AGRICULTURAL POTENTIAL SCOPING ASSESSMENT REPORT FOR THE PROPOSED KALGOLD EXPANSION PROJECT

Ratlou Local Municipality, North West

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CLIENT

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1 Introduction

The Biodiversity Company was commissioned to compile an agricultural potential scoping report for the Kalgold Expansion project. The existing Harmony Kalgold operation wishes to expand its current production from the current production rate of 130 000 tons per month to 300 000 tons per month. A pre-feasibility study has been undertaken. The findings of the pre-feasibility study have concluded that the following new activities and expansions must be provided for:

1 The pit footprint will increase.

2 Larger dewatering pipelines.

3 Extension to Spanover waste rock dump.

4 Road from the pit to new ROM pad.

5 New ROM pad.

6 New plant.

7 Recommission old Tailings Storage Facility (TSF) at low deposition rate.

8 Increase tailings deposition rate at D-zone pit.

9 Install pipeline from Central dam to the new processing plant.

10 Install a tailings pipeline from the new processing plant to old TSF and D-zone pit.

11 Install pipeline from old processing plant raw water pond to the new plant (D-zone return water).

12 Install two power lines from Ferndale substation to the new processing plant.

13 Install evaporators at Central dam (to get rid of excess water).

14 Install a water treatment plant at the new plant.

15 Relocate and expand the explosives magazine.

16 Additional new road from the plant to the N18.

Kalgold mine is an open pit mining operation located some 60km South West of Mahikeng in the North West Province. The mine is owned and operated by Harmony Gold, who acquired the mine in 1999. The mine is located in the Kraaipan Greenstone Belt, which is part of the large Amalia-Kraaipan Greenstone terrain. The largest ore body is found in the D-Zone, which was mined out by a single pit operation along a strike length of 1 300m and to a depth of approximately 290m below surface. Mining at Kalgold Mine continued at the A-Zone, Windmill and Watertank Open Pits, which are all relatively new opencast operations.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (No. 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

The approach has taken cognisance of the recently published Government Notice 320 in terms of NEMA dated 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of

the National Environmental Management Act, 1998, when applying for Environmental Authorisation". The National Web based Environmental Screening Tool has characterised the terrestrial biodiversity for the project area as "very high sensitivity".

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making with regards to the proposed project.

2 Document Structure

The table below provides the NEMA (2014) Requirements for the assessment, and also the relevant sections in the reports where these requirements are addressed (Table 2-1).

Table 2-1 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
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 8
Appendix 6 (1)(cB):	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 11
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;	Section 10
Appendix 6(1)(g):	An identification of any areas to be avoided, including buffers;	Section 10
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;	N/A
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 9
Appendix 6(1)(k):	Any mitigation measures for inclusion in the empr;	Section 12
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 (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;	N/A

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	**AGRICULTURAL POTENTIAL SCOPING ASSESSMENT REPORT FOR THE PROPOSED KALGOLD EXPANSION PROJECT COLLIERY**
Submitted to	EIMS ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
Report Writer / 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:

- Description of the baseline receiving environment specific to the field of expertise (general surrounding area as well as site specific environment);
- Identification and description of any sensitive receptors in terms of agricultural potential that occurs in the project area, and the manner in which these sensitive receptors may be affected by the activity;
- Screening to identify any critical issues (potential fatal flaws) that may result in project delays or rejection of the application;
- Provide a map to identify sensitive receptors in the project area, based on available maps and database information; and
- Impact assessment, mitigation and rehabilitation measures to prevent or reduce the possible impacts as per the study.

5 Project Description

Kalgold mine is an open pit mining operation located some 60 km from Mahikeng in the North West Province. The project area is divided by the N18 national highway and falls in the Ratlou Local Municipality within the Ngaka Modiri Molema District Municipality. The area surrounding the project area consists predominantly of mining activities, secondary roads and agricultural fields. The project layout is shown in Figure 5-1, while the location of the project area is shown in Figure 5-2.

