WETLAND ECOLOGY SCOPING REPORT FOR ELANDSFONTEIN COLLIERY

Emalahleni, Mpumalanga

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CLIENT

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1 Introduction

The Biodiversity Company (TBC) was appointed to conduct a wetland scoping assessment comprising desktop information and also a high-level impact identification and assessment for the Environmental Impact Assessment (EIA) for Elandsfontein colliery. The applicant plans to consolidate two mining right areas into a single mining right.

2 Document Structure

This report has been compiled in accordance with the EIA Regulations, 2014 (Government Notice (GN) R982). A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 1 below.

Table 1: Report Structure

ENVIRONMENTAL REGULATION	DESCRIPTION	SECTION IN REPORT
NEMA EIA REGULATIONS 2014 (AS AMENDED)		
Appendix 6 (1)(a):	Details of – (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 3 and Appendix B
Appendix 6 (1)(b):	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix A
Appendix 6 (1)(c):	an indication of the scope of, and the purpose for which, the report was prepared;	Section 4
Appendix 6 (1)(ca):	an indication of the quality and age of base data used for the specialist report;	Section 9
Appendix 6 (1)(cb):	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 10
Appendix 6 (1)(d):	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A
Appendix 6 (1)(e):	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 8
Appendix 6(1)(f):	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	N/A
Appendix 6(1)(g):	an identification of any areas to be avoided, including buffers;	N/A
Appendix 6(1)(h):	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 5
Appendix 6(1)(i):	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7
Appendix 6(1)(j):	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 10
Appendix 6(1)(k):	any mitigation measures for inclusion in the EMPr;	Section 10
Appendix 6(1)(l):	any conditions for inclusion in the environmental authorisation;	N/A
Appendix 6(1)(m):	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
Appendix 6(1)(n):	a reasoned opinion- (i) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and	N/A

	(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
Appendix 6(1)(o):	a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
Appendix 6(1)(p):	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
Appendix 6(1)(q):	any other information requested by the competent authority.	N/A

3 Specialist Details

REPORT NAME	**WETLAND ECOLOGY SCOPING REPORT FOR ELANDSFONTEIN**
SUBMITTED TO	EIMS ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
THE CLIENT	jgeo
REPORT WRITER	**Ivan Baker** Ivan Baker is Cand. Sci Nat registered (119315) in environmental science and geological science. Ivan is a wetland and ecosystem service specialist, a hydropedologist and pedologist that has completed numerous specialist studies ranging from basic assessments to EIAs. Ivan has carried out various international studies following FC standards. Ivan completed training in Tools for Wetland Assessments with a certificate of competence and completed his MSc in environmental science and hydropedology at the North-West University of Potchefstroom..
REPORT REVIEWER	**Andrew Husted** Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
DECLARATION	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the

project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

4 Terms of Reference

The Terms of Reference (ToR) included the following:

- The delineation, classification and assessment of wetlands within 500 m of the project area;
- Implementation of WET-Health for determination of Present Ecological State (PES) of wetland areas;
- Implementation of WET-EcoServices for determination of ecosystem services for the wetland areas;
- Determine the Ecological Importance and Sensitivity (EIS) of wetland systems;
- Conduct impact assessments relevant to the proposed activity;
- Recommendations relevant to associated impacts;
- Report compilation detailing the baseline findings.
- Provide a map to identify sensitive receptors in the project area, based on available maps and database information; and
- Suggest possible impacts, mitigation and rehabilitation measures to prevent or reduce the possible impacts as per the desktop study.

5 Project Description

The Elandsfontein Colliery is located in the Witbank Coal Field on the farm Elandsfontein 309 JS. The property is approximately 16 km west of the town of Witbank in the Mpumalanga Province, South Africa. The centre point of the site is 25°53'05.01"S and 29°05'36.57"E. The Elandsfontein Colliery comprises of 2 distinct mining rights (MR314 and MR63). The applicant plans to consolidate the two mining right areas into a single mining right with associated consolidated Environmental Management Programme (EMPr). In addition, the applicant wishes to expand their existing mining operations to include additional mineral resource areas (i.e. new opencast & underground areas within the consolidated mining right boundary) (GSW, 2019). The area surrounding the project area consists predominantly of mining activities, secondary roads and agricultural areas.

The various land-use activities within, and adjacent to the project area have impacted upon the associated ecosystems according to available desktop information. A locality map of the project area is shown in Figure 1.

