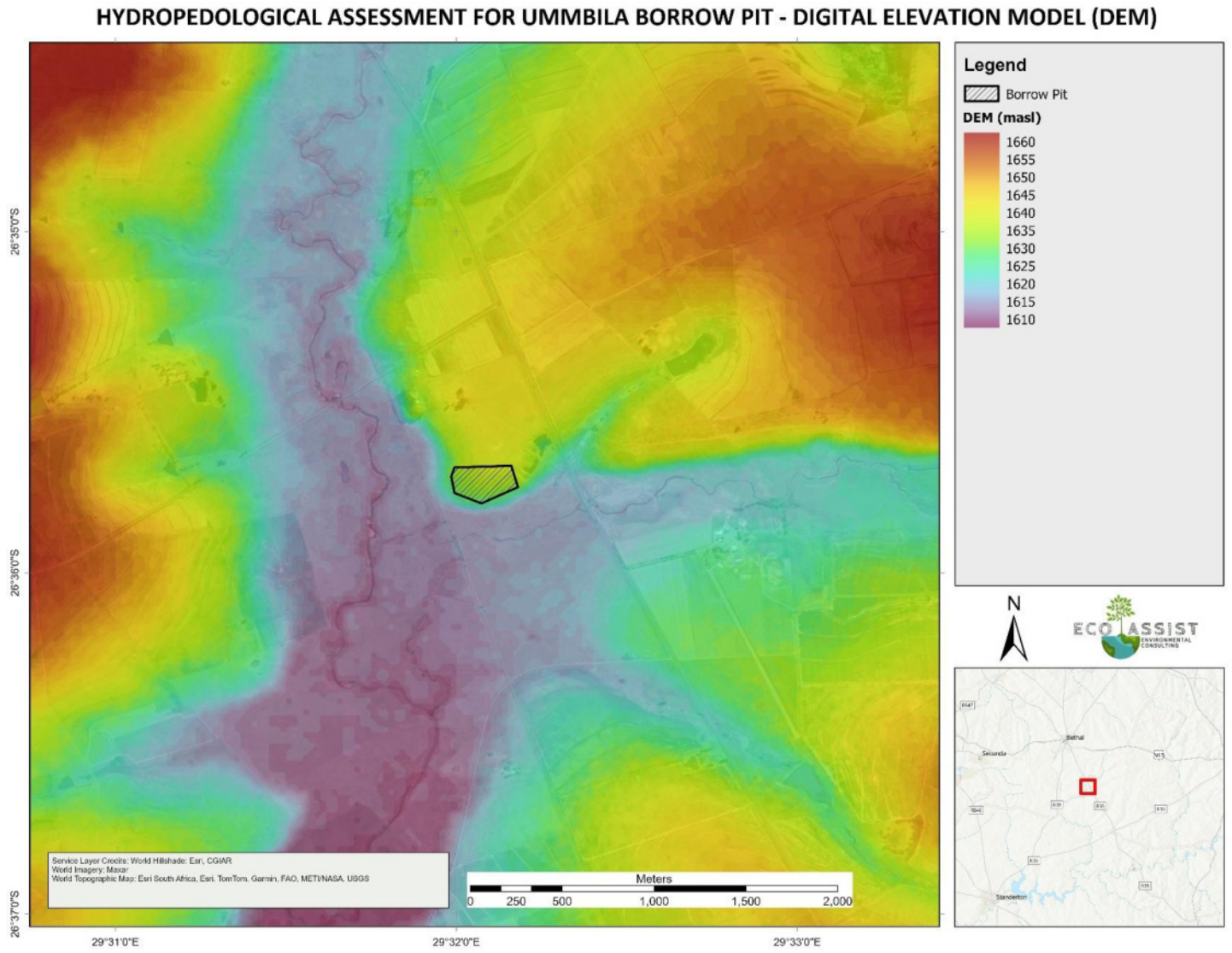

Figure 7-2: The DEM for the project area.

7.3 Desktop Soils & Geology

7.3.1 Geology

The geology for the project area is mainly dolerite; sandstone, grit and shale of the Ecca Group, Karoo Sequence (Land Type Survey Staff, 1972 - 2006) (Figure 7-4).

7.3.2 Land Types

The land type data was used to obtain generalised soil patterns and terrain types for the site. Land Type data exists in the form of published 1:250 000 maps. These maps indicate delineated areas of similar terrain types, pedosystems (uniform terrain and soil pattern) and climate (Land Type Survey Staff, 1972 - 2006).

The project falls within land type Ea20 (Figure 7-5). The Ea20 land type is dominated by the crest (30%) and midslope (60%) landscape positions (Figure 7-3). The soil forms anticipated in this land type are the Glenrosa, Swartland, and Arcadia soil forms. The valley bottoms are expected to be dominated by the Willowbrooke soil form. The land type data suggests that the slopes in the area range from 0% to 8%. The soil depths range from 300mm to 600mm. The clay percentage ranges from 20% to 45%.

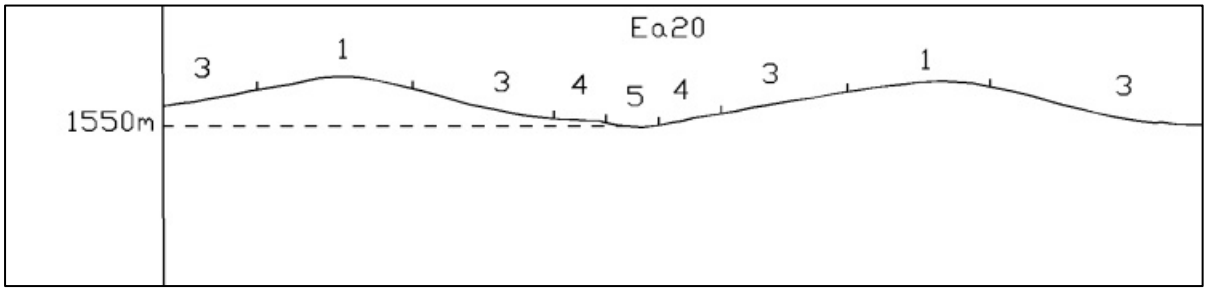

Figure 7-3: The hillslope catena of land type Ea20.

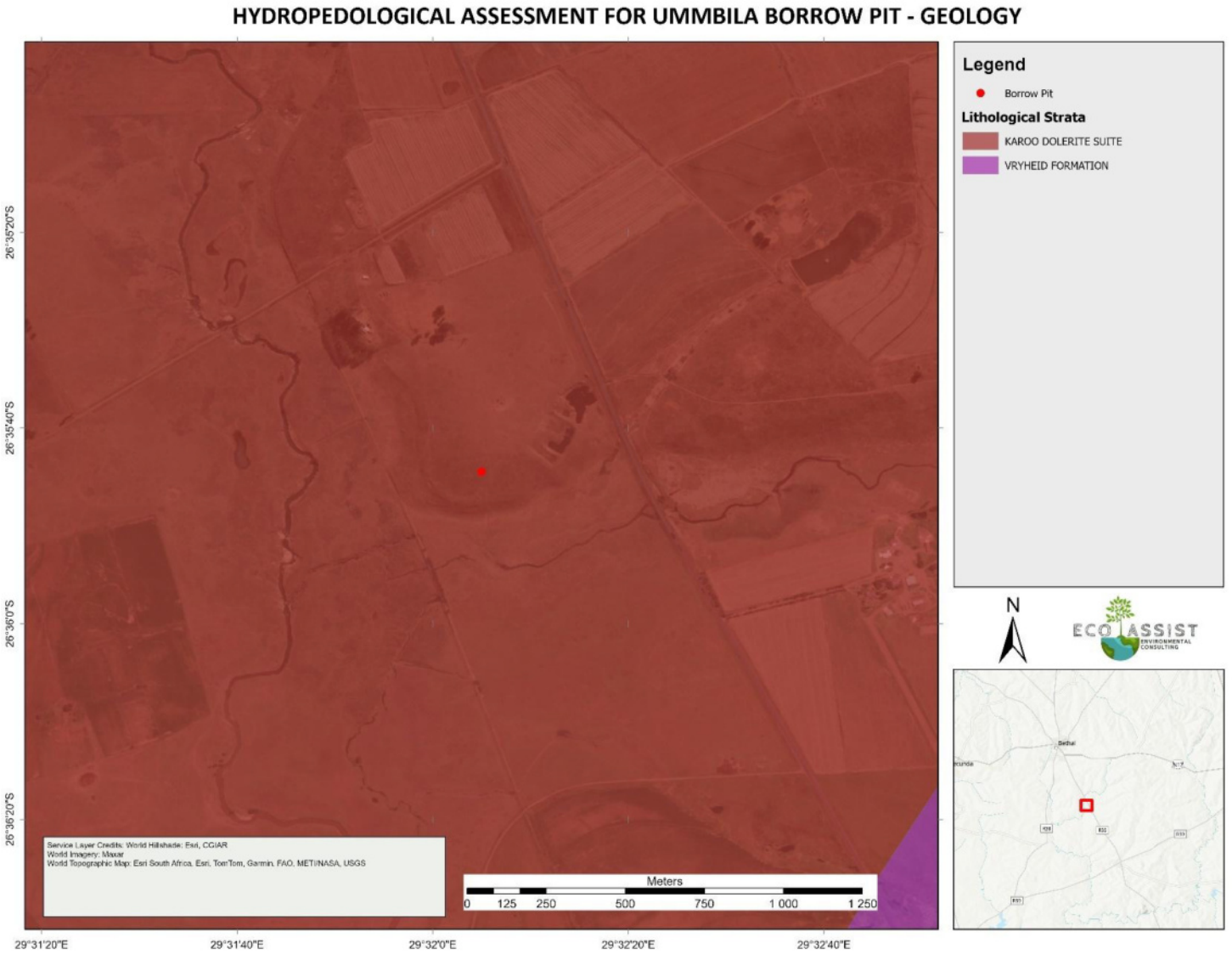

Figure 7-4: Regional geology for the project area.

