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SPECIALIST IMPACT ASSESSMENT FOR PROPOSED NEW 132kV LINE INTO ESKOM ANKERLIG POWER STATION: TERRESTRIAL VEGETATION COMPONENT.

Prepared for: Savannah Environmental (Pty) Ltd, Johannesburg

Client: Eskom

EXECUTIVE SUMMARY

This botanical impact assessment was requested in order to help inform decisions regarding the proposed installation of a new 132kV power line into the Ankerlig power station at Atlantis. The study area is located within a rapidly developing part of the south-western Cape, where much of the remaining natural vegetation is under intense development pressure. Three alternative new 132kV transmission line routes were investigated in the Scoping phase (Savannah 2008 2007), but only Options 1 and 2 have been taken through to the Impact Assessment phase. The total length of Option 1 would be about 2.6km and 3.8km for Option 2.

Confidence levels in the botanical findings are regarded as sufficient, although no fieldwork was undertaken specifically for this project, as the routes have been surveyed as part of previous projects in the area. The proposed power line routes cross two distinct vegetation types, corresponding to different soil types. The Ankerlig plant is located within Cape Flats Dune Strandveld, an Endangered vegetation type, whereas both Options would T-off abd cross an area supporting Atlantis Sand Fynbos (Vulnerable status). About 50% of the Option 2 route is regarded as being of High botanical sensitivity, and <10% of the Option 1 route is of High sensitivity. The remainder of both routes is regarded as being of Low to Medium sensitivity.

The key issues identified are:

- Loss of natural vegetation during the construction stage. About 80% of this will potentially be permanent (bushcutting of up to 1.6km of sensitive servitude [approx. 5ha]; pylon footprints [approx 0.2ha]; some tracks [0.4ha]), and about 20% will be temporary, as trampled and partly disturbed areas (*e.g.* around pylons) and should eventually partly recover.
- Bushcutting is identified as a major source of disturbance and vegetation loss, and should be regulated and restricted to once every ten years in the Medium and High sensitivity areas.
- Alien invasive vegetation is the major problem along large parts of the proposed power line route and how this is managed in the servitude is a key factor in the assessment. If effectively controlled it could be a positive outcome of the development.
- Cumulative effects on the relevant vegetation types are important, as both vegetation types are regarded as threatened, and ideally no further loss of existing habitat should take place.

Overall **Option 1** is likely to have a **Low negative** impact on the vegetation at a regional scale, prior to mitigation, and **Option 2** is likely to have a **Medium negative** impact on the vegetation at a regional scale. The primary negative impact is loss of natural vegetation that would result from Eskom bushcutting (typical practice in Eskom servitudes) in High sensitivity areas (<1ha for Option 1 servitude, about 5ha of Option 2 servitude), as this would cause major community change and species loss. Additional direct, permanent loss of natural vegetation would occur in tower footprints, and a long-term impact in the track areas. The bushcutting impact can only be mitigated by careful and ongoing removal of all invasive alien vegetation in the servitude, and by not engaging in bushcutting in the High sensitivity areas. Bushcutting should really not be necessary as this vegetation does not grow much taller than 1.2m, and the fire risk is no more than in bushcut, grassy vegetation. Impacts could be reduced to **Low negative for Option 2 after mitigation,** but the likelihood of this mitigation being implemented is thought to be low, and hence final impacts should be viewed as Medium negative.

Option 1 is thus the preferred alternative from a botanical point of view.

The potentially positive impacts of this development will only come about if recommendations noted under Mitigation (Sect. 9) are implemented and enforced. If mitigation is not effectively carried out, there will be no positive impacts. Alien clearing (not bushcutting, but clearing using the correct methodology) within the servitude in High sensitivity areas would be a Low positive impact, as alien invasive vegetation is currently a major problem in much of the study area. It would be most important and valuable to clear aliens on an annual basis within the High sensitivity areas and this is thus recommended as essential mitigation. Additional botanical inputs at the walk through stage would add relatively little value, and are not consequently recommended.

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DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence and include an abbreviated Curriculum Vita.

I, N.A. Helme, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own.

NA Helme

Abridged CV:

Contact details as per letterhead.

Surname : HELME

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Date of birth : 29 January 1969

University of Cape Town, South Africa. BSc (Honours) – Botany (Ecology & Systematics). 1990.

SACNASP Registration No: 400045/08 (Pri.Sci.Nat.)

Since 1997 I have been based in Cape Town, and have been working as a specialist botanical consultant, specialising in the diverse flora of the south-

western Cape. Since the end of 2001 I have been the Sole Proprietor of Nick Helme Botanical Surveys.

