

## **IMPACT EVALUATION**

### **Evaluation of impact of proposed development**

The objective of this part of the report was to evaluate the impacts of the proposed development of the powerline. Potential impacts are evaluated according to *magnitude, extent, duration and probability* and, based on the above, the rated significance of the impacts is given (rated “Low”, “Medium” or “High”). These criteria are drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989 and are defined as follows:

- **Nature**

The nature of the impact is whether it is a negative (destructive) or positive (beneficial) impact.

- **Extent of the impact**

A description of whether the impact will be: (1) local extending only as far as the development site area; or (2) limited to the site and its immediate surroundings; or (3) will have an impact on the region, or (4) will have an impact on a national scale or (5) across international borders. The criterion is scored according to the number in brackets.

- **Duration of the impact**

The impact is evaluated in terms of whether the lifespan of the impact would be (1) very short term (0-1), (2) short term (2-5 years), (3) medium term (5-15 years), (4) long term (16-30 years) or (5) permanent.

- **Magnitude**

The magnitude of the impacts is quantified on a scale from 0-10, where 0 is small and will have little effect (e.g. firecracker exploding), and 10 is very large and results in complete destruction (e.g. atomic bomb exploding).

- Probability of occurrence

The probability of the impact actually occurring is estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

The significance is calculated by combining the criteria in an additive formula multiplied by the probability: (magnitude+duration+extent) x probability. A significance of <30 is considered to be low, 30–60 as medium, and >60 as high.

Potential impacts include the following:

### **Construction impacts**

#### ***Increased noise pollution during construction***

Increased noise pollution may occur during construction due to the use of heavy machinery, transport, etc. during construction. This may have an impact on animals in the immediate vicinity by frightening them away from the area and may be serious if these are territorial animals that are displaced due to this activity. The impact will only occur for the duration of construction and will be restricted to the site of current construction activities. The nature of the impact is negative. It will be restricted to the immediate area where construction is taking place and the immediate surroundings and is rated 2. The impact will occur during construction and is therefore short-lived and rated 1. The magnitude is low and rated 2 and the probability is high and rated 4. Mitigation is difficult, but activities can be restricted to habitats that are not important for sensitive species thus reducing potentially harmful effects. It is unlikely to have a long-term negative impact on the threatened status of any organisms as many animals will move away temporarily until the noise abates. The significance of the impact is rated 20, low. With the proposed mitigation the probability of the impact drops to 3 resulting in the impact being rated 15, low.

<b>Issue</b>	<b>Corrective</b>	<b>Nature</b>	<b>Extent</b>	<b>Duration</b>	<b>Magnitude</b>	<b>Probability</b>	<b>Significance</b>
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		measures						
Increased noise pollution during construction will cause some territorial animals to be displaced	No	Negative	2	1	2	4	20 Low	
	Yes	Negative	2	1	2	3	15 Low	
Corrective actions		<ul style="list-style-type: none"> <li>• Avoid sensitive habitats, as defined in the sensitivity assessment, when planning the powerline route</li> <li>• Avoid known populations of species of special concern when planning the powerline route</li> </ul>						

### ***Increased dust during construction***

Increased dust pollution may occur during construction due to the use of heavy machinery, transport, etc. during construction, especially hile driving along gravelm service roads. This may have an impact on animals populations and vegetation in the immediate vicinity by causing an increase in dust particles in the air that could cause respiratory problems in animals or dust deposition on leaves of plants. For vegetation, serious dust pollution can cause plant mortality in the affected areas. The impact will only occur for the duration of construction and will be restricted to the site of current construction and transport activities. The nature of the impact is negative. It will be restricted to the immediate area where construction is taking place and the immediate surroundings and is rated 2. The impact will occur during construction and is therefore short-lived and rated 1. The magnitude is low and rated 2 and the probability is high and rated 4. Mitigation is possible by avoiding areas defined as being sensitive and also by implementing measures o reduce dust pollution, e.g. by spraying water onto roadways that are used very often. It is unlikely to have a long-term negative impact on the threatened status of any organisms, unless it directly affects populations of threatened species, as many animals will move away temporarily until the impact abates. Vegetation may recover following rainfall. The significance of the impact is rated 20, low. With the proposed mitigation the probability of the impact drops to 3 and the magnitude to 3 resulting in the impact being rated 12, low.

