

**APPENDIX F: IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF A ESKOM  
132/11KV OLIFANTSHOEK SUBSATION AND POWERLINE IN OLIFANTSHOEK, NORTHERN CAPE  
PROVINCE.**

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## **INTRODUCTION**

It is **Eskom Holdings SOC Limited's** (Eskom) intention to establish a new 10MVA 132/11kV substation and 31km power line as a means of delivering increased electrification to the area. This project is referred to as the **Olifantshoek Substation and power line**, and from hereon, the '**proposed project**'.

The proposed project will consist of the following activities and associated infrastructure:

- » The new 10MVA Olifantshoek 132/11kV substation (approximately 100m x 100m in extent) and ancillaries (including a metering station, control building, admin building, workshop and associated infrastructure).
- » The construction of a new 132kV single circuit overhead power line (31km long within a 32m wide servitude) from the new Olifantshoek Substation to the Emil Switching Station, and ancillaries (including access tracks/roads, laydown areas, operational and maintenance facilities).
- » Decommissioning of the existing 22/11kV 2.5MVA Olifantshoek Substation including all site rehabilitation and preservation

A 300m wide corridor was investigated for the Project to allow for optimisation of the infrastructure layout, including laydown areas, in order to, inter alia, accommodate specialist findings where necessary. The overhead power line will have associated access tracks (approximately 4m in width) where these are required. This infrastructure will fall within this assessed corridor, the final placement of which will depend on local geotechnical, topographical conditions and potential environmental sensitivities.

Two alternative substation sites and two alternative power line corridors are being considered within this Basic Assessment Report (Appendix A1). The majority of the length of the power line will run parallel to the existing Ferrum/Nieuwehoop 400kV and Ferrum/Lewensaar 275kV lines (refer to Figure 1). A corridor of 300m in width was assessed for the siting of the power line route. Within this corridor, a servitude of 32m will be negotiated with the affected landowners. Access roads (of up to 4m in width) will be constructed along the servitude, where required. Existing roads will be used as far as possible. The power line is proposed to be constructed, owned and operated by Eskom.

### **Site Location**

The Olifantshoek substation and ancillary infrastructure is located within the urban edge of the Town Olifantshoek situated approximately 35 km north east of Kathu (refer to **Figure 1**) and falls within the Gamagara local municipality. The powerline route will run the length of 31 km from the Olifantshoek substation, turning-in at the Emil switching station just west of Kathu. The substation site at Olifantshoek can be accessed via the N14 in the town of Olifantshoek.

**Table 1: Location of the study area**

<b>Province</b>	<b>Northern Cape Province</b>	
<b>District Municipality</b>	John Taolo Gaetsewe	
<b>Local Municipality</b>	Gamagara Local Municipality	
<b>Ward number(s)</b>	Ward 3, Ward 4 and Ward 5	
<b>Nearest town(s)</b>	Olifantshoek  New substation is ~ 35km Northeast of Kathu.	
<b>Farm Name/Portion</b>	<b>FARM NAME</b>	<b>PORTION NUMBER</b>
	FRITZ 540	1/540
	FRITZ 540	2/540
	FRITZ 540	5/540
	LANHAM 539	RE/539
	WRIGHT 538	1/538
	WRIGHT 538	RE/538
	BREDENKAMP 567	RE/567
	BROOKS 568	RE/568
	BEAUMONT 569	RE/569
	BEAUMONT 569	3/569
	MURRAY II 570	3/570
	COX 571	2/571
	COX 571	RE/571
	VOSTERSHOOP 706	RE/706
	DIERGAART'S HEUWEL 765	765
	HARTLEY 573	RE/573
	NEYLAN 574	1/574
	NEYLAN 766	2/766
	COX 571	1/571
	COX 571	3/571
	Erf 155	
	NEYLAN 766	4/766

The sections that follow will include an assessment of:

- » Section A: Impacts Associated with the proposed Olifantshoek power line
- » Section B: Assessment of Cumulative Impacts
- » Section C: Overall Conclusions