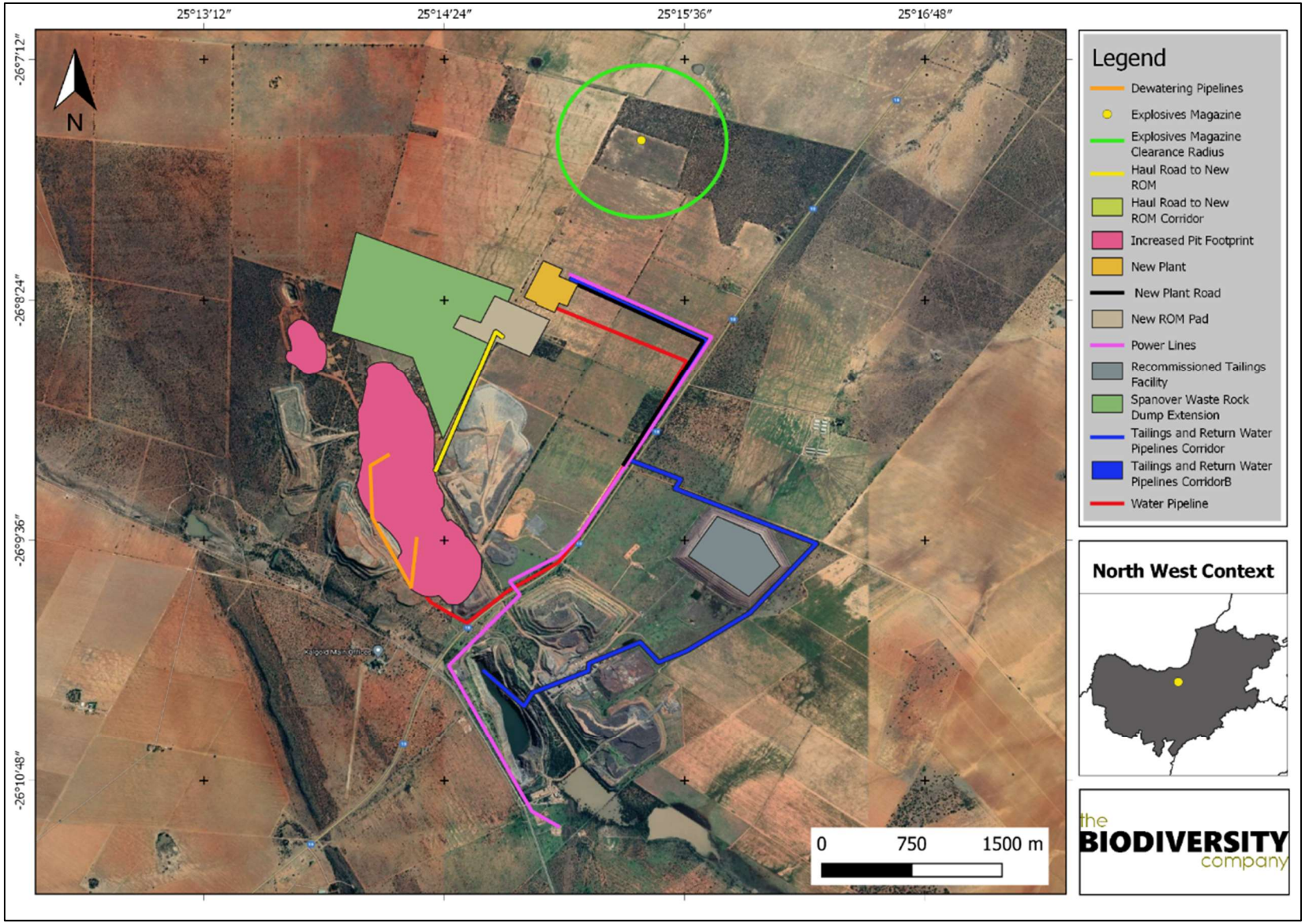

Figure 5-1 Project infrastructure layout

Figure 5-2 Locality of the project area

6 Key Legislative Requirements

Currently, various pieces of legislation and related policies exist that guide and direct the land user in terms of land use planning both on a national and provincial level. This legislation includes, but is not limited to:

- The Constitution of the Republic of South Africa (Act 108 of 1996);
- Sub-division of Agricultural Land Act (Act 70 of 1970);
- Municipal Structures Act (Act 117 of 1998);
- Municipal Systems Act (Act 32 of 2000); and
- Spatial Planning and Land Use Management Act (Act 16 of 2013 – not yet implemented).

The above mentioned are supported by additional legislation that aims to manage the impact of development on the environment and the natural resource base of the country. Related legislation to this effect includes:

- Conservation of Agricultural Resources Act (Act 43 of 1983);
- Environment Conservation Act (Act 73 of 1989);
- National Environmental Management Act (Act 107 of 1998); and
- National Water Act (Act 36 of 1998).

7 Limitations

The following limitations should be noted for the study:

- This assessment represents the Scoping Phase of the project only. After further field surveys a final baseline and impact assessment report will be submitted;
- The sensitivity map included in this report is based on desktop information alone; and
- A field survey still needs to be conducted to advise on the viability of the alternatives.

8 Study Approach

The following approach (or methods) will be implemented for the baseline and impact assessment phase of the project.

8.1 Desktop Assessment

The elevation and slope percentage of the project area will be determined by means of SAGA software, which will be used to determine the agricultural potential of the site.

