

ECOLOGICAL IMPACT ASSESSMENT

ROBERTSON RESERVOIR PROJECT

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AUGUST 2018

PROJECT DETAILS


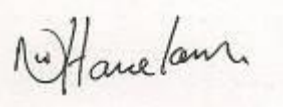
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1. Introduction

Langeberg Municipality has identified a potentially suitable development area available for the proposed reservoir construction. The site is located next to the existing reservoir and the pipeline route will follow the same route as the existing route.

An ecological impact assessment was conducted on 25 July 2018 to identify potential sensitive ecological features which may be impacted by the development.

The ecosystem impact assessment was commissioned in order to help inform the possible development and environmental authorisation process for the proposed reservoir development as described above. The assessment is intended to provide ecosystem information that can be used to guide the potential development process.



Figure 1: Impacted and Assessment Area.

Nicolaas Hanekom is a registered Professional Natural Scientist in the ecological science field with the South African Council for Natural Scientific Professions (“SACNASP”) and a qualified Environmental Assessment Practitioner (“EAP”) who holds a Masters Technologiae, Nature Conservation degree from the Cape Peninsula University of

Technology. Hanekom attended and obtained a certificate on Integrated Protected Area Planning at the Centre for Environmental Development, University of KwaZulu. He has lectured in two subjects at the Cape Peninsula University of Technology. He has 26 years of ecology experience, working for South African National Parks, Free State and Western Cape departments of environmental affairs.

Hanekom has been responsible for many ecological impact assessments and several EIA applications since 2006.

2. Terms of Reference

The terms of Reference for this study were as follows:

- Undertake a site visit to assess the vegetation in the study area.
- Provide a description of the terrestrial ecology and vegetation in the study area and identify and locate any plant Species of Conservation Concern that are present, or likely to be present.
- Provide a description of the freshwater ecology in the study area and identify and locate any wetlands or water courses that are present, or likely to be present.
- Compile a ecological sensitivity map of the area, with accompanying explanation in the report. Refer to and take into account any CBA maps for the area.
- Identify likely ecological impacts of the proposed development alternatives, and the No Go alternative, and assess their significance, using standard IA methodology.
- Provide recommendations for mitigation of any identified impacts, and for the construction and operational phases of the proposed project.
- Provide a professional opinion on whether the proposed development should be authorised, from an ecological perspective.

3. Limitations, Assumptions and Methodology

The study area was visited on 25 July 2018. The site visit was undertaken within what is normally considered as winter. It was possible to identify most of the terrestrial indigenous vegetation species remaining on site as well as determine whether or not there are any seasonally wet soils present on the site. The overall confidence level in the accuracy of the findings is high. The study area was walked and all indigenous plants were noted. Various photographs and plant specimens were taken. Any potentially seasonally wet soils and/or watercourse characteristics present on the site were also taken note of and recorded if present, although none was found.

Relevant references are noted in the text, and conclusions were drawn based on this documentation and professional experience in the area. Areas were measured using Google Earth Pro.

It is assumed that the study area is an accurate representation of the proposed development area as provided by the engineers. For purposes of this assessment the No Go alternative is assumed to be a continuation of the status quo, which in this case is

vacant land.

Conservation value and sensitivity of habitats are products of species diversity, plant community composition, rarity of habitat and vegetation type, degree and type of habitat degradation, rarity of species, ecological viability and connectivity, restorability, vulnerability to impacts, and reversibility of threats. Any areas with a good chance of supporting and maintaining viable populations of threatened or localised plant species are deemed to be of High sensitivity.

Medium sensitivity areas have been partly disturbed and typically support 10 - 30% of the original species diversity (prior to disturbance), may have limited numbers of a few plant Species of Conservation Concern, and have moderate rehabilitation potential.

Low sensitivity areas have been heavily disturbed, with changes to the soil structure and composition, and support less than 10% of the expected indigenous plant diversity, no plant Species of Conservation Concern, and rehabilitation potential is considered to be low, at least without substantial investments in time, materials and money.