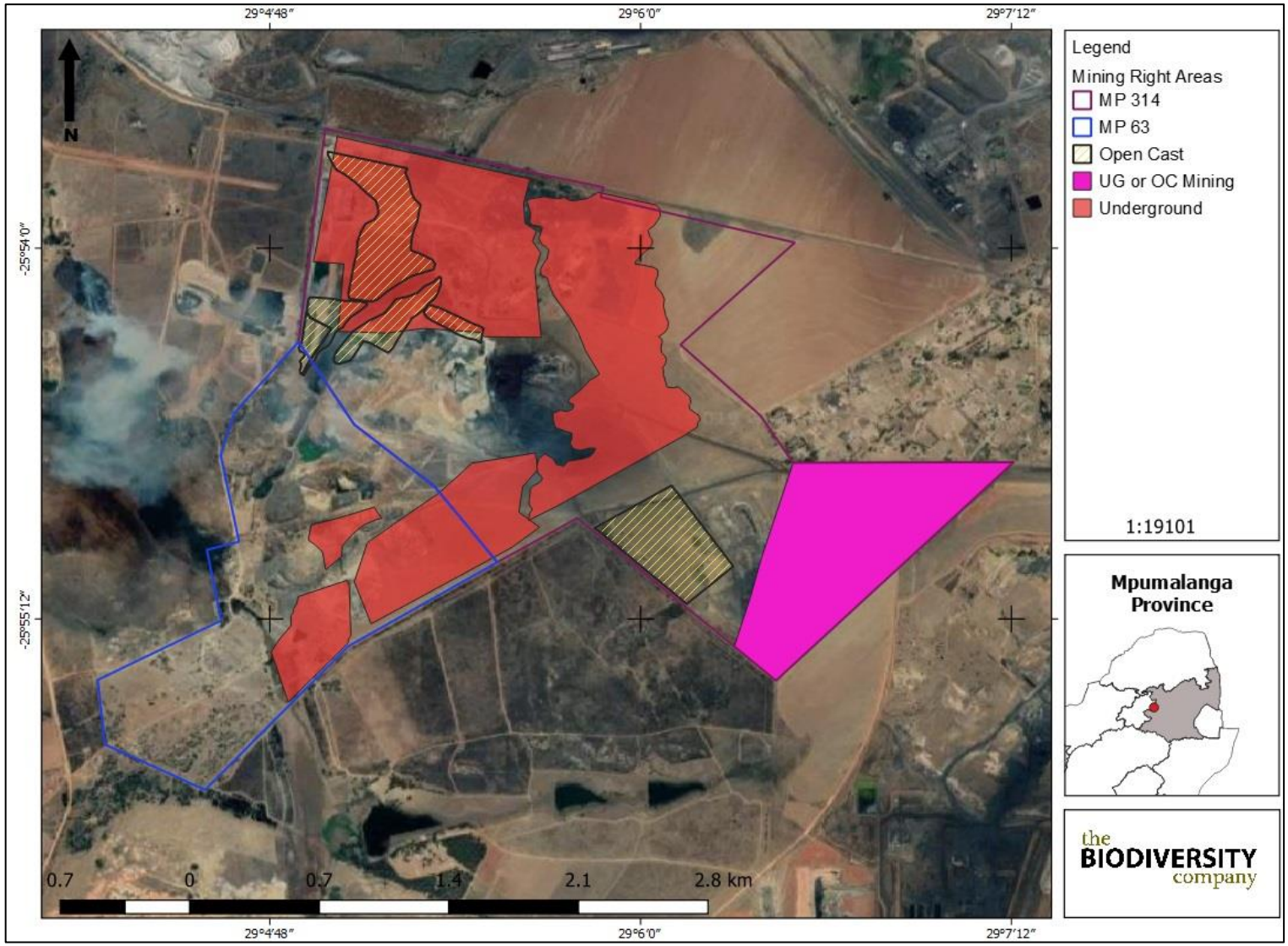

Figure 1: The proposed Elandsfontein project area

6 Key Legislative Requirements

6.1 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (Act No. 107 of 1998 – NEMA) and the associated Regulations as amended in April 2017, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation application process needs to be followed. This could follow either the Basic Assessment (BA) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

7 Limitations

The following limitations should be noted for the study:

- This assessment represents the Scoping Phase of the project only;
- A detailed wetland baseline and impact assessment report will be submitted for the Environmental Impact Assessment (EIA) phase of the project;
- The impact assessment has only been conducted for the proposed opencast and underground mining areas; and
- A field survey still needs to be conducted to advise on the viability of the alternatives.

8 Methodologies

8.1 Wetland Identification and Mapping

The wetland areas are delineated in accordance with the Department of Water Affairs and Forestry (DWAF, 2005) guidelines, a cross section is presented in Figure 2. The outer edges of the wetland areas were identified by considering the following four specific indicators:

- The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;
- The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation.
    - The soil forms (types of soil) found in the landscape were identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991);
- The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation is used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role.

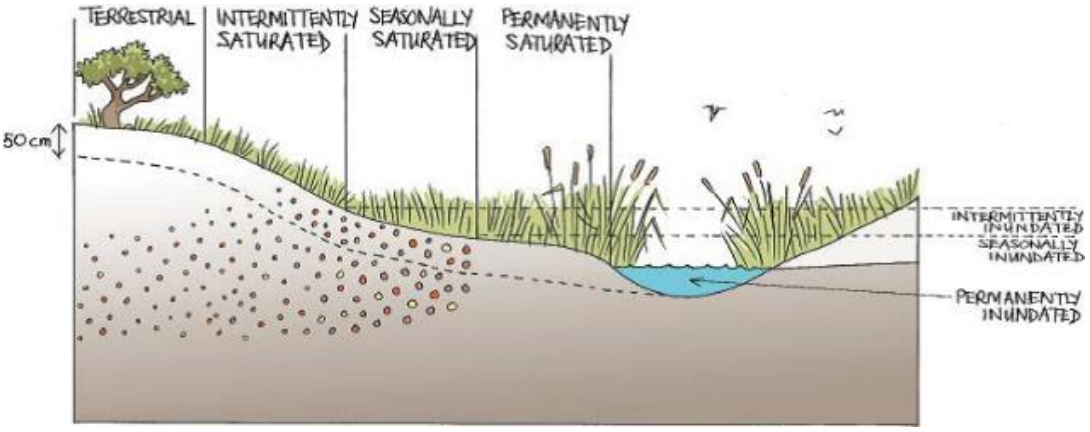

Figure 2: Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (Ollis et al. 2013)

8.2 Wetland Delineation

The wetland indicators described above are used to determine the boundaries of the wetlands within the project area. These delineations are then illustrated by means of maps accompanied by descriptions.

8.3 Wetland Functional Assessment

Wetland Functionality refers to the ability of wetlands to provide healthy conditions for the wide variety of organisms found in wetlands as well as humans. EcoServices serve as the main factor contributing to wetland functionality.

The assessment of the ecosystem services supplied by the identified wetlands was conducted as per the guidelines as described in WET-EcoServices (Kotze *et al.,* 2008). An assessment was undertaken that examines and rates the following services according to their degree of importance and the degree to which the services are provided (Table 2).

Table 2: Classes for determining the likely extent to which a benefit is being supplied

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

8.4 Present Ecological Status of wetlands

The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, and then to convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of impact of individual activities/occurrences and then separately assessing the intensity of impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The Present State categories are provided in Table 3.

Table 3: The Present Ecological Status categories (Macfarlane, et al., 2009)

Impact Category	Description	Impact Score Range	PES
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**

8.5 Ecological Importance and Sensitivity of Wetlands

The method used for the EIS determination was adapted from the method as provided by DWS (1999) for floodplains. The method takes into consideration PES scores obtained for WET-Health as well as function and service provision to enable the assessor to determine the most representative EIS category for the wetland feature or group being assessed. A series of determinants for EIS are assessed on a scale of 0 to 4, where 0 indicates no importance and 4 indicates very high importance. The mean of the determinants is used to assign the EIS category as listed in Table 4, (Rountree *et al.,* 2012).