8.2 Field Survey

The site will be traversed by vehicle and on foot. A soil auger will be used to determine the soil form/family and depth. The soil will be hand augured to the first restricting layer or 1.5 m. Soil survey positions will be recorded as waypoints using a handheld GPS. Soils will be identified to the soil family level as per the "Soil Classification: A Taxonomic System for South Africa" (Soil Classification Working Group, 1991). Landscape features such as existing open trenches will also be helpful in determining soil types and depth.

8.3 Agricultural Potential Assessment

Land capability and agricultural potential will be determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long-term sustainable use of land under rain-fed conditions. At the same time an indication is given about the permanent limitations associated with the different land use classes.

Land capability is divided into eight classes and these may be divided into three capability groups. Table 8-1 shows how the land classes and groups are arranged in order of decreasing capability and ranges of use. The risk of use increases from class I to class VIII (Smith, 2006).

Table 8-1 Land capability class and intensity of use (Smith, 2006)

Land Capability Class	Increased Intensity of Use									Land Capability Groups
I	W	F	LG	MG	IG	LC	MC	IC	VIC	Arable Land
II	W	F	LG	MG	IG	LC	MC	IC		
III	W	F	LG	MG	IG	LC	MC			
IV	W	F	LG	MG	IG	LC				
V	W	F	LG	MG						Grazing Land
VI	W	F	LG	MG						
VII	W	F	LG							
VIII	W									Wildlife
W - Wildlife		MG - Moderate Grazing			MC - Moderate Cultivation					
F- Forestry		IG - Intensive Grazing			IC - Intensive Cultivation					
LG - Light Grazing		LC - Light Cultivation			VIC - Very Intensive Cultivation					

The land potential classes are determined by combining the land capability results and the climate capability of a region as shown in Table 8-2. The final land potential results are then described in Table 8-2.

Table 8-2 The combination table for land potential classification

Land capability class	Climate capability class							
	C1	C2	C3	C4	C5	C6	C7	C8
I	L1	L1	L2	L2	L3	L3	L4	L4
II	L1	L2	L2	L3	L3	L4	L4	L5

III	L2	L2	L3	L3	L4	L4	L5	L6
IV	L2	L3	L3	L4	L4	L5	L5	L6
V	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei
VI	L4	L4	L5	L5	L5	L6	L6	L7
VII	L5	L5	L6	L6	L7	L7	L7	L8
VIII	L6	L6	L7	L7	L8	L8	L8	L8

Table 8-3 The Land Potential Classes

Land potential	Description of land potential class
L1	Very high potential: No limitations. Appropriate contour protection must be implemented and inspected.
L2	High potential: Very infrequent and/or minor limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L3	Good potential: Infrequent and/or moderate limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L4	Moderate potential: Moderately regular and/or severe to moderate limitations due to soil, slope, temperatures or rainfall. Appropriate permission is required before ploughing virgin land.
L5	Restricted potential: Regular and/or severe to moderate limitations due to soil, slope, temperatures or rainfall.
L6	Very restricted potential: Regular and/or severe limitations due to soil, slope, temperatures or rainfall. Non-arable
L7	Low potential: Severe limitations due to soil, slope, temperatures or rainfall. Non-arable
L8	Very low potential: Very severe limitations due to soil, slope, temperatures or rainfall. Non-arable

8.4 Current Land Use

Land use was identified using aerial imagery and then ground-truthed while out in the field. The possible land use categories are:

- Mining;
- Bare areas;
- Agriculture crops;
- Natural veld;
- Grazing lands;
- Forest;
- Plantation;
- Urban;
- Built-up;
- Waterbodies; and
- Wetlands.

8.5 Soil Sampling

The topsoil and subsoil of ten soil profiles in selected undisturbed areas will be sampled and sent off to the Nvirotek Lab for fertility testing.

9 Receiving Environment

9.1 Climate

The project area is characterised by summer rainfall with very dry winters. The mean annual precipitation (MAP) is about 400–480 mm. There is frost frequent in winter, Mucina & Rutherford (2006), see Figure 9-1.