Reference is made to the South African Vegetation Map (Mucina & Rutherford 2006 and 2012 updates), to the National Spatial Biodiversity Assessment (Rouget et al 2004), and to the National List of Threatened Ecosystems (DEA 2011). In addition, the Western Cape Biodiversity Spatial Plan (2017) was also referenced as well.

4. Description of the Study Area and Findings

The site is situated on the hill on the eastern boundary of Robertson. The development area has a moderate to steep slope and is situated on a plateau area on the hill. The surrounding areas have steep slopes. The highest point of the site is ±277m and the lowest ±248m above mean sea level.

The area normally receives about 201mm of rain per year and because it receives most of its rainfall during winter it has a Mediterranean climate. It receives the lowest rainfall (5mm) in December and the highest (27mm) in August. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for the area range from 17.6°C in July to 29.3°C in February. The region is the coldest during July when the mercury drops to 4.8°C on average during the night.

The site is underlain by geological formations derived from shales.

The site vegetation is characterised as Breede Shale Renosterveld (Least Threatened (LT)). Reference: Western Cape Biodiversity Spatial Plan 2017.

Important Taxa Tall Shrubs: *Euclea undulata* (d), *Lycium ferocissimum* (d), *Dodonaea viscosa* var. *angustifolia*, *Euryops tenuissimus*, *Searsia angustifolia*, *S. undulata*. Low Shrubs: *Aspalathus steudeliana* (d), *Elytropappus rhinocerotis* (d), *Galenia africana* (d),

G. herniariaefolia (d), *G. secunda* (d), *Oedera sedifolia* (d), *O. squarrosa* (d), *Pentzia incana* (d), *Pteronia incana* (d), *P. paniculata* (d), *Anthospermum aethiopicum*, *Aspalathus candicans*, *A. pachyloba* subsp. *macroclada*, *A. submissa*, *A. varians*, *Carissa bispinosa* subsp. *bispinosa*, *Chrysocoma ciliata*, *C. coma-aurea*, *Felicia filifolia* subsp. *filifolia*, *F. flanagani*, *Freylinia undulata*, *Hermannia vestita*, *Heterolepis peduncularis*, *Metalasia octoflora*, *Oedera genistifolia*, *Passerina obtusifolia*, *Pteronia fasciculata*, *Selago fruticosa*, *Senecio pinifolius*, *Wahlenbergia tenella*. Succulent Shrubs: *Delosperma pageanum* (d), *Euphorbia burmannii* (d), *E. mauritanica* (d), *Ruschia caroli* (d), *R. festiva* (d), *Tylecodon paniculatus* (d), *Adromischus filicaulis* subsp. *filicaulis*, *Aloe microstigma* subsp. *microstigma*, *Crassula atropurpurea* var. *atropurpurea*, *C. pubescens* subsp. *pubescens*, *C. rupestris*, *C. tetragona*, *Pelargonium alternans*, *Psilocaulon coriarium*, *Ruschia multiflora*, *Tetragonia fruticosa*, *T. sarcophylla*, *Tylecodon grandiflorus*. Herb: *Hypericum lalandii*. Geophytic Herbs: *Babiana melanops*, *Freesia caryophyllacea*, *Geissorhiza heterostyla*, *G. inflexa*, *G. ornithogaloides* subsp. *ornithogaloides*, *G. purpureolutea*, *G. tulbaghensis*, *Lachenalia polyphylla*, *Ornithogalum dubium*, *Oxalis goniorrhiza*, *Wurmbea monopetala*. Succulent Herbs: *Crassula aphylla*, *C. muscosa*. Graminoids: *Ehrharta calycina*, *E. villosa* var. *villosa*, *Ficinia ramosissima*, *Hypparrhenia hirta*, *Ischyrolepis gaudichaudiana*, *Merxmuellera stricta*.