Table 4: Description of Ecological Importance and Sensitivity categories

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

8.6 Ecological Classification and Description

The National Wetland Classification Systems (NWCS) developed by the South African National Biodiversity Institute (SANBI) will be considered for this study. This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels, and then also includes structural features at the lower levels of classification (Ollis *et al.,* 2013).

8.7 Buffer Requirements

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

8.8 Impact Assessment Methodology

The methodology used in determining the significance of potential environmental impacts relating to the Elandsfontein project was supplied by EIMS. The details of this methodology can be made available on request.

9 Receiving Environment

9.1 Vegetation Types

The MRA is located within two vegetation types, including the Rand Highveld Grassland (Gm 11) Eastern Highveld Grassland (Gm 12). The distribution of the Rand Highveld Grassland ranges between the North-West, Gauteng, Free State and Mpumalanga provinces. This vegetation type can be found between rocky ridges specifically between Witbank and Pretoria. The Rand Highveld Grassland extends into these ridges in the Stoffberg area as well as west of Krugersdorp stretching all the way to Potchefstroom. The preferred altitude for this vegetation type is between 1300m and 1635m above sea level (Mucina & Rutherford, 2006).

Grass species commonly found in these regions include the genera *Themeda. Eragrostis, Elionurus* and *Heteropogon*. The diversity of herbs is high in these regions with rocky ridges and hills being colonized by sparse woodlands accompanied by a rich suite of shrubs with the genus *Rhus* making up the bulk thereof (Mucina & Rutherford, 2006). The sparse woodlands in this vegetation type includes species like *Protea caffra* subsp., *Caffra, Acacia caffra, P. Welwitschii* etc.

The project area falls within the Eastern Highveld Grassland (Gm 12) vegetation type. This vegetation type is located in the Gauteng and Mpumalanga province within the plains between Belfast and Johannesburg. This vegetation type also extends to Bethal, the western areas of Piet Retief and Ermelo. The altitude in which this vegetation type occurs ranges between 1 520 meters above sea level to 1 780 meters above sea level (Mucina & Rutherford, 2006).

The vegetation of this vegetation type is characterised by short and dense grasslands that occur in moderately undulating plains which include low hills and pan depressions (Mucina & Rutherford, 2006). Small scattered rocky outcrops are common in this area with wiry, sour grasses accompanied by some woody species which include *Celtis africana, Parinari capensis, Protea caffra* etc.

The conservation status of the Gm 12 vegetation type is endangered with a target percentage of 24. Half of the area is already transformed into agriculture, mining, urban etc. with a handful of conservation areas still up and running. These include Holkranse, Nooitgedacht Dam and Morgenstond (just to name a few) (Mucina & Rutherford, 2006).

9.2 Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Bb 13 and the Ba 5 land types. Figure 3 illustrates the respective terrain units relevant to the Bb 13 land type with the expected soils illustrated in Table 5. Figure 4 illustrates the respective terrain units relevant to the Ba 5 land type with the expected soils illustrated in Table 6.

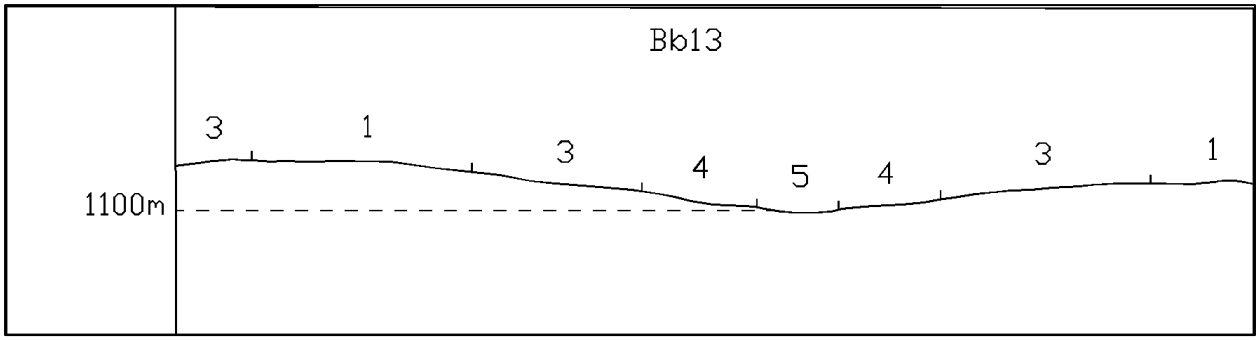

Figure 3: Illustration of land type Bb 13 terrain units (Land Type Survey Staff, 1972 - 2006)

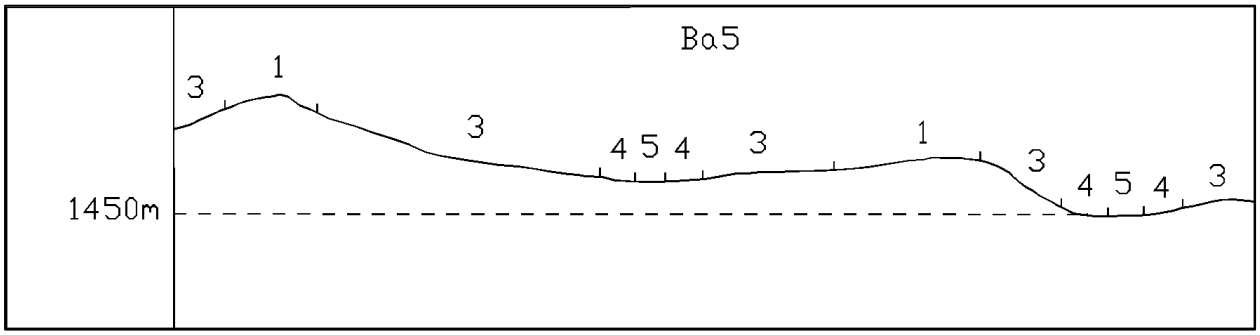

Figure 4: Illustration of land type Ba 5 terrain units (Land Type Survey Staff, 1972 - 2006)

