INDIflora cc

ENVIRONMENTAL SERVICES

TELEPHONE: 0314650609
FAX NUMBER: 0314650609
CELL: 0825770898
E-MAIL:johanbodenstein@absamail.co.za

PO BOX 41845
ROSSBURGH
4072
Web page: www.sawebs.co.za/indiflora

11 March 2005

Mr S Dunsmore
PBA International (SA)
PO Box 3300
Houghton
Johannesburg
2041

Dear Stuart

Please find attached the ecological report for Braamhoek 400 kV Substations.

Various aspects (Veldtypes, wetlands, Vegetation, Medicinal plants, Mammals, Birds, Amphibia, Reptiles, Fish and Biodiversity indicators) were investigated.

I trust the report is acceptable to you.

Yours faithfully

Johan Bodenstein
PrNatSci

ND Horticulture (Natal Technikon)
ND Nature Conservation (Technikon RSA)
B-Tech Nature Conservation (Mangosuthu Technikon)

ECOLOGICAL ASSESSMENT FOR THE PROPOSED 400KV BRAAMHOEK SUB-STATION.

Terms of Reference:
PBA International (SA) has requested Johan Bodenstein of Indiflora cc Environmental Services to evaluate the proposed sites for the 400 kV sub-station and two alternatives, in ecological terms, for its suitability and potential environmental impacts and to produce a report on his findings.

General information:
Location:
Braamhoek substation is to be situated very near the north-western boundary of KwaZulu-Natal between Van Reenen's Pass and the Majuba Pass in the foothills of the Drakensberg. It is to receive energy generated by turbines in the mountain from water taken from a storage dam above the mountain. The proposed sub-station is then to feed the energy along the transmission line in a south-easterly direction (north-south alignment) to Venus substation situated just north of Estcourt from where it will be fed into the national grid.

Topography:
The sub-station site is situated on the farm Braamhoek and Saaifontein at the foot of the Drakensberg. The land is steep along the slope of the escarpment and then becomes undulated at the footslopes where the substation is to be sites. Further away from the mountain the land becomes quite flat with scattered koppies in the landscape. The two alternatives are situated at almost the same contour level as the preferred site but are located further west. The two alternative sites are on much more undulated land making the need for extensive earthworks greater. The greater earthworks will create a more significant negative visual impact than the eastern-most site which is almost tucked away in the folds of the landscape and which is a flatter site with less earthworks required.

Field visit:
The study area was visited on 4 to 5 October 2004 and again from 12 to 14 January 2005. The location site options were investigated. The substation sites are situated on farmland where various levels of transformation were observed. The vegetation at the substation sites was mainly disturbed grassland. There are areas where human settlement have greatly modified and transformed the natural vegetation to secondary growth, particularly at the western site.

Specialist information:
Veldtypes:
The substation sites at Braamhoek is situated on 3 Acocks veldtypes (Acocks, 1975), namely #56 Highland sourveld, # 65 Southern tall grassveld and #64 Northern Tall Grassveld. According to Camp (1997) the substation sites are situated in 2 Bio-resource Groups (BRG's) namely # 8 Moist highland sourveld and #11 Moist transitional tall grassveld.

Highland sourveld is found between 1400 and 1800 m asl in rolling mountainous terrain. This veld is fire maintained and dominated by short bunch grasses of which *Alloteropsis semialata, Andropogon appendiculatus*

and *Themeda triandra*. Disturbed and overgrazed veld becomes dominated by *Eragrostis species* and *Aristida junciformis*. Forbs are an important aspect of this grassveld. Forest patches with *Podocarpus falcatus* and *P.latifolius* occur in this veld type where they are not affected by fire, usually on steep slopes. Undergrazing leads to the veld becoming invaded by woody species such as *Leucosidea sericea* and *Buddleja salvifolia* which are both precursors to *Podocarpus* forest. Moist transitional tall grassveld (#11) is an endemic grassveld and is also known as *Themeda-Hyparrhenia* grassland. *Hyparrhenia* is dominant in this grassveld but more dominant on disturbed land. *Eragrostis curvula, Eragrostis plana* and *Sporobolus africanus* are the dominant grasses where the veld is heavily overgrazed.