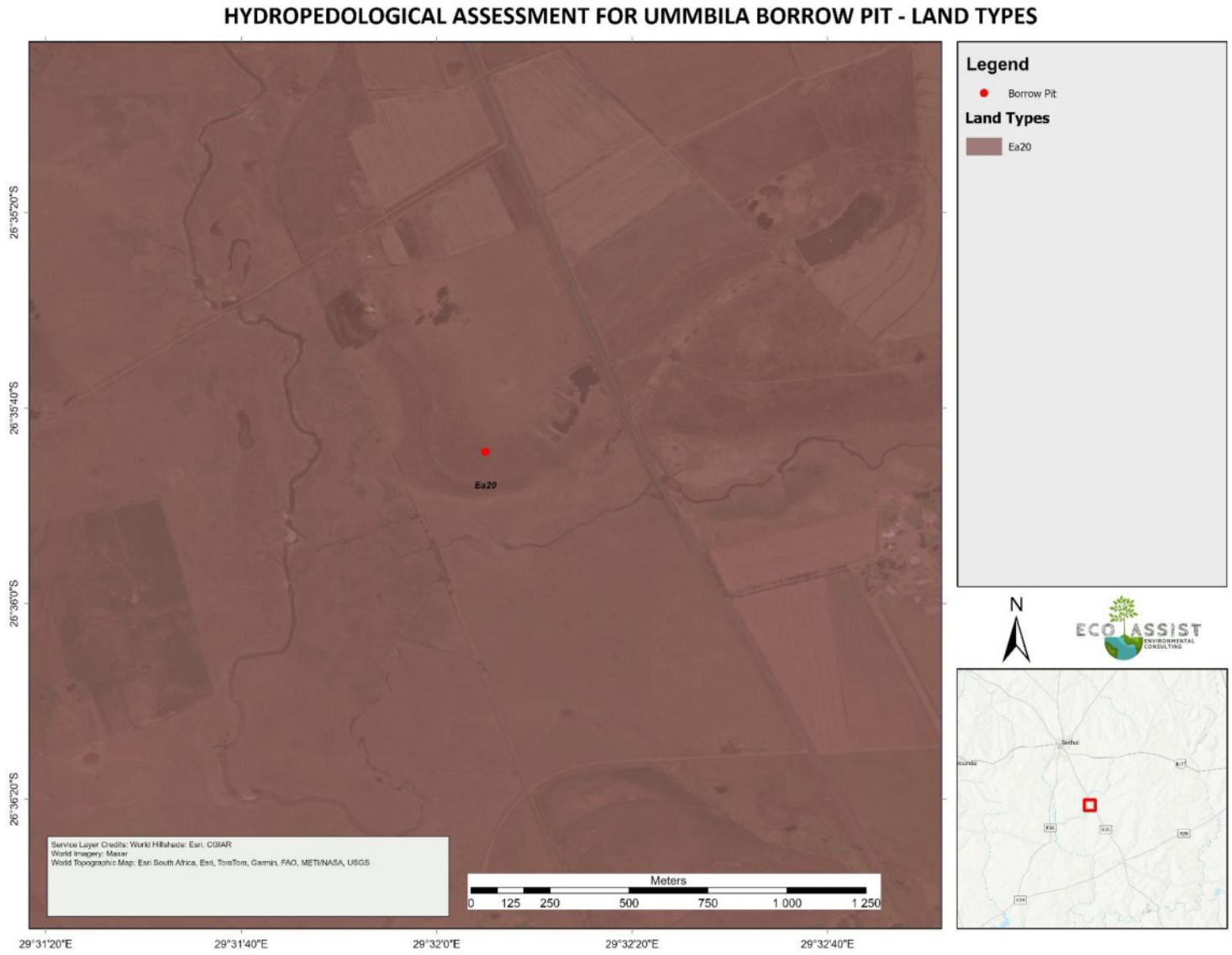

Figure 7-5: Land type within the project area.

8 SITE ASSESSMENT RESULTS

A soil survey was conducted for the Ummbila project area using a hand-held auger and a GPS to log all information in the field. The soils were classified to the family level as per the "Soil Classification: A Natural and Anthropogenic System for South Africa" (Soil Classification Working Group, 2018).

Soil forms found are described in the subsequent sections.

8.1 Soil Forms and Hillslope Hydrology

The following soil forms were identified on-site;

- Mispah (Orthic A-horizon over Hard Rock);
- Glenrosa (Orthic A-horizon over a Lithic horizon);
- Tukulu (Orthic A-horizon over a Neocutanic B-horizon, over a Soft Plinthic horizon); and
- Hydromorphic (Wetland soils in valley bottom).

The hydropedological soil types were classified (Table 8-1) during the site assessment and are illustrated in Figure 8-4.

Table 8-1: Soil form descriptions and their associated hydropedological classification.

Soil Form	Hydropedological Group
Tukulu	Interflow (Soil/Bedrock)
Glenrosa/Mispah	Responsive (Shallow)
Hydromorphic	Responsive (Saturated)

Figure 8-1: Shows the Mispah/Glenrosa soil profile.

Figure 8-2: Shows the Plinthic concretions in the lower soil profile of the Tukulu soil.

Figure 8-3: Shows the hydromorphic wetland system in valley bottom landscape.

8.2 Hillslope Hydrology

The hydropedology survey was conducted to obtain information regarding the soil morphology and hydropedological flow paths relevant to the hillslope by means of transects. The hydropedological soil types classified during the site assessment are illustrated in Figure 8-4.

The hillslope catenae from the top of the catchment right down to the valley bottoms have a general convex shape. The crest landscape position is relatively flat with water accumulating and slowly moving along the bedrock interface. These soils were the Tukulu soil form and classified as interflow (soil/bedrock). The soils become shallower and fractured once we reach the edge of the scarp. These soils were the Mispah and Glenrosa soil forms. These were classified as responsive (shallow). The footslope and valley bottom soils were hydromorphic in nature and were classified as responsive (saturated). Water moves along the soil/bedrock interface and emerges in the responsive (saturated) class.

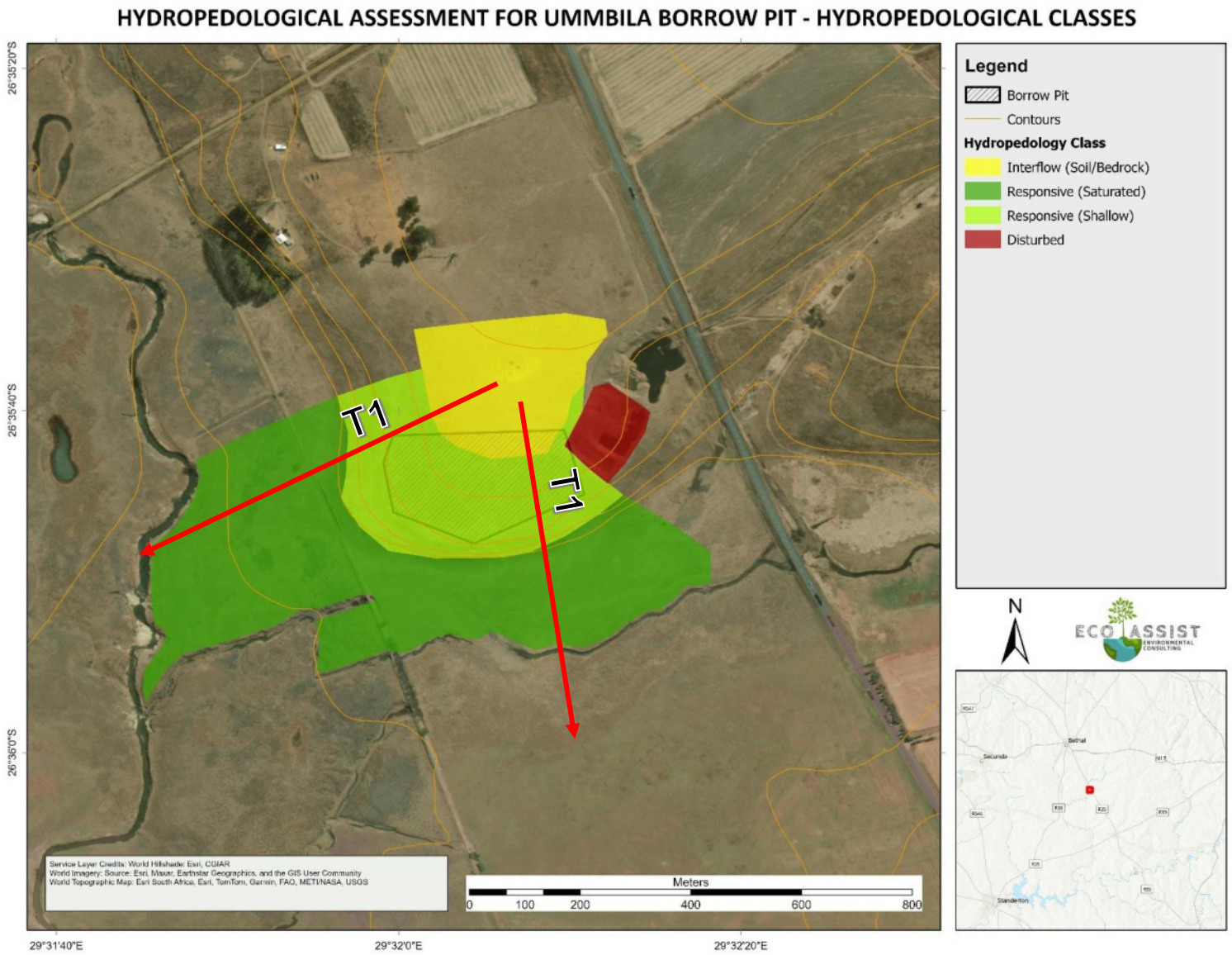

Figure 8-4: Hillslope hydropedological classification showing the hydropedological units for the project area.

During the survey one (1) dominant hillslope hydropedological hillslope was identified and is described in the section to follow.

Figure 8-5 shows the represented cross section for T1 (transect 1). The crest landscape positions were dominated by interflow and shallow responsive. The valley bottoms were found to be wet with Katspruit or Dundee soils. These soils indicate saturated responsive hydropedological zones. This is as a result of the flattening of the slope and the accumulation of water from the landscape into the lower landscape zones.

***Note:** The blue arrows indicate the dominant direction of flow. The size of the arrow indicates the dominance/intensity of flows.*

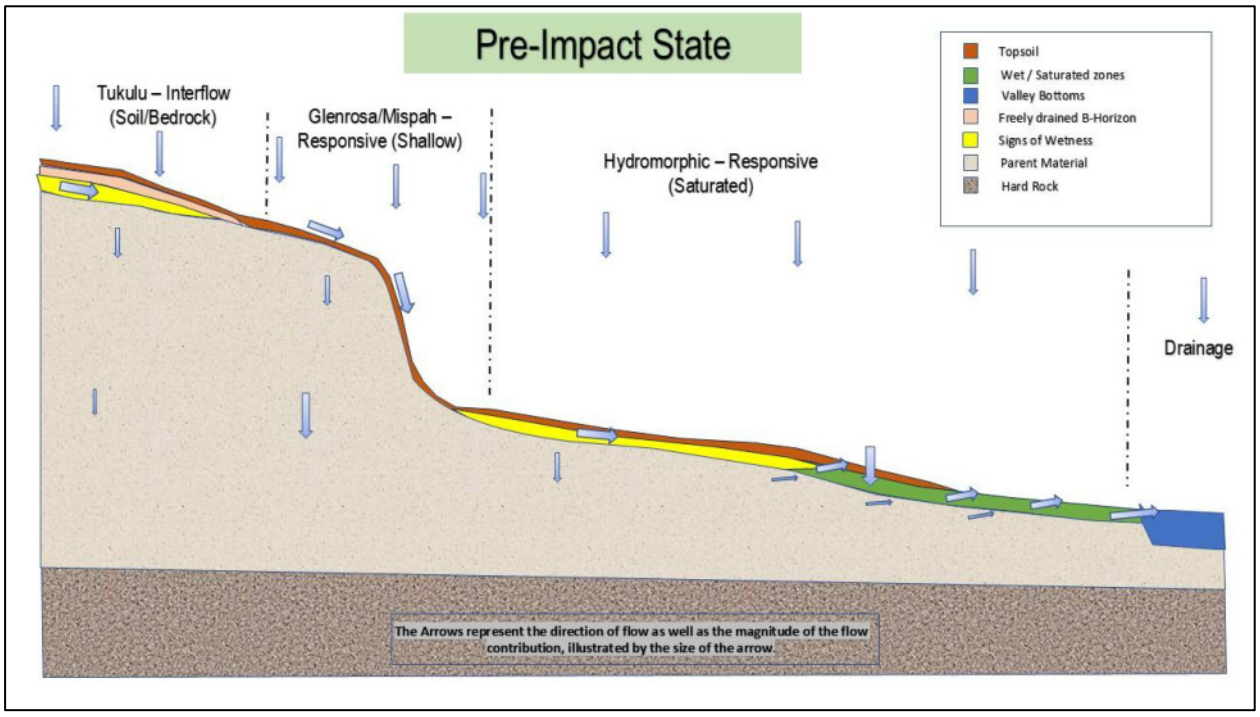

Figure 8-5: Hillslope hydrology for hydropedological soil catena T1 of the project area.