Table 5: Soils expected at the respective terrain units within the Bb 13 land type (Land Type Survey Staff, 1972 - 2006)

Terrain units							
1 (40%)		**3 (45%)**		**4 (10%)**		**5 (5%)**	
Clovelly	45	Avalon	35	Avalon	30	Karspruit	40
Glencoe	25	Clovelly	35	Longlands	25	Kroonsdad	30
Hutton	15	Hutton	10	Kroonstad	15	Furnwood	20
Avalon	15	Glencoe	10	Glencoe	10	Longlands	10
		Longlands	5	Wasbank	10		
		Kroonstad	5	Furnwood	10		

Table 6: Soils expected at the respective terrain units within the Ba 5 land type (Land Type Survey Staff, 1972 - 2006)

Terrain units							
1 (20%)		**3 (60%)**		**4 (15%)**		**5 (5%)**	
Hutton	60	Hutton	40	Hutton	25	Rensburg	50
Glenrosa	20	Avalon	15	Avalon	15	Katspruit	30
Clovelly	10	Glencoe	10	Longlands	15	Swartland	20
		Glenrosa	10	Kroonstad	10		
		Clovelly	5	Bonheim	10		

	Longlands	5	Clovelly	10	
	Swartland	5	Swartland	5	
	Wasbank	5	Glencoe	5	
	Mispha	5	Wasbank	5	

The geology of this vegetation type is characterised by the Pretoria group and the Witwatersrand Subgroup's quartzite ridges as well as the Rooiberg Group's Selons River Formation which is from the Transvaal Supergroup. The parent geology from this vegetation type supports shallow soils like Glenrosa and Mispah which typically forms on slopes and ridges where topsoil is likely to wash off (Mucina & Rutherford, 2006).

9.3 Climate

The climate for the Rand Highveld Grassland is characterised by a summer rainfall with a mean annual precipitation of 654mm which is slightly lower in the western parts of this vegetation type see (Figure 5). These areas are known to have warm-temperate conditions with dry winters. The likelihood of frost however is greater in the western parts with the incidence of frost ranging from 30 to 40 days compared to the east which has a frost incidence of 10 to 35 days (Mucina & Rutherford, 2006). This vegetation type is also classified as endangered even though very little conservation has been done for this vegetation type.

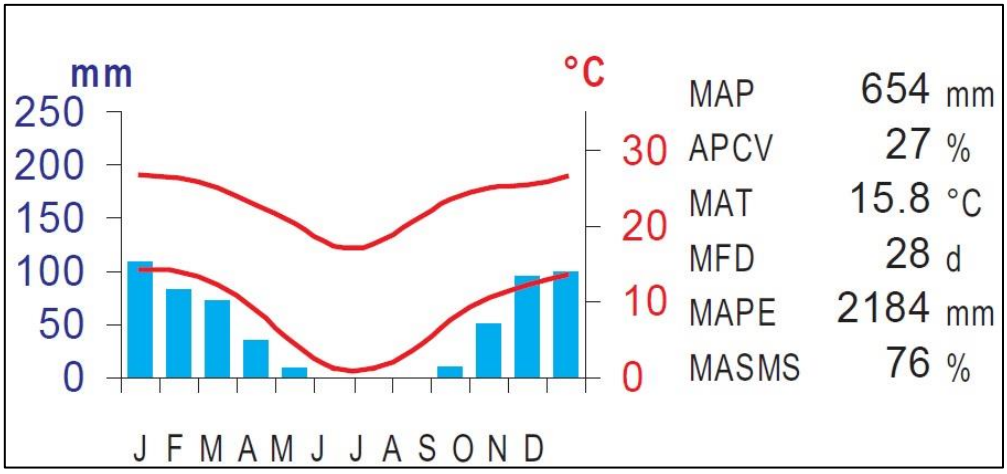

Figure 5: Climate for the Rand Highveld Grassland (Mucina & Rutherford, 2006)

9.4 River lines and Mpumalanga Highveld Grassland Wetlands

Various non-perennial and perennial streams have been identified within the proposed project area by means of the "2529" quarter degree square topographical river line data set. The Mpumalanga Highveld Grassland Wetland Layer indicates an additional wetland within the MRA, namely a floodplain wetland with various other wetland types located within the MRA's surroundings (see Figure 6).

9.5 NFEPA Wetlands

Two types of NFEPA wetlands were identified within the MRA, namely channelled valley bottom wetlands as well as seeps (see Figure 7). The channelled valley bottom wetlands are classified as natural and the seeps are classified as artificial.

