

Biodiversity Assessment

FOR A PROPOSED BIOMASS POWER PLANT NEAR MKUZE, NORTHERN KWAZULU-NATAL

ADDENDUM

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1. BIODIVERSITY ASSESSMENT

1.1 SUMMARY

ACER (Africa) Environmental Management Consultants was appointed by Savannah Environmental (Pty) Ltd to conduct a Biodiversity Assessment for the proposed Biomass Power Plant near Mkuze in northern KwaZulu-Natal.

The study area is approximately 10 ha in size and is located within a private game reserve. It is situated on Farm number 13434 just west of the town Mkuze, in the Jozini Local Municipality, KwaZulu-Natal. The terrain of the proposed site is flat to slightly undulating and the Zululand Lowveld Vegetation Type (conservation status: vulnerable). According to Ezemvelo KZN Wildlife Minimum Set Analysis, the entire site falls within a Biodiversity Priority Area 1. Priority 1 Areas are designated zones that have a natural land cover (primary vegetation in excellent condition) and high biodiversity value. These areas have the highest priority for environmental management and, as such, development within this designation should be low-key, highly environmentally sensitive and harmonious with the surrounding conditions. The study area also falls within a *vulnerable ecosystem*, namely, Black Rhino Range, as listed by the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).

The following protected species were found on site: *Sclerocarya birrea* subsp. *caffra* (Marula tree) and *Elaeodendron transvaalense* (Bushveld Saffron). According to NEMBA a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit from the Department of Agriculture, Forestry and Fisheries. Additionally a *Crinum* species was recorded on site, this is a Specially Protected Indigenous Plant according to Schedule 12 of the Natal Nature Conservation Ordinance (No. 15 of 1974) and a permit will be required from Ezemvelo KZN Wildlife.

The ECO appointed to the site is alerted to the fact that an alien invasive species was recorded immediately adjacent to the site. *Parthenium hysterophorus*, also known as famine weed, is toxic to animals and has devastating effects on grasslands in KwaZulu-Natal.

It is recommended that the drainage line to the north-eastern corner of the study area is avoided. If the development takes place within the drainage line or its buffer, a Water Use Licence would be required. It is further recommended that the development footprint should be fenced off before the start of construction, to avoid negative impacts on the animals within the game reserve.

1.2 INTRODUCTION

ACER (Africa) Environmental Management Consultants was appointed by Savannah Environmental (Pty) Ltd to conduct a Biodiversity Assessment for an expanded area to the west of the authorised Biomass Power Plant near Mkuze in northern KwaZulu-Natal. Environmental Authorization (EA) was received for the EIA done on the initial study area, however, in order to amend the development footprint, an amendment to the EA will be sought.

The terms of reference for the ecological assessment were as follows:

- Undertake a site visit and vegetation survey of the proposed site.
- Identify protected and Red Data plants and any important habitats that may occur within the proposed site.
- Undertake a desktop assessment of the terrestrial fauna, excluding birds.
- Identify wetlands on site.
- Provide an amendment to the previous report in the form of an addendum.

The study area is situated on Farm number 13434 just west of the town Mkuze and the National Route 2 (N2), in the Jozini Local Municipality, KwaZulu-Natal (Figure 1-1). The study area (Figure 1-2) is approximately 10 ha in size and is located within a private game reserve. One plant community and two sub-communities were identified as well as a drainage line passing along the north-eastern corner in the study area. The vegetation is primary and in excellent ecological condition.