The eastern and preferred location is situated in 1BRG namely Moist highland sourveld. The site is approximately 1 hectare in size and will require an access road to it. Moist highland sourveld makes up the bulk of the landscape. The land has been transformed through historical landuse practices and the veld is no longer in a pristine state. Alien invaders have invaded the valleys and drainage lines and are forming pockets in the landscape.

The central option is also situated in 1BRG namely Moist highland sourveld. The location is less favourable from a topography aspect. The quality of the vegetation is much the same s the preferred option.

The western option is situated in 1BRG namely Moist highland sourveld. There is a group of homesteads in close proximity to the proposed location the land in this area has been transformed through land-use practice of subsistence agriculture and the invasion of alien invader species.

Plants identified at the substation locations include:

Scientific name	**Common name**	**Plant type**	**Conservation status**
Acacia dealbata	Silver wattle	Tree	Alien invader
Acacia decurrens	Green wattle	Tree	Alien invader
Acacia mearnsii	Black wattle	Tree	Alien invader
Aristida junciformis	Three-awngrass	Grass	Indigenous
Berkheya insignis		Forb	Indigenous
Berkeya rhapontica		Forb	Indigenous
Berkheya speciosa	Skraaldisseldoring	Forb	Indigenous
Canthium kuntzeanum	Mountain turkey-berry	Shrub	Indigenous
Diospyros lycioides	Bluebush	Shrub	Indigenous
Eragrostis chloromelas	Narrow curly leaf	Grass	Indigenous
Eragrostis racemosa	Narrow-heart love grass	Grass	Indigenous
Fimbristylis complanata		Sedge	Indigenous
Gnidia kraussiana	Lesser-yellow head	Forb	Indigenous
Haplocarpa scaposa	False Gerbera	Forb	Indigenous
Helichryssum alloides		Forb	Indigenous
Helichryssum aureonitens	Golden everlasting	Forb	Indigenous
Helichryssum oreophilum		Forb	Indigenous
Helichryssum regulosum		Forb	Indigenous
Hyparrhenia filipendula	Fine thatching grass	Grass	Indigenous
Hypoxis angustifolia		Bulb	Indigenous

Hypoxis filiformis	Grass star-flower	Bulb		Indigenous
Indigofera sanguinea		Shrub		Indigenous
Lantana camara	Lantana	Shrub		Alien invader
Leonotis intermedia	Broad-leaved Leonotis		Shrub	Indigenous
Lotononis foliosa	Book-leaved Lotononis		Forb	Indigenous
Paspalum dilitatum	Dallis grass	Grass		Indigenous
Pellaea sp.		Fern		Indigenous
Pentanisia prunelloides	Broad-leaved Pentanisia		Forb	Indigenous
Polygala rhinostigma		Forb		Indigenous
Polygala serpentaria	Slangwortel	Forb		Indigenous
Pseudognaphalium luteo-album	Jersey cudweed		Forb	Indigenous
Rhus rhemanniana	Blunt-leaved currant	Shrub		Indigenous
Scabiosa corymbosa	Wild Scabiosa	Forb		Indigenous
Senecio discodregeanus		Forb		Indigenous
Senecio madagascariensis		Forb		Indigenous
Solanum mauritianum	Bugweed	Shrub		Alien invader
Vernonia hirsuta	Quilted-leaved Vernonia		Forb	Indigenous
Watsonia latifolia		Bulb		Indigenous

Wetlands:
Wetlands were observed in the area of all three substations as very moist grasslands occur in the depressions in the landscape. The presence of the wetlands may complicate the final postion of the substation and the route of the access road. The impact of construction activities on wetlands is very detrimental to the wetlands as they recover very poorly from such damage. The impact of the erected power structures on the birdlife associated with wetland grassland is significant and mitigating measures taken do not prove the structures to be free of impacts.

Vegetation:
There is 1potential Red data species present in the Bio-resource Groups (BRG's) where the proposed substations are to be erected. The distribution of Kniphofia flammula is uncertain although it is known to occur in the same habitat. The exact nature of the impact on this species is uncertain but is expected to be low as the mitigation measures of confining all activities to the Eskom servitude will limit any negative impact. Kniphofia is transplantable and any plants identified in the access road and tower areas are to be uplifted and relocated in the land adjacent to the disturbed area.