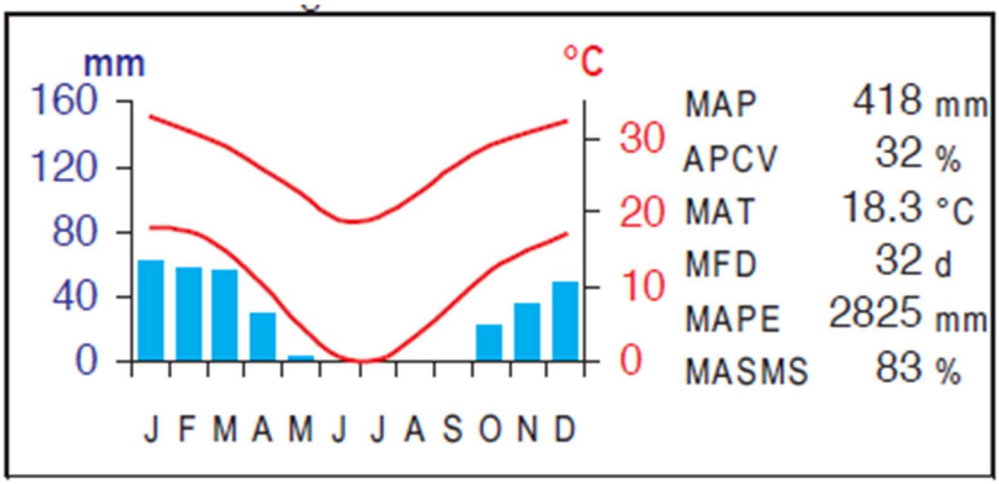

Figure 9-1 Climate diagram for the region, Mucina & Rutherford (2006).

9.2 Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Ae29, Ah17 and Ai3 land types (*Figure 9-2*). A description of these land types is as follows:

Land type Ai3 is dominated by the foot-slopes terrain unit and has a slope of 0 to 1 %. The dominant soil forms expected in this land type is the Clovelly (Cv) and the Fernwood (Fw). Both these soils are expected to be sandy with a clay percentage of around 5 % or less and have depths exceeding 1.2 m.

Land type Ah17 has a good mix of terrain units but predominantly the slope is between 0 and 5 %. The dominant soil forms expected in this land type is the Clovelly (Cv) and the Hutton (Hu). Both these soils are expected to be sandy with a clay percentage of around 5 % or less and have depths exceeding 1.2 m and should have a good land capability associated with them.

Land type Ae29 is dominated by the mid-slopes terrain unit and has a slope of 0 to 10 %. The dominant soil form expected in this land type is the Hutton (Hu). The expected clay content for these soils are between 5 % and 15 % and the depths range from 750 mm to deeper than 1200 mm.

The geology of this area is characterised by the Andesitic lavas of the Allanridge Formation of the Ventersdorp Supergroup, sometimes covered with silcrete or calcrete of the Kalahari Group, on flat to hilly plains.

The soils for the area are characterised by Aeolian Kalahari sand of Tertiary to Recent age on flat sandy plains, soils deep (>1.2 m). The dominant soil forms include the Clovelly and Hutton forms (Mucina & Rutherford, 2006).