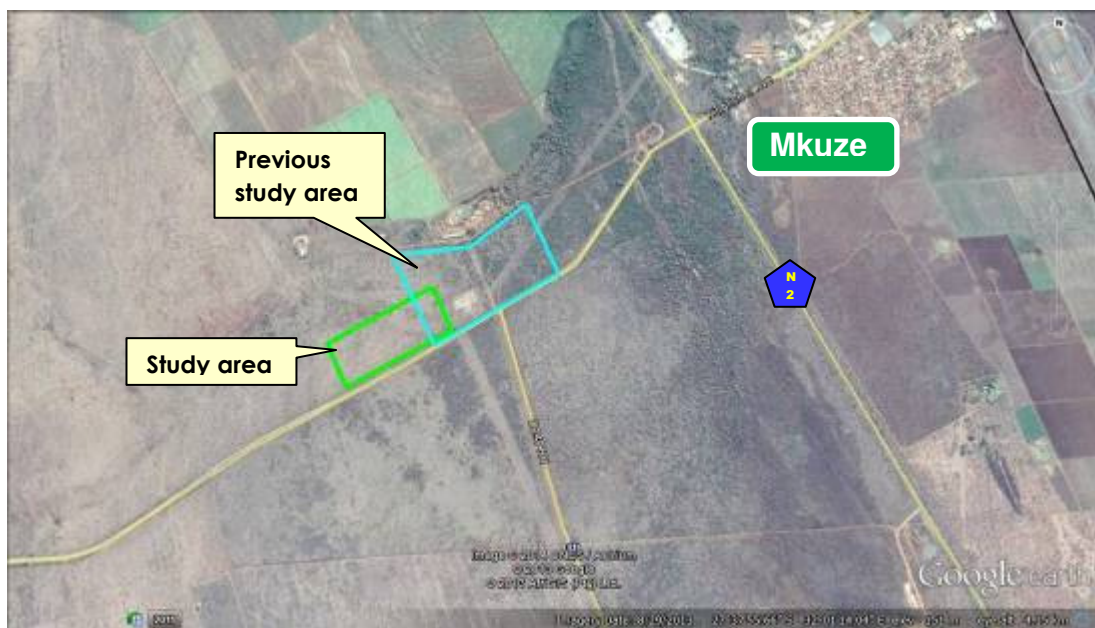


Figure 1-1 Google Earth image showing study area



Figure 1-2 Study area

1.2.1 Approach to the Assessment

This assessment involved a site visit to verify whether the vegetation communities found on site were different to that previously observed, and to record any differences observed as well as to note if any sensitive ecosystems occur within the potential development footprint. Additionally, a search for red data plants and protected trees was conducted.

1.2.2 Assumptions and Limitations

The vegetation was easily identified on site, except for a *Crinum* species that was observed during the visit. The *Crinum*¹ was not in flower.

1.2.3 Information Sources

Ezemvelo KZN Wildlife (EKZNW) and the South African National Biodiversity Institute (SANBI) GIS datasets were used to create the maps in the report, including EKZNW vegetation and MINSET (Minimum Set Analysis) Biodiversity data.

¹ The genus *Crinum* is a Specially Protected Indigenous Plant according to Schedule 12 of the Natal Nature Conservation Ordinance No. 15 of 1974.

1.3 VEGETATION ASSESSMENT

EKZNW's MINSET data identified that the site falls within a Biodiversity Priority Area 1 (Figure 1-3)**Error! Reference source not found..** Priority 1 Areas have the highest priority for environmental management and, as such, development within this designation should be low-key, highly environmentally sensitive and harmonious with the surrounding conditions.

The National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) provides a listing of ecosystems² that are threatened and in need of protection. It is required that impacts should be avoided, minimised, mitigated and/or offset as appropriate (Government Gazette, 9 December 2011). The study area falls within a vulnerable ecosystem³, namely, Black Rhino Range (Figure 1-4).



Figure 1-3 Minimum Set Analysis (EKZNW)

Based on the Vegetation Map of South Africa, Lesotho and Swaziland, and ground-truthed during the field visit, the Zululand Lowveld vegetation type occurs on site⁴ (Figure 1-5).

Ezemvelo KZN Wildlife GIS vegetation data is slightly more refined than Mucina and Rutherford (2006), however, according to EKZNW data, the same vegetation type occurs on site (Figure 1-6).

² SANBI & DEAT. 2009. *Threatened Ecosystems in South Africa: Descriptions and Maps*. South African National Biodiversity Institute, Pretoria. Government Gazette on 9 December 2011.

³ Vulnerable ecosystems have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention.

⁴ Mucina, L. and Rutherford, M.C. (eds). 2006. *The vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.