There are 6 priority medicinal plants present in the BRG's 8 and 11. They are on the list of priority medicinal plants because of their conservation status and their economic value. Whilst they remain valuable for the medicinal trade their conservation status may remain the same or increase to a higher conservation status. The plants potentially present in the study area of the three alternative positions include:

Bowiea volubilis (Vulnerable) is found BRG 8 and 11 in untransformed grassland and thickets.
Curtisia dentata (Low risk) is found in BRG 8 and 11 in forest.
Haworthia limifolia (Vulnerable) is found in BRG 8 in Mountain savanna and untransformed grassland

The expected impact on medicinal plants is expected to be negative but low. Mitigation revolves around the identification of the specific species and to remove them from the areas of road accesses and tower bases and to re-establish them in a safe but locally suitable area. Mitigation will reduce the potential impact which will remain low.

Mammals:
Only one species may be impacted on. In BRG 11 the Dobson's rough haired golden mole (*Chrysospalax villosus dobsonii*) prefers unimproved grasslands. The expected impact on this animal is expected to be negative but low. Moles generally move away from noise and it is expected that the activities of establishing access roads and tower bases will frighten the animals off which will reduce the impact. Mitigation measures to be taken include the confining of activities to the Eskom servitude and should such an animal be unearthed that it be placed away from the line where it can survive unharmed. It is expected that the level of significance after mitigation to remain as low.

Birds:
The proposed two corridors may conflict with 7 species of bird that are listed in the Red-data list for birds. This includes: the white winged flufftail (Globally endangered and nationally critical) found in BRG #8 and associated with wetlands. The wattled crane (Globally vulnerable and nationally critical) is found in BRG's 8 and 11 and associated with grasslands and wetlands. Crowned cranes (Nationally vulnerable) are found in BRG 8 and 11and are associated with grasslands and wetlands. Ground hornbills (Nationally vulnerable) are found in BRG 8 and 11 and are associated with grasslands and woodlands. Striped flufftails (Nationally vulnerable) are found in BRG 8 and 11 and are associated with grasslands with long grass where over-grazing and too regular burning is limited. Blue korhaan (globally and nationally near threatened) is found in BRG 8 and 11 and associated with grasslands with short grass.

Korhaan is known to be much reduced in number in the study area due to landuse practices and the status of the flufftails needs further investigation. The cranes are present in the study area and are likely to conflict with the proposed electricity structures. Detail reporting on the impact with birds is to be reported on by a bird specialist appointed for this purpose. It is expected that the potential impact on birds to be negative and moderately significant. Mitigation revolves around confining activites to the Eskom servitude and to attach bird flappers to the lines in the areas where the birds occur that are known to conflict with powerlines. It is expected that the level of significance after mitigation to be low.

Amphibia:
Two potential conflict species are found in the BRG #8 (the moist highland sourveld). This BRG is situated just north-west of Braamhoek. The two species that may be affected are: the Natal leaf folding frog (*Afrixalus spinifrons intermedius*) occurring in highland wetlands in midland conditions and the long-toed tree frog (*Leptopelis xenodactylus*) preferring tree-less marshland in the grasslands along the foothills of the Drakensberg. The impact on these two species is expected to be negative and of low significance. Mitigation includes the routing of the line around wetlands and to

confine activities to the Eskom servitude. The level of significance after mitigation remains low.

Reptiles:
There is 1 potential conflict species of reptiles occurring in the two BRG's the substations ae to be located in. The first BRG is #8 Moist highland sourveld in which the Natal midlands dwarf chameleon (*Bradypodion thamnobates*) prefers grassland and is found in BRG.

The expected impact on the reptiles is expected to be negative due to the potential destruction of habitat and the level of significance is moderate. Mitigation measures revolve around the limiting of activities to the Eskom servitude and the rapid rehabilitation after construction. After mitigation it is expected that the level of significance to be low.

Fish:
There appears to be no fish or crustaceans on the red data list within the study area.

Invertebrates:
Red data butterflies do occur in the study area.