Endemic Taxa Low Shrubs: *Aspalathus macrocarpa*, *Cliffortia varians*, *Lotononis rigida*. Succulent Shrubs: *Acrodon purpureostylus*, *Drosanthemum aureopurpureum*, *D. hallii*, *Lampranthus hurlingii*. Geophytic Herbs: *Babiana villosa*, *Freesia fucata*, *Ixia vanzijliae*, *I. vinacea*, *Moraea incurva*, *M. radians*.

The following species were recorded during the site visit:

Euclea undulata (d), *Lycium ferocissimum* (d), *Dodonaea viscosa* var. *angustifolia*, *Euryops tenuissimus*, *Searsia angustifolia*, *Aspalathus steudeliana* (d), *Elytropappus rhinocerotis* (d), *Galenia africana* (d), *Oedera sedifolia* (d), *Pentzia incana*, *Hermannia vestita*, *Euphorbia burmannii* (d), *Ruschia caroli*, *Helichrysum* sp, *Cissampelos* sp, *Acacia saligna*.

The pipeline route was previously disturbed during the construction of the current pipe. The natural vegetation remaining on site is in a moderate condition. No threatened or protected species were recorded on the site. The site is not classified as a Critically Biodiversity Area or Ecological Support area and not identified for conservation purposes. The vegetation that will be impacted is classified as Other Natural Area (ONA). ONA is areas not currently identified as a priority, but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although not prioritised, they are still an important part of the natural ecosystem. The management objectives are to minimize habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land-uses, but some authorisation may still be required for high-impact land-uses. There are no wetlands or water courses in close proximity to the impacted area. The Droë River, a tributary of the Bree River flows approximately 270m north of the impacted area. The proposed development would not require any Water Use Registration from Breede Gouritz Catchment Management agency as the activities will not be within the regulated zone

(100m from water course or 500m from wetland).

207 Avifauna species are known to occur in the bigger area (Hockey et al 2006). No sensitive breeding or roosting sites were observed on site during the survey. It is expected that the proposed development will not impact on any listed bird species. Other bird species known to occur on the property will be impacted upon by the proposed development, but they could simply fly away and move back after construction.

As reported in Smithers (1983) small buck e.g. common duiker, steenbok and grysbok, rodents such as mole rats, field mice and hares, as well as carnivores such as genets and mongoose are likely to inhabit the area.

Some 73 mammal species are known to occur in the bigger area (Smithers 1983). As reported in Alexander *et al* (2007) 33 reptile species are likely to inhabit the area. None observed during the survey.

The following table lists the Red Data mammal species (including their status) which are predicted, or confirmed to occur in the general area and possibly within the study area (Friedman & Daly, 2004):

COMMON NAME	SCIENTIFIC NAME	RED DATA CATEGORY	PREDICTED OCCURENCE
Lesueur's Wing-gland Bat	<i>Cistugo lesueurii</i>	Near threatened	Unlikely
Long-tailed Serotine Bat	<i>Eptesicus hottentotus</i>	Least Concern	Unlikely
Schreibers' Long-fingered Bat	<i>Miniopterus schreibersii</i>	Near Threatened	Possible
Temminck's Hairy Bat	<i>Myotis tricolor</i>	Near Threatened	Possible
Cape Serotine Bat	<i>Neoromicia capensis</i>	Least Concern	Possible
Egyptian Split Faced Bat	<i>Nycteris thebaica</i>	Near threatened	Possible
Cape horseshoe bat	<i>Rhinolophus capensis</i>	Near threatened	Possible
Geoffroy's horseshoe bat	<i>Rhinolophus clivosus</i>	Near threatened	Possible
Egyptian Fruit Bat	<i>Rousettus aegyptiacus</i>	Least Concern	Unlikely
Egyptian Free-tailed Bat	<i>Tadarida aegyptiaca</i>	Least Concern	Possible
Mauritian Tomb Bat	<i>Taphozous mauritanus</i>	Least Concern	Unlikely
Rock Hyrax	<i>Procavia capensis</i>	Least Concern	Likely
Cape Clawless Otter	<i>Aonyx capensis</i>	Least Concern	Unlikely
Water Mongoose	<i>Atilax paludinosus</i>	Least Concern	Unlikely

