Appendix F

Impact Assessment

for Final Basic Assessment

Kokerboom Upgrade

Black Mountain Mining

ENDEMIC VISION
ENVIRONMENTAL SERVICES
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1 The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.

To ensure compliance with the NEMA regulations, all possible impacts are assessed 0 the direct; indirect as well as cumulative impacts.

The assessment of impacts includes inputs from the impact assessor; specialists; project engineers and stakeholders. The impact assessment is framed from the literature review; environmental screening and the site assessment.

The site visit was conducted on 18 August 2021 to determine the impacts on site.

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to alternatives understudy for meeting a project need. Assessment of impacts will be based on EIA Regulations (Nema EIA Regulations, 2014). The various environmental impacts and benefits of this project are discussed in terms of impact status, probability, duration, scale/extent and magnitude/severity.

The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significance of the potential impacts will be determined through a synthesis of the criteria below:

Impact Status
The nature or status of the impact is determined by the conditions of the environment before construction and operation. A discussion on the nature of the impact will include a description of the cause of the effect, the aspect that will be affected and how it will be affected. The nature of the impact can be described as negative or positive.

Table 1: Impact of Nature Rating

RATING	DESCRIPTION	RATING
Positive	A benefit to the receiving environment	(+ve)
Negative	A cost to the receiving environment	(-ve)

Probability: This describes the likelihood of the impact actually occurring.

Improbable: The possibility of the impact occurring is very low, due to the circumstances, design or experience.

Probable: There is a probability that the impact will occur to the extent that provision must be made, therefore.

Highly Probable: It is most likely that the impact will occur at some stage of the development.

Definite: The impact will take place regardless of any prevention plans, and there can only be relied on mediatory actions or contingency plans to contain the effect.

Duration: The lifetime of the impact.

Short term: The impact will either disappear with mitigation or will be mitigated through natural processes in a period shorter than any of the phases.

Medium-term: The impact will last up to the end of the phases, whereafter it will be negated.

Long term: The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.

Permanent: Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a period that the impact can be considered transient.

Scale: The physical and spatial size of the impact

Site: The impacted area extends only as far as the activity, e.g. footprint.

Local: The impact could affect the whole or a measurable portion of the above-mentioned properties and adjacent properties.

Regional: The impact could affect the area including the neighboring residential areas.

Magnitude/ Severity: Does the impact destroy the environment or alter its function.

Low: The impact alters the affected environment in such a way that natural processes are not affected.

Medium: The affected environment is altered, but functions and processes continue in a modified way.

High: Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

Significance: This is an indication of the **importance of the impact** in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

Negligible: The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.

Low: The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.

Moderate: The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.

High: The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The ratings of the identified impacts were undertaken quantitatively. A risk matrix will be used to determine the significance of the impacts. The magnitude of the impact, the extent of the impact, the reversibility of the impact, the duration of the impact and the probability of the impact occurring were taken into consideration. The assessment has been conducted without implementing any mitigation or management measures and then with the implementation of management and mitigation measures. During the process, a score was determined to divide the significance of the impacts into negligible, low, moderate and high.

The following scale is used to determine the significance score of the impact.

Table 2: Impact of significance rating

Aspect	Description	Weight	Significance Rating	Weight	Score Color
Duration	Short term	1	(Duration, Scale, Magnitude) x Probability		
	Medium-term	3			
	Long term	4			
	Permanent	5	Negligible	<20	
Scale/Extent	Site	1			
	Local	2			
	Regional	3	Low	<40	
Magnitude/Severity	Low	2			
	Medium	6			
	High	8	Moderate	<60	
Probability	Improbable	1			
	Probable	2			
	Highly probable	4	High	>60	
	Definite	5			

For the ecological impact assessment, a desktop review of the available ecological information for the area was conducted as well as a field assessment to identify and characterize ecological features on site. The site visit was conducted during August 2021. The evaluation of impacts included a baseline establishment, flora analysis, fauna analysis and hydrological analysis.

An ecological sensitivity map was generated from the field visit results, data interpretation and literature review. The ecological status, considering the biotic and abiotic elements and the way they interact is considered for this assessment.

The following aspects were the focus of the sensitivity mapping:

- Watercourses, (washes);
- Location of important species and populations; and
- Mountain habitats representing Bushmanland Inselbergs.

2 Identification of impacts

The potential impacts for this project are determined from the original scope of the project; the potential alternatives available as viewed within the environmental and social receiving environment.