Metisela meninx (Vulnerable) occurs in marsh areas where rice grass grows in thick clumps in unpolluted environments between 1400 – 1700 m asl. Much of the habitat of this species has been destroyed in Gauteng making the high lying wetland grasslands in the study area very suitable habitat.

Capys penningtoni (Vulnerable) occurs as an endemic among Proteas on mountain slopes in the Natal midlands and the foothills of the Drakensberg. The area above the sub-station site at Braamhoek is potential habitat for this species.

Chrysoritis lyncurium (Vulnerable) inhabits rocky outcrops in Moist highland sourveld where stunted bushes of Diospyros and Myrsine occur. This habitat type is again situated above the sub-station site at Braamhoek.

The potential impact on the Red data species of butterflies is negative and the significance is moderate. Mitigation revolves around minimizing the damage to the landscape to a minimum by confining it to the Eskom servitude and by immediate rehabilitation. The impact is expected to be limited to the construction phase. With mitigation it is expected that the impact can be reduced to have a low significance.

Summary:
This study was conducted by visiting the study area twice making observations and confirming those with reference material on return to the office. The physiographic environment and biotic components were inspected and the likelihood of potential impacts assessed, and reported on. Mitigatory measures are suggested and the expected level of significance after mitigation.

Table 1: Levels of impact significance before and after mitigation.

	Significance	Vegetation	Wetlands	Plants	Medicinal plants	Birds	Mammals	Amphibia	Reptiles	Fish	Invertebrates
Option 1 (Eastern location)	Before mitigation	Low	Moderate	Low	Low	Moderate	Low	Low	Low	None	Moderate
	After mitigation	Low	Low	Low	Low	Low	Low	Low	Low	None	Low
Option 2 (Central location)	Before mitigation	Low	Moderate	Low	Low	Moderate	Low	Low	Low	None	Moderate
	After mitigation	Low	Low	Low	Low	Low	Low	Low	Low	None	Low
Option 3 (Western location)	Before mitigation	Low	Moderate	Low	Low	Moderate	Low	Low	Low	None	Moderate
	After mitigation	Low	Low	Low	Low	Low	Low	Low	Low	None	Low
	Cumulative	Low	Low	Low	Low	Low	Low	Low	Low	None	Low

Conclusion:
The area was studied and the potential impacts identified. Mitigation measures are suggested. From the impact tables there is no clear preference in terms of a preferred location. The eastern location is however the preferred site because it is closest to where the lines will come out of the mountain and the land there is the best hidden from sight and is more level than the other sites. There are existing farm roads almost to the site reducing the need to create new access roads. The central option is very steep and there is no existing access route which will leave significant scars in the landscape. The western option is very far from where the lines will come out of the mountain making it a very expensive option apart from it being on fairly uneven land which will require significant earthworks.

References:
Acocks, J.P.H. 1975. Veld types of South Africa. Memoirs No 40, Botanical Research Institute, Pretoria.
Camp, K. G. 1997. Bio-resource Groups of KwaZulu-Natal. Cedara Report No N/A/97/6, Cedara.
Carruthers, V. 2001. Frogs and frogging. Struik, Cape Town.
Golding, J. 2002. Southern African Plant Red Data Lists. Southern African Botanical diversity Network Report No 14. National Botanical Institute, Pretoria.
Goodman, P. 2000. Determining the conservation value of land in KwaZulu-Natal. Ezemvelo KZN Wildlife, Pietermaritxburg.
Lepidepterists Society, 2003. Red data list of Butterflies of South Africa. http://www.lepsoc.org.za/red_data_book.htm
Pooley, E. 1993. The complete field guide to trees of Natal and Zululand & Transkei. Natal Flora Trust, Durban.
Pooley, E. 1998. A field guide to Wild flowers KwaZulu Natal and the eastern region. Natal Flora Trust, Durban.