9 ENVIRONMENTAL IMPACT ASSESSMENT

9.1 Methodology

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

To enable a scientific approach to the determination of the environmental significance (importance), a numerical value is linked to each rating scale. Clearly defined rating and rankings scales (Table 9-1 - Table 9-6) were used to assess the impacts associated with the proposed activities.

Table 9-1: Severity or magnitude of impact.

High	3
Moderate	2
Low	1
None	0

Table 9-2: Extent of activity.

International	6
National	5
Regional	4
Local	3
Site	2
Footprint	1

Table 9-3: Duration of activity.

Permanent / Beyond life of the activity	5
Long-term (more than 5 years)	4
Medium-term (18 months - 5 years)	3
Short term (6-18 months)	2
Temporary (0-6 months)	1

Table 9-4: Reversibility of impacts.

Low to non-reversible	3
Moderate	2
High	1

Table 9-5: Probability of impact.

Definite (75% to 100%)	2
Probable (50% to 75%)	1
Improbable (0-less than 50%)	0

Table 9-6: Loss of Irreplaceable Resources.

Yes	1
No	0

Each impact identified must be assessed in terms of probability (likelihood of occurring); the consequence of the impact (spatial scale, severity and duration); and the associated risk (impact significance).

Consequence was then determined as follows:

CONSEQUENCE = (Duration + Extent + Irreplaceable Loss) x Severity

The significance or risk of each identified impact was then based on the product of consequence and likelihood:

SIGNIFICANCE = Consequence x Probability

Impacts were rated as either of high, medium or low significance on the basis provided in Table 9-7. Each impact was also assessed in terms of the level to which there is an irreplaceable loss of resources and its degree of reversibility. The ratings as described in Table 3-7: Impact significance ratings.

The nature of the Impact can be rated as positive or negative impacts, and the significance of the impacts are rated accordingly.

Nature
+
-

Table 9-7: Impact significance ratings.

Risk Rating	Significance	Colour Code
High (positive)	49 to 72	H
Medium (positive)	25 to 48	M
Low (positive)	1 to 24	L
Neutral	0	N
Low (negative)	-1 to - 24	L
Medium (negative)	-25 to -48	M
High (negative)	-49 to -72	H

The significance of an impact gives an indication of the level of mitigation measures required in order to minimise negative impacts and reduce environmental damage during the construction, operational and decommissioning phases. Suitable and appropriate mitigation measures, to ensure avoidance, management and mitigation of impacts, were identified for each of the potential impacts based on specialist recommendations.

9.2 Impacts Identified

This section determines the construction and operational phase impacts of the proposed reception site and the proposed airstrip site on the hydropedological flow drivers feeding the water resources (Table 9-8).

The potential impacts on the hydropedological flow drivers are identified for the construction and operation of the proposed project are provided in Table 9-8.

Table 9-8: Impacts Description.

Impact	Description
Contamination of Water Resources	The operation will utilise large machinery. The excavated soil and overburden material will be stockpile within the project area. The surface runoff could carry pollutants to the water resources downstream.
Loss of vadose zone flows feeding water resources	The hardened surface will reduce infiltration.

9.3 Hydropedological Impacts

This section determines the construction and operational phase impacts of the proposed Borrow Pit activities on the hydropedological flow drivers feeding the water resources.

9.4 Impact Assessment Findings

The Borrow Pit construction and operation takes place on two hydropedological soil units. These include shallow responsive and the interflow (soil/bedrock) zones. The impacts were assessed by activity as each activity will have a varied impact on the hydropedological flow drivers either in impact type or impact magnitude.

1. Borrow Pit excavation and operation.

Figure 9-1 shows the represented cross section for T1 (transect 1) during operational and post-operational phase. T1 has one (1) activity taking place on it.

The excavation of the Borrow Pit takes place in the interflow and shallow response zones.

The activities impact on the small portion of interflow which will have little to no impact on the overall hydropedological functioning of the landscape. The shallow responsive zones will also not be impacted as the Borrow Pit will have a similar hydrological response as the shallow response soils. The Borrow Pit creates a large area of impervious surfaces which promote runoff. This increases peak flows of storm events as well as discharge volumes into a concentrated area potentially increasing erosion risk. The quantity of water that would previously have potentially infiltrated into the landscape is now redirected on the surface to specified storm water discharge points.

The responsive zone impacts are associated with increased flow velocity and flow volume from the runoff created by the activity's upslope.

The overall impacts are considered Neutral to Low from a hydropedological perspective.

***Note:** The blue arrows indicate the dominant direction of flow. The size of the arrow indicates the dominance/intensity of flows. The green arrows indicate an increased flow whereas the red arrows indicate a reduction of flow in the given direction.*

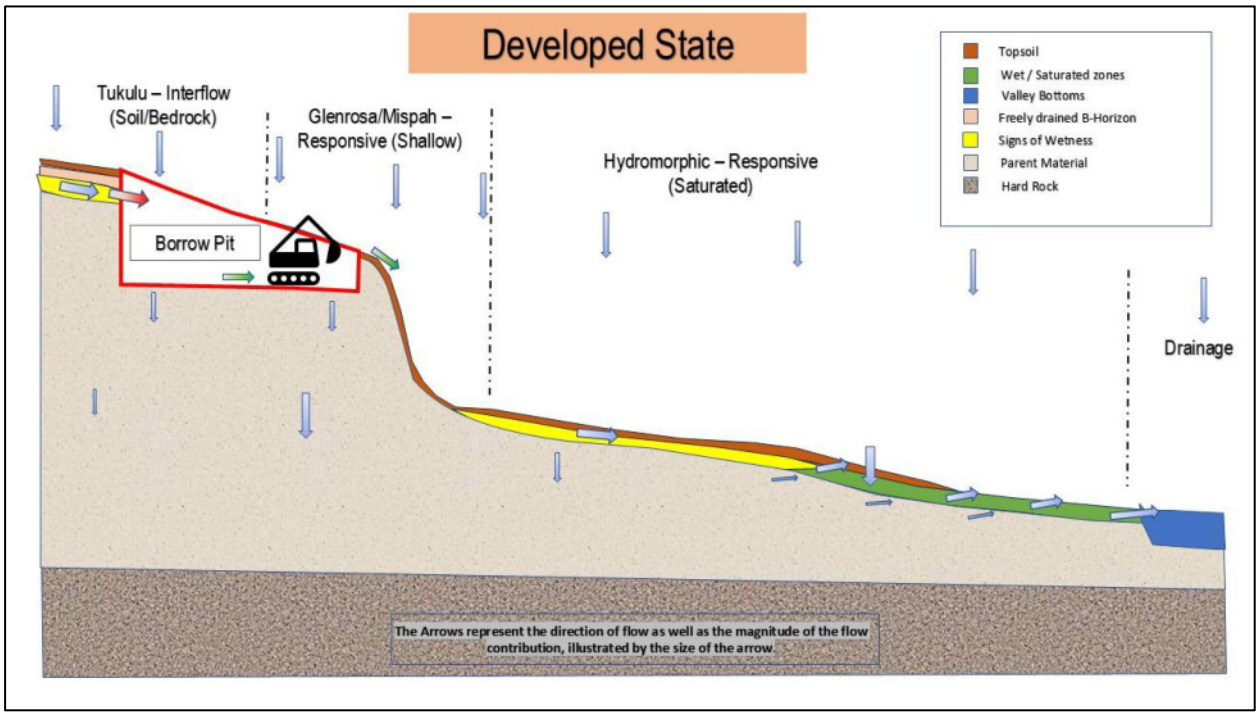

Figure 9-1: Hillslope hydrology for post-developed hydropedological soil catena of the project area.

Table 9-9: Assessment of significance of potential construction and operational impacts on hydropedological flow drivers associated with the proposed Borrow Pit site pre- and post- mitigation

Construction Phase																	
Impact	Prior To Mitigation									Post Mitigation							
	Duration of Impact	Extent of Activity	Irreplaceable Loss	Severity of Impact	Consequence	Reversibility of Impacts	Probability of Impact	Nature	Significance	Duration of Impact	Extent of Activity	Irreplaceable Loss	Severity of Impact	Consequence	Reversibility of Impacts	Probability of Impact	Nature	Significance
Contamination of Water Resources	2	1	0	2	6	1	0	-	0	2	1	0	2	6	1	0	-	0
	Short Term	Footprint	No	Moderate		High	Improbable	Negative	**Neutral**	Short Term	Footprint	No	Moderate		High	Improbable	Negative	**Neutral**
Loss of vadose zone flows feeding water resources	2	2	0	1	4	3	1	-	4	2	2	0	1	4	3	1	-	4
	Short Term	Site	No	Low		Low to non-reversible	Probable	Negative	**Low Negative**	Short Term	Site	No	Low		Low to non-reversible	Probable	Negative	**Low Negative**

Operational Phase																	
Impact	Prior to mitigation									Post mitigation							
	Duration of Impact	Extent of Activity	Irreplaceable Loss	Severity of Impact	Consequence	Reversibility of Impacts	Probability of Impact	Nature	Significance	Duration of Impact	Extent of Activity	Irreplaceable Loss	Severity of Impact	Consequence	Reversibility of Impacts	Probability of Impact	Nature	Significance
Contamination of Water Resources	1	1	0	2	4	1	0	-	0	1	1	0	2	4	1	0	-	0
	Temporary	Footprint	No	Moderate		High	Improbable	Negative	**Neutral**	Temporary	Footprint	No	Moderate		High	Improbable	Negative	**Neutral**
Loss of vadose zone flows feeding water resources	2	2	0	1	4	3	1	-	4	2	2	0	1	4	3	1	-	4
	Short Term	Site	No	Low		Low to non-reversible	Probable	Negative	**Low Negative**	Short Term	Site	No	Low		Low to non-reversible	Probable	Negative	**Low Negative**

9.5 Mitigation Measures

The mitigation hierarchy is regarded internationally as the best practice framework for environmental planning and managing environmental impacts. It is a set of prioritised, sequential steps that are applied to anticipate, avoid, and reduce the potential negative impacts of project activities on the natural environment. It involves a sequence of four key components: avoidance, minimisation, remediation, and offset as illustrated in (Edwards, et al., 2018).

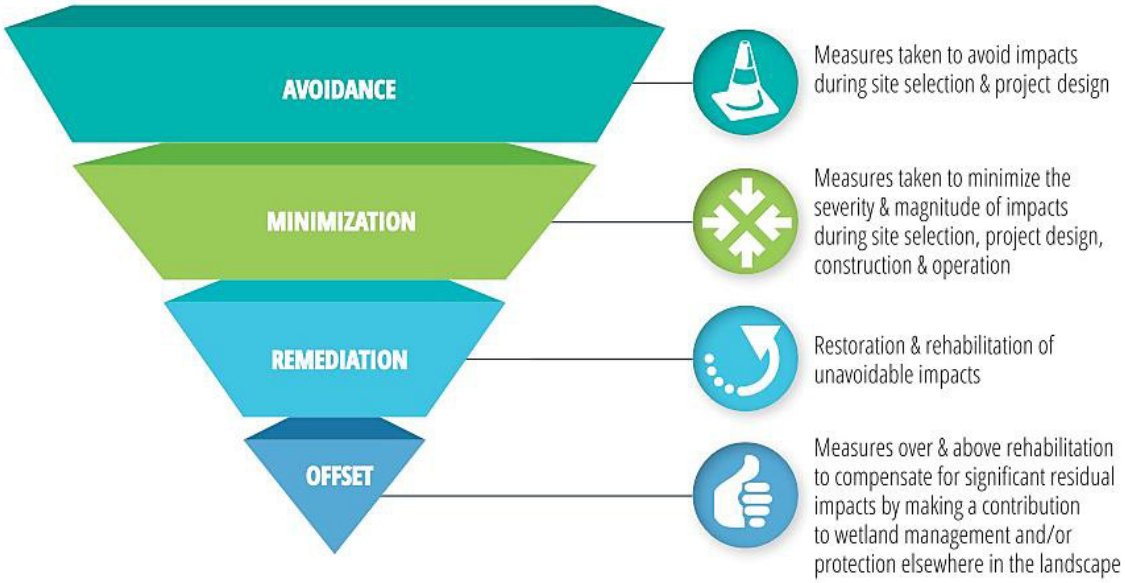

Figure 9-2: The mitigation hierarchy (Edwards, et al., 2018).