Black-backed Jackal	<i>Canis mesomelas</i>	Least Concern	Likely
Caracal	<i>Caracal caracal</i>	Least Concern	Likely
Yellow Mongoose	<i>Cynictis penicillata</i>	Least Concern	Possible
African Wild Cat	<i>Felis silvestris</i>	Least Concern	Likely
Small Grey Mongoose	<i>Galerella pulverulenta</i>	Least Concern	Likely
Small-spotted Genet	<i>Genetta genetta</i>	Least Concern	Likely
Large-spotted Genet	<i>Genetta tigrina</i>	Least Concern	Likely
Large Grey Mongoose	<i>Herpestes ichneumon</i>	Least Concern	Likely
Striped Polecat	<i>Ictonyx striatus</i>	Least Concern	Possible
Honey Badger	<i>Mellivora capensis</i>	Near Threatened	Unlikely
Bat-eared Fox	<i>Otocyon megalotis</i>	Least Concern	Likely
Leopard	<i>Panthera pardus</i>	Least Concern	Unlikely
African Weasel	<i>Poecilogale albinucha</i>	Data deficient	Unlikely
Aardwolf	<i>Proteles cristatus</i>	Least Concern	Unlikely
Cape Fox	<i>Vulpes chama</i>	Least Concern	Unlikely
Red Hartebeest	<i>Alcelaphus buselaphus</i>	Least Concern	Unlikely
Springbok	<i>Antidorcas marsupialis</i>	Least Concern	Unlikely
Black Rhinoceros	<i>Diceros bicornis bicornis</i>	Critically Endangered	Unlikely
Cape Mountain Zebra	<i>Equus zebra zebra</i>	Vulnerable	Unlikely
Klipspringer	<i>Oreotragus oreotragus</i>	Least Concern	Unlikely
Grey Rhebok	<i>Pelea capreolus</i>	Least Concern	Unlikely
Steenbok	<i>Raphicerus campestris</i>	Least Concern	Likely
Eland	<i>Taurotragus oryx</i>	Least Concern	Unlikely
Kudu	<i>Tragelaphus strepsiceros</i>	Least Concern	Unlikely
Reddish-grey Musk Shrew	<i>Crocidura cyanea</i>	Data Deficient	Unlikely
Least Dwarf Shrew	<i>Suncus infinitesimus</i>	Data deficient	Unlikely
Cape Hare	<i>Lepus capensis</i>	Least Concern	Unlikely
Scrub Hare	<i>Lepus saxatilis</i>	Least Concern	Possible
Hewitt's Red Rock Rabbit	<i>Pronolagus saundersiae</i>	Least Concern	Unlikely
Chacma Baboon	<i>Papio ursinus</i>	Least Concern	Possible
Cape Spiny Mouse	<i>Acomys subspinosus</i>	Least Threatened	Unlikely
Namaqua Rock Mouse	<i>Aethomys</i>	Least	Unlikely