The following methodology was used in assessing impacts related to the proposed development. All impacts are assessed according to the following criteria:

- » The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.
- » The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- » The **duration**, wherein it is indicated whether:
  - \* The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - \* The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - \* Medium-term (5–15 years) – assigned a score of 3;
  - \* Long term (> 15 years) - assigned a score of 4; or;
  - \* Permanent - assigned a score of 5.
- » The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - \* 0 is small and will have no effect on the environment;
  - \* 2 is minor and will not result in an impact on processes;
  - \* 4 is low and will cause a slight impact on processes;
  - \* 6 is moderate and will result in processes continuing but in a modified way;
  - \* 8 is high (processes are altered to the extent that they temporarily cease); and
  - \* 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  - \* Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - \* Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - \* Assigned a score of 3 is probable (distinct possibility);
  - \* Assigned a score of 4 is highly probable (most likely); and
  - \* Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- » The **status**, which is described as positive, negative or neutral.
- » The degree to which the impact can be reversed.
- » The degree to which the impact may cause irreplaceable loss of resources.
- » The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S = (E+D+M) P$ ; where

S = Significance weighting



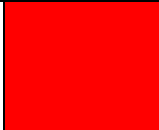
E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance** weightings for each potential impact are as follows:

<b>Significance</b>	<b>Colour Key</b>
<b>&lt; 30 points: <u>Low</u></b> Where this impact would not have a direct influence on the decision to develop in the area),	
<b>30-60 points: <u>Medium</u></b> Where the impact could influence the decision to develop in the area unless it is effectively mitigated	
<b>&gt; 60 points: <u>High</u></b> Where the impact must have an influence on the decision process to develop in the area)	

## SECTION A: IMPACTS ASSOCIATED WITH THE PROPOSED POWER LINE AND SUBSTATIONS (EXISTING AND NEW)

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Please note that the entire footprint of the Olifantshoek substation and power line project, which follows the Solar-Ferrum 400kV power line (Case ID 5323) has previously undergone a Heritage Impact Assessment (HIA) as part of both Gaigher (2014, NID 161427) and Beaumont (2007, NID 4600) reports. Gaigher concluded that only ephemeral scatters of Stone Age artefacts of low significance were located in the vicinity of the power line, and he recorded no rock engravings or built heritage sites. The only burial ground recorded were the Olifantshoek Cemetery, which lies 500m to the West of the Southern-most portion of the proposed power line, but which will not be impacted.

It was thus concluded in a Heritage Screener undertaken by Cedar Tower Heritage Consultants, that due to the disturbed nature of the proposed development area, as well as the extensive HIA coverage for the area from previous assessments, it is unlikely that the proposed 132kV power line and substation will impact on any significant heritage resources. As such it is recommended that **NO FURTHER HERITAGE STUDIES ARE REQUIRED**. Should any heritage resources be discovered during the construction phase of the Olifantshoek Substation and Power Line, work must cease and the SAHRA APM unit should be contacted immediately. The tables which follow therefore do not include an assessment of impacts on heritage sites.

As both power line options traverse similar habitats, the potential impacts (ecology, avifauna and hydrological) will be the same or only slightly different for both power line options (negligible difference), and subsequently the impact statements provided below are applicable for both power line options. Both substation locations will pose a similar and equal threat on Ecology and Avifauna in the vicinity. Visual impacts were assessed separately for each project alternative. In terms of the Hydrological impacts, the existing substation is located outside of any watercourse or riparian zone and as such will not impact on the identified watercourses and riparian zones, subsequently no assessment was deemed necessary. Furthermore, the preferred substation option is located well beyond the boundaries of any watercourse and/or riparian zone and thus no impacts have been assessed for this option. Subsequently, potential impacts assessed are only applicable to the alternative substation option which is not preferred.

## IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

### Alternative (preferred alternative)

**No significant impacts** are anticipated that may result from the planning and design phase of the proposed development. The planning and design phase of the project, if implemented correctly will result in the least negative impacts during the construction and operation phase of the project. Activities associated with the design and pre-construction phase pertains mostly to a feasibility assessment which is done mostly at a desktop level. In some cases, site visits need to take place but the impact of these visits is negligible, if any, e.g. photographs and field surveys.

## IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION, OPERATION AND DECOMMISSIONING PHASES OF THE PROJECT

### 1. ASSESSMENT OF ECOLOGICAL IMPACTS

#### 1.1. Construction Phase Impacts

Potential ecological impacts resulting from the construction of the proposed Olifantshoek power line and the new substation would stem from a variety of different activities and risk factors associated with the construction and operational phases of the project including the following:

- » Vegetation clearing & site preparation
- » Operation of heavy machinery at the site
- » Human presence

There are two main impacts, in terms of ecology, resulting from the construction of the project. These are:

- » **Impacts on vegetation and protected plant species:** Although direct impact to most sensitive features such as pans can be avoided, some vegetation loss will occur regardless of mitigation and avoidance and it is also likely that at least some individuals of listed or protected plant species will be impacted by the development of the power line and associated infrastructure. The abundance of protected species such as *Acacia erioloba* and *Boscia albitrunca* is high along some parts of the power line route and within the new substation site and some impact on these species is likely. The decommissioning of the old Olifantshoek substation is not likely to affect vegetation due to the high transformation of the existing site.
- » **Direct Faunal impacts:** Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna during construction of the power lines and substation. Sensitive and shy fauna would move away from the area during the



construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals or reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the presence of construction personnel or greater site access.

### 1.1.1. Proposed Powerline Impacts

**Impact 1:** Impacts on vegetation & protected plant species of the power line construction

<b>Impact Nature:</b> Impacts on vegetation and protected plant species will occur due to vegetation clearing and disturbance associated with the construction of the powerline and associated infrastructure. There are protected trees present along the route, especially <i>Acacia erioloba</i> . However, there are no highly sensitive features within the site and overall post-mitigation impacts are likely to be <b>Medium</b> .				
	Preferred (Green)		Alternative (Purple)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (1)	Local (1)	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Moderate (6)	Low (4)	Moderate (7)	Low (5)
<b>Probability</b>	Certain (5)	Probable (4)	Certain (5)	Probable (4)
<b>Significance</b>	<b>Medium (55)</b>	<b>Medium (36)</b>	<b>Medium (60)</b>	<b>Medium (40)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Low	Low	Low	Low
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Impacts on protected plant species can to some extent be mitigated through avoidance, but some impact on vegetation and protected species is inevitable and cannot be avoided.			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated or avoided.</li> <li>» Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.</li> <li>» Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas etc.</li> <li>» Vegetation clearing activities near sensitive areas should be kept to a minimum and these activities monitored by the Environmental Control Officer.</li> <li>» Vegetation clearing to be kept to a minimum. No unnecessary vegetation</li> </ul>			

	<p>to be cleared. Preferably <i>Acacia erioloba</i> trees under the line should be trimmed and not cut down.</p> <ul style="list-style-type: none"> <li>» All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed.</li> <li>» Temporary lay-down areas should be located within the development footprint or within areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.</li> <li>» A permit from DENC is required for any vegetation clearing, destruction or translocation of listed or protected plant species.</li> <li>» Existing tracks should be used for access wherever possible.</li> <li>» The morphology and hydrology of the riverbeds should not be altered by unnecessary excavations, dumping of soil or other waste.</li> </ul>
<b>Cumulative Impacts</b>	The potential for cumulative impacts is low given the footprint of the line and the level of existing development in the area. Although many <i>Acacia erioloba</i> could be affected, this is the dominant tree in the area and the loss of several hundred individuals is not considered highly significant.
<b>Residual Impacts</b>	Some residual habitat loss will result from the development, equivalent to the operational footprint of the facility.