The focus of mitigation measures is to follow the mitigation hierarchy where possible. The activities that are not required within the water resource and its associated buffer zone will follow the avoidance principles and as a result impacts/risk are expected to be low for these activities. The aspects that occur within the water resource will follow the minimisation and remediating principles to reduce the significance of potential impacts associated with the proposed activity. The prescribed mitigation measures for the proposed activity are provided in the respective sections below.

9.5.1 Site Planning

Every effort must be made to avoid potential impacts from the outset of a project (e.g., through careful spatial or temporal placement of elements of infrastructure) to prevent or limit impacts to water resources.

Various aspects will contribute to the risks described above, and as a result the mitigation measures for these aspects are listed below.

9.5.2 Site Clearing

During site clearing the vegetation and topsoil is removed, increasing the runoff and erosion potential of flowing water. to mitigate these impacts the following measures must be followed:

- Minimise the area of soil disturbance to reduce the impact of sedimentation into waterbodies.
- Clearing and grading must occur only where necessary to build and provide access to the project activities. Clearing must be done immediately before construction, rather than leaving soils exposed for months or years.
- Where possible, plants should be cut down to ground level instead of being removed completely to stabilise the soil during land-clearing operations.
- The proposed limits of land disturbance must be physically marked off to ensure that only the land area required for the development is cleared.
- When excavated areas are backfilled the surface must be level with the surrounding land surface, to minimise soil erosion from the areas when the excavation is complete.
- The most efficient approach to control erosion is to minimise the area of land disturbed as well as the duration for which it is exposed.
- Once surfaces have been exposed, they must immediately be protected from erosion, so limiting the source of the sediment.
- During the excavation of pits, roads, construction sites, the removed topsoil must be stored and appropriately protected so that it does not wash into waterbodies, causing sedimentation and nutrient loading. This is then used to backfill the area so that it can be effectively rehabilitated.
- Topsoil that is removed during excavation must NEVER be buried or rendered unusable in any way (such as mixing it with spoils or being compacted by machinery).
- During excavation soil must be excavated one layer at a time and stored in separate stockpiles so they can be returned in their natural order when the area is backfilled. This improves soil functions and improves the template for plant growth.

9.5.3 Access Control

- Water resources must be well fenced and sign-posted, to keep machinery, people, and livestock away from the water body as well as vegetated areas to reduce the soil disturbance, soil compaction and vegetation destruction, which thus reduces the amount of erosion and habitat loss.

9.5.4 Erosion and Sedimentation Control

- Sediment traps are small impoundments that allow sediment to settle out of runoff. They are usually installed in a drainageway or other point of discharge from a disturbed area. Temporary diversions can be used to direct runoff to the sediment trap. Sediment traps detain sediments in stormwater runoff to protect receiving water bodies, and the surrounding area. The traps are formed by excavating an area or by placing an earthen embankment across a low area or drainage swale. An outlet or spillway is often constructed using large stones or aggregate to slow the release of runoff.

9.5.5 Soil Stabilisation

- Stabilisation practices (e.g., revegetation) must occur as soon as possible after grading. In colder climates, a mulch cover is needed to stabilise the soil during the winter months when grass does not grow or grows poorly.

- The following measures can be used to stabilise soils for site preparation and construction: hydro mulch, straw (placed evenly on slope), crimping (rolling the placed straw with a sheep-foot roller), seeding, fertiliser, transplanting and net (jute netting pinned onto the slope).

9.5.6 Stockpile Management

- Unprotected stockpiles are very prone to erosion and therefore must be protected. Small stockpiles can be covered with a tarp to prevent erosion. Large stockpiles must be stabilised by erosion blankets, seeding, and/or mulching.

9.5.7 Pollution Control

- If soil contamination occurs (such as due to a spill) the soil must be removed from the site and disposed of appropriately.
- Prevention of spills eliminates or minimises the discharge of pollutants to water bodies.
- Handle hazardous and non-hazardous materials, such as concrete, solvents, asphalt, sealants, and fuels, as infrequently as possible and observe all national and local regulations when using, handling, or disposing of these materials.
- An effective response plan must be in place and personnel must be ready to mobilise in the event of a spillage to reduce the environmental effects of an oil or chemical spill.
- Spill control devices such as absorbent snakes and mats must be placed around chemical storage areas, and they can be used in an emergency to contain a spill.
- Implement preventative maintenance system to ensure that work vehicles are maintained in an acceptable condition. This would involve routinely checking vehicles for leaks before construction begins; and not allowing vehicles with significant leaks to operate or be repaired within the construction site. Ideally, vehicle maintenance and washing occurs in garages and wash facilities, not on active construction sites.
- Before an operation occurs near a waterbody, vehicles must be checked for leaks, to reduce soil and water contamination from vehicle fluids.
- Old engine oil must NOT be thrown on the ground or down a stormwater drains but rather collected in containers and recycled.
- Ensure that appropriate solid waste disposal facilities are provided, and adequate signage is provided for all solid, liquid, and hazardous waste types. These must contain waste products in a weatherproof manner and to prevent any airborne litter, access to scavengers or loss of food residues that may be washed into surface or ground waters. Collected waste needs to be disposed of at a registered landfill site/hazardous waste facility.
- Re-fuelling areas for vehicles must be bunded and located away from water resources and sensitive environments to prevent any accidental spillage contaminating soil or seeping into groundwater aquifers. All servicing area runoff must be directed towards a fully contained collection sump for recovery and appropriate disposal.
- There must be no standing water at a stockpile site, to reduce erosion as well as the contamination of the water by nutrients/ toxics.

9.5.8 Development Construction and Maintenance

- Water on the road should be diverted away as quickly as possible, to minimise the amount of water running directly from the road into the water body. The drainage must lead the water to vegetated filter strips, which remove particles and contaminants from the water.
- Having more frequent drains on the approach to a water body ensures that the least amount of water is discharged directly into the water body and reduced sediment loading.
- A water bar diverts water flowing down a surface (e.g., road) to one side. This reduces the volume of water that flows down the surface and the subsequent erosion that occurs.

9.5.9 Runoff Control

- Manage the quantity and flow rate of stormwater runoff caused by changes to the land, such as clearing vegetation, removal of topsoil, and changes in the ground profile from the cut and fill operations carried out during the construction phase. This will be done by the construction of stormwater cut-offs in the form of diversion berms and v-drains. This will ensure that the stormwater runoff does not generate high flow rates due to long flow paths.
- Prevent soil erosion and keep sediment from being transported to nearby water bodies by placing silt traps. This will also assist in preventing contaminants such as oil, chemicals, and construction debris from polluting local waterways and farm/ground dams.

9.5.10 Stormwater Management Works

- V-Drains: Utilise V-drains to efficiently channel stormwater away from critical areas, reducing the risk of erosion and sediment build-up.
- Flow Diversion: Diversion systems are to be implemented to regulate the flow of stormwater, directing it away from vulnerable areas and into designated channels. This helps to control runoff and protect both prepared and active farmland.
- Erosion and Sediment Control: Measures must be taken to prevent erosion and sediment build-up, ensuring that stormwater does not carry soil and debris into watercourses or farmland. This includes the use of sediment basins, and other erosion control techniques.
- Runoff Reduction: Manage stormwater effectively, reduce the amount of runoff entering watercourses such as groundwater dams. This helps to maintain water quality and prevent flooding.

9.5.11 Sediment Controls

- Sediment basins and rock dams can be used to capture sediment from stormwater runoff before it leaves a site. Both structures allow a pool to form in an excavated or natural depression, where sediment can settle. The pool is dewatered through a single riser and drainage hole leading to a suitable outlet on the downstream side of the embankment or through the gravel of the rock dam. The water is released more slowly than it would be without the control structure.

9.5.12 Sanitation

- Portable toilets must be provided where work is being done and must be located a considerable distance away from water resources and riparian areas.

9.5.13 Site Management

- Alien and invasive vegetation have several detrimental effects on water quality, from nutrient enrichment to increased erosion and excessive water use, which is especially relevant in dry areas or in important catchments. Invasive species are highly likely to colonise disturbed areas, even after rehabilitation and follow-up clearing must be done until healthy vegetation returns to the site.
- Areas (away from surface water bodies and outside of the riparian zone) must be designated for the storage of materials and mixing of materials (such as concrete or chemicals). This reduces contamination of water resources from these materials/ activities.
- To ensure that it reaches most people signs must be written in the languages of the area (NOT just English). This ensures that non-English speakers can understand and will hopefully cooperate in reducing water pollution by the measures indicated on the sign.
- Within a construction site, vehicle access must be strictly controlled (i.e., there must be set parking, turning areas, set routes and no access to undisturbed areas.) This minimises soil disturbance and compaction and pollution from fluids leaking onto the ground as well as the disturbance of aquatic organisms.

10 RECOMMENDATIONS

The following recommendations have been made to minimise threats to sensitive receptors (subsurface flow paths) and wetland functioning;

- A buffer of 40 m around the edge of the wetland systems is recommended. This buffer must be in place for the duration of the operational phase of the Borrow Pit (EcoLink Consulting, 2024).

11 CONCLUSIONS

The Borrow Pit will have a Neutral to Low impact on the flow drivers within the project area. The impacts to the flow drivers include the increased runoff from the Borrow Pit upslope within the interflow and shallow responsive zones. These stem from the increased impervious surfaces which promote runoff from the impervious surfaces.

It is the opinion of the Specialist that the proposed Borrow Pit may proceed, this is based on the above recommendations and mitigation measures.

12 REFERENCES

EcoLink Consulting. 2024. *Wetland and Aquatic Assessment Associated Proposed Borrow Pit Near the Town of Bethal, Mpumalanga Province.* 2024.

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Mucina, L and Rutherford, M C. 2006. *The Vegetation of South Africa, Lesotho, and Swaziland. Strelitzia 19.* Pretoria : National Biodiversity Institute, 2006. ISBN-13: 978-1-919976-21-1.

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Van Tol, J J, Le Roux, P A and Lorentz, S. 2017. The science of hydropedology - Linking soil morphology with hydrological processes. *Water Wheel 16 (3).* 2017.