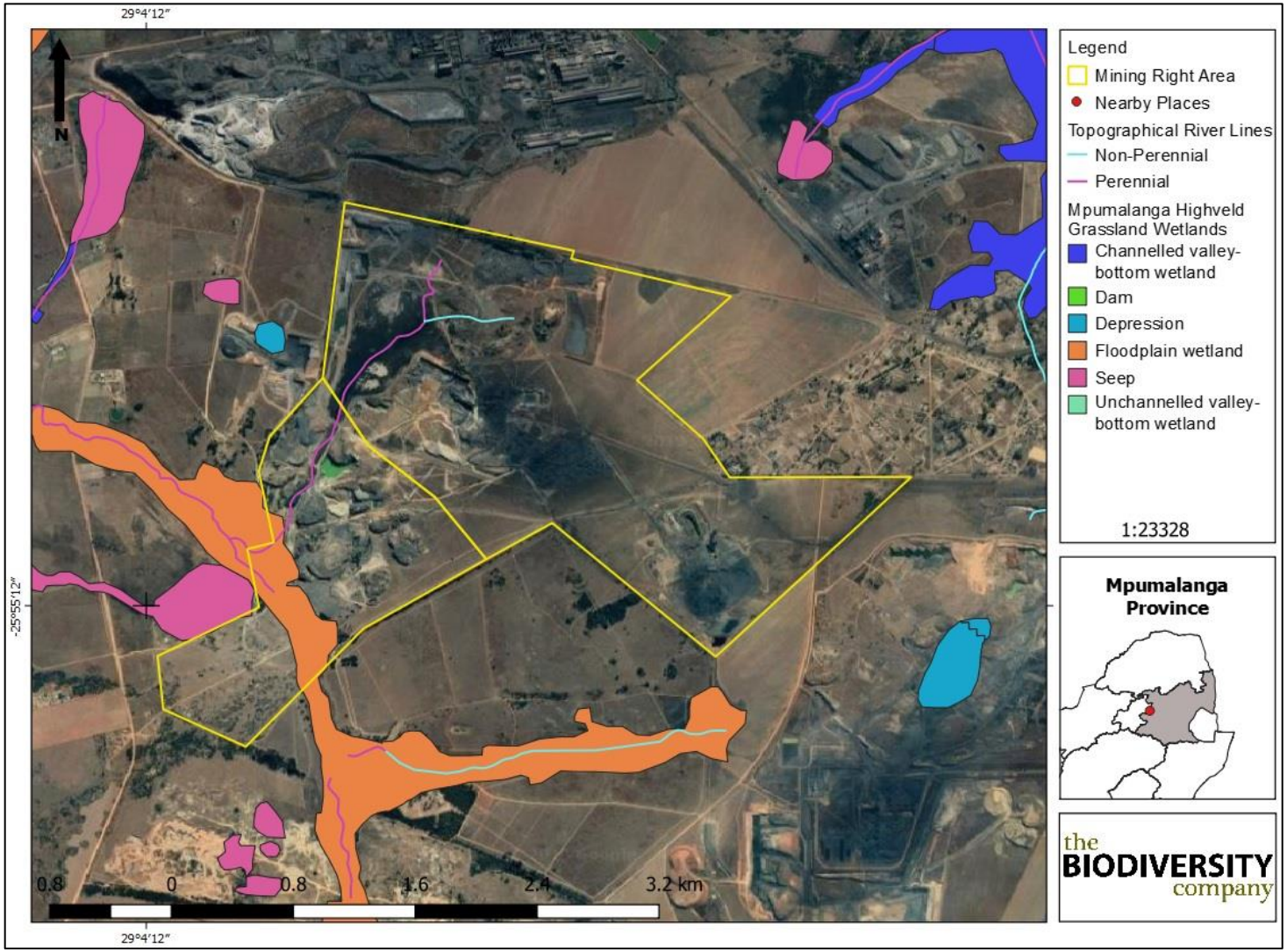

Figure 6: Illustration of topographical river lines and the Mpumalanga Highveld Grassland Wetlands

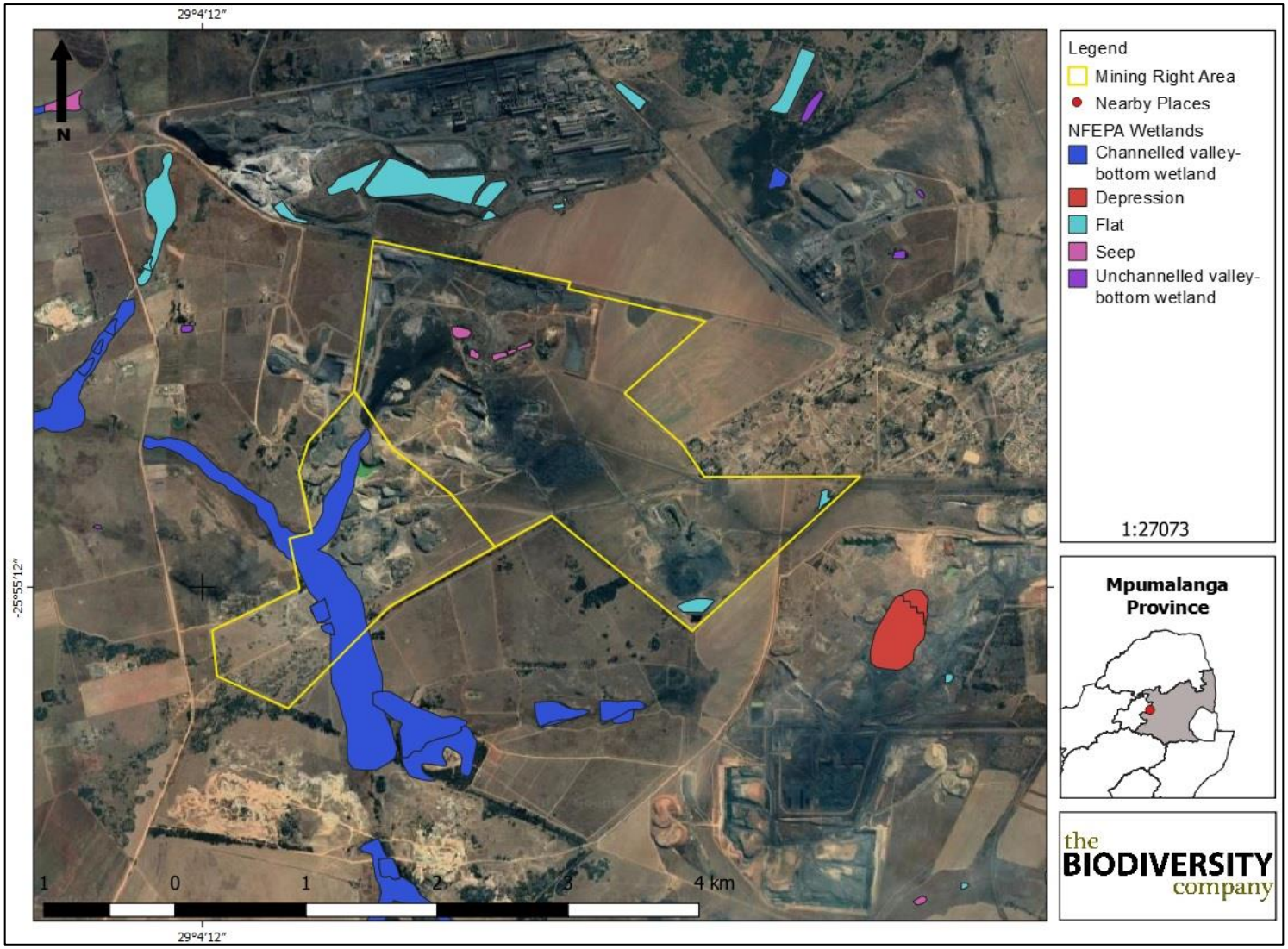

Figure 7: NFEPA wetlands within the project area and its surroundings

10 Impact Assessment

The summarised impact assessment is a prediction of the risks/impacts that will be associated with the mining phases associated with the proposed opencast and underground mining areas. A full impact assessment will be completed once the final fieldwork assessment has been conducted. The risk assessment ranges from moderate to low for the anticipated risks and activities associated with the project. One main impact has been taken into consideration for the proposed activities, namely “Loss/Degradation of wetlands”.