The project scale; complexity and scope are defined as:

Table 3: Development scope of the project

Development objective	Upgrade of the Kokerboom Reservoir and pipeline on the property of Black Mountain Mining (Pty) Ltd
Type of impact	Infrastructure upgrading
Impact description	The proposed upgrading involves the construction of two new reservoirs opposite the existing Kokerboom reservoir and the construction of new pipeline parallel to an existing pipeline for 7,8km
Impact period	2022 - 2023
Total impact footprint	13,2 ha
Affected vegetation types	SKr 18 - Bushmanland Inselberg Shrubland SKr 19 - Aggeneys Gravel Vygieveld NKb 3 – Bushmanland Arid Grassland
Affected water resources	Washes
Affected sensitive habitats	CBA1 & CBA2
Affected heritage resources	None identified

Table 4: Planned footprint

Infrastructure type	Area (m2)	Area (ha)
Reservoirs working area	15 165	1,5
Pipeline working area	117 000	11,7
Impact footprint	**132 165**	**13,2**

Main activities and infrastructure:

- Construction of two new reservoirs;
- Construction of new pipeline;
- Rehabilitation; and
- Maintenance

Project life cycle phases applicable:

- Site clearance and construction;
- Rehabilitation; and
- Operational

The impacts are associated primarily with the construction phase of the project, with reduced, similar impacts during the operational phase. Closure and restoration phase is not applicable to this project.

The upgrading of the Kokerboom reservoir and pipeline is part of the second phase of the upgrading of the Pella pipeline. The project will not be accessing new water resources and will not have a cumulative water resource impact. Impacts regarding water resource use are thus not assessed in this impact assessment.

Noise, dust and traffic impacts have not been included in this impact assessment. Compared to the baseline noise, dust and traffic impact from the town and mining activities, these items are considered insignificant. Cumulative impact of this project on these aspects will be insignificant.

Increased risk of grass fires associated with construction related activities are eliminated as this is not a fire driven system with little or no grass cover in the project area. Vegetation is primarily dispersed shrubs and succulents.

Ecological Impacts included in this assessment:

- Loss of vegetation cover;
- Loss of protected plant specimens;
- Loss of topsoil;
- Changes in soil functionality, compaction;
- Changes in surface hydrological patterns and processes;
- Disturbance of fauna engagent patterns;
- Loss of habitat;
- Change in species compostion;
- Ecological system impacts: Ecological process & function restoration; and
- Restoration of construction impacts.

The scope of the project excludes the following potential socio-economic impacts normally associated with linear activities. This is because local existing business will be used for a short period of time to complete the project.

- Impacts related to the potential influx of job-seekers; creation of employment and business opportunities, and opportunity for skills development and on-site training is limited as known skills and existing business is used;

- Impacts associated with the presence of construction workers on local communities is limited due location of pipeline mainly away from residents and local companies used that live in the town over a short period;

- Impact on productive farmland and future land-use potential is limited because the area is currently used for the existing pipeline and the property owned by the mine with mineral extraction as the main land use.

Socio-economic and cultural impacts included in this assessment:

- Short term local employment;
- Basic water supply;
- Loss of heritage artefacts or paleontological resources;
- Accumulation of waste on site; and
- Changes in topography: visual quality.

Cumulative impacts are derived from the residual and latent impacts that remain after mitigation measures as well as cumulation of listed impacts within the context of the landscape dynamics in terms of social and ecological continuation; processes and functionality.

The only potential cumulative impact is the loss of natural vegetation, increasing the impacted footprint of the landscape. This cumulative impact applies because the reservoirs will be a permanent fixture. The total impact area is however small for the reservoir areas (1,5 ha), but the pipeline areas situated along the existing pipeline and already disturbed areas will have low cumulative impact.

Cumulative impacts considered in this assessment:

- Loss of natural vegetation

3 Impact Assessment

Scoping level impact assessment was undertaken during the site visit in terms of existing impacts and condition of the environment.

Existing impacts present on the planned pipeline footprint:

- Existing gravel road;
- Existing pipeline footprint;
- Existng telecomunication line footprint; and
- Road reserve.

Percentage habitat condition for the proposed project footprint:

- 10% Natural (New reservoirs site)
- 30% Near natural (Road reserve)
- 30% Degraded (Existing pipeline and telecomunication line footprint)
- 30% Transformed (Gravel Road)

The screening report and site assessment from the different input disciplines concluded that the receiving environment is unlikely to have any heritage resources as most of the area is already impacted. Specialist input from a heritage practitioner is excluded.

Impacts assessed in the Ecological Specialist Report (Appendix D) have been incorporated into this impact assessment.