A selection of previous botanical work on larger projects on the west coast is as follows:

- Scoping study for Eskom Ankerlig – Omega transmission line (Savannah 2007)
- Scoping and Impact Assessment for proposed Eskom Wind Energy Facility on the Cape West Coast (Savannah 2007)
- Fine Scale vegetation mapping and conservation planning project in NW Sandveld and Saldanha Peninsula (CapeNature 2007)
- Scoping and Impact Assessment for proposed new Eskom powerline from Alexander Bay to Vredendal (SEFSA 2006)
- Assessment of proposed Bound for Gold mineral sands exploration program on the west coast south of Brand se Baai (Amathemba Environmental 2006)
- Impact Assessment of proposed Namakwa Sands expansion project, Brand se Baai (Golder 2005)
- Scoping and Impact Assessment for proposed new Eskom Omega substation (Eyethu Engineers 2004)
- Vegetation survey of proposed Namakwa Sands heavy mineral sands expansion project at Brand se Baai and Koekenaap MSP (CCA 2003)
- Scoping and IA on upgrading of Lamberts Bay - Elands Bay road (Marion Thomas 2002; revised in 2004, for EPRMS).

1. INTRODUCTION

This botanical impact assessment was requested in order to help inform decisions regarding the proposed relocation of three gas turbines from the Acacia Power Station near Goodwood and one from Port Rex Power Station in East London to the existing Ankerlig power station near Atlantis. In addition, a 132kV power line is needed into the Ankerlig Power Station, and this is the primary subject of this botanical impact assessment. No botanical impacts are associated with moving the gas turbines as the current and proposed sites support no natural vegetation. Three alternative 132kV transmission line routes were investigated in the Scoping phase (Savannah Environmental 2008), but only Options 1 and 2 have been taken through to the Impact Assessment phase. The total length of Option 1 would be about 2.6km and 3.8km for Option 2.

The study area falls outside the domain of any of the Fine Scale Vegetation Mapping Projects (FSP) recently conducted for CapeNature (Helme 2007).

The study area is located within a rapidly developing part of the south-western Cape, where much of the remaining natural vegetation is under intense development pressure.

2. LIMITATIONS AND ASSUMPTIONS

No specific fieldwork was undertaken for this desktop study, due partly to time and budget constraints, plus the fact that I have worked extensively in the area on previous projects and am familiar with the vegetation in the relevant areas. In order to compensate for this the habitat approach was used, whereby habitat integrity, rarity and vulnerability were used as a surrogate for determining conservation value. Much of this interpretation is thus based on previous experience in the area, plus perusal of high resolution Google Earth imagery, and there is an adequate degree of confidence (>80%) attached to the broad scale botanical findings. It is assumed that the new servitude for Option 2 would run west of the existing servitude which runs west of the railway line.

3. TERMS OF REFERENCE

Terms of reference were adapted from the standard TOR for biodiversity specialists as proposed by CapeNature, and DEA&DP's guidelines for biodiversity assessment (Brownlie 2005) were also adhered to. The CapeNature TOR are as follows:

- Describe the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.
- In terms of biodiversity pattern, identify or describe:

Community and ecosystem level

a. The main vegetation type, its aerial extent and interaction with neighbouring types, soils or topography;

b. The types of plant communities that occur in the vicinity of the site.

c. Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment).*

Other pattern issues

a. Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.

b. The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).

b. The condition of the site in terms of current or previous land uses.

In terms of **biodiversity process**, identify or describe:

a. The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.

b. Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries)

c. Any possible changes in key processes, e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.

•What is the significance of the potential impact of the proposed project – with and without mitigation – on biodiversity pattern and process at the site, at local and regional scales?

- Recommend actions that should be taken to prevent or mitigate impacts. Indicate how these should be scheduled to ensure long-term protection, management and restoration of affected ecosystems and biodiversity.
- Discuss the need for biodiversity offsets, as this has been brought up by various I&APs.
- Indicate limitations and assumptions, particularly in relation to seasonality.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 Regional context

The study area falls within the southwest coastal region of the Cape Floristic Region (CFR), and is firmly part of the Fynbos biome. The CFR is one of only six floristic regions in the world, and is the only one confined to a single country. It is also by far the smallest floristic region, occupying only 0.01% of the world's land surface, and supporting about 9000 plants species, almost half of all the plant species in South Africa. At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. The latest data from the Red Data Book listing process currently being undertaken for South Africa is that fully 85% of the threatened plant species in the country occur only in the south-western Cape, and these total over 1500 species (D. Raimondo – pers. comm.). It should thus be abundantly clear that the south-western Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The soil type is probably the primary driver of vegetation type in this area, which means that as the soil type changes from acid to alkaline sand so the vegetation type shifts from Strandveld to Sand Fynbos. Fire is an important element of Fynbos functioning (De Villiers *et al* 2005), but would naturally be more common in Fynbos and Renosterveld areas than in Strandveld areas (De Villiers *et al* 2005). Changes to the natural fire regimes are having significant impacts on the natural vegetation throughout the Fynbos biome (pers. obs.)