Figure 1-4 Threatened terrestrial ecosystems (remaining extent) (SANBI)

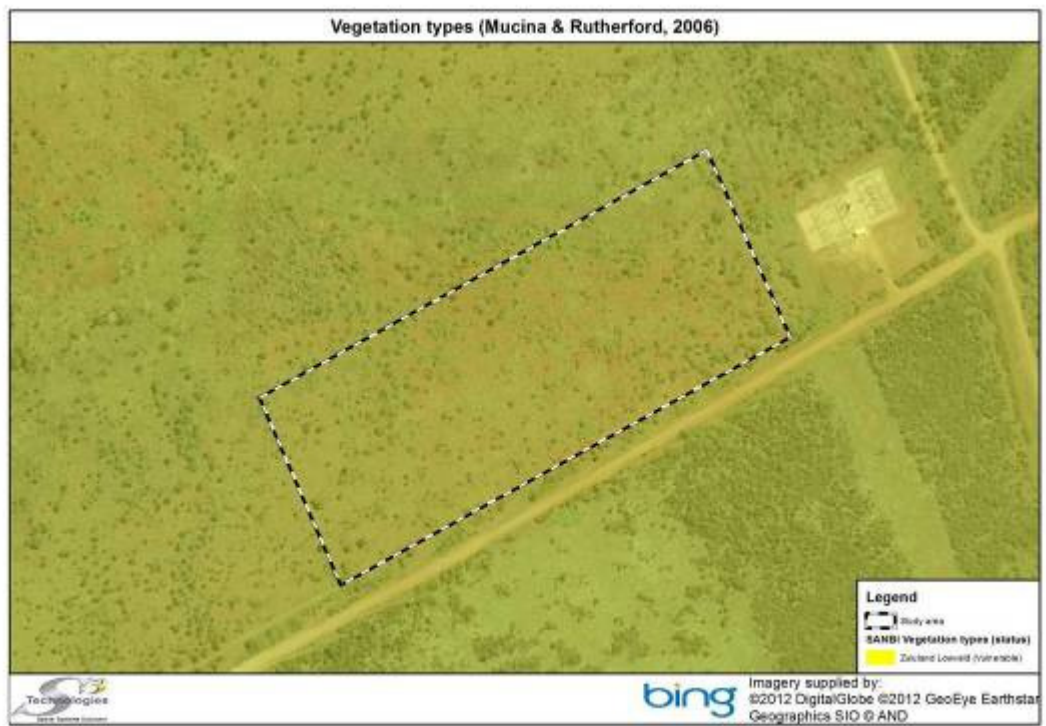


Figure 1-5 Vegetation types (Mucina & Rutherford, 2006)



Figure 1-6 Vegetation types (EKZMW, 2011)

1.3.1 Vegetation communities identified on site

The site survey took place on 15 February 2014. Only one of the two vegetation communities identified during the (initial) site survey conducted in June 2012 was located on site, namely the *Acacia tortillis* – *Urochloa mosambicensis* short thicket community (Figure 1-7 and Figure 1-8). See Appendix 1 for a list of plant species recorded on site. The deep red soils of this plant community are formed *in situ* (Figure 1-9 and Figure 1-10). A drainage line passes along the north-eastern corner of the study area (Figure 1-11). The *Acacia tortillis* – *Urochloa mosambicensis* short thicket community is further divided into two sub-communities, with *Acacia nigrescens* more dominant close to the drainage line in the north, and *Acacia tortillis* more dominant over the remainder of the site.

Carrying out any activity involving modifications to a watercourse, such as impeding or diverting the flow of water within a watercourse, or altering the bed or banks of a watercourse, would require a water use licence from the Department of Water Affairs. Ideally, no infrastructure should be located within a watercourse, or 30 m from its edge.

A watercourse is defined as-

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, lake or dam into which, or from which, water flows, and
- (d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse

– National Water Act (Act 36 of 1998)



Figure 1-7 *Acacia tortillis* – *Urochloa mosambicensis* short thicket community



Figure 1-8 *Acacia tortillis* – *Urochloa mosambicensis* short thicket community



Figure 1-9 Deep soils associated with the *Acacia tortillis* – *Urochloa mosambicensis* short thicket community



Figure 1-10 Red Structured B horizon



Figure 1-11 Drainage line on site touches on the study area

1.3.2 Red Data plant species and Protected trees

The following Red Data plant species were recorded during the site visit: (Red list categories are provided in Figure 1-12).

- *Elaeodendron transvaalense* (Bushveld Saffron)

The following Protected trees were recorded during the site visit (Table 1-1):

- *Elaeodendron transvaalense* (Bushveld Saffron)
- *Sclerocarya birrea* (Marula)

The following Specially Protected Indigenous Plant was recorded during the site visit:

- *Crinum* species

The Bushveld saffron is widespread but not common. It is very popular in the muthi markets and population declines have been observed. It is a slow growing tree and viable seed is often difficult to find. The tree is a protected tree, and due to its declining populations is also listed as *near threatened*.