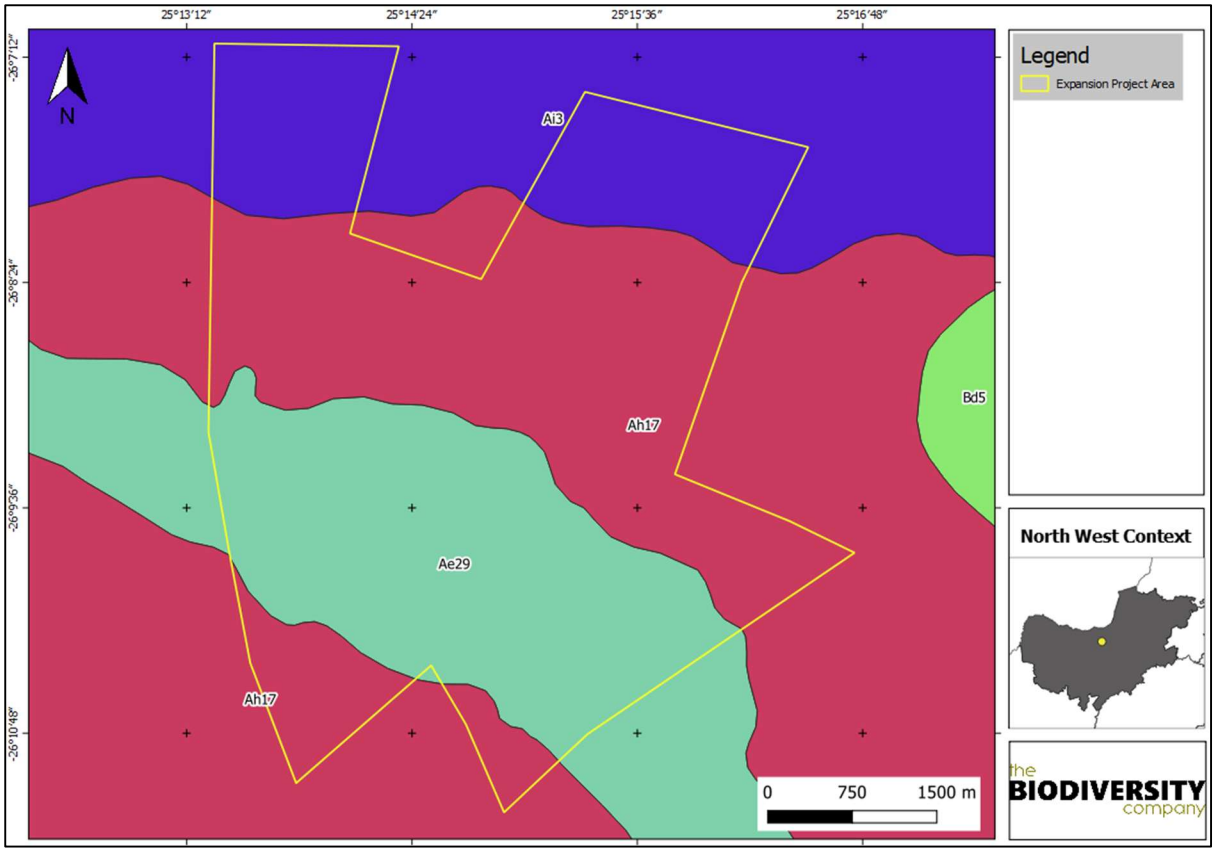

Figure 9-2 The land types associated with the project area

10 Agricultural Theme Sensitivity

10.1 Methodology

As part of the EIMS environmental mapping methodology, specialists are required to identify all features in terms of the specific field of expertise within the study area. This methodology includes the compilation of detailed shapefiles with specific attributes. Three main components form part of this methodology, namely;

- Feature layer;
- Overall sensitivity layer; and
- Legislative constraint layer.

All identified features will be rated according to the sensitivity of the feature as well as threats posed by proposed activities. These sensitivity rankings are described and illustrated in Table *10-1*

Table 10-1 Sensitivities relevant to the EIMS methodology

	Sensitivities				
	Least Concern	Low	Medium	High	No-Go
Broad Class Description	The inherent feature status and sensitivity is already degraded. The proposed development will not affect the current status and/or	The proposed development will have not had a significant effect on the inherent	The proposed development will negatively influence the	The proposed development will negatively significantly influence the	The proposed development cannot legally or practically take place.

	may result in a positive impact. These features would be the preferred alternative for the project or infrastructure placement.	feature status and sensitivity.	current status of the feature.	current status of the feature.	
Scoring	0	1	2	3	+99

10.1.1 Legislative constraint layer

The agricultural theme sensitivity as indicated in the screening report was derived to range from *Low* to *High* (Figure 10-1). This was based on the land capability classes and also annual crop cultivation. The areas that are predominantly associated with existing mining infrastructure have been classified as *Low* to *Medium* sensitivity. The remaining extent of the project area is largely intact and considered to be *High* sensitivity.

The soils in the project area that remain intact are generally described as freely drained and structured soils, with favourable physical properties. These soils may have restricted soil depth, excessive drainage, high erodibility and low natural fertility.