### Impact 2: Faunal Impacts During Construction of the Power Line.

<b>Impact Nature:</b> Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. There are fauna resident within the site and these will be impacted during construction of the powerline. However, faunal diversity and density within the site is low and post mitigation impacts are likely to be <b>Low</b> and of <b>Local</b> significance only.				
	<b>Preferred (Green)</b>		<b>Alternative (Purple)</b>	
	<b>Without Mitigation</b>	<b>With Mitigation</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (1)	Local (1)	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Low (5)	Low (4)	Low (5)	Low (4)
<b>Probability</b>	Probable (4)	Probable (3)	Probable (4)	Probable (3)
<b>Significance</b>	<b>Medium (32)</b>	<b>Low (21)</b>	<b>Medium (32)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Medium	Medium	Medium	Medium
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Large amounts of noise and disturbance at the powerline site during construction is largely unavoidable.			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.</li> <li>» All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as</li> </ul>			

	<p>snakes, tortoises which are often persecuted out of superstition, or pangolin which are traded illegally.</p> <ul style="list-style-type: none"> <li>» Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified person in line with the required permit.</li> <li>» No construction activity should be allowed at the site between sunset and sunrise.</li> <li>» All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.</li> <li>» All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.</li> </ul>
<b>Cumulative Impacts</b>	During the construction phase, the activity would contribute to cumulative fauna disturbance and disruption in the area, but the impact would be of local extent and not of high significance with mitigation.
<b>Residual Impacts</b>	There will be minimal residual impact as the facility will have low operational impacts on fauna, after the construction phase.

### 1.1.2. Proposed Substation Impacts

**Impact 1:** Impacts on vegetation & protected plant species of the substation during construction

<b>Impact Nature:</b> Impacts on vegetation and protected plant species will occur due to vegetation clearing and disturbance associated with the construction of the substation.				
There are protected trees present in the footprint of the substations, especially <i>Acacia erioloba</i> . There is also sensitive riparian vegetation in place at Substation A. Overall post-mitigation impacts are likely to be <b>Low, provided mitigation by avoiding Protected trees is undertaken..</b>				
	Alternative Substation (Orange)		Preferred Substation (Yellow)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (1)	Local (1)	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Moderate (6)	Low (4)	Low (5)	Low (3)
<b>Probability</b>	Certain (5)	Probable (4)	Certain (5)	Probable (4)
<b>Significance</b>	<b>Medium (55)</b>	<b>Medium (36)</b>	<b>Medium (50)</b>	<b>Low (36)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Low	Low	Low	Low
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Impacts on protected plant species can to a large extent be mitigated through avoidance at Substation B, but some impact on vegetation is inevitable and cannot be avoided.			

<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Preconstruction walk-through of the site in order to locate species of conservation concern that can be translocated or avoided.</li> <li>» Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.</li> <li>» Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas etc.</li> <li>» Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.</li> <li>» All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed.</li> <li>» Temporary lay-down areas should be located within the development footprint or within areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.</li> <li>» A permit from DENC is required for any vegetation clearing, destruction or translocation of listed or protected plant species.</li> </ul>
<b>Cumulative Impacts</b>	The potential for cumulative impacts is low given the small footprint of the substation.
<b>Residual Impacts</b>	Some residual habitat loss will result from the development, equivalent to the operational footprint of the facility.

**Impact 2: Faunal Impacts During Construction of the Substation.**

**Impact Nature:** Disturbance, transformation and loss of habitat at the substation site will have a negative effect on resident fauna during construction.

There are fauna resident within the site and these will be impacted during construction. However, faunal diversity and density within the site is low and post mitigation impacts are likely to be **Low** and of **Local** significance only.