4.2 Description of the vegetation

The Ankerlig Power Station and the northern 20% of both Options are located within Cape Flats Dune Strandveld (Mucina & Rutherford 2006), although there is little natural vegetation of this type in good condition along the proposed routes. This vegetation type is restricted to the area from Atlantis south to the Cape Flats and the Cape Peninsula, and is regarded as an Endangered vegetation type on a national basis (Rouget *et al* 2004). When the analysis for the threat status of ecosystems was done in 1996 less than 60% of its original extent was still intact, with only 5% conserved, and a national conservation target of 24% (Rouget *et al* 2004), which means that the remaining patches are vulnerable to degradation and loss.

Most of the the proposed route (both Options) is through an area of Atlantis Sand Fynbos (Mucina & Rutherford 2006). This vegetation type is restricted to acid sands in the Atlantis area, and has been severely impacted by agriculture, urbanisation and alien invasive plants, so that only 59% remains, with 2% conserved, and a national conservation target of 30%. The vegetation type is thus regarded as Vulnerable on a national basis (Rouget *et al* 2004). Within the study area much of this habitat is severely invaded by alien *Acacia saligna* (Port Jackson) and *Acacia cyclops* (rooikrans). The best quality and highest sensitivity example of this vegetation type along either of the routes is in the southern half of Option 2, parallel to and west of the existing Eskom servitude (Figure 1, and see Helme 2007).

5. DESCRIPTION OF ISSUES IDENTIFIED

The key issues are:

- Loss of natural vegetation during the construction stage. About 80% of this will potentially be permanent (bushcutting of up to 5ha of sensitive servitude for Option 2, and < 1ha for Option 1]; tower footprints [approx 0.2ha]; some tracks [0.4ha]), and about 20% will be temporary, as trampled and partly disturbed areas (*e.g.* around towers) should eventually partly recover.
- Bushcutting is identified as a major source of disturbance and vegetation loss, and should not be undertaken in the High sensitivity areas.
- Alien invasive vegetation is the major problem along large parts of the power line route and how this is managed in the servitude is a key factor

in the assessment. If effectively controlled it could be a positive outcome of the development.

- Cumulative effects on the relevant vegetation types are important, as Atlantis Sand Fynbos is Vulnerable, and ideally no further loss of existing habitat should take place. However, the construction and maintenance (incl. bushcutting) of power lines have direct negative impacts, although the long term impacts can be mitigated to some degree by alien vegetation control.