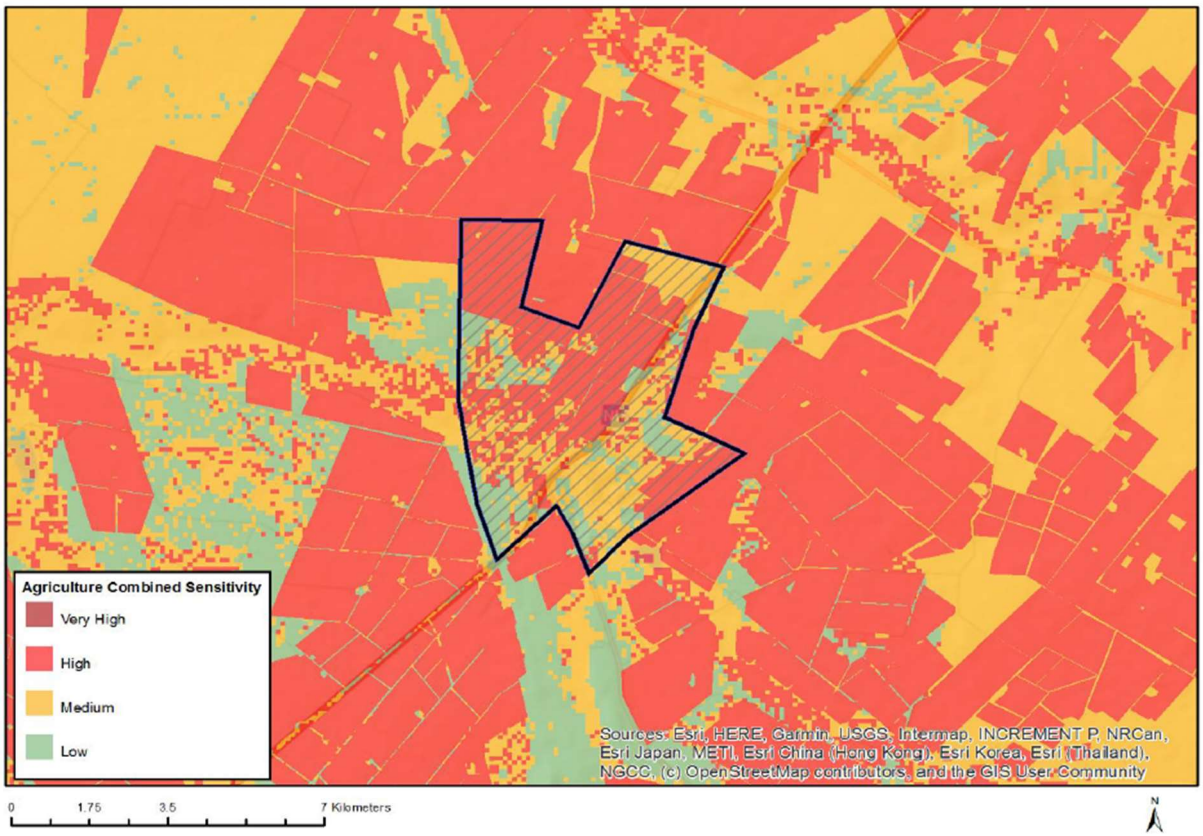

Figure 10-1 Agricultural Theme Sensitivity, TBC Screening Report

11 Impact Assessment

The project area is flat in relief. The land type data suggest that soils of the Hutton, Clovelly, and Fernwood forms are present in the landscape. The average land capability based on the land type data is that of a class III (moderate cultivation). Class III land would pose moderate limitations to agriculture with some erosion hazard and would require special conservation practice and tillage methods. The farming method for this capability would require the rotation of crops and ley (50%). The current dominant land use seems to be croplands in the north with the remaining undisturbed area being veld/grazing. The disturbed areas are classified as mining land use.

Impacts were assessed in terms of the construction/operational, decommissioning/ rehabilitation and closure phases. Mitigation measures were only applied to impacts deemed relevant.

11.1 Impact Assessment Methodology

An impact assessment methodology was provided by EIMS to determine the environmental risk associated with various aspects related to the proposed expansion alternatives. This impact assessment takes the following components into consideration.

- The nature of the associated impact (positive or negative);
- The extent of the proposed activities;
- The duration of the proposed activities;
- The magnitude of the effects caused by the proposed activities;
- The reversibility of associated impacts; and
- The probability of relevant aspects affecting sensitive receptors.

Each one of the above-mentioned components are given a rating, which cumulatively provides the specialist with a pre-mitigation environmental risk rating. These components are then scored again taking into consideration mitigating factors. The cumulative impact and irreplaceable loss to sensitive receptors are then scored to ultimately indicate a “Priority Factor” score.

11.2 Agricultural Potential Impact Assessment

The anticipated impacts are derived from the main activities associated with the expansion which include:

1 The pit footprint will increase.

2 Larger dewatering pipelines.

3 Extension to Spanover waste rock dump.

4 Road from the pit to new ROM pad.

5 New ROM pad.

6 New plant.

7 Recommission old Tailings Storage Facility (TSF) at low deposition rate.

8 Increase tailings deposition rate at D-zone pit.

9 Install pipeline from Central dam to the new processing plant.

10 Install a tailings pipeline from the new processing plant to old TSF and D-zone pit.

11 Install pipeline from old processing plant raw water pond to the new plant (D-zone return water).

12 Install two power lines from Ferndale substation to the new processing plant.

13 Install evaporators at Central dam (to get rid of excess water).

14 Install a water treatment plant at the new plant.

15 Relocate and expand the explosives magazine.

16 Additional new road from the plant to the N18.

11.2.1 Unplanned Events

The planned activities will have anticipated impacts as discussed; however, unplanned events may occur on any project and may have potential impacts which will need management.

Table 11-1 is a summary of the findings of an unplanned event assessment from a terrestrial ecology perspective. Note, not all potential unplanned events may be captured herein, and this must therefore be managed throughout all phases according to recorded events.