APPENDIX E: GEOTECHNICAL REPORT

INROADS CONSULTING
CIVIL ENGINEERS

Inroads Consulting cc
Reg No 2003/003308/23
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2007

P O Box 87318
HOUGHTON
Johannesburg
South Africa
2041

Our ref: 2520/g

17 April 2025

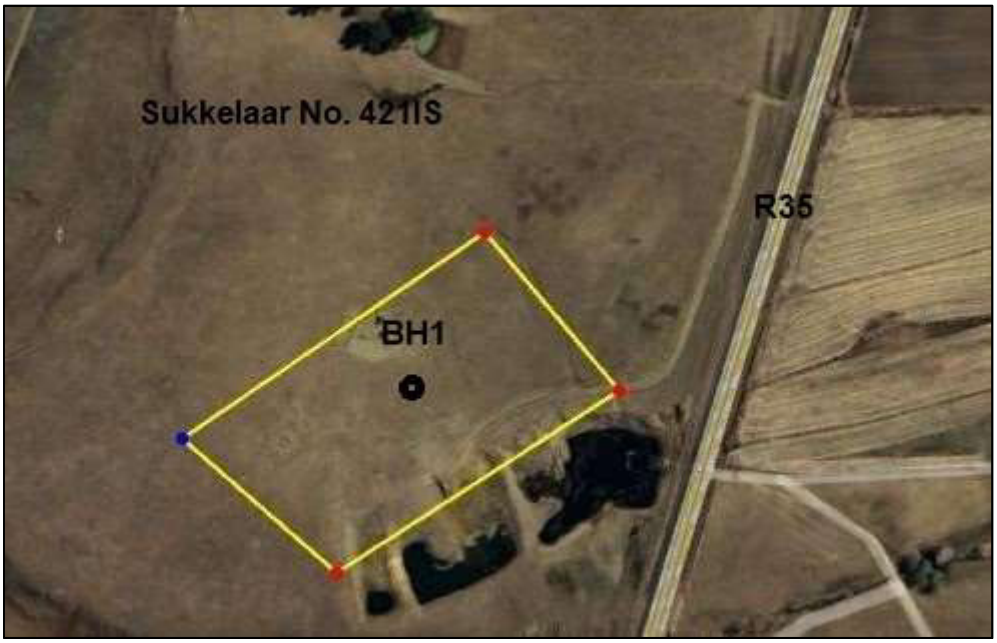
Stefanutti Stocks Geotechnical (Pty) Ltd.
PO Box 12394
Aston Manor
1630

Attention Mr S Singh

GEOTECHNICAL INVESTIGATION FOR THE PROPOSED BORROW PIT ON PORTION 9 OF THE FARM SUKKELAAR NO. 421 IS

Dear Sir,

A geotechnical investigation was conducted for the Ummbila Emoyeni Wind Farm project at the site of a proposed 5-hectare borrow pit located on the farm Portion 9, Sukkelaar No. 421IS in the Gert Sibande District Municipality as illustrated below. The investigation entailed drilling a rotary cored borehole, referenced BH1, within the area. The core was logged and photographed and the image and log is attached to this report.



A 600 mm thick topsoil and transported layer blanket the area and overlay residual dolerite as a silty sand, which extends to a depth of some 1,5 m. Highly weathered, soft rock, dolerite underlies the residual soil and extends to a depth of about 6 m where unweathered, hard rock, dolerite was encountered and extends to the bottom of the borehole.

Based on the core log, and subject to laboratory testing, the highly weathered dolerite is considered suitable for use as G6 quality gravel

Yours faithfully

_____

Brian Harrison Pr Eng
for Inroads Consulting

INROADS CONSULTING
CIVIL ENGINEERS

PO Box 87318
Houghton
2041

169 Lyndhurst Road
Lyndhurst
2192

Tel: (011) 443 7811
Fax: (011) 443 2951

BOREHOLE LOG

Borehole No
BH1

Project:

Location:

Co-ordinates: X:
y:

Elevation: -

Ref No: 1393/g

Orientation: Vertical

Drilling Method	Size	Core Recovery - %	RQD - %	Fracture Frequency	Test or Sample Type	Test Result	Depth - m	Symbol	Description
Rotary core	NWD4	45		NA					Moist, brown, SILTY SAND. *Topsoil/Transported.*
									0.6
		50		+20			1.0		Moist, brown, SILTY SAND with angular medium and coarse gravels. *Residual dolerite.*
									1.5
		50	0	+20			2.0		Pale grey stained brown, highly weathered, fine grained, closely to medium jointed, soft rock, DOLERITE.
		80	0	+20			3.0		
				+20			4.0		
		100	15	+20			5.0		
							6.0		
		100	96	0					6.0
				2			7.0		Grey, unweathered, fine grained, widely jointed, hard rock, DOLERITE.
		100	98	0			8.0		
							9.0		
									9.0

End of borehole at 9,0 m

Drilling progress/shift
Casing depth
Standing water
SPT Test

Undisturbed sample
Disturbed sample
P Point load test (MPa)
N SPT result

Contractor: StefannutiStocks
Driller: Rodney M
Machine: INGH152001
Logged by: BAH

Drilling started: 10/11/24
Drilling completed: 10/11/24
No of core boxes: 1
Date logged: 30/11/24

INROADS CONSULTING
CIVIL ENGINEERS

PO Box 87318
Houghton
2041

55 Bradford Estate
Bradford Road, Bedfordview
2007

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Ref: 2520/g	BORROW PIT ON PORTION 9 OF THE FARM SUKKELAAR NO. 421 IS PHOTOGRAPH OF BOREHOLE CORE	Figure No 1

APPENDIX F: STORMWATER MANAGEMENT PLAN

Stefanutti Stocks
Inland Region

Stormwater Management Plan

For:
Goldwind Africa Pty Ltd

Project:
Ummbila Emoyeni WEF Project

Project Number: INREN00006

Contract Name: Ummbila Emoyeni

Stormwater Management Plan

Project Number : INREN00006

Project Name : Ummbila Emoyeni WEF

Client : Goldwind Africa (Pty) Ltd

Contract Manager : Nelius Smith

Revision : 0

Date Start : 17 May 2025

Date End :

Document Review Register

No	Initials	Surname	Occupational Category	Operation / Dept.	Date	Signature

CONTENTS

TERMS AND DEFINITIONS

EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Program
EMP	Environmental Management Plan
NEMA	National Environmental Management Act
OHSA	Occupational Health and Safety
RTSF	Regional Tailings Storage Facility
R & R	Rest and Recuperation
RWD	Return Water Dam
NWA	National Water Act
WMA	Waste Management Act
WUL	Water Use Licence

Stormwater Management Plan

1 INTRODUCTION

The Stormwater Management Plan has been prepared to describe the works undertaken by the contractor during the construction period of the Ummbila Emoyeni WEF project and its associated quarries within the area.

2 PURPOSE

This Stormwater Management Plan has been developed to encourage and recognize construction practices on stormwater management and the effort to reduce run-off of rainwater and wastewater from construction areas. This water can often contain debris, chemicals, eroded soil, and other pollutants, which can be carried into streams, rivers, lakes, wetlands, and surrounding areas.

The purpose of stormwater management is to prevent stormwater from entering the works in a manner that results in soil erosion, which may have a detrimental effect on the construction works, particularly during the following operations:

- Establishment of the construction mining works area.
- Clearing and grubbing of vegetation.
- Creation and maintenance of various stockpiles.
- Construction of stormwater protection bunds and stormwater discharge points.
- Construction and maintenance of temporary construction access roads.
- Construction of stormwater diversion berms, v-drains, and trenches in and around the quarry and access routes to work areas.

Many of these activities may result in either increased run-off and siltation or pollution of water bodies in the vicinity, several stormwater berms will be required to both divert clean run-off around the works, prevent run-off contamination with silts or sediments, and temporarily retain such run-off to allow entrained silt to settle.

The Stormwater Management Plan has been prepared to provide practical on-site controls in the construction work areas to:

- Prevent damages to the works.
- Prevent contamination of the downstream watercourse during the project construction phase.
- Provide measures to address run-off from these disturbed areas within the construction footprint.
- Avoid unnecessary run-off of water and sedimentation into worked and prepared farmlands.

3 ENVIRONMENTAL STANDARDS

Before activity takes place, Management (i.e., comprising of the Site Agents, Safety Officer, Construction Manager, and Environmental Officer) should take cognizance of the legal requirements for stormwater management, in areas agreed upon with Goldwind Africa and as per the recommendation in the Environmental Impact Assessment and Environmental Management Program (EIA), Environmental Authorisation (EA) and the Water Use Licence (WUL) applicable to the site.

Other legislative considerations include:

- National Environmental Management Act (NEMA) 107 of 1998: Provides principles for decision-making on matters affecting the environment and provides procedures for environmental assessments.
- National Environmental Management: Waste Act 59 of 2008: Measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.
- Local Municipal By-laws.
- National Water Act 36 of 1998: Ensures that the nation's water resources are protected, used, developed, conserved, managed, and controlled sustainably and equitably.

4 OBJECTIVES OF MEASURES TO BE IMPLEMENTED

This Stormwater Management Plan has the following objectives:

4.1 Control Run-off Volume and Flowrate

- Manage the quantity and flow rate of stormwater run-off caused by changes to the land, such as clearing vegetation, removal of topsoil, and changes in the ground profile from the cut and fill operations carried out during the construction phase. This will be done by the construction of stormwater cut-offs in the form of diversion berms and v-drains. This will ensure that the stormwater run-off does not generate high flow rates due to long flow paths.
- Prevent soil erosion and keep sediment from being transported to nearby water bodies by placing silt traps. This will also assist in preventing contaminants such as oil, chemicals, and construction debris from polluting local waterways and farm/ground dams

4.2 Stormwater Management Works

At Ummbila Emoyeni WEF, we prioritize effective stormwater management to protect our farmland and watercourses. Our comprehensive strategy includes the following key components:

V-Drains: We utilize V-drains to efficiently channel stormwater away from critical areas, reducing the risk of erosion and sediment build-up.

Flow Diversion: Diversion systems are implemented to regulate the flow of stormwater, directing it away from vulnerable areas and into designated channels. This helps to control runoff and protect both prepared and active farmland.

Erosion and Sediment Control: Measures are taken to prevent erosion and sediment build-up, ensuring that stormwater does not carry soil and debris into watercourses or farmland. This includes the use of sediment basins, and other erosion control techniques.

Runoff Reduction: By managing stormwater effectively, we reduce the amount of runoff entering watercourses such as groundwater dams. This helps to maintain water quality and prevent flooding.

Ummbila Emoyeni WEF's stormwater management works are designed to safeguard agricultural land and water resources, promoting sustainable farming practices and environmental protection.

5 ROLES AND RESPONSIBILITIES

The management and labourers will be the personnel responsible for managing stormwater.

Site Manager’s roles and responsibilities are to ensure the following:

- All personnel involved in activities related to the stormwater drain are competent to do so.
- Monitor and ensure the activities related to the Stormwater Management Plan remain relevant and current.
- If and when necessary, revise the Stormwater Management Plan to accommodate any changes on site.

Foremen's responsibilities include:

- Supervision of all related operations.
- Ensure frequent toolbox talks are held where the work activities, safety, and environmental hazards and mitigations in this Stormwater Management Plan are discussed with Plant Operators and Labourers.
- Ensuring all activities are carried out as per this Stormwater Management Plan.
- Ensure that the control measures stipulated in this Storm Water Management Plan are implemented in his/her section(s).

Safety officer’s roles and responsibilities are to:

- Ensure that all personnel comply with the OHSA in the execution of their duties.
- Ensuring employees are inducted and aware of their roles and responsibilities.
- Assist in identifying and mitigating hazards and risks in the work area.
- Ensure that plant and operators' certifications and licenses are valid.

Environmental Representative roles and responsibilities are to:

- Ensure all activities are carried out as per this Storm Water Management Plan and comply with the contract specification and relevant legal requirements.
- Compile material for site awareness and toolbox talks.
- Conducting inspections, compilation of reports, and an action plan to address the identified Impacts or Aspects.
- Compile inspection and monitoring documents for the weekly and monthly checks.
- Ensure that no watercourses are silted up through the proposed stormwater trapezoidal channels.
- Ensure that stormwater channels do not cause any damage to surrounding areas where they daylight.
- Ensure that no erosion occurs in the stormwater run-off areas.