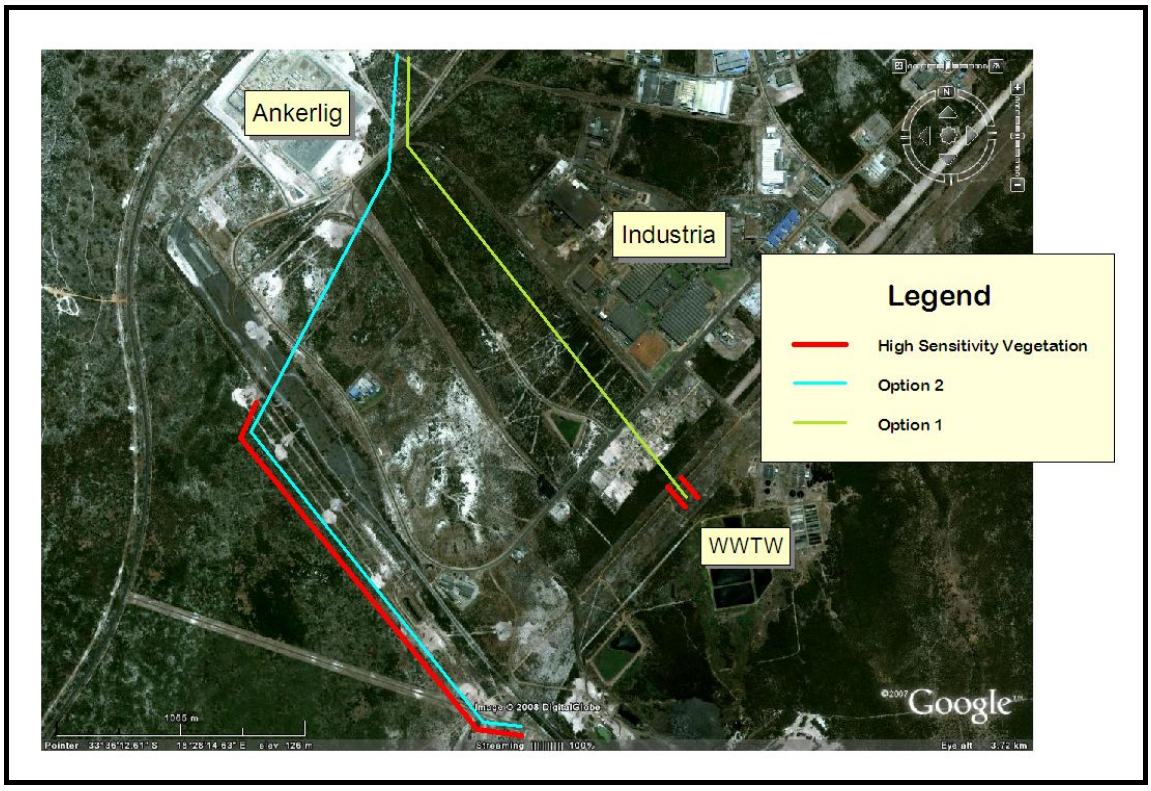

Figure 1: Aerial view showing approximate positions of two Options, and main areas of botanical sensitivity.

6. IMPACT ASSESSMENT

Impacts may be both direct and indirect, with the former occurring mostly at the construction stage and the latter mostly at the operational stage.

The impacts are typically at the site scale, although the vegetation types concerned are all relatively localised (restricted to extreme SW Cape), and all are regarded as threatened on a national basis, and thus there is also a regional and national element.

6.1 Direct Impact: Permanent loss of natural vegetation

In the case of this project the primary direct impacts are loss of natural vegetation within the tower footprints, as well as potential impacts associated with the management of the servitudes, such as bushcuttting. Some temporary (long-term) loss of vegetation will also occur in the tracks required to service the power lines, even if they use existing tracks, as the track is not always in the area needed. All hard infrastructure (power line footings) will result in the permanent loss of existing vegetation, and adjacent disturbance associated with this will be medium- to long-term in nature, but the vegetation should eventually recover.

Regular (annual, or even up to once every four years) bushcutting eliminates numerous species and totally changes the vegetation structure, effectively turning it into a species-poor and fire-prone grassland (pers. obs.). Bushcutting should really not be necessary (although this is unlikely to be recognised by Eskom management) as this vegetation does not grow much taller than 1.2m, and the fire risk is no more than in the grassy vegetation that comes to dominate in bushcut areas (pers. obs.).

Impacts may be split up into direct impacts associated with development footprints (approx. 0.4ha of tower footprints) and a second direct impact, namely the too frequent bushcutting of the power line servitude, but are combined for purposes of the summary below.

Option 1

Impacts associated with the hard footprints are deemed to be **Low negative** on a regional scale **before mitigation**, and **Negligible after mitigation**.

Option 2

Impacts associated with the hard footprints are deemed to be **Medium negative** on a regional scale **before mitigation**, and **Low negative after mitigation**.

6.2 Direct Impact: Long term but temporary loss of natural vegetation

The existing natural vegetation will be disturbed in various areas, mostly as a result of heavy machinery and heavy vehicles required to erect the power line and towers. These areas should eventually recover to a significant degree (if natural vegetation is retained in the adjacent areas), but certain species may not

return for many years, due to changes in soil structure (such as compaction). The impacts in this case thus rate as being long-term.

Option 1

Temporary impacts associated with the cosnstruction are deemed to be **Very Low negative** on a regional scale **before mitigation**, and **Negligible after mitigation**.

Option 2

Impacts associated with the hard footprints are deemed to be **Low to Medium negative** on a regional scale **before mitigation**, and **Low negative after mitigation**.

6.3 Indirect impacts

Indirect ecological impacts are often difficult to identify, and even more difficult to quantify.

There are few indirect impacts of the power line, as it does not disrupt ecological connectivity or ecological processes, at least from a botanical point of view. As soil disturbance encourages alien plant invasion a possible indirect impact would be increased invasion of disturbed areas by alien plants (notably *Acacia*), and a possible positive impact (after mitigation) in the form of removal of invasive alien vegetation in the servitude (this would be regarded as essential mitigation). Overall indirect impacts of the power line after mitigation could thus be Low positive.