Johan Bodenstein
PrNatSci

Indiflora cc
Environmental Services
PO Box 41845
Rossburgh
4072

Tel: 0314650609
Fax: 0314650609
Cell: 0825770898
e-mail: johanbodenstein@absamail.co.za

Dated
12 March 2005

IMPACT TABLES FOR THE BRAAMHOEK 400 kV SUBSTATION

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Use of creosote poles***	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	Low	None
Probability of occurrence	Highly probable	Improbable
Status of the impact	Negative	None
Accumulative Impact	Med	None
Level of significance	**Moderate**	**No significance**
Mitigation measures	Plastic sleeves on the wooden poles will restrict leakage. Storage area to be restricted and preventative measures taken to limit pollution.	Not required
Level of significance after mitigation	**Low**	**No significance**
EMP requirements	• Use CCA treated poles instead of creosote poles, or use old weathered poles from which leaking creosote is unlikely. • All creosote poles must be sleeved with PVC sleeves resistant to abrasive action of creosote.	
Discussion: Material resistant to the corrosive action of creosote should be placed on the ground in the storage areas to trap any leaking creosote. Sleeves on poles will trap creosote in the sleeve and prevent soil pollution. After the poles served their purpose and are removed the soiled sleeves can be discarded in an appropriate manner in a registered landfill site and the receipt retained on file for auditing purposes.		

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Erosion***	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	High	Low
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Moderate	Low
Level of significance	High	Low
Mitigation measures	• Identify potential areas for erosion at the outset and take preventative measures. • Where soil is exposed through construction activities, steps need to be taken to reduce the potential for erosion eg creating berms and use of soil binding emulsions. • Steep slopes at the substation platform and access road cuttings must be protected with the use of bands of geofabric and organic matter sausages across the slope to trap moving sediment. • Frequent monitoring during the construction and decommissioning phases are required, particularly after recorded heavy rain storms, are required to determine places where mitigation measures have failed and where potential threats remain. • Careful planning of access roads could reduce	• Maintenance teams are to be trained to become sensitive to sites where erosion is just starting. They are to advise the maintenance teams to respond and take appropriate mitigating measures. • Environmental auditing is required at least once a year along the entire route to identify potential threats.

	the potential threat for erosion.	
Level of significance after mitigation	**Moderate**	**Low**
EMP requirements	• Access roads to be carefully planned and selected – where possible use existing access roads • All streams and drainage lines to be crossed must be stabilised and rehabilitated immediately. • All wetland areas are to be avoided • All existing erosion areas along access routes used for construction and operation must be rehabilitated. • Environmental Officer to inspect all roads. A revisit before the 12 month contract period is also recommended so that the contractor can repair any unstable areas.	• Ongoing monitoring and audits required.

Discussion: Erosion is a concern in the study area for the substation. This is a manageable aspect of the proposed development, but there needs to be confidence that problems associated with the construction of the substation is avoided. The issue is closely linked to other issues such as impacts on fauna, flora and general access.

Soil erosion is a major problem in the study area. Poor land management (overgrazing, etc) is the main cause of the problem. The soils in the area are highly erosive and very sensitive to disturbance.

It is not the task of Eskom Transmission to resolve current erosion problems. However it will be important to rehabilitate any areas of erosion crossed by the construction teams in the attempt to protect new works.

The exact location of access roads will not be determined during the EIA. This will only be determined when the construction contract is let. An archaeologist and ecologist should visit the proposed access road siting to ensure that sensitive environments are not disturbed.

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Fauna***	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	Low	None
Probability of occurrence	Probable	Improbable
Status of the impact	Negative	None
Accumulative Impact	Moderate	None
Level of significance	Moderate	No significance
Mitigation measures	• Avoid nesting burrows when discovered. • Access roads not to cross wetlands. • Cause as little disturbance to woodland areas. • Limit all activities to take place within servitude boundaries.	Not required
Level of significance after mitigation	**Low**	**No significance**
EMP requirements	• Avoid rocky and wooded areas • Do not cross wetlands	
Discussion: Animals require sites with adequate food and resting or nesting potential to survive. Rocks provide good shelter against the elements. Rocky areas should be avoided where possible when constructing access roads to limit the potential for destroying the habitats of resident animals. Wetland areas provide a different type of habitat to many animals and is considered very sensitive habitat. It should be avoided during the construction of access roads and tower bases. Wooded areas are where animals shelter during inclement weather and where many birds nest. Damage to these areas must be kept to the minimum.		