Table 11-1 Summary of unplanned events for terrestrial biodiversity

Unplanned Event	Potential Impact	Mitigation
Hydrocarbon spills into the surrounding environment	Contamination of soils.	A spill response kit must be available at all times. The incident must be reported on and if necessary. Spills must be contained and cleaned up.
Acid Mine Drainage	Contamination of soils	Water treatment, post closure water and soil monitoring and water level management.
TSF Failing or TSP Pipeline burst	Contamination of soils.	Monitoring of TSF structure and follow legislative guidelines. Regular monitoring for leaks, cracks and faults in the pipeline

11.2.2 Planning Phase Impacts

The planning phase activities are considered a low risk as they typically involve desktop assessments and initial site inspections. This would include preparations and desktop work in support of waste management plans, environmental and social screening assessments, finalising drill sites and facilities and consultation with various contractors involved with a diversity of proposed project related activities going forward. It is assumed all existing servitudes will be used for access and existing plans are implemented, so based on this no impacts have been considered for the planning phase.

11.2.3 Construction Phase/Operational Phase Impacts

The following potential impacts were considered on agricultural potential. This phase refers to the period when construction of the additional proposed infrastructure is built/installed. This phase usually has the largest direct impact on land uses.

11.2.3.1 Destruction, further loss and fragmentation of the high agricultural land use

The proposed expansion will result in the stripping of topsoil and alterations to the existing land uses. These changes are likely to result in changes in the land use from agricultural to mining (or transformed). The proposed activities will impact on areas expected to be high agricultural potential, with some aspects affecting medium to low sensitivity areas. It is possible that suitable agricultural land could become fragmented, resulting in these smaller portions no longer being deemed feasible to farm.

11.2.3.1.1 Mitigation Measures

Please see section 12.

11.2.3.1.2 Cumulative Impacts

The cumulative impact rating has been scored “Medium” given the extent of existing mining activities as well as the expected degradation of the soil resources as a result of mining activities.

11.2.3.1.3 Irreplaceable Loss of Resources

The construction and operational phases of the relevant activities could result in a loss of natural resources.

11.2.3.1.4 Impacts on Alternatives Considered

No alternatives were provided.

11.2.3.2 Increased erosion

The removal vegetation and changes to the local topography could result in an alteration to surface run-off dynamics. The soils in the project area are generally characterised by excessive drainage and also high erodibility. This could result in further loss of topsoil, and soil forms suitable for agriculture.

11.2.3.2.1 Mitigation Measures

Please see section 12.

11.2.3.2.2 Cumulative Impacts

The cumulative impact rating has been scored “Medium” given the extent of existing mining activities as well as the expected degradation of the soil resources as a result of mining activities.

11.2.3.2.3 Irreplaceable Loss of Resources

The erosion stemming from the construction and operational phases of the relevant activities could result in a loss of natural resources.

11.2.3.2.4 Impacts on Alternatives Considered

No alternatives were provided.

11.2.4 Decommissioning and Rehab/Closure Phase

This phase is when the scaling down of activities ahead of temporary or permanent closure, cessation of mining or production is initiated. During this phase, the operational phase impacts will persist until of the activity reduces and the rehabilitation measures are implemented.

11.2.4.1 Continued destruction, further loss and fragmentation of the high agricultural land use

The spread of alien invasive species will result in the loss of habitat and water for indigenous fauna and flora. Overall, the fauna assemblage will be changed. Erosion will also disrupt the vegetation in the surrounding areas and result in habitat loss.

11.2.4.1.1 Mitigation Measures

Please see section 12.

11.2.4.1.2 Cumulative Impacts

The cumulative impact rating has been scored “Medium” given the extent of existing mining activities as well as the expected degradation of the soil resources as a result of mining activities.

11.2.4.1.3 Irreplaceable Loss of Resources

The improper stockpiling and care / management of soils, and also continued erosion stemming from the project could result in a loss of natural resources.

11.2.4.1.4 Impacts on Alternatives Considered

No alternatives were provided.

11.2.5 Assessment of Significance

Table 11-2 shows the significance of potential impacts associated with the proposed expansion, on agricultural potential before and after the implementation of mitigation measures as well as cumulative and irreplaceable loss.

Table 11-2 Assessment of significance of potential impacts on agricultural potential associated with the project

Impact	Aspect	Pre-mitigation ER	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
Construction Phase								
Destruction, further loss and fragmentation of the high agricultural land use – TSP, Pit, WRD	Alternative 1	-20	-12	Medium	2	3	1.50	-18.00
Destruction, further loss and fragmentation of the high agricultural land use - Linear servitudes and Magazine	Alternative 1	-18.75	-12	Medium	2	3	1.50	-18.00
Destruction, further loss and fragmentation of the high agricultural land use – Plants	Alternative 1	-20	-12	Medium	2	3	1.50	-18.00
Erosion	Alternative 1	-13	-8.25	Medium	2	3	1.50	-12.38
Operational Phase								
Destruction, further loss and fragmentation of the high agricultural land use	Alternative 1	-16	-9	Medium	2	3	1.50	-13.50
Erosion	Alternative 1	-13	-8.25	Medium	2	3	1.50	-12.38
Decommissioning and Rehab Phase								
Continued destruction, further loss and fragmentation of the high agricultural land use	Alternative 1	-13	-8.25	Medium	2	3	1.50	-12.38
Closure Phase								
Destruction, further loss and fragmentation of the high agricultural land use	Alternative 1	-12	-8.25	Medium	2	3	1.50	-12.38