The Marula tree is a highly valued tree and has many uses. In its natural habitat, it is a foodplant for a number of faunal species. The leaves (and fruit) are browsed by game, the bark is stripped by elephants, several butterflies and moth species feed on it. Among its many other uses, it is also used medicinally by humans. It is a protected tree.

Sclerocarya birrea subsp. *caffra* (Marula tree) and *Elaeodendron transvaalense* (Bushveld Saffron) are protected species and removal or damage of these trees would require a licence from the Department of Agriculture, Forestry and Fisheries (DAFF).

The genus *Crinum* belongs to the family Amaryllidaceae, and is recognized as a Specially Protected Indigenous Plant according to Schedule 12 of the Natal Nature Conservation Ordinance No. 15 of 1974. A relocation permit is required by a landowner who wishes to develop his land where the development may cause damage or destruction of specially protected indigenous plants.

Table 1-1 Red data plants and protected trees recorded on site

Species name	Family	RD status	Habitat and Ecology	Notes
<i>Elaeodendron transvaalense</i>	CELASTRACEAE	NT	Savanna and bushveld, from open woodland to thickets, often on termite mounds.	Protected tree. Threatened by harvesting bark for medicinal use
<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	ANACARDIACEAE	LC	Savanna and bushveld, medium- to low-altitude open woodland	Protected tree. Used medicinally

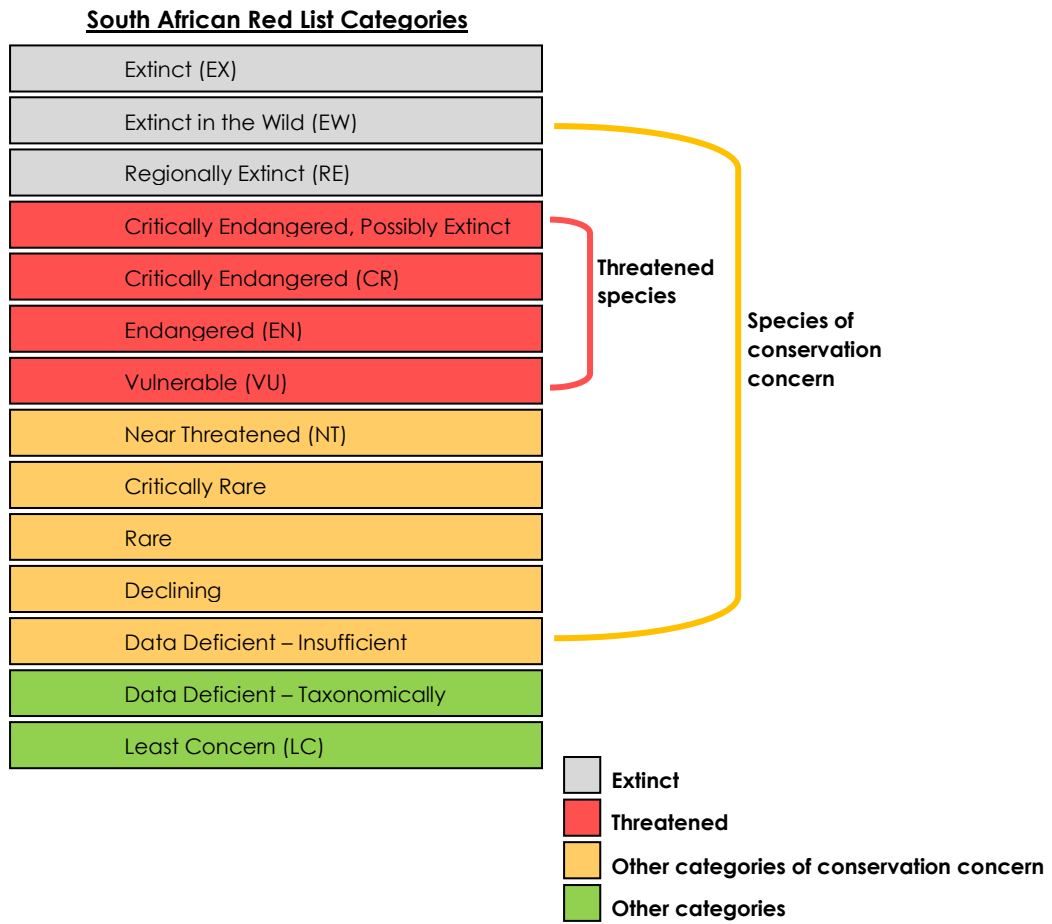


Figure 1-12 Red List Categories (according to the Threatened Species Programme, SANBI)

1.3.3 Alien invasive plant species alert

The Convention on Biological Diversity (CBD) is an international treaty that is dedicated to promoting sustainable development. In November 1995, South Africa became a signatory to the CBD and undertook to 'prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats and species' (Article 8(h)).