	Alternative Substation (Orange)		Preferred Substation (Yellow)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (1)	Local (1)	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Low (6)	Low (5)	Low (5)	Low (4)
<b>Probability</b>	Probable (4)	Probable (3)	Probable (4)	Probable (3)
<b>Significance</b>	<b>Medium (36)</b>	<b>Low (24)</b>	<b>Medium (32)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Medium	Medium	Medium	Medium
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be</b>	Large amounts of noise and disturbance at the substation site during construction is			

<b>mitigated?</b>	largely unavoidable.
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.</li> <li>» All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises which are often persecuted out of superstition, or pangolin which are traded illegally.</li> <li>» Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified person in line with the required permit.</li> <li>» No construction activity should be allowed at the site between sunset and sunrise.</li> <li>» All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.</li> <li>» All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.</li> </ul>
<b>Cumulative Impacts</b>	During the construction phase, the activity would contribute to cumulative fauna disturbance and disruption in the area, but the impact would be of local extent and not of high significance with mitigation.
<b>Residual Impacts</b>	There will be minimal residual impact as the facility will have low operational impacts on fauna, after the construction phase.

## 1.2 Operation Phase Impacts

The risk factors associated with the operational phases of the project including the following:

- » Servitude maintenance activities
- » Power line presence
- » Human presence

There is only one main impact, in terms of ecology, resulting from the operation of the project. This is:

- » **Degradation of ecosystems:** Maintenance activities such as vegetation clearing as well as the large amount of disturbance created during construction of the power line and substation will leave the site vulnerable to degradation through alien plant invasion and soil erosion. In addition, the disturbed areas will also be vulnerable to alien plant invasion, especially woody species such as *Prosopis*, which was observed to be present at the site at a low density, but which could quickly invade disturbed areas. Areas near to wetlands and watercourses are usually particularly vulnerable to alien plant invasion and disturbance in these areas should be kept to a minimum to reduce this risk.

### 1.2.1. Proposed Powerline Impacts

#### Impact 1: Degradation of Ecosystems during Operation of the Power Line

**Impact Nature:** Disturbance is likely to increase the vulnerability of the disturbed areas to erosion. Furthermore, these areas are likely to remain vulnerable to alien plant invasion for some time following construction and alien species could invade suitable sites created during the construction disturbance.

	Preferred (Green)		Alternative (Purple)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (2)	Local (1)	Local (2)	Local (1)
<b>Duration</b>	Long-term (4)	Medium-term (3)	Long-term (4)	Medium-term (3)
<b>Magnitude</b>	Medium (5)	Low (3)	Medium (5)	Low (3)
<b>Probability</b>	Probable (4)	Improbable (3)	Probable (4)	Improbable (3)
<b>Significance</b>	<b>Medium (44)</b>	<b>Low (21)</b>	<b>Medium (44)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	High	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Erosion control measures should be implemented in areas where soil has been disturbed due to construction activities.</li> <li>» Due to the disturbance at the site as well as the increased runoff generated at the site, alien plant species are likely to be a long-term problem at the site. A long-term control plan will need to be implemented and regular monitoring for alien plants within the development footprint should be undertaken.</li> <li>» Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible and should only be used for woody species which re-sprout following continual manual control.</li> </ul>			
<b>Cumulative Impacts</b>	Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled then the cumulative impact from alien species would not be significant.			
<b>Residual Impacts</b>	If erosion and alien species at the site are controlled, then there will be very little residual impact.			

### 1.2.2. Proposed Substation Impacts

#### Impact 1: Degradation of Ecosystems during Operation of the Substation

**Impact Nature:** Disturbance is likely to increase the vulnerability of the disturbed areas of the substation to erosion. Furthermore, these areas are likely to remain vulnerable to alien plant invasion for some time following construction and alien species could invade suitable sites created during the construction