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Flora***	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction and decommissioning	None
Intensity	High	None
Probability of occurrence	Highly probable	Improbable
Status of the impact	Negative	None
Accumulative Impact	Moderate	None
Level of significance	Low	No significance
Mitigation measures	• Areas of sensitive plant communities are to be identified and flagged during the construction of road accesses so that they can be avoided. • Where conflict is unavoidable sensitive plants that are known to relocate well should be lifted and replanted to limit the cumulative impact.	Not required
Level of significance after mitigation	**Low**	**No significance**
EMP requirements	Keep all construction activities within the boundary of the servitude. Rehabilitate immediately after construction by levelling the disturbed land as best possible and to apply erosion control and seeding the exposed soil with veld grass seed of the species present in the surrounding area.	
Discussion: Grassland makes up the vegetation of the area. Further site inspection and monitoring will be required during the design and construction stages. A number of rare and medicinal plants, including red data species, are known to occur in the area.		

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Avifauna***	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Ongoing
Intensity	Low	Moderate
Probability of occurrence	Highly probable	Highly probable
Status of the impact	Negative	Negative
Accumulative Impact	Moderate	Moderate
Level of significance	Low	High
Mitigation measures	• The clear marking of the lines from the substation and the placement of birdguards on the tower structures will mitigate the potential impacts	• Bird flappers and bird guards will assist in limiting the potential threat on a long term basis. • The introduction of new technology as it becomes available to assist with the reduction in bird impacts.
Level of significance after mitigation	**Low**	**Moderate**
EMP requirements	• Attach bird flappers and bird guards during construction. • Contractor and his staff to be made aware of sensitive areas, and to prevent them from raiding nests etc. • Construction work to be confined to servitude	• Establish monitoring programme. • Fit additional 'bird flappers' as appropriate.

Discussion: A diversity of birds eg Bustards, Secretary Birds, Cranes, Korhaans, Storks and Bald Ibis's occurs in the area that typically interact with transmission lines, including a number of Red Data species. The nature of impacts is listed below (see also specialist report).

Collision risk

If the new line runs parallel to one of the existing lines the significance (Potentially highly significant), is much reduced (Any diversion away from existing lines remain a concern). The bird specialist needs to review the location of 'bird flappers' during the design phase as a mitigation measure.

Disturbance

Cranes, storks, vultures and herons are more abundant along the upper reaches of the line near the Braamhoek Sub-station in the wet grasslands. There is a relatively low significance rating.

Bird streamers

Large birds (vultures etc.) can cause shorting when they defecate when the alighting after roosting above conductors - leading to power dips which can have a severe impact on downstream power users.

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Import of alien vegetation***	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Ongoing
Intensity	Moderate	Moderate
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	High	Moderate
Level of significance	Moderate	Moderate
Mitigation measures	• Eliminate any alien plants in the area where construction takes place. • Prevent the movement of soil from one area to another.	Ongoing monitoring and control actions taken when infestation is observed.
Level of significance after mitigation	**Low**	**Low**
EMP requirements	• Invader species in the area to be indicated to the contractor. • Eradication of the alien plants and treatment of stumps should be part of operating in the area. • Materials contaminated by alien plant seed etc should not be imported and must be obtained from controlled sources. • Alien plant areas should not be used for storage/stock piling of materials for fear of disturbance and spreading of seed.	• Areas where alien plants become established to be monitored and control action taken to prevent further spreading.

Discussion: Alien invader species occur in the area, including Lantana, Black, Green and Silver Wattle, Bugweed and Syringa. There is a risk that construction activities accelerate the spread of invader plants by disturbing these areas specifically during access road and substation construction.

Careful management during the construction and rehabilitation process can minimise the potential spread of aliens. This to be addressed in the EMP. Alien vegetation within the Eskom servitude will be eradicated as indicated

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Poaching***	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Ongoing
Intensity	Moderate	Low
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Low	Low
Level of significance	Moderate	Low
Mitigation measures	• Environmental education for construction staff to sensitise them to the need to conserve. • Limiting the activities of staff to the Eskom servitude.	Ongoing education.
Level of significance after mitigation	**Low**	**Low**
EMP requirements	• Staff to be educated. • Activities to be limited to the Eskom servitude • Monitoring of construction camp area for signs of poaching.	
Discussion: There will be increased poaching of fauna and flora due to immigration during the construction phase. Increased poaching due to improved access (new access roads).		