Issue	Corrective measures	Nature	Extent	Duration	Magnitude	Probability	Significance
Increased dust pollution during construction may affect animals and vegetation in the vicinity	No	Negative	2	1	2	4	20 Low

	Yes	Negative	2	1	1	3	12	Low
Corrective actions	<ul style="list-style-type: none"> <li>• Avoid sensitive habitats, as defined in the sensitivity assessment</li> <li>• Avoid populations of species of special concern, e.g. <i>Aloe dichotoma</i>, when planning powerline route</li> <li>• Use water sprayers to reduce dust emissions off road surfaces</li> </ul>							

### ***Increased risk of veld fires***

There may be increased incidence of veld fires in areas surrounding camp and construction sites of the construction crew. This may have an impact on animals and vegetation in the immediate vicinity by causing immediate loss of habitat. Where the vegetation consists of sparse dwarf shrubs, it may not burn very easily, but any vegetation that is primarily composed of taller woody shrubs, the probability of destructive effects from fire are more likely. This may be serious if these are territorial animals that are displaced due to this activity or if populations of threatened, sensitive or protected plants are affected. The impact will only occur for the duration of construction and will be restricted to the site of current construction activities, but may spread further depending on the characteristics of the vegetation. The nature of the impact is negative. It will be restricted to the immediate area where construction is taking place, although it could spread more extensively and is rated 3. The impact will occur during construction and is therefore short-lived and rated 1. The magnitude is potentially high and rated 4 and the probability is moderate and rated 3. Mitigation is possible by raising awareness, by ensuring effective fire control in construction camps and by ensuring that an emergency fire-reaction system is in place to deal with possible veld fires. Potentially harmful effects may also be minimised by avoiding constructing the powerline through sensitive areas. The significance of the impact is rated 24, low. With the proposed mitigation the probability of the impact drops to 2 and the potential magnitude to 3 resulting in the impact being rated 14, low.

Issue	Corrective measures	Nature	Extent	Duration	Magnitude	Probability	Significance
Increased risk of veld fires leading to damage of sensitive habitats or populations of sensitive plant species or vegetation production	No	Negative	3	1	4	3	24 Low
	Yes	Negative	3	1	3	2	14 Low

Corrective actions	<ul style="list-style-type: none"> <li>• Avoid sensitive habitats, as defined in the sensitivity assessment, when planning the powerline route</li> <li>• Ensure effective fire-control at camp and construction sites of construction crew</li> <li>• Raise awareness of necessity for fire-control</li> <li>• Institute management system to react to veld fires that do occur</li> </ul>
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### **Operational and long-term impacts**

#### ***Loss and fragmentation of habitats***

The loss and fragmentation of vegetation and habitats could possibly occur at a local scale (site of individual pylons) as well as across the entire route (access roads, construction impacts, etc.). In addition, clearing of vegetation or cutting of woody vegetation to keep it below a maximum height may lead to loss of habitat. Due to the linear nature of the proposed construction of the powerline, this may also lead to fragmentation of habitats. Due to the relatively low stature of most of the vegetation in the study area, cutting of vegetation will probably not be necessary. However, where cutting is necessary, it is usually sensitive habitats that would be affected. The impact will occur for the lifetime of the powerline and beyond. The nature of the impact is negative. Habitat loss and habitat fragmentation are assessed separately.