Table 1: Impact Table for Indirect Impacts of Power Line (both Options)

Nature: Alien invasion associated with disturbance along power line		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Long term	Temporary
Magnitude	Minor	Minor
Probability	Distinct possibility	Distinct possibility
Significance	**Low**	Low
Status (positive or negative)	Negative	Positive
Reversibility	No	No
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Mitigation should centre on ongoing annual alien clearing within servitude, along with a policy of no bushcutting in servitude, or bushcutting at most once every 10 years.		
Cumulative impacts: Yes; but small		
Residual Impacts: No		

6.4 Cumulative impacts

To some extent a cumulative impact is a regional impact, rather than the local site scale impact, *i.*e. if something has a regional impact it also has a cumulative impact. The Atlantis to Cape Town region is a hotspot of threatened plant species (pers. obs.), due to large scale habitat loss, and any development impacting on remaining natural vegetation in this area will thus have a cumulative negative impact. The larger the overall site impact, the larger the cumulative impact. The cumulative impacts on this project are regarded as Very Low negative.

6.5 Positive impacts

The potential positive impacts will only come about if recommendations noted under Mitigation (Sect. 9) are implemented and enforced. If mitigation is not effectively carried out there will be no positive impacts. Alien clearing within the servitude would be a Low positive impact, as alien invasive vegetation is currently a major problem in much of the region. It would be most important and valuable to clear aliens with the High sensitivity areas (estimated at up to 2km of servitude for Option 2 and only about 300m for Option 1).

7. IMPACT STATEMENT

Overall Option 1 is significantly preferred over Option 2, as the former passes through an industrial area with little remaining natural vegetation, whereas Option 2 would run through almost 2km of sensitive natural vegetation west of

the existing industrial area. **Overall impacts prior to mitigation would be Low negative for Option 1 and Medium negative for Option 2.**

The main negative impact is the highly significant impact that would result from the usual Eskom bushcutting in High sensitivity areas (mostly in Option 2), as this would cause total community change and species loss. Additional direct, permanent loss of natural vegetation would occur in pylon footprints (about 0.4ha), and a long term but temporary impact in the track areas (up to 0.3ha). The bushcutting impact can only be mitigated by careful and ongoing removal of all invasive alien vegetation in the servitude, and by not engaging in bushcutting in the High sensitivity areas. Bushcutting should really not be necessary as this vegetation does not grow much taller than 1.2m, and the fire risk is no more than in bushcut, grassy vegetation. Impacts for **Option 1** could theoretically be reduced to **Negligible after mitigation, and to Low negative for Option 2,** but the chances of mitigation being successfully applied are considered to be low.

8. CONCLUSIONS

- Option 1 is the clearly preferred Alternative from a botanical point of view as it is shorter, lies closer to the industrial area and crosses less sensitive vegetation.
- Typical Eskom bushcutting in the High sensitivity servitude areas will have a High negative impact, and should not be undertaken. Ongoing alien clearing should instead be undertaken in this area as mitigation. See Section 9 for details.
- The power line footprint itself will have only a Very Low negative impact on the vegetation, and it is more the servitude management that is important in the long term.

9. RECOMMENDED SITE SPECIFIC MITIGATION

- Creation of new tracks must be minimised within the servitudes.
- No bushcutting may occur within the High sensitivity sections of the servitude (see Figure 1). If it is proven essential, the maximum frequency permitted should be once every ten years.
- Ongoing, annual alien plant management must be undertaken in the High and Medium sensitivity sections of the servitudes. Methodology used must comply with DWAF methodology for control of *Acacia saligna* and *Acacia cyclops*. Key elements include: alien clearing must be undertaken by well

trained teams using the right equipment; all stems must be cut by hand (not heavy machinery); all cut stumps must immediately (within 5 minutes) be painted with a suitable herbicide that contains a visible dye (in order to prevent resprouting, and to ensure that all stems are painted); no spraying of herbicide; cut stems must be neatly stacked at the outside edges of the servitudes, or preferably removed from the servitudes to an approved organic waste dump site.

- Additional botanical inputs at the walk down stage would add relatively little value, and are not consequently recommended.
- Annual monitoring should be undertaken by an independent consultant to ensure that alien vegetation is being cleared appropriately (see bullet 3) from the High sensitivity areas, and to ensure that these areas are not being bushcut more than once every ten years.

10. REFERENCES

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