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Impact on conservation areas***	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	Low	None
Probability of occurrence	Probable	Improbable
Status of the impact	Positive	None
Accumulative Impact	Low	Low
Level of significance	Low	None
Mitigation measures	• Correct siting of the substation area	None
Level of significance after mitigation	**None**	**None**
EMP requirements	• Keep all activities within the confines of the Eskom servitude.	• Ongoing monitoring through annual audits.
Discussion: The potential impact on the conservation potential of the land should be minimised with the EMP.		

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Fire***	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	High	None
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Moderate	Low
Level of significance	High	Moderate
Mitigation measures	• As per EMP.	Ongoing monitoring and control actions taken when necessary.
Level of significance after mitigation	**Low**	**Low**
EMP requirements	• Contractors to be trained in fire fighting in veld and woodland areas (fire beaters and backpack sprayers to be made available with each construction team) • Maintain vegetation in servitudes, particularly hotspot areas. • Contact telephone number and name of Eskom operations control room to be published for line management (eg switching off line) during extreme fire conditions. • Publish reporting procedures for fire fighting and line operations – eg names of local fire fighting representatives (eg conservancy and game farm representatives, farmers associations) and reporting of location by pylon number. • Access routes to servitudes to be clearly marked with pylon numbers.	• Ongoing monitoring through annual audits.

Discussion: The occurrence and management of fires in the area may be altered by the construction and operation of the substation and transmission lines. Ecological, safety, and economic implications can result from the change in the nature of fire hazards and events. In the study area fires are a natural part of the environment, and are an important part of the management of grasslands in particular. The new substation and lines are not seen to change the nature and occurrence of fires during operation, and careful management during construction will minimise veld fire incidents. The line operation should not be significantly affected by fires, though the hotter, more intense fires in the woodland may cause occasional operational problems.

Braamhoek 400kV Substation		
Theme	Well being	
Nature of impact	***Access roads***	
Stage	Construction	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	Moderate	None
Probability of occurrence	Highly probable	Improbable
Status of the impact	Negative	None
Accumulative Impact	Moderate	Low
Level of significance	High	Moderate
Mitigation measures	• Acquire legal permission to enter the land through landuse agreements. • Erect gates for organised access and maintain gates closed and locked at all times. • Select access routes along existing roads as far as possible. • New access routes to be selected in consultation with the landowner and the Environmental Control Officer. • Keep earthworks to the minimum cut and fill. • All embankments to be of a gradient of 1:3 or more. • Rehabilitation should commence immediately after access road is constructed. • Erosion control on road works should form part of road construction specification.	Ongoing monitoring and control actions taken when necessary.
Level of significance after mitigation	Low	None

EMP requirements	• Use existing roads where possible • Establish maintenance responsibilities. • All erosion and water damage on access roads to be rehabilitated before construction is complete. (it may be required that interim damage will also need to be repaired – to prevent stock losses, etc – this will need to be monitored by the Environmental Officer and the necessary repairs undertaken. • Number of tracks within the servitude to be minimised – kept to one for all areas. • Wetland areas to be avoided • Eroded areas to be avoided unless proper erosion management is put in place	• Ongoing monitoring through annual audits.

Discussion: Eskom Transmission undertakes to maintain roads and access routes used for maintenance.

Many concerns have been raised by I&AP's regarding problems with access roads for the existing Transmission lines. There is strong doubt that the situation will be any better for the proposed line. It is recognised that the impact of the establishment and maintenance of access roads can be minimised and mitigated by careful planning and management. However, there needs to be confidence that these will be put in place beyond the preparation of an EMP.

Johan Bodenstein Dated 12 March 2005
PrNatSci

Indiflora cc
Environmental Services
PO Box 41845
Rossburgh, 4072

Tel: 0314650609
Fax: 0314650609
Cell: 0825770898
e-mail:johanbodenstein@absamail.co.za