Weeds and invasive plant species are regulated according to the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA). These regulations were amended in 2001 and are in the process of being revised. The amended regulations stress that, when controlling alien invasives, methods should be used that are appropriate for the species concerned as well as to the ecosystem in which they occur. One or a combination of the following control methods may be used: uprooting, felling, cutting, burning, treatment with registered herbicides, biological control or any other appropriate method. Repetitive follow-up actions will be mandatory until the required control has been achieved.

There are no new alien invasive species recorded on site, however, this alien invasive plant species alert serves to bring attention to a plant called *Parthenium hysterophorus* also known as **famine weed** that was found immediately outside the game reserve.

***Parthenium hysterophorus* (famine weed)**

Famine weed was originally introduced from central South America., and is classified as a **category 1** weed⁵ in South Africa. It is an annual herb growing up to 1,5m high with an erect, longitudinally grooved, hairy stem and deep tap root. It has pale green, hairy leaves and small white flowers in compact heads, flowering from September to May⁶. One adult plant has the ability to generate up to 15,000 viable seeds. Allergic reactions to the plant include: skin rashes, asthma, hay fever and blistered skin⁷. It invades disturbed areas, roadsides, rail sides, water courses, cultivated fields and overgrazed land. To remove *Parthenium*: pull the plant out from the roots before it flowers (and sets seed). Burn the famine weed once it is dry, making sure that the seeds are not further distributed. Emerging plants and leaves can be sprayed with a registered herbicide. Staff, in contact with the plant, are to wear protective gloves, clothing and a facemask at all times.



Figure 1-13 Famine weed (*Parthenium hysterophorus*) (a) growth form (b) flowers (c) leaf

⁵ Category 1 plants are prohibited and must be controlled or eradicated.

⁶ <http://www.invasives.org.za/component/k2/item/295-parthenium-weed%7Cparthenium-hysterophorus.html>

⁷ <http://www.simplygreen.co.za/local-stories/biz-and-community/toxic-plant-threatens-farms-health.html>

1.4 FAUNA ASSESSMENT

No new habitats were recorded on site, so the fauna assessment remains the same as indicated in the initial report. Refer to the report *Botanical and Terrestrial Faunal Assessment: for a proposed biomass power plant near Mkuze, Northern KwaZulu-Natal* (ACER, July 2012) for the faunal assessment.

1.5 IDENTIFICATION OF POTENTIAL IMPACTS

The potential impacts for the activities remain the same as the initial report, the following needs to be highlighted:

- The drainage line is considered a sensitive habitat, and should be avoided as far as possible. If the development footprint encroaches on the drainage line, then a water use licence will be required. Additionally, the ECO should ensure that the drainage line is visibly demarcated and waste materials generated during construction do not spill into the drainage line. Construction vehicles should not pass through the drainage line.
- The ECO should monitor the increase in cover of alien invasive species on and around the site, and effective methods of control should be applied.

1.6 LEGISLATIVE REQUIREMENTS

Some of the most important environmental legislation and guidelines applicable to this project are summarized below.

1.6.1 National Environmental Management Act, 1998 (Act 107 of 1998)

The National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) requires negative impacts on the environment and on people's environmental rights to be anticipated and prevented, and where they cannot altogether be avoided, to be minimized and remedied.

1.6.2 National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)

According to the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA) a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit from Ezemvelo KZN Wildlife or the Department of Agriculture, Forestry and Fisheries. Restricted activities include, among others, hunting, catching, capturing or killing; as well as gathering, collecting, damaging or destroying any threatened or protected species.

The National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) provides a listing of ecosystems that are threatened and in need of protection. It is required that impacts should be avoided, minimised, mitigated and/or offset as appropriate (Government Gazette, 9 December 2011). The study area falls within a vulnerable ecosystem, namely, Black Rhino Range.