It is worth noting that the subsidence investigation report (Geomech Consulting, 2019) indicated various areas characterised by a “High” risk of subsidence, with various other areas characterised by “Moderate” risks. The north-western corner, where wetlands are expected to be undermined has not been assessed in regard to subsidence risks (see Figure 8).

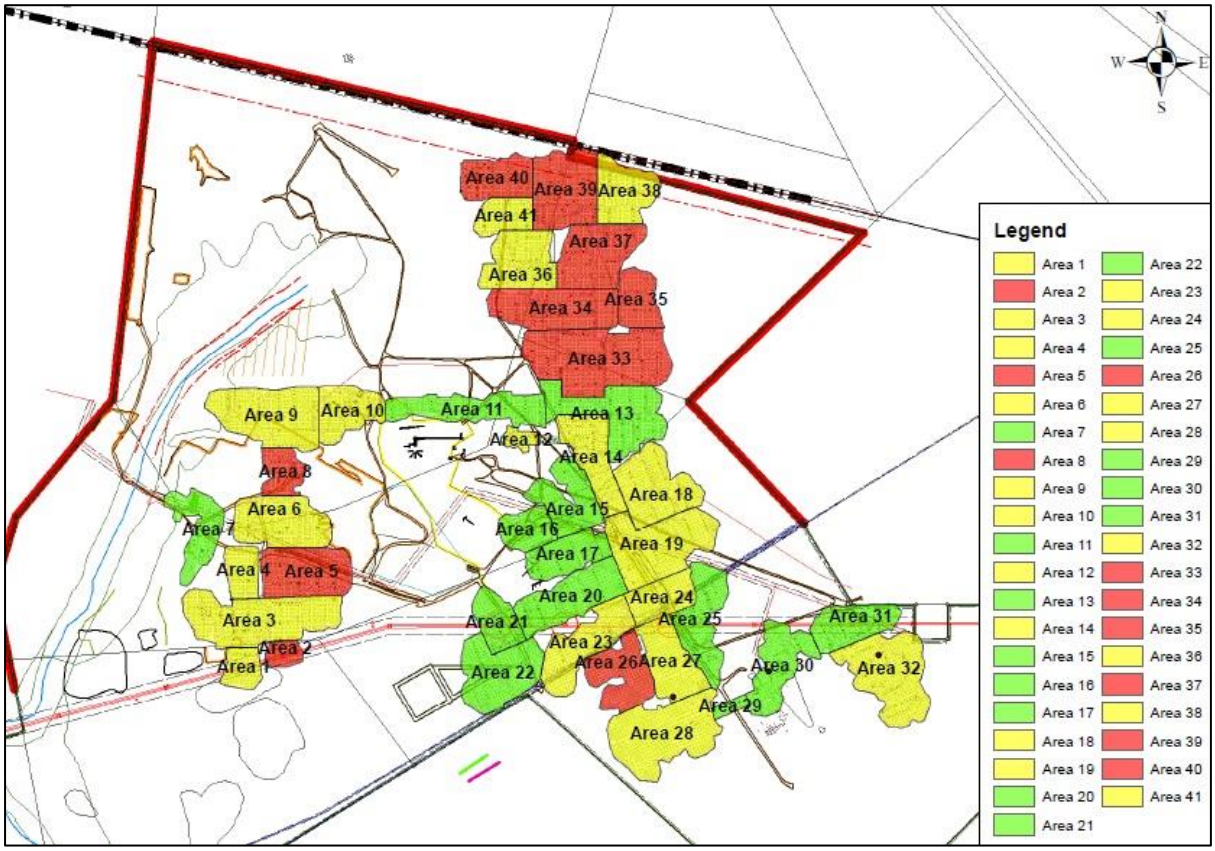

Figure 8: Subsidence risk level

10.1 Planning Phase

Opencast and Underground Mining

The final significance rating has been determined to be “Low” given the duration of planning activities, the lower magnitude of impacts and the fact that roads already are in existence throughout the project area, which will be utilised during the planning phase.

10.1.1 Mitigation

No mitigation measures are required for this phase, given the fact that the pre- and post-mitigation environmental risks are expected to be the same (“Low”).

10.1.2 Cumulative Impact

The cumulative impact rating has been scored “High” given the extent of existing mining activities within 500 m of the desktop wetlands as well as the expected degradation of the wetlands as a result of mining activities.

10.1.3 Irreplaceable Loss

The planning phase of the relevant activities are not expected to result in irreplaceable loss of wetlands.

10.2 Construction Phase

Opencast and Underground Mining

The final significance rating for the construction of the opencast and underground mine and associated infrastructure has been determined to be associated with a “Moderate” final significance score. This includes blasting activities, construction of associated infrastructure and stripping of topsoil.

10.2.1 Mitigation

The following mitigation measures are prescribed to ensure the final significance rating mentioned above is reached;

- Make use of existing mining infrastructure and access routes where possible;
- Wetland areas and associated buffer zones must be avoided;
- Vehicles are to be serviced at a suitable workshop and re-fuelled at designated filling areas with appropriate pollution control facilities;
- An alien vegetation removal and management plan must be implemented for the from the onset of the opencast mining phase of the project;
- General stormwater management practices should be included in the design phase and implemented during the life of the project; and
- An inspection of the rehabilitated areas should be completed within one month of completing this phase.