	<i>namaquensis</i>	Threatened	
Common Mole Rat	<i>Cryptomys hottentotus</i>	Least Concern	Unlikely
Water Rat	<i>Dasymys incorntus</i>	Near Threatened	Unlikely
Grey Climbing Mouse	<i>Dendromus melanotis</i>	Least Concern	Possible
Brant's Climbing Mouse	<i>Dendromus mesomelas</i>	Least Concern	Unlikely
Short-tailed Gerbil	<i>Desmodillus auricularis</i>	Least Concern	Unlikely
Cape Mole Rat	<i>Georychus capensis</i>	Least Concern	Unlikely
Hairy Footed Gerbil	<i>Gerbillurus paeba</i>	Least Concern	Unlikely
Spectacled Dormouse	<i>Graphiurus ocellaris</i>	Least Concern	Possible
Porcupine	<i>Hystrix africaeaustralis</i>	Least Concern	Likely
Large-eared Mouse	<i>Malacothrix typica</i>	Least Concern	Unlikely
Multimammate Mouse	<i>Mastomys coucha</i>	Least Concern	Unlikely
Pygmy Mouse	<i>Mus minutoides</i>	Least Concern	Unlikely
Verreaux's Mouse	<i>Myomyscus verreauxi</i>	Least Concern	Unlikely
Vlei Rat	<i>Otomys irroratus</i>	Least Concern	Unlikely
Laminate Vlei Rat	<i>Otomys laminatus</i>	Least Concern	Unlikely
Saunders Vlei Rat	<i>Otomys saundersiae</i>	Least Concern	Unlikely
Karoo Bush Rat	<i>Otomys unisulcatus</i>	Least Concern	Unlikely
Brant's Whistling Rat	<i>Parotomys brantsii</i>	Least Concern	Unlikely
Springhare	<i>Pedetes capensis</i>	Least Concern	Possible
Striped Mouse	<i>Rhabdomys pumilio</i>	Least Concern	Likely
Pouched Mouse	<i>Saccostomus campestris</i>	Least Concern	Unlikely
Krebs' Fat Mouse	<i>Steatomys krebsii</i>	Least Concern	Unlikely
Cape Rock Elephant-shrew	<i>Elephantulus edwardii</i>	Least Concern	Unlikely
Aardvark	<i>Orycteropus afer</i>	Least Concern	Unlikely

Observations and Findings:

(High 70-100% confident): No rare mammal species as listed were observed during the site survey.

Rare Listed species of avifauna of special significance could include the following:

The avifauna species of special significance likely to occur within the area are:

- Black Harrier *Circus maurus* (Near Threatened)
- Lanner Falcon *Falco biarmicus* (Near Threatened)
- Blue Crane *Anthropoides paradiseus* (Vulnerable)
- Denham's Bustard *Neotis denhami* (Vulnerable)
- Martial Eagle *Polemaetus bellicosus* (Vulnerable) Barnes 2000
- African Fish Eagle *Haliaeetus vocifer* (Vulnerable)
- African Marsh Harrier *Circus ranivorous* (Vulnerable)
- Lesser Kestrel *Falco naumunni* (Vulnerable)
- Peregrine Falcon *Falco peregrinus* (Near Threatened)

Observations and Findings:

(High 70-100% confident): None of the above species were observed on or near site during the survey and are more likely to occasionally visit the site and do not breed there.

The surrounding areas have a steeper slope and storm water management must be controlled to prevent erosion. The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions and only proceed under supervision of a competent and diligent Environmental Control Officer during the construction phase.

Storm water runoff from the site must be controlled in order to prevent erosion and siltation of the surrounding area.



Photograph 1: Reservoir proposed site.



Photograph 2: Proposed pipeline route.

5. Identification and Assessment of Potential Impacts and Layout Alternatives

The reservoir site and pipeline route have been provided for assessment thus far. If the recommendations of this report are incorporated into the proposed layout the ecological impact in the study area is likely to be of **low negative significance** at regional scale, after mitigation.

(See Appendix B attached for Impact Assessment Methodology used)