1.6.3 National Forests Act, 1998 (Act 84 of 1998):

According to section 15(1) of the National Forests Act, 1998 (Act 84 of 1998), no person may cut, disturb, damage, destroy, possess, collect, remove, transport, export, purchase, sell,

donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree (as listed in Government Gazette Notice 734 of 16 September 2011), except under a licence or exemption granted by the Minister of the Department of Agriculture, Forestry and Fisheries. *Sclerocarya birrea* subsp. *caffra* (Marula tree) and *Elaeodendron transvaalense* (Bushveld Saffron) are protected species and removal or damage of these trees would require a licence.

1.6.4 Natal Nature Conservation Ordinance (No. 15 of 1974) and the KwaZulu Nature Conservation Act, 1992 (Act 29 of 1992)

According to the Natal Nature Conservation Ordinance No. 15 of 1974 and the KwaZulu Nature Conservation Act, 1992 (Act 29 of 1992), no person shall, among others: damage, destroy, or relocate any specially protected indigenous plant, except under the authority and in accordance with a permit from Ezemvelo KZN Wildlife (EKZNW).

A permit is required for the relocation of a specially protected indigenous plant: a *Crinum* species (a specially protected indigenous plant according to Schedule 12) was found within the development footprint, and this will require a permit from Ezemvelo KZN Wildlife. (Section 201A of the Natal Nature Conservation Ordinance (No. 15 of 1974).

1.6.5 Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)

The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983), as amended, (CARA) provides for control over the utilization of natural agricultural resources. Section 6 of the Act makes provision for control measures to be applied in order to achieve the objectives of the Act. These measures relate to, amongst others: utilization and protection of wetlands; the regulating of the flow pattern of run-off water; the utilization and protection of vegetation; the control of weeds and invader plants; and the restoration or reclamation of eroded land or land which is disturbed or denuded.

1.6.6 National Water Act, 1998 (Act 36 of 1998)

The major objectives of the National Water Act, 1998 (Act 36 of 1998) are to ensure that water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors: protecting aquatic ecosystems and their biodiversity; and reducing and preventing pollution and degradation.

A water use licence would be required from the Department of Water Affairs to carry out any activity involving modifications to watercourses as well as the bed or banks of the wetland. Hence, no infrastructure should be located within the drainage line, or 30 m from its edge.

1.7 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

The assessment of the different impacts is provided in the Table 1-2 and Table 1-3. Impact assessments remain the same for the additional study area, with the added impacts discussed below. Refer to the report *Botanical and Terrestrial Faunal Assessment: for a proposed biomass power plant near Mkuze, Northern KwaZulu-Natal* (ACER, July 2012) for the assessment of impacts.

Table 1-2 Impact assessment summary table for the Construction Phase

Construction Phase										
Direct Impacts										
Impact Description	Mitigation	Spatial Extent	Intensity	Duration	Reversibility	Irreplaceability	Probability	Significance & Status		Confidence
								Without Mitigation	With Mitigation	
Disturbance and loss of drainage line	<ul style="list-style-type: none"> • Move development out of drainage line and buffer. • Waste materials should be stored according to best practice guidelines and recommendations to prevent contamination. Accidental spills should be reported to the ECO immediately. 	Local	High	Long term to Permanent	Low to non-reversible	Moderate to High	Highly probable to Definite	High Negative	Low to no impact if drainage line and buffer is avoided.	High
Disturbance and loss of vegetation due to construction activities	<ul style="list-style-type: none"> • Keep vegetation clearance to a minimum. • Sensitive areas should be demarcated and avoided. • Protected plant species should be rescued. • Apply for permits for protected and specially protected plant species before the start of construction. 	Site specific to Local	High	Short Term	Low	Moderate	Highly probable	High Negative	Medium Negative	High
Faunal habitat destruction	<ul style="list-style-type: none"> • Large mammals threatened by the construction activities should be relocated to the remainder of the game reserve. • Fence off the development footprint prior to the start of construction to avoid negative impacts on the animals 	Local	Medium	Long term	Low	Low	Highly probable to Definite	Medium Negative	Low Negative	High

Table 1-3 Impact assessment summary table for the Operational Phase

Operational Phase										
Direct Impacts										
Impact Description	Mitigation	Spatial Extent	Intensity	Duration	Reversibility	Irreplaceability	Probability	Significance & Status		Confidence
								Without Mitigation	With Mitigation	
Disturbance and loss of vegetation due to construction activities	<ul style="list-style-type: none"> • Monitor spread of alien invasive species due to site clearance. • Control alien plants using methodology in the EMPr. 	Local	High	Long Term	Low	Moderate	Highly probable	Medium Negative	Medium Negative	High

1.8 CONCLUSION

The terrain of the proposed development site is flat to slightly undulating and the Zululand Lowveld Vegetation Type was found on site. The proposed site falls within a privately owned game reserve. One plant community, namely the *Acacia tortillis* – *Urochloa mosambicensis* short thicket community, was found in the study area.