10.2.2 Cumulative Impact

The cumulative impact rating has been scored “High” given the extent of existing mining activities within 500 m of the desktop wetlands as well as the expected degradation of the wetlands as a result of mining activities.

10.2.3 Irreplaceable Loss

The costruction phase of the relevant activities may result in irreplaceable loss of wetlands.

10.3 Operational Phase

Opencast and Underground Mining

The final significance rating for the operations of the opencast and underground mine and associated infrastructure has been determined to be associated with a “Moderate” final significance score. This includes blasting activities, traffic of heavy machinery, sedimentation, dust accumulation within wetlands, erosion etc.

10.3.1 Mitigation

The following mitigation measures are prescribed to ensure the final significance rating mentioned above is reached;

- Make use of existing mining infrastructure and access routes;
- Wetland areas and associated buffer zones must be avoided;
- Areas with a high-risk subsidence risk which underlay wetlands may only be considered for bord and pillar mining methods;
- Areas where high risk for subsidence may occur must be avoided or mitigated through effective engineering controls;
- Undermined wetland areas must not be mined using the high extraction method;
- Appropriate recommendations from the rock engineering study regarding pillar size. must be implemented to reduce the overall risk for subsidence, particularly in regions where wetlands and watercourses are undermined;
- Groundwater models of the mining activities must be updated following the completion of the mining activities;
- Following the completion of the mining activities, groundwater studies must re-determine whether mine water decant will occur and the quality of the potential decants;
- Should groundwater decant occur, the quality of the water should be determined and the effect upon the surface water determined, and managed accordingly;
- Vehicles are to be serviced at a suitable workshop and re-fuelled at designated filling areas with appropriate pollution control facilities;
- An alien vegetation removal and management plan must be implemented for the from the onset of the opencast mining phase of the project;
- General stormwater management practices should be included in the design phase and implemented during the life of the project; and
- An inspection of the rehabilitated areas should be completed within one month of completing this phase.

10.3.2 Cumulative Impact

The cumulative impact rating has been scored “High” given the extent of existing mining activities within 500 m of the desktop wetlands as well as the expected degradation of the wetlands as a result of mining activities.

10.3.3 Irreplaceable Loss

The planning phase of the relevant activities may result in irreplaceable loss of wetlands.

10.4 Decommissioning Phase

Opencast

The final significance rating for the decommissioning of the opencast mine and associated infrastructure has been determined to be associated with a “Moderate” final significance score. This includes blasting of infrastructure, increased traffic, pollution etc.

Underground Mining

The final significance rating for the decommissioning of the opencast mine and associated infrastructure has been determined to be associated with a “Low” final significance score.

10.4.1 Mitigation

The following mitigation measures are prescribed to ensure the final significance rating mentioned above is reached;

- Make use of existing mining infrastructure and access routes;
- Wetland areas and associated buffer zones must be avoided;
- Vehicles are to be serviced at a suitable workshop and re-fuelled at designated filling areas with appropriate pollution control facilities;
- An alien vegetation removal and management plan must be implemented for the from the onset of the opencast mining phase of the project;
- Decommissioned building material must be stored outside of the recommended buffer zones and be removed within one day of decommissioning;
- General stormwater management practices should be included in the design phase and implemented during the life of the project; and
- An inspection of the rehabilitated areas should be completed within one month of completing this phase.

10.4.2 Cumulative Impact

The cumulative impact rating has been scored “High” given the extent of existing mining activities within 500 m of the desktop wetlands as well as the expected degradation of the wetlands as a result of mining activities.

10.4.3 Irreplaceable Loss

The planning phase of the relevant activities may result in irreplaceable loss of wetlands.

10.5 Rehabilitation and Closure Phase

Opencast and Underground Mining

The final significance rating has been determined to be “Low” given the lfact that rehabilitation will be part of this phase, which subsequently allows for an improvement in environmental conditions.

10.5.1 Mitigation

No mitigation measures are required for this phase, given the fact that the pre- and post-mitigation environmental risks are expected to be the same (“Low”). Even though this score is expected to be low, some mitigation measures have been prescribed in regard to potential Acid Mine Drainage implications;

- Groundwater models of the mining activities must be updated following the completion of the mining activities;
- Following the completion of the mining activities, groundwater studies must re-determine whether mine water decant will occur and the quality of the potential decants;
- Should groundwater decant occur, the quality of the water should be determined and the effect upon the surface water determined, and managed accordingly; and
- Rehabilitation and monitoring must be carried out bi-annually until very little impacts are observed.

10.5.2 Cumulative Impact

The cumulative impact rating has been scored “High” given the extent of existing mining activities within 500 m of the desktop wetlands as well as the expected degradation of the wetlands as a result of mining activities.

10.5.3 Irreplaceable Loss

The planning phase of the relevant activities are not expected to result in irreplaceable loss of wetlands.

11 Conclusion

It is apparent from the scoping assessment that a number of different wetland types and HGM units potentially are located within the project area. None of these wetlands appear to be in a largely natural state, which is likely a result of the local land uses, and predominantly the mining of the area. The identification and delineation of these wetland areas will be further assessed during the EIA studies, and the ecological significance of these systems established.

The proposed mining alternatives may result in the loss of some of these wetland systems, with indirect impacts resulting in a loss or degradation of ecological services and the overall integrity of these wetland systems. The proposed opencast mining area is located within close proximity to a local wetland system and there is likely to be a recommendation to implement a buffer area to be adhered to.

A detailed impact assessment will be completed to fully determine the significance and likelihood of all associated impacts.

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13 Appendices

Appendix A: Specialist declarations

DECLARATION

I, Ivan Baker, declare that:

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

Ivan Baker

Wetland Ecologist

The Biodiversity Company

November 2019

Appendix B: Specialist CV

Ivan John Baker

Masters in Environmental Science and Hydropedology

Cell: +27 79 898 4056

Email: ivan@thebiodiversitycompany.com

Identity Number: 9401105251087

Date of birth: 10 January 1994

Profile Summary

Working experience throughout Southern Africa

Working experience in West-Africa

Specialist experience with mining, construction and agriculture.