Loss of habitat will be restricted to the immediate area where the powerline is built, primarily the sites of the pylons and service roads and is rated 2. The impact will last permanently and is rated 5. The magnitude is potentially high (locally) and rated 8 and the probability is moderate and rated 3. Mitigation is difficult, but activities can be restricted to habitats that are not sensitive or important for sensitive species thus reducing potentially harmful effects. The significance of the impact is rated 45, medium. With the proposed mitigation the probability of the impact drops to 1 and the extent to 1 resulting in the impact being rated 14, low.

<b>Issue</b>	<b>Corrective measures</b>	<b>Nature</b>	<b>Extent</b>	<b>Duration</b>	<b>Magnitude</b>	<b>Probability</b>	<b>Significance</b>
Loss of portions of sensitive habitats	No	Negative	2	5	8	3	45 Medium
	Yes	Negative	1	5	8	1	14 Low

<b>Corrective actions</b>	<ul style="list-style-type: none"> <li>• Avoid sensitive habitats, as defined in the sensitivity assessment, when planning the powerline route.</li> <li>• Use existing access roads as service and construction roads, where possible</li> <li>• Avoid medium to tall vegetation in planning the powerline route</li> <li>• Assess the planned pylon sites individually for sensitive features</li> </ul>
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Fragmentation of habitat will affect areas potentially far removed from where the powerline is built and is rated 4. The impact will last permanently and is rated 5. The magnitude is moderate due to the diffuse nature of a powerline in its affect on the ground and rated 5 and the probability is moderate and rated 3. The powerline can be routed to avoid sensitive habitats or, where necessary to cross them, to be done in such a way as to avoid fragmenting these habitats excessively thus reducing potentially harmful effects. The significance of the impact is rated 39, medium. With the proposed mitigation the probability of the impact drops to 1 resulting in the impact being rated 13, low.

<b>Issue</b>	<b>Corrective measures</b>	<b>Nature</b>	<b>Extent</b>	<b>Duration</b>	<b>Magnitude</b>	<b>Probability</b>	<b>Significance</b>
Fragmentation of sensitive habitats	No	Negative	3	5	5	3	39 Medium
	Yes	Negative	3	5	5	1	13 Low
Corrective actions	<ul style="list-style-type: none"> <li>• Avoid sensitive habitats, as defined in the sensitivity assessment, when planning the powerline route.</li> <li>• If it is necessary to cross potentially sensitive areas, then attempt to do so in a manner that will cause the least amount of fragmentation.</li> <li>• Use existing access roads as service and construction roads, where possible</li> </ul>						

### ***Spread of alien species***

The development activities may result in conditions that, in the long-term, favour the spread of alien species. These conditions include any disturbance to natural vegetation or the soil surface. The impact will have a long-term effect. The nature of the impact is negative. It will be restricted to the immediate area where the powerline is located and the immediate surroundings and is rated 2. The impact will have a long-term effect and rated 4. The magnitude is low and rated 3 and the probability is moderate and rated 3. Mitigation is possible by disturbing limited amounts of natural habitat, especially sensitive areas, rehabilitating disturbed areas as soon as possible and avoiding activities that introduce

alien plant propagules from other areas, e.g. translocating topsoil. The significance of the impact is rated 27, low. With the proposed mitigation the probability of the impact drops to 2 and the magnitude to 2 resulting in the impact being rated 16, low.

Issue	Corrective measures	Nature	Extent	Duration	Magnitude	Probability	Significance
Spread of alien species	No	Negative	2	4	3	3	27 Low
	Yes	Negative	2	4	2	2	16 Low
Corrective actions	<ul style="list-style-type: none"> <li>• Use existing access</li> <li>• Limit disturbance to vegetation,</li> <li>• Avoid sensitive habitats, as defined in the sensitivity assessment</li> <li>• Rehabilitate disturbed areas,</li> <li>• Don't translocate topsoil from one area to another or bring in topsoil from other areas</li> </ul>						

**Disturbance to sensitive ecosystems**

Sensitive ecosystems in the study area include rivers, wetlands, seasonally wet areas as well as those vegetation types classified as sensitive. The nature of the impact is negative. It will be restricted to the immediate area where construction takes place (primarily the sites of the pylons) and the immediate surroundings and is rated 2. The impact will be permanent and rated 5. The magnitude is potentially high and rated 7 and the probability is moderate and rated 3. Mitigation is possible by avoiding sensitive habitats and habitats that are important for sensitive species. The significance of the impact is rated 42, medium. With the proposed mitigation the probability of the impact drops to 2 and the magnitude to 5 resulting in the impact being rated 24, low.