Labourers and Operators shall:

- Comply with the instructions issued by the Contracts Manager, Foremen, Safety Officer, and Environmental Rep.
- Ensure that work is carried out in compliance with the Stormwater Management Plan.
- Report all incidents and deviations from this plan to the Safety Management Department.

All personnel involved ensure that activities are conducted in accordance with WUL, the SWMP, the EIA/EMP, and the EA.

6 POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS

Possible negative impacts identified at the stormwater drains may occur during the construction and maintenance stage, which will involve soil pollution and degradation if no mitigation measures are put in place and maintained.

7 PREVENTATIVE MEASURES AND STORMWATER MANAGEMENT TOOLS

7.1 Excavations

When excavated materials will be used for backfilling and where practicable, materials will be placed upstream of excavations to act as berms for re-directing stormwater run-off during rain events.

7.2 Borrow areas

All borrow areas are to be protected from stormwater intrusion by way of placing berms on the upstream side of the borrow pits to direct any stormwater around the pit. Borrow pits will be constructed in a manner that allows the pit to drain freely toward the concrete pipes, trapezoidal channels, and v-drains. This will ensure that the water does not pool in the pit.

7.3 Stockpile areas

Stockpile protection will involve cutting miter drains upstream of the stockpiles and constructing and maintaining protection berms both upslope and downslope of the stockpiles. Stockpiling must not take place in drainage lines or areas where it will impede surface water run-off.

7.4 Vegetation-cleared areas

Vegetation clearance must be limited to areas where construction activities will occur, and mitigation measures must be implemented to reduce the risk of erosion and alien species invasion. Topsoil stockpiles shall be kept at a maximum height of 2m and covered with indigenous vegetation to prevent soil erosion.

7.5 Construction Equipment

All construction equipment which includes plant, generators, and water pumps will be provided with drip trays to be in place when in use or stored/parked, to contain any potential fuel/oil leaks interacting with surface water and soil.

7.6 Access ramps

Access ramps over drains/berms will be reviewed and where possible, be provided with a pipe/portal.

7.7 Fuel, Oil storage and other chemicals

Fuels are stored in tanks and bunded. The bunded area is provided with a concrete floor and has a capacity of more than 110% of the total storage capacity of all the tanks. Oil is stored in drums in a bunded area. Used oil is collected and recycled by registered service provider. The fuel filling area is provided with a solid concrete surface with a sump to collect spillage and water run-off.

7.8 Protection of works when Contractor off-site

Protection of works will be incorporated over R&R (Pay) weekends, Easter and December breaks.
Areas identified will be as far as reasonably practicable, managed, and maintained to avoid any overflow, diversion, or run-off to damage or contaminate any other streams, waterbodies, or work areas. Assessment of areas to be done by the responsible personnel mentioned above before the closure over long periods and pay weekends.

8 TRAINING REQUIREMENTS ABOUT THIS STORMWATER MANAGEMENT PLAN

Any person involved with the execution of any construction work on this project, including contractors (subcontractors) must receive induction training regarding the requirements and its implementation on site.

9 INSPECTION, MAINTENANCE AND RECORD KEEPING

- Inspect weekly or after significant rain events.
- Repair/ replace damaged silt traps, berms, trenches, etc., and removal of sediments where required; and
- Record keeping of inspections.

10 REVIEW/UPDATE OF THIS SPECIFICATION

This plan must be reviewed/updated whenever any changes are made to any of the processes contained herein or whenever the client specifications are revised and thereafter it must be approved by the project manager.

APPENDIX G:REHABILITATION PLAN

Ummbila Emoyeni

Borrow Pit

SUBCONTRACTOR:	EPC CONTRACTOR:	EMPLOYER: Ummbila Emoyeni (RF) (Pty) Ltd
Stefanutti Stocks	**Goldwind New Energy South Africa (Pty) Ltd**	

DOCUMENT CONTROL

Authorisations	Name	Description	Signature	Date
Author	H Botha	**Rehabilitation Plan**		
Reviewed by	N Smith			

REVISION HISTORY

Rev	Date	Affected Sections & Description	Originator
01			

Contents

Rehabilitation Procedure for the Ummbila Emoyeni Borrow Pit

1 Introduction

This Rehabilitation Procedure outlines the procedures for rehabilitating disturbed areas within the Ummbila Emoyeni Wind Energy Facility borrow pit. The primary objective is to restore the environmental integrity of the site by addressing areas disturbed during construction, including access roads, mining area and any other impacted zones. The rehabilitation process will follow the guidelines specified in the Environmental Management standards to mitigate environmental impacts, enhance ecological recovery, and ensure compliance with relevant environmental legislation.

2 Scope of Rehabilitation Work

Rehabilitation will be carried out on all areas disturbed during the construction and mining phase. This includes:

- Access roads no longer required during the operational phase.
- Temporary construction areas such as laydown yards, construction mining zones, and any other affected zones.
- Other disturbed land within the project site.

The rehabilitation will ensure that the disturbed areas are cleared of all foreign material, levelled, and re-vegetated with indigenous plant species to restore ecological balance, prevent erosion, and enhance biodiversity.

3 Objectives of Rehabilitation

- **Erosion Control:** Prevent further erosion of soil, especially in areas vulnerable to wind or water erosion.
- **Ecological Restoration:** Promote the return of indigenous plant species and prevent the spread of alien invasive species.
- **Soil Stability:** Ensure that topsoil is replenished, and compacted areas are addressed to allow healthy root growth for re-vegetation.
- **Long-term Sustainability:** Minimize the long-term environmental impacts and foster ecological sustainability by applying best practices for soil stabilization and vegetation re-establishment.

4 References & Requirements

General Waste Management Procedure Work
Department of Water Affairs and Forestry, 1998,

- Waste Management Series. Minimum requirements for the Handling and Disposal of Hazardous Waste
- Occupational Health and Safety Act (OHS Act 1993) and its Regulations.
- Environmental Conservation Act. 73 of 1989
- National Environmental Management Waste Act 59 of 2008
- National Water Act (Act No. 36 of 1998)
- Provincial Laws and Local by Laws
- Department of Water Affairs and Forestry, 1998, Waste Management Series. Minimum

Requirements for the Handling and Disposal of Hazardous Waste

- Environmental Conservation Act. 73 of 1989

5 Rehabilitation Process

5.1 Clearing and Cleaning

- **Clearance of Foreign Material:** All disturbed areas must be cleared of foreign material such as construction debris, waste, invasive plant species, and any leftover construction materials. The area must be thoroughly cleaned to ensure that no remnants of construction activities remain.
- **Pre-Rehabilitation Inspection:** Prior to initiating rehabilitation works, an inspection will be conducted to ensure the areas to be rehabilitated are free of any contamination or foreign materials, including large construction debris, machinery remnants, and waste.

5.2 Topsoil Importation

- **Topsoil Importation Requirements:** Where the existing topsoil is insufficient, additional topsoil will be imported to a minimum depth of 75mm and up to a maximum of 150mm. The topsoil must be of good quality, free of contaminants such as invasive plant species, and sourced from approved suppliers or nearby undisturbed areas where it will not lead to further ecological degradation.

- **Topsoil Handling and Protection:** Stockpiled topsoil will be protected from erosion and contamination. During stockpiling, the shape and slope of the stockpile will be designed to minimize soil loss. The topsoil will be stored in a manner that prevents the separation of finer and coarser particles, ensuring that it retains its fertility and structure.
- **Topsoil Application:** Once levelling is complete, the imported topsoil will be spread evenly across the disturbed areas to the required depth (75mm to 150mm). This topsoil will be used to promote the successful growth of indigenous plant species, providing a healthy seedbed, and enhancing soil fertility.

5.3 Revegetation and Landscaping

- **Site Preparation for Revegetation:** After topsoil is applied, the area will be prepared for vegetation establishment. The soil will be scarified or lightly ripped to a depth of 50–100mm to break any compacted layers and improve water infiltration and root penetration. This will be done in conjunction with the planting activities, ensuring that soil moisture levels are adequate for seed germination and plant growth.

- **Selection of Plant Species:** Indigenous plant species that are appropriate for the local climate, soil type, and ecological conditions will be selected. Species should include a mix of grasses, forbs, and small shrubs, which are native to the area and provide habitat for local fauna. Species selected should be non-invasive and adapted to the specific environmental conditions of the rehabilitation areas.
- **Seeding and Planting:** The seeding (if required) will be carried out using a mix of locally collected or commercial indigenous seeds that are suited to the various zones of the rehabilitation area. In addition, mechanical transplanting of local vegetation will be employed to speed up the process, especially in areas with high moisture content, such as wetlands or stream buffers.
- **Seeding Method:** The seeding method will be adapted depending on the area's characteristics. A broadcast seeding method will be used for flat, low-lying areas, while seed drilling or row planting may be employed in more compact or uneven terrain.
- **Timing of Revegetation:** Revegetation activities will be timed to coincide with optimal growing seasons, ideally between April and October, to allow for successful germination and establishment of vegetation.

5.4 Water and Irrigation Management

- **Irrigation of Re-vegetated Areas:** To support initial plant growth, irrigation may be required, especially in areas with insufficient natural rainfall. A temporary irrigation system may be installed, particularly in the early stages of rehabilitation, to ensure that newly planted vegetation receives adequate water for establishment.
- **Water Management:** The rehabilitation areas will be monitored for water management issues, particularly during heavy rainfall events. Drainage channels may need to be installed or adjusted to ensure proper runoff control, reducing the potential for erosion and waterlogging.

5.5 Alien Invasive Species Management

- **Control of Invasive Species:** Any alien invasive species present in the rehabilitation area must be identified and eradicated. This will include mechanical removal or controlled use of herbicides (where appropriate and approved). Follow-up clearing operations will be conducted to ensure that any regrowth of invasive species is controlled.
- **Post-Rehabilitation Monitoring:** Ongoing monitoring will be conducted to assess the success of rehabilitation efforts. Any alien invasive species identified during the monitoring process will be promptly addressed to prevent encroachment into the rehabilitation area.

6 Monitoring and Reporting

6.1 Monitoring Procedures

- **Regular Site Inspections:** The Environmental Officer (EO) will conduct regular inspections of the rehabilitation areas to assess progress. Inspections will focus on the condition of topsoil, the health of planted vegetation, the presence of invasive species, and any signs of erosion or soil degradation.
- **Revegetation Success:** Success of revegetation will be determined by the establishment of a healthy and diverse plant cover, with a specific focus on the presence of indigenous species.
- **Erosion Control:** Erosion risk will be assessed during inspections, and corrective measures (such as additional planting or the installation of erosion control fabric) will be implemented if required.

6.2 Final Reporting

A final environmental audit report will be compiled and submitted to the relevant authorities within 30 days of completing rehabilitation activities. This report will assess the success of the rehabilitation program, identify any challenges encountered, and propose corrective measures if necessary.

7 Conclusion

This Rehabilitation Method Statement ensures that the disturbed areas within the Ummbila Emoyeni Wind Energy Facility borrow pits are effectively restored to their natural state. The rehabilitation process will involve thorough cleaning, levelling, importing of topsoil, and appropriate re-vegetation with indigenous species. With proper monitoring and follow-up, the project aims to reduce environmental impacts and contribute to long-term ecological sustainability of the site.