Nature of potential impact: Loss of terrestrial indigenous vegetation				
Discussion: The habitat loss is deemed to be permanent (>15 years). The pipeline route was previously disturbed during the construction of the current pipe. The natural vegetation on site is in a moderate condition. No threatened or protected species were recorded on the site. The site is not classified as a Critically Biodiversity Area or Ecological Support area and not identified for conservation purposes. The vegetation that will be impacted is classified as Other Natural Area (ONA). There are no wetlands or water courses in close proximity to the impacted area. The Droë River, a tributary of the Bree River flows approximately 270m north of the impacted area. The proposed development would not require any Water Use Registration from Breede Gouritz Catchment Management agency as the activities will not be within the regulated zone (100m from water course or 500m from wetland).				
Cumulative impacts: Habitat fragmentation, loss of ecological connectivity and erosion.				
Mitigation:				
<ul style="list-style-type: none"> Restrict development to impact area throughout construction phase, ensuring that no areas outside of the proposed development footprint area are further disturbed. Top soil of disturbed areas must be spread over exposed areas and vegetation (branches of surrounding shrubs) must be cut and spread over the exposed areas. Erosion must be monitored and the area rehabilitated and stabilized as soon as signs of erosions occur. 				
Criteria	Proposed layout		No Development Option	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Extent	2	1	-	-
Duration	5	5	-	-
Magnitude	4	2	-	-
Probability	5	4	-	-
Significance	55 – Medium	32 - Medium	No significance	No significance
Status	Medium negative	Medium negative	Neutral	Neutral
Reversibility	PR		-	
Irreplaceable loss of resources	PR - 2		-	
Can impacts be mitigated?	2-Partly		-	

No-Go Alternative

The proposed area will not be impacted and the loss of indigenous vegetation will not occur.

6. Concluding Remarks and Recommendations

The site vegetation is characterised as Breede Shale Renosterveld (Least Threatened). Reference: Western Cape Biodiversity Spatial Plan 2017. The pipeline route was previously disturbed during the construction of the current pipe. The natural vegetation remaining on site is in a moderate condition. The proposed development will not lead to the loss of ecological functioning of the remaining vegetation. No threatened or protected species were recorded on the site. The site is not classified as a Critically Biodiversity Area or Ecological Support area and not identified for conservation purposes. The vegetation that will be impacted is classified as Other Natural Area (ONA). There are no wetlands or water courses in close proximity to the impacted area. The Droë River, a tributary of the Bree River flows approximately 270m north of the impacted area. The proposed development would not require any Water Use Registration from Breede Gouritz Catchment Management agency as the activities will not be within the regulated zone (100m from water course or 500m from wetland). The surrounding areas have a steeper slope and storm water management must be controlled to prevent erosion. The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions and only proceed under supervision of a competent and diligent Environmental Control Officer, both during the construction-, operational and decommissioning phases. Storm water runoff from the site must be controlled in order to prevent erosion and siltation of the surrounding area.

The ecological impact in the study area is likely to be of **moderate negative significance** at regional scale, after mitigation. It is recommended that the development be authorised without causing significant negative botanical and freshwater ecosystem impacts.

7. References

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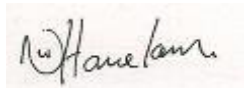
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APPENDIX A: Declaration of Independence THE SPECIALIST

Note: Duplicate this section where there is more than one specialist.

I **Nicolaas Willem Hanekom**, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I :

- in terms of the general requirement to be independent:
 - other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity; or
 - am not independent, but another specialist (the “Review Specialist”) that meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).



Signature of the Specialist:

Pri.Sci.Nat (Ecological Science) 400274/11

Name of Company:

Eco Impact Legal Consulting 9Pty) Ltd

Date:

08 September 2018

APPENDIX B: Impact Assessment Methodology

Below is the assessment methodology utilized in determining the significance of the potential mining impacts on the biophysical environment, and where applicable the possible alternatives. The methodology is broadly consistent with that described in the Department of Environmental Affairs' Guideline Document on the EIA Regulations (1998) and as provided by the Shangani Management Services.

For each potential impact, the significance is determined by specified factors as in Table 1. Significance is described prior to mitigation as well as with the most effective mitigation measure(s) in place.

The mitigation described in the document represents the full range of plausible and pragmatic measures that must be implemented.

Despite the attempts at providing a completely objective and impartial assessment of the environmental implications of proposed activities, the specialist can never completely escape the subjectivity inherent in attempting to define significance.