Issue	Corrective measures	Nature	Extent	Duration	Magnitude	Probability	Significance
Disturbance to sensitive ecosystems	No	Negative	2	5	7	3	42 Medium
	Yes	Negative	2	5	5	2	24 Low
Corrective actions	<ul style="list-style-type: none"> <li>• Avoid sensitive habitats, as defined in the sensitivity assessment, when planning the powerline route</li> <li>• Avoid populations of species of special concern, e.g. <i>Aloe dichotoma</i>, when planning the powerline route</li> </ul>						

**Impacts on populations of endemic and red data species**

A number of threatened, endemic, sensitive or protected species have been identified as having the potential to occur along the proposed route of the powerline. The location of plants and animals that fall into these categories has been taken into account when defining sensitive habitats. If these habitats are disturbed or destroyed it may have serious negative consequences for populations of these species. The nature of the impact is negative. It will be restricted to the immediate area where construction is taking place and the immediate surroundings, but could cause consequences on a more regional scale and is rated 3. The impact will be permanent and is rated 5. The magnitude is moderate to high and rated 7 and the probability is moderate and rated 3. This can be mitigated by avoiding sensitive habitats or, where particular populations may be identified in the field, e.g. *Aloe dichotoma*, such populations can be avoided. An exception is birds that are killed by contact with powerlines, but this impact is assessed separately below. The significance of the impact is rated 45, medium. With the proposed mitigation the probability of the impact drops to 1 and the magnitude to 5 resulting in the impact being rated 13, low.

Issue	Corrective measures	Nature	Extent	Duration	Magnitude	Probability	Significance
Impacts on populations of endemic and red data species	No	Negative	3	5	7	3	45 Medium
	Yes	Negative	3	5	5	1	13 Low
Corrective actions	<ul style="list-style-type: none"> <li>• Avoid sensitive habitats, as defined in the sensitivity assessment</li> <li>• Avoid populations of species of special concern, e.g. <i>Aloe dichotoma</i></li> </ul>						

**Impacts on the movement and migration of bird and animal species**

Overhead powerlines may have a potentially lethal impact on local populations of some bird species. For example, there is a high incidence of fatalities and injuries due to collisions with overhead powerlines and fences for Ludwig’s Bustard, the Peregrine Falcon and the Lanner Falcon (Barnes 2000). The nature of the impact is negative and it is likely to have a long-term negative impact on the threatened status of some organisms. It will be restricted to the immediate area where the powerline is built and the immediate surroundings, but affects processes (migration) that operate at a regional, national or even international scale and is rated 5. The impact is permanent and rated 5. The magnitude is moderate to high, depending on the species of concern, and rated 8 and the probability is high and rated 4. Mitigation is difficult. Possible



mitigation includes installing devices on the powerline to increase visibility, but research is ongoing to deal with such impacts. The significance of the impact is rated 72, high. With the proposed mitigation the probability of the impact drops to 3 and the magnitude to 5 resulting in the impact being rated 45, medium.

Such impacts are permanent to long-term at the regional scale and have HIGH negative significance.

<b>Issue</b>	<b>Corrective measures</b>	<b>Nature</b>	<b>Extent</b>	<b>Duration</b>	<b>Magnitude</b>	<b>Probability</b>	<b>Significance</b>
Impacts on the movement and migration of bird and animal species	No	Negative	5	5	8	4	72 High
Corrective actions	Yes	Negative	5	5	5	3	45 Medium
Install devices on powerlines to reduce impacts/collisions and cases of electrocution							