Table 5: Impact statement before mitigation

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before mitigation
Flora	Site Clearance and Construction	Clearing Indigenous Vegetation	Loss of vegetation cover	Direct Negative Moderate	Long term	Site	Medium	Definite	**55**
Flora	Site Clearance and Construction	Clearing Indigenous Vegetation	Loss of protected plant specimens	Direct Negative Moderate	Long term	Site	Medium	Highly Probable	**44**
Soil	Site Clearance and Construction	Clearing Soils	Loss of topsoil	Direct Negative Moderate	Medium term	Site	Medium	Highly Probable	**40**
Soil	Site Clearance & Construction	Construction: earth works	Changes in soil functionality: compaction	Direct Negative Low	Long term	Site	Low	Highly Probable	**28**
Heritage	Site Clearance and Construction	Construction: earth works	Loss of heritage artefacts or paleontological resources	Direct Negative Low	Permanent	Local	High	Probable	**30**
Waste	Site Clearance and Construction	Construction: earth works	Accumulation of waste on site	Direct Negative Low	Short term	Site	Medium	Definite	**40**
Water - Surface	Site Clearance and Construction	Construction within wash crossings	Changes in surface hydrological patterns and processes	Direct Negative Low	Medium term	Site	Medium	Probable	**20**
Socio-Economic	Site Clearance and Construction	Construction of Pipeline	Short term local employment	Direct Positive Low	Short term	Local	Medium	Highly Probable	**36**
Fauna	Site Clearance & Construction	Disturbance: fauna and flora	Disturbance of fauna engagement patterns	Direct Negative Low	Short term	Local	Low	Probable	**10**
Ecology	Site Clearance & Construction	Disturbance: fauna and flora	Loss of habitats	Indirect Negative Low	Medium term	Site	Medium	Highly Probable	**40**
Biodiversity	Site Clearance & Construction	Disturbance: fauna and flora	Change in species composition	Direct Negative Moderate	Long term	Site	Low	Probable	**14**
Ecology	Rehabilitation	Rehabilitation	Ecological system impacts: Ecological process & function restoration	Direct Positive Moderate	Long term	Site	Medium	Probable	**22**
Rehabilitation	Rehabilitation	Rehabilitation	Restoration of construction impacts	Direct Positive Moderate	Long term	Site	Medium	Probable	**22**
Visual	Operational	Constructed Reservoirs	Changes in topography: visual quality	Direct Negative Low	Permanent	Site	Low	Highly Probable	**32**

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before mitigation
Flora	Operational	Maintenance	Loss of vegetation cover	Direct Negative Low	Long term	Site	Low	Definite	**35**
Social	Operational	Upgraded Reservoir and Pipeline	Basic water supply	Direct Positive Moderate	Long term	Local	Medium	Definite	**60**

Rehabilitation; local employment and basic water supply are indicated in green as direct positive impacts.

Table 6: Impact statement after mitigation

Element	Project Phase	Activity	Impact Description	Duration	Scale	Severity	Final Probability	Final Score Residual
Flora	Site Clearance and Construction	Clearing Indigenous Vegetation	Loss of vegetation cover	Long term	Site	Medium	Probable	22
Flora	Site Clearance and Construction	Clearing Indigenous Vegetation	Loss of protected plant specimens	Long term	Site	Medium	Improbable	11
Soil	Site Clearance and Construction	Clearing Soils	Loss of topsoil	Medium term	Site	Medium	Probable	20
Soil	Site Clearance & Construction	Construction: earth works	Changes in soil functionality: compaction	Long term	Site	Low	Probable	14
Heritage	Site Clearance and Construction	Construction: earth works	Loss of heritage artefacts or paleontological resources	Permanent	Local	High	Improbable	15
Waste	Site Clearance and Construction	Construction: earth works	Accumulation of waste on site	Short term	Site	Medium	Probable	16
Water - Surface	Site Clearance and Construction	Construction within wash crossings	Changes in surface hydrological patterns and processes	Medium term	Site	Medium	Probable	20
Socio-Economic	Site Clearance and Construction	Construction of Pipeline	Short term local employment	Short term	Local	Medium	Highly Probable	36
Fauna	Site Clearance & Construction	Disturbance: fauna and flora	Disturbance of fauna engagement patterns	Short term	Local	Low	Improbable	5
Ecology	Site Clearance & Construction	Disturbance: fauna and flora	Loss of habitats	Medium term	Site	Medium	Probable	20
Biodiversity	Site Clearance & Construction	Disturbance: fauna and flora	Change in species composition	Long term	Site	Low	Improbable	7
Ecology	Rehabilitation	Rehabilitation	Ecological system impacts: Ecological process & function restoration	Long term	Site	Medium	Highly Probable	44
Rehabilitation	Rehabilitation	Rehabilitation	Restoration of construction impacts	Long term	Site	Medium	Highly Probable	44
Visual	Operational	Constructed Reservoirs	Changes in topography: visual quality	Permanent	Site	Low	Highly Probable	32
Flora	Operational	Maintenance	Loss of vegetation cover	Long term	Site	Low	Probable	14
Social	Operational	Upgraded Reservoir and Pipeline	Basic water supply	Long term	Local	Medium	Definite	60

All impacts assessed will be of low significance if mitigation measures listed in the Environmental Management Program (Appendix G) are implemented.

Table 7: Cumulative impact statement

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Cumulation Description	Cumulative Impact Scale	Cumulative Impact Probability	Cumulation Significance
Flora	Site Clearance and Construction	Clearing Indigenous Vegetation	Loss of vegetation cover	Direct Negative Moderate	Permanent infrastructure	Site	Definite	55