Recognising this, potential subjectivity in the current process is addressed as follows:

- Be clear about the difficulty of being completely objective in the determination of significance;
- Develop an explicit methodology for assigning significance to impacts and outlining this methodology in detail. Having an explicit methodology not only forces the assessor to come to terms with the various facets contributing toward determination of significance, thereby avoiding arbitrary assignment, but also provides the reader of the report with a clear summary of how the assessor derived the assigned significance; and
- Wherever possible, differentiating between the likely significance of potential environmental impacts as experienced by the various affected parties.

Although these measures may not totally eliminate subjectivity, they do provide an explicit context within which to review the assessment of impacts.

Table 1: Assessment criteria for the evaluation of impacts

Criteria	Description		
Nature	a description of what causes the effect, what will be affected, and how it will be affected.		
	Type	Score	Description
Extent (E)	None (No)	1	Footprint
	Site (S)	2	On site or within 100 m of the site
	Local (L)	3	Within a 20 km radius of the centre of the site
	Regional (R)	4	Beyond a 20 km radius of the site
	National (Na)	5	Crossing provincial boundaries or on a national / land wide scale
Duration (D)	Short term (S)	1	0 – 1 years
	Short to medium (S-M)	2	2 – 5 years
	Medium term (M)	3	5 – 15 years
	Long term (L)	4	> 15 years

Criteria		Description	
	Permanent(P)	5	Will not cease
Magnitude (M)	Small (S)	0	will have no effect on the environment
	Minor (Mi)	2	will not result in an impact on processes
	Low (L)	4	will cause a slight impact on processes
	Moderate (Mo)	6	processes continuing but in a modified way
	High (H)	8	processes are altered to the extent that they temporarily cease
	Very high (VH)	10	results in complete destruction of patterns and permanent cessation of processes.
Probability (P) the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned	Very improbable (VP)	1	probably will not happen
	Improbable (I)	2	some possibility, but low likelihood
	Probable (P)	3	distinct possibility
	Highly probable (HP)	4	most likely
	Definite (D)	5	impact will occur regardless of any prevention measures
Significance (S)	Determined through a synthesis of the characteristics described above: S = (E+D+M) x P Significance can be assessed as low, medium or high		
Low: < 30 points:	The impact would not have a direct influence on the decision to develop in the area		
Medium: 30 – 60 points:	The impact could influence the decision to develop in the area unless it is effectively mitigated		
High: > 60 points:	The impact must have an influence on the decision process to develop in the area		
No significance	When no impact will occur or the impact will not affect the environment		
Status	Positive (+)		Negative (-)
The degree to which the impact can be reversed	Completely reversible (R)	90-100%	The impact can be mostly to completely reversed with the implementation of the correct mitigation and rehabilitation measures.
	Partly reversible (PR)	6-89%	The impact can be partly reversed providing that mitigation measures as stipulated in the EMP are implemented and rehabilitation measures are undertaken
	Irreversible (IR)	0-5%	The impact cannot be reversed, regardless of the mitigation or rehabilitation measures taking place
The degree to which the impact may cause irreplaceable loss of resources	Resource will not be lost (R)	1	The resource will not be lost or destroyed provided that mitigation and rehabilitation measures as stipulated in the EMP are implemented
	Resource may be partly destroyed (PR)	2	Partial loss or destruction of the resources will occur even though all management and mitigation measures as stipulated in the EMP are implemented
	Resource cannot be replaced (IR)	3	The resource cannot be replaced no matter which management or mitigation measures are implemented.
The degree to which the impact can be mitigated	Completely mitigatable (CM)	1	The impact can be completely mitigated providing that all management and mitigation measures as stipulated in the EMP are implemented
	Partly mitigatable (PM)	2	The impact cannot be completely mitigated even though all management and mitigation measures as stipulated in the EMP are implemented. Implementation of these measures will provide a measure of mitigatability
	Un-mitigatable (UM)	3	The impact cannot be mitigated no matter which management or mitigation measures are implemented.