A drainage line passes along the north-eastern corner of the study area. It is recommended that the drainage line and its buffer be avoided. Should the development footprint fall inside the drainage line or its buffer, then a Water Use Licence would be required.

Sclerocarya birrea subsp. *caffra* (Marula tree) and *Elaeodendron transvaalense* (Bushveld Saffron) are protected species recorded on site. A permit from the Department of Agriculture, Forestry and Fisheries (DAFF) is required to remove these trees during construction. Additionally a *Crinum* species was recorded on site, this is a Specially Protected Indigenous Plant according to Schedule 12 of the Natal Nature Conservation Ordinance (No. 15 of 1974) and a permit will be required from Ezemvelo KZN Wildlife.

The impacts for the site remain the same as for the initial report, albeit a larger section of the game reserve will be impacted, this occurs on the edge of the reserve. The development footprint should be fenced off before the start of construction, to avoid negative impacts on the animals within the game reserve. Refer to the report *Botanical and Terrestrial Faunal Assessment: for a proposed biomass power plant near Mkuze, Northern KwaZulu-Natal* (ACER, July 2012) for a discussion on the impacts and conclusion. Overall the impacts on the plant communities should be medium and the impacts on the drainage line should be low if the recommendations and mitigation measures in this report are followed.

APPENDIX 1

Plant Species List

The following plant species were identified in this plant community during the survey:

Woody species:

Acacia gerrardii Benth.
Acacia nigrescens Oliv.
Acacia nilotica (L.) Willd. ex Delile ssp. *kraussiana* (Benth)
Acacia senegal (L.) Willd.
Acacia tortilis (Forssk.) Hayne
Capparis tomentosa Lam.
Commiphora neglecta I.Verd.
Dichrostachys cinerea (L.) Wight & Arn.
Ehretia amoena Klotzsch
Ehretia rigida (Thunb.) Druce
Elaeodendron transvaalense (Burt Davy) R.H.Archer (dead specimen recorded on site)
Euclea divinorum Hiern
Gossypium herbaceum L.
Grewia flavescens Juss.
Gymnosporia glaucophylla Jordaan
Gymnosporia senegalensis (Lam.) Loes.
**Lantana camara* L.
Lantana rugosa Thunb.
**Opuntia ficus-indica* (L.) Mill.
Ormocarpum trichocarpum (Taub.) Engl.
Ozoroa engleri R.& A.Fern.
Phyllanthus reticulatus Poir.
Schotia capitata Bolle
Sclerocarya birrea (A.Rich.) Hochst. subsp. *caffra* (Sond.) Kokwaro
Solanum giganteum Jacq.
Spirostachys africana Sond.
Ziziphus mucronata Willd.

Herbaceous species:

Abutilon austro-africanum Hochr.
**Achyranthes aspera* L.
**Alternanthera pungens* Humb., Bonpl. & Kunth
**Boerhavia diffusa* L.
Blepharis integrifolia (L.f.) E.Mey. ex Schinz
Crinum cf. *paludosum* I.Verd.
Cucumis africanus L.f.
Dalechampia capensis A.Spreng.
Evolvulus alsinoides (L.) L.
Ipomoea oblongata E.Mey. ex Choisy
Justicia flava (Vahl) Vahl
Melhania prostrata DC.
Ocimum americanum L.
Phyllanthus maderaspatensis L.
Raphionacme hirsuta (E.Mey.) R.A.Dyer ex E.Phillips
Stylochiton natalensis Schott
Vernonia oligocephala (DC.) Sch.Bip. ex Walp.

Grass species:

Cenchrus ciliaris L.

Eragrostis superba Peyr.

Panicum maximum Jacq.

Setaria sphacelata (Schumach.) Moss

Themeda triandra Forssk.

Urochloa mosambicensis (Hack.) Dandy



Figure 1-14 *Cucumis africanus*