APPENDIX H: EMERGENCY PREPAREDNESS AND RESPONSE PLAN

Ummbila Emoyeni

Borrow Pit

SUPPLIER/ SUBCONTRACTOR: Stefanutti Stocks	**EPC CONTRACTOR: Goldwind New Energy South Africa (Pty) Ltd**	**EMPLOYER: Ummbila Emoyeni (RF) (Pty) Ltd**

Emergency Preparedness and Response Plan

DOCUMENT CONTROL

Authorisations	Name	Description	Signature	Date
Author	Heinrich Botha	CHSM		
Reviewed by	Sherwin Singh	Construction Manager		
Approved by				

REVISION HISTORY

Rev	Date	Affected Sections & Description	Originator
00	2025/04/15	Initial	

Table of Contents

1 REFERENCES

Emergency Preparedness and Response Core Procedure	SSS/SEQ/CPR005
Emergency Preparedness and Response Plan Specification	SSS/SEQ/SPF004

2 FORMS AND TEMPLATES

Workers Register	
Visitors Register	
Emergency Contact List	
Site Layout Plan	

3 SCOPE OF PLAN

The Scope of Work for this project will be undertaken in the municipal area of Bethal, within the Mpumalanga Province within the border of the Republic of South Africa and includes the following key Operations with regards to the works -

- Public Roads.
- Movement of plant and equipment
- Farming Equipment and Livestock
- Gates and Access Control.

4 PURPOSE

The purpose of this procedure is to establish and maintain a process for carrying out emergency preparedness and response actions within Stefanutti Stocks, including all areas of its operations. The main aim of the process is to minimize the impacts of emergency situations on the environment, risks and injuries to employees, subcontractors, general public and other interested and affected parties while ensuring a rapid response and ensuring a means to account for all persons affected by an emergency.

5 SCOPE OF APPLICATION

This project occupational emergency preparedness and response plan is applicable to all persons, including client representatives, contractors (subcontractors) and employees on the project.

6 EMERGENCY PREPAREDNESS AND RESPONSE IMPLEMENTATION

6.1 Roles and Responsibilities (on the project)

The Construction Manager must:

- It is the responsibility of the Construction Manager to ensure that suitable health and safety standards and procedures are implemented and maintained.
- It is the responsibility of the Construction Manager to co-ordinate, monitor and control the various activities pertaining to the implementation and maintenance of emergency planning in accordance with legal requirements.
- The Construction Manager shall be the contact person between the Client/Client Agent and Stefanutti Stocks.

The Construction Health and Safety Officer must:

- Ensure that the procedure as set out in this document is followed and adhered to at all times during any emergency response.
- Ensure proper communication and reposting of the emergency takes place.
- Coordinate with the Construction Manager in emergency situations and take lead in assisting support personnel.

The Construction Supervisors must:

- The Supervisor is responsible for the front-line field management of the incident within his areas of responsibility.
- For determining whether outside assistance is required, and for relaying requests for internal resources or outside assistance through the Emergency Management Team.

The Health and Safety Representatives must:

- Assist within its area of responsibility, identify possible witnesses and gathering of information.
- Assist the site safety officer with the management of the affected area.
- All employees must:
- To adhere to and follow this emergency procedure as communicated on the Ummbila Emoyeni Borrow Pit project.

6.2 Resources

- First Aid Boxes
- Trained and Competent First Aiders
- External Support via Emergency Response Services
- Ambulance Services Bethal
- Police Services - Bethal
- Fire Department -Bethal
- Department of Employment and Labour - Bethal

6.3 Management Responsibility and Commitment (on the project)

To minimize the severity and impact to Stefanutti Stocks employees from all emergencies by establishing and maintaining an emergency response plan that can effectively handle all emergencies.

A plan that will provide a guideline on requirements to be met, in the various types of emergencies on the Ummbila Emoyeni Borrow Pit project

Responsibility as per discussion and elaboration above as stated in the Roles and Responsibilities on this project.

6.4 Objectives and Targets

Communication of this procedure will be communicated to all within Ummbila Emoyeni Borrow Pit project. Communication will form part of the induction training.

Emergency evacuations will be conducted on a quarterly basis.

A full report with pictures and attendance registers to be kept.

On-site scenarios to be used as to better the effectiveness' of the response.

Stefanutti Stocks will perform adequate emergency response drills and exercises to facilitate the practicing of the site ERP and supporting response and rescue arrangements to ensure it is able to provide adequate response during an emergency situation.

Testing of the emergency response process will be completed through a collaborative approach involving all on the Ummbila Emoyeni Borrow Pit project.. Stefanutti Stocks will conduct 4 emergency drills during the duration of the Ummbila Emoyeni Borrow Pit project. A full report with photos and registers of the drill exercise(s) will be kept.

6.5 List of Potential Health and Safety Emergency Situations

- Fire Emergency
- Severe Weather
- Bomb Threats
- Labour/Civil Unrest and Industrial Action
- Environmental Response
- First Aid Treatment
- Medical Treatment
- Fatality
- Excavation and Trench Collapse
- Plant/Vehicle Colliding
- Hazardous and Radioactive Leakage

6.6 Environmental Aspects

- Oils
- Fuels – Diesel and Petrol
- Chemicals
- Hydrocarbons

6.7 List of Potential Environmental Emergency Situations

- Spillages
- Pollution of ground and soil

6.8 Emergency Drill Procedure

- Upon declaration of a project emergency, the alarm and assembly procedure will be implemented immediately.

- Alarm: In the event of an emergency the alarm will sound. All personnel shall proceed to pre-designated assembly areas.
- The Emergency Management Team will take up their responsibilities immediately.
- The Emergency Management Team will respond immediately and facilitate clearing people out of the hazardous/ dangerous area.
- Assembly: Upon receiving instructions to assemble, all employees will secure their work area and walk in a calm, orderly manner to the assembly area. Wind direction must be taken into consideration, movement should be across wind.
- Assembly at Site Camp will be managed to the response needed.
- Securing a work area includes but is not limited to the following:
- All motorized equipment, welding equipment, and burning equipment will be shut down.
- All gas, diesel, propane, electrical, open flame and other powered equipment will be shut down immediately.
- All electrically powered tools will be disconnected from their power source.
- Employees assigned to motorized equipment/ vehicles will park on the side of the roads (in a safe area).
- Foreman will ensure all employees working in remote areas and in confined spaces have been alerted and have proceeded to the assembly area.
- Foreman will take head count of their employees with reference to the DSTI. If any employees are found to be missing, the Emergency Response Team will be informed immediately of the employee's name, employee number, and last known location of the employee.
- The Supervisors will call the roll of all employees and visitors. If any employee is found to be missing, his name, employee number, and last known location will be reported immediately to the Emergency Response Team.
- The Emergency Response Team will immediately respond to the emergency and attempt to control the situation without putting their lives at risk and help facilitate in the evacuation of employees and help with the injured.
- The Emergency Coordinator will evaluate the situation and summon additional emergency services where necessary/ required.
- No attempt will be made to locate missing employees until:

- A search is authorized by the Stefanutti Stocks Contract Manager OHS Act 16(2)(d) or Construction Manager CR 8(1) Appointee.
- It is determined that a search and rescue party can be reasonably protected during such a search.
- The Emergency Coordinator will call the emergency situation off only when it is positively determined that the danger no longer exists, and only then may employees return to their normal duties.
- Only the Stefanutti Stocks Renewable energy Contracts Manager or Construction Manager is allowed to communicate to the press and other parties outside the project inquiring about the emergency situation in compliance with the Stefanutti Stocks corporate policy.
- Scene Survey – take control of the scene, find out what happened, make sure area is safe.
- Primary Survey – quickly assess the casualty for life-threatening injuries or illnesses and give first aid.
- Secondary Survey – step by step gathering of information to complete the picture of casualty's overall condition.
- Ongoing casualty care – you continue to monitor the casualty's condition and if medical help is needed until arrival of said medical care.
- SAMPLE may be used as to establish a clear history of the casualty – Symptoms, Allergies, Medications, Past or Present medical history, last meal and Events leading to the incident.

6.9 Emergency Notification procedure

When reporting an emergency take note of the following:

- Give them your full name and telephone number.
- Name the exact area where the emergency occurred.
- Time the incident occurred.
- Type of incident which occurred e.g. fire, explosion, civil unrest etc
- Name and quantity of material involved to the known extent.
- Possible hazard to human health, environment or community.

6.10 Emergency Alarm Sounds

Emergency Alarms sounds will include air horn and or whistle to be blown.

6.11 Headcount Following Emergency Evacuation

- Each foreman and supervisor will be responsible for their team.
- The site DSTI register will be used as roll call and to ensure all is accounted for.
- Safety Officer with the assistance from the SHE Representatives, to contact each foreman, taking count of all employees on-site.
- Site Visitors register will be available, and the responsible employee will account for the visitor under his/her control
- Workers Register -DSTI
- Visitors Register

6.12 Rescue and Medical Duties

Rescue service will be contacted, and available response clarified.

Service level agreement with an Emergency medical provider.

Response emergency team member on site.

First Aid room.

Seriti Mine Medical Response service might be used as part of emergency response needed.

6.13 Methods and Responsibilities for Reporting

The responsibilities of reporting emergencies and thereby obtaining a speedy response and assistance including:

- Notify Supervisor, Foreman, First Aider or SHE Representative
- Notify Emergency Coordinator - Activate Emergency Response Team
- Notify Safety Officer- Emergency Services, Security, Fire, Ambulance
- Notify Construction Manager - Stefanutti Stocks Management, Client and Client Representatives

6.14 Emergency Contact List

Emergency contact details will be discussed and communicated within induction training.

Emergency contact details displayed on site and on notice boards

Refer to emergency Contact List

6.15 Clarification Contact List

Internal on project:

- Construction Manager: Sherwin Singh
- Client Representative: TBA
- Site CHSM : Heinrich Botha

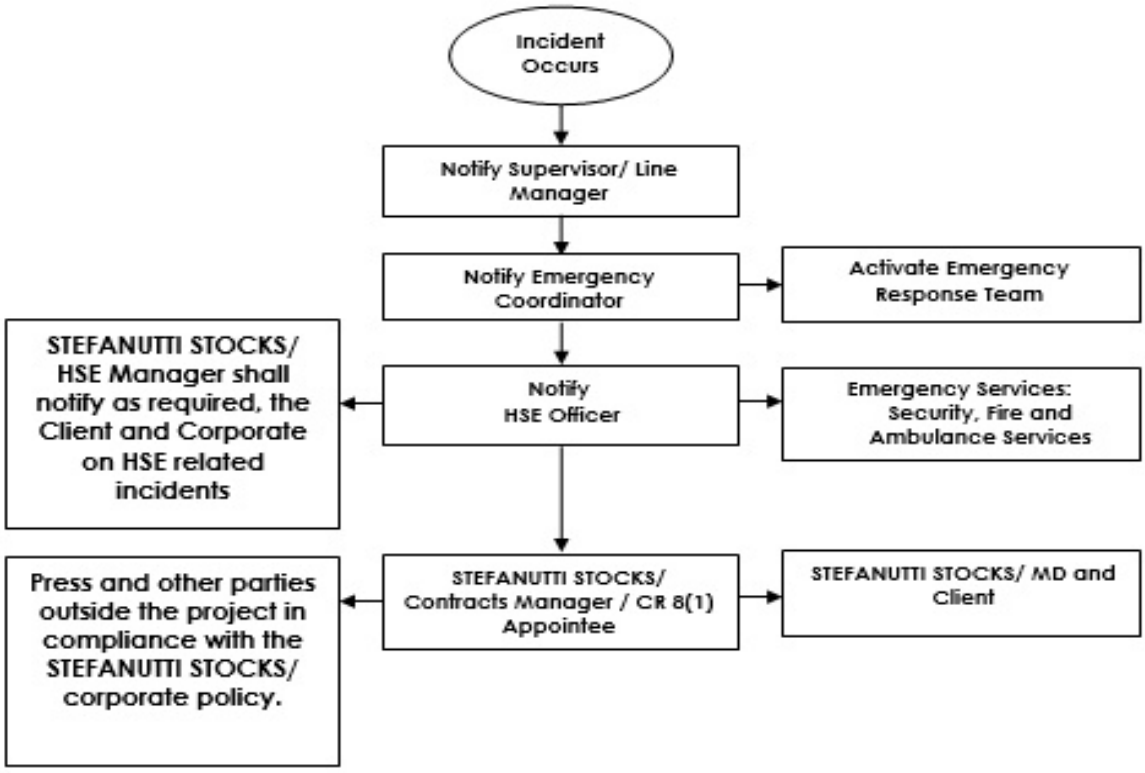
External within Stefanutti Stocks:

- Contracts Director: Joe Nell
- Project Manager: Marritus Bezuidenhout
- Safety Manager: JA Schoeman

6.16 Fatality Response

- Assess the area and ensure that no-one enters the area.
- Emergency Services to be contacted immediately.
- Police Service to be contacted.
- Department of Employment and Labour notified.
- Top Management informed
- Client Representatives informed
- Client informed

6.17 Injury Response



Contact Emergency Person.