disturbance.				
	Alternative Substation (Orange)		Preferred Substation (Yellow)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (1)	Local (1)	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Short-term (2)	Long-term (4)	Short-term (2)
<b>Magnitude</b>	Medium (4)	Low (3)	Medium (4)	Low (3)
<b>Probability</b>	Probable (4)	Improbable (3)	Probable (4)	Improbable (3)
<b>Significance</b>	<b>Low (36)</b>	<b>Low (18)</b>	<b>Medium (36)</b>	<b>Low (18)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	High	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Erosion control measures should be implemented in areas where soil has been disturbed due to construction activities.</li> <li>» Due to the disturbance at the site as well as the increased runoff generated at the site, alien plant species are likely to be a long-term problem at the site. A long-term control plan will need to be implemented and regular monitoring for alien plants within the development footprint should be undertaken.</li> <li>» Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible and should only be used for woody species which re-sprout following continual manual control.</li> </ul>			
<b>Cumulative Impacts</b>	Alien invasion would contribute to some cumulative habitat degradation in the area, but if alien species are controlled then the cumulative impact from alien species would not be significant.			
<b>Residual Impacts</b>	If erosion and alien species at the site are controlled, then there will be very little residual impact.			

### 1.3. Decommissioning Phase Impacts

The risk factors associated with the operational phases of the project including the following:

- » Operation of heavy machinery at the site
- » Human presence

There are two main impacts, in terms of ecology, resulting from the decommissioning of the project. These are:

- » **Direct Faunal Impacts** : Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna during decommissioning of the new power line, the new substation and during the decommissioning of the old Olifantshoek substation. Sensitive and shy fauna would move away from the area during decommissioning as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the decommissioning activities and might be killed. Some mammals or reptiles would be vulnerable to illegal collection or poaching during this phase as a result of the presence of construction personnel or greater site access.
- » **Degradation of Ecosystems:** It is likely that decommissioning will generate moderate levels of disturbance that will leave the site of the power line, new substation and old Olifantshoek substation vulnerable to degradation through alien plant invasion and soil erosion. Disturbance without follow-up maintenance activities would pose a risk of generating soil erosion and alien plant invasion problems. In addition, the use of heavy machinery to remove the infrastructure would also pose a risk of degradation through pollution impacts.

### 1.3.1. Proposed Powerline Impacts

#### Impact 1. Faunal Impacts During Decommissioning of the Power Line

**Impact Nature:** Disturbance or persecution of fauna of the powerline during the decommissioning phase may occur. Increased levels of noise, pollution, disturbance and human presence during decommissioning will be detrimental to fauna resident or utilising the site. Sensitive and shy fauna would move away from the area during the decommissioning phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the activities and might be killed. Some mammals and reptiles would also be vulnerable to illegal collection or poaching.

	Preferred (Green)		Alternative (Purple)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (1)	Local (1)	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Medium (4)	Low (2)	Medium (4)	Low (2)
<b>Probability</b>	Probable (4)	Improbable (3)	Probable (4)	Improbable (3)
<b>Significance</b>	<b>Low (28)</b>	<b>Low (15)</b>	<b>Low (28)</b>	<b>Low (15)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	High	High	High	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes.			
<b>Mitigation</b>	» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.			



	<ul style="list-style-type: none"> <li>» Any accidental chemical, fuel, and oil spills that occur at the site during decommissioning should be cleaned up in the appropriate manner as related to the nature of the spill.</li> <li>» No open excavations, holes or pits should be left at the site as fauna can fall in and become trapped.</li> <li>» All disturbed areas should be rehabilitated with a cover of indigenous plants.</li> </ul>
<b>Cumulative Impacts</b>	Cumulative impacts at the decommissioning phase are likely to be low.
Residual Impacts	With avoidance measures there should be no residual impact on fauna.

**Impact 2.** Degradation of Ecosystems following decommissioning of the Power Line

<b>Impact Nature:</b> Alien plants are likely to invade the decommissioned sites as a result of disturbance created during decommissioning. This impact would be likely to persist from several years after decommissioning until such time as a cover of indigenous species recovered. Disturbance during decommissioning will leave the site vulnerable to soil erosion.				
	<b>Preferred (Green)</b>		<b>Alternative (Purple)</b>	
	<b>Without Mitigation</b