12 Specialist Management Plan

Table 12-1 presents the recommended mitigation measures and the respective timeframes, targets and performance indicators for the study. The mitigations within this section have been taken into consideration during the impact assessment in cases where the post-mitigation environmental risk is lower than that of the pre-mitigation environmental risk.

Table 12-1 Mitigation measures including requirements for timeframes, roles and responsibilities for the study

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Proper planning of mining sequences	Planning	Applicant, Project manager, Environmental Officer	Development footprint	During Phase
Acquire stripping and stockpiling guideline	Planning	Applicant, Project manager, Environmental Officer	Development footprint	During Phase
Acquire rehabilitation and monitoring plans	Planning	Applicant, Project manager, Environmental Officer	Rehabilitation	During Phase
Detailed investigation into ideal locations for the construction of all the infrastructure on site	Planning	Applicant, Project manager, Environmental Officer	Development footprint	During Phase
Clearing of vegetation.	Construction/Operational Phase	Project manager, Environmental Officer	Development footprint	On a needs basis
Assign all access, pipeline and powerline routes	Planning	Project manager, Environmental Officer	Servitudes	During Phase
Stripping and stockpiling of topsoil	Construction/Operational Phase	Project manager, Environmental Officer	Development footprint	On a needs basis
Stockpile the stripped soils in designated stockpile areas	Construction/Operational Phase	Project manager, Environmental Officer	Soil stockpiles	Applicant Eco Environmental authority
Vegetate these stockpiles according to the rehabilitation plan	Construction/Operational Phase	Project manager, Environmental Officer	Soil stockpiles	Ongoing
Continuously monitor erosion on site	Life of Project	Project manager, Environmental Officer	Development footprint	Ongoing
Monitor compaction on site	Life of Project	Project manager, Environmental Officer	Development footprint	Ongoing
Manage, maintain and care for soil stockpiles	Construction/Operational Phase	Project manager, Environmental Officer	Soil stockpiles	Ongoing
Implement proper storm water management plans	Life of Project	Applicant, Hydrologist, Project manager, Environmental Officer.	Project Infrastructure	Ongoing
Topsoil to be replaced for rehabilitation purposes	Post Construction/Closure Phase/Rehabilitation phase	Project manager, Environmental Officer	Rehabilitation	Ongoing, concurrent rehabilitation
All rehabilitated areas should be assessed for signs of compaction, fertility and erosion.	Post Construction/Closure Phase/Rehabilitation phase	Project manager, Soil Scientist, Environmental Officer	Rehabilitation Areas	Ongoing, from the rehabilitation phase
The soils fertility must be assessed by a soil specialist yearly (during the dry season so that recommendations	Post Construction/Closure Phase/Rehabilitation phase	Project manager, Soil Scientist, Environmental Officer	Rehabilitation Areas	Annually

can be implemented before the start of the wet season) as to correct any nutrient deficiencies;				
Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated;	Closure Phase/Rehabilitation phase	Project manager, Environmental Officer	Development footprint	On a needs basis
If erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place;	Life of Project	Project manager, Environmental Officer	Project Area	On a needs basis

13 Conclusion

It is evident from the spatial data that the project area has been altered both currently and historically. Agriculture and mining have had an extensive impact on the agricultural potential in the area. The areas that are predominantly associated with existing mining infrastructure are classified as *Low* to *Medium* sensitivity. The remaining extent of the project area is largely intact and considered to be *High* sensitivity.

14 References

Land Type Survey Staff. 1972 - 2006. Land Types of South Africa: Digital Map (1:250 000 Scale) and Soil Inventory Databases. Pretoria: ARC-Institute for Soil, Climate, and Water.

Mucina, L., & Rutherford, M. C. 2006. The Vegetation of South Africa, Lesotho, and Swaziland. Strelitzia 19. Pretoria: National Biodiversity Institute.

Smith, B. 2006. The Farming Handbook. Netherlands & South Africa: University of KwaZulu-Natal Press & CTA.

Soil Classification Working Group. 1991. Soil Classification A Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.

15 Appendices

Appendix A Specialist declarations

DECLARATION

I, Andrew Husted, 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.

Andrew Husted

Wetland Ecologist

The Biodiversity Company

October 2020