Stefanutti Stocks Emergency Persons:

- Construction Manager CR 8(1) -Sherwin Singh
- CHSM – Heinrich Botha

As reasonably practicable first aid box and trained first aiders will be readily available on site and as required by the clients' specifications.

Injured personnel must receive immediate First Aid by the trained personal on site until the Emergency Coordinator or members of the Emergency Response Team arrive.

Assessed on site and severity of the injury to be determined by the First Aider.

Should further medical treatment be needed.

- All patient transport shall only be authorised and coordinated by the Immediate Supervisor/Foreman or Safety Officer.

- If situation is of such nature that injured be taken directly to the hospital, arrangements to be made for necessary documents to be brought to the hospital, completed and signed off.
- The patient shall be transported to the appropriate medical facility in relation to the injury, where necessary.

All First aid or medical treatment shall be reported to the immediate Foreman/Supervisor/Safety Officer immediately or before end of the shift.

6.18 Excavation Collapse Response

As part of the response, first details of what will be a collapse or fall of ground-The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person, any manmade cavity or depression in the earth's surface 1m and deeper, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation, and if installed forms or similar structures reduce the depth-to-width relationship, an excavation may become a trench.

Identification of where the position is of the buried employee, and quick response with the hand excavation within the located area.

Immediate response required by emergency services

Notification to the rescue team and site management.

Account of possible number of employees buried, by means of roll call as per DSTI with the work area.

6.19 Fire Emergencies

Contact Emergency number or sound the alarm via air horn or over the radio with specific location of imminent danger.

<u>STEFANUTTI STOCKS/ Emergency Persons:</u>

- Construction Manager CR 8(1) -Sherwin Singh
- CHSM – Heinrich Botha

- Try and extinguish it by yourself if you are trained to do so. (PASS to be communicated to all as part of Awareness Training)
- All windows and doors must be closed.
- All employees/ visitors to move in a swiftly and calm way, to the assembly point indicated to them.
- All employees will be responsible for the visitor with him/ her.
- All visitors to follow the employees and report to assembly point.
- At the assembly point, the Emergency Point Coordinator will have roll call.
- Please remember to move as calmly as possible to the assembly point.
- Make sure that there is enough space for the emergency and rescue workers/ teams to get past you.

6.20 Explosions

The Stefanutti Stocks Inland Renewable Energy Contracts Manager OHS Act 16(2)(d) or the Construction Manager CR 8(1) Appointee shall review the bomb threat to determine what course of action to follow:

Should you be the one receiving the threat, immediately contact the Contact Emergency numbers.

STEFANUTTI STOCKS/ Emergency Persons:

- Construction Manager CR 8(1) -Sherwin Singh
- CHSM – Heinrich Botha
- Or your immediate Foreman/Supervisor, who in turn will contact the Emergency Co-ordinator.

    - The Emergency Co-ordinator shall inform the Stefanutti Stocks Renewable Energy Contracts Manager OHS Act 16(2)(d) or the Construction Manager CR 8(1) Appointee and the Stefanutti Stocks Renewable energy HSE Officer.
    - The instruction to evacuate will only be given by the Emergency Co-ordinator or the Senior Manager present.
    - This instruction will include where to assemble and which route to follow.
    - Once personnel are all assembled Management will take further decision should there be a need to evacuate personnel off site.

6.21 Other Responses

6.21.1 Labour/Civil Unrest:

- Any person with the knowledge of a strike or pending strike shall inform their direct Supervisor or Line Manager immediately.
- Supervisor or manager shall ensure that the Emergency Coordinator (EC) is notified immediately regarding the number of persons involved and the location of the unrest.
- The Stefanutti Stocks Renewable Energy Contracts Manager OHS Act 16(2)(d) or the Construction Manager CR 8(1) Appointee will decide on what actions need to be taken.
- The Stefanutti Stocks Contracts Manager OHS Act 16(2)(d) or the Construction Manager CR 8(1) Appointee shall ensure communications in maintained with the client.
- Assemble of all personnel will take place at the Stefanutti Stocks laydown area as identified.

6.21.2 Severe Weather.

This includes weather such as severe thunderstorms, lightning storms and high winds.

- With the detection of thunderstorms and lighting, notice via the WhatsApp group or by cell phone will be given to all foreman and supervisors to ensure that their team members are evacuated from site and assemble at site camp.
- . Dust Suppression to be increased with regards to the control of excessive dust due to high wind conditions, dust masks readily available to assist employees faced with these types of conditions on-site.

The site shall be inspected to ensure that no loose material is left unsecured. All material that can be easily blown shall be secured when not being installed.

After the severe weather has passed, the Emergency Response Team will meet to evaluate the damage and provide feedback to the Stefanutti Stocks Renewable Energy Contracts Manager or Construction Manager and assist in the formulation of the plan to return to work.

6.21.3 Environmental Response.

Environmental emergency situation shall include but not limited to (major or unusual emissions, veld fires, explosions, major Hazardous Chemical Spillages and water leakages (section 30 NEMA incidents and section 24 NWA incidents, etc.)

- Immediately contact the emergency response team.
- Only enter or access the area if there is no exposure hazard(s) without additional PPE.
- If there is a hazard do not enter the area and keep others away.
- Be aware of the wind direction.
- If it is safe to do so, attempt to stop the cause of the incident and attempt to stop the incident spreading by applying emergency spill kits or applying similar control measures or action (e.g. stop the spillage, leak, etc).
- Handover to the emergency response team on their arrival.
- Report to the relevant authority (i.e., DWS and/ or DFFE/MDARDLEA)

Objective	Procedure	Requirements
1. Isolate the spillage to minimise danger to the workers.	➢ Erect a barricade around the spillage. ➢ Evacuate the area if there is danger of fire or fumes. ➢ Notify the fire team. ➢ Treat affected person/s.	➢ Warning notices, e.g. flammable liquids. ➢ Barricade the spillage. ➢ PPE to protect the persons erecting the barricade. ➢ Assistance from security to secure barricades and keep people away. ➢ Fire team ➢ Contact the nearest hospital.
2. Confine spillage.	➢ Isolate the spillage	➢ Shovels ➢ Sand or stone dust ➢ PPE ➢ Spill kits
	➢ Prevent or minimise the entry of chemicals into the storm water system or sewage system.	➢ Shovels ➢ Sand or stone dust ➢ PPE ➢ Spill kits
3. Clean up spillage.	➢ If the spillage is a fluid, pump the spillage into a suitable container for disposal.	➢ Pumps ➢ Labour ➢ Suitable container ➢ PPE

		➢ Pumps ➢ Labour ➢ Suitable container ➢ PPE
4. Disposal.	➢ Refer to the SDS or the suppliers	➢ Refer to the SDS or the suppliers.
5. Neutralise any material that cannot be cleaned up.	➢ Treat spillage with a suitable neutralising agent; refer to MSDS or supplier.	➢ A supply of a suitable neutralising agent in ready-to-use form ➢ PPE ➢ A suitable means of testing whether neutralisation has been effective.
6. Interception of Ground Water	➢ Excavate a drainage line to direct the water into a sump. ➢ Erect a barricade around the sump. ➢ Pump out the water into water trucks and reuse for constructions.	➢ Pumps ➢ Labour ➢ PPE ➢ Water trucks ➢ TLB

6.21.4 Plant/Vehicle Collision.

In the event where two vehicle or plant collided, this scenario will be treated as a vehicle accident as defined by the Roads Act.

The scene will not be disturbed, and vehicle or plant will not be moved, unless due to safety measures or precautions, endangering people, plant or the environment.

Photos to be taken before such measure will be communicated, and only instructions given by the Construction Manager in this regard will be accepted.

Emergency response contacted should medical assistance be required.

Police service contacted and incident to be reported to the authorities.

6.21.5 Radioactive Leakage.

Stefanutti Stocks Core Procedure to be followed within this regard.

At the time of the incident (troxler damaged) immediately contacted the ARPO or RPO.

ARPO – Ridhwaan Chicktay 082 528 2786

RPO – Martin Hopkins 071 605 8448

Construction Manager will be instructed to set up a 20m precautionary perimeter.

Mr. Martin Hopkins (RPO) will in turn immediately contacted the Department of Health to inform them of the incident.

Mr. Martin Hopkins will contact Mr. Greig Breytenbach from VI Instruments.

Communication between Mr. Martin Hopkins and Greig Breytenbach with site management to gather photographic evidence of the damaged Troxler, the purpose of this is to analyse the information provided and apply suitable precautionary measures.

7 TRAINING REQUIREMENTS

Any person involved with the execution of any construction work on this project, including contractors (subcontractors) and client representatives must receive training from a competent person on the requirements of this Emergency preparedness and Response Plan. Construction Health and Safety Officers must train all project appointed Construction Supervisors who in turn must train all persons working under their control. Contractors must train all of their own employees. The training must be scheduled in line with the requirements outlined in the Competence, Training and Awareness Core Procedure.

Testing of the emergency response process will be completed through a collaborative approach involving all on the Ummbila Emoyeni Borrow Pit project. Stefanutti Stocks will conduct 4 emergency drills during the duration of the Ummbila Emoyeni Borrow Pit project. A full report with photos and registers of the drill exercise(s) will be kept.

8 REVIEW / UPDATE OF THIS SPECIFICATION

This Emergency Preparedness and Response Plan must be reviewed / updated whenever any changes are made to any of the processes contained herein or whenever new or emerging risks are identified and thereafter it must be approved by the Construction Manager.

9 ANNEXURE A

External Contact Details EMERGENCY NUMBERS		
Police Services		017 647 9900
Ambulance Services		017 647 6341
Fire Department		017 624 3171
Medi Clinic Highveld		0861222118/084124
Principal Contractor Stefanutti Stocks		
Project Manager	Marritus Bezuidenhout	083 646 5054
Construction Manager	Sherwin Singh	074 476 2177
Safety Manager	Jan Andre Schoeman	083 785 7752
CHSM	Heinrich Botha	079 058 2214
RPO -Radiation Protection Officer	Martin Hopkins	071 605 8448
ARPO – Asst Radiation Protection Officer	Ridhwaan Chicktay	082 528 2786