Specialist expertise include hydropedology, pedology, land contamination, agricultural potential, land rehabilitation, rehabilitation management and wetlands resources.

Experience hydropedological modelling (HYDRUS model)

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services Infrastructure Development, Farming, Land contamination, Sustainability and Conservation.

Key Experience

- Environmental Impact Assessments (EIA)
- Environmental Management Programmes (EMP)
- Wetland delineations and ecological assessments
- Rehabilitation Plans and Monitoring
- Soil-and rock classification
- Level 1, 2 and 3 hydropedology assessments
- Agriculture potential assessments
- Land contamination assessments
- Modulation of surface- and subsurface flows (HYDRUS model)

Countries worked in

South Africa	Mozambique
Swaziland	Zimbabwe
Guinea	

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

- MSc (North-West University of Potchefstroom) – Hydropedology
- BSc Honours (North-West University of Potchefstroom) – Environmental geology- Pedology and rehabilitation
- BSc Environmental sciences
- Pr Sci Nat candidateship

SELECTED PROJECT EXPERIENCE

Project Name: Environmental impact assessment for the construction of Road DR08606 leading to Mlamli Hospital, Sterkspruit

Client: EIMS

Personal position / role on project: Wetland ecologist

Location: Sterkspruit, Eastern Cape Province, South Africa

Main project features: To conduct a wetland assessment, as a component of the environmental authorisation process and Water Use Licence Application (WULA) for the construction of Road DR08606 leading to Mlamli Hospital

Project Name: Biodiversity Baseline & Impact Assessment Report for the proposed Nondvo Dam Project

Client: WSP

Personal position / role on project: Wetland ecologist

Location: Mbabane, Swaziland

Main project features: To conduct various assessments according to IFC standards in regard to delineation of wetlands and assessing ecosystem services.

Project Name: Agricultural Potential Assessment - Proposed Kalabasfontein Coal Mining Project Extension

Client: Nemai EIMS.

Personal position / role on project: Project Manager and Soil Specialist.

Location: Bethal, Mpumalanga, South Africa

Main project features: To conduct a soil assessment to identify any sensitive resources that might be affected by the proposed mining activities and associated infrastructure as part of an environmental impact assessment.

Project Name: Soil assessment for the closure of the St Helena Shaft, Harmony

Client: EIMS

Personal position / role on project: Soil specialist

Location: Welkom, Free State, South Africa

Main project features: To conduct a thorough soil and fertility assessment to recommend relevant mitigation and rehabilitation measures to finalise closure at the relevant mine

Project Name: Wetland Functionality Assessment for the Environmental, Health and Socio-Economic Baseline Studies for Block 2 at Siguiri Gold Mine

Client: SRK Consulting

Personal position / role on project: Wetland ecologist

Location: Siguiri, Guinea, West-Africa

Main project features: To conduct various assessments according to IUCN standards in regard to delineation of wetlands and assessing ecosystem services.

Project Name: Level 3 Hydropedological Assessment for the Sara Buffels Mining Project

Client: Alegna Environmental Consulting

Personal position / role on project: Hydropedologist

Location: Ermelo, Mpumalanga, South-Africa

Main project features: To conduct various assessments to determine the hillslope hydrology and to acquire information relevant to the vadose zone's hydraulic properties to quantify sub-surface flows by means of modelling.

Project Name: Level 3 Hydropedological Assessment for the Buffalo Coal Mining Project

Client: Agreenco

Personal position / role on project: Hydropedologist

Location: Dundee, KwaZulu-Natal, South-Africa

Main project features: To conduct various assessments to determine the hillslope hydrology and to acquire information relevant to the vadose zone's hydraulic properties to quantify sub-surface flows by means of modelling

Project Name: Biodiversity Baseline & Impact Assessment for the proposed Tetereane 15MW Solar PV Plant

Client: WSP

Personal position / role on project: Ecosystem Services Specialist

Location: Cuamba, Mozambique, Southern-Africa

Main project features: To conduct various assessments according to IUCN standards in regard to ecosystem services

Project Name: Land contamination assessment for the proposed Fleurhof Development

Client: Geo Soil and Water

Personal position / role on project: Soil Specialist

Location: Fleurhof, South Africa

Main project features: To conduct assessments relevant to the determination of land contamination, including recommendations, mitigations and risk assessments.

OVERVIEW

An overview of the specialist technical expertise include the following:

- Ecological wetland assessment studies, including the integrity (health) and functioning of the wetland systems.
- Wetland offset strategy designs.
- Wetland rehabilitation plans.
- Monitoring plans for wetland systems.
- Soil classification and agricultural assessments.
- Stripping and stockpiling guidelines.
- Soil rehabilitation plans.
- Soil and stockpile monitoring plans.
- Hydro pedological assessments.

TRAINING

Some of the more pertinent training undergone includes the following:

- Tools for a Wetland Assessment (Certificate of Competence) – Rhodes University 2018; and
- Workshop on digital soil mapping.

EMPLOYMENT EXPERIENCE

Internship at SRK consulting (January 2017-August 2017)

- **Field assistant** for SRK consulting during 2017 included the sampling of surface and groundwater as well as on site tests, the accumulation of various different data sets from field loggers, presenting and arranging the relevant data and ultimately using it for my own personal post-graduate studies.

Internship at The Biodiversity Company (August 2017-December 2017)

Employed as an intern (wetland and soil scientist) during the last few months of 2017. During this period, I was part of a variety of soil- and wetland projects, both as report writer and/or field assistant.

CURRENT EMPLOYMENT: The Biodiversity Company (January 2018 – Present)

- **Scientific report writing** to ensure that the relevant standards and requirements have been attained, namely local country legislation, as well as WB, EP and IFC requirements.

ACADEMIC QUALIFICATIONS

North-West University of Potchefstroom (2018): MAGISTER SCIENTIAE (MSc) - Hydropedology:

Title: *Characterisation of vadose zone processes in a tailings facility*

North-West University of Potchefstroom (2016): BACCALAUREUS SCIENTIAE HONORIBUS (Hons) – Environmental Geology- Pedology and rehabilitation

North-West University of Potchefstroom (2015): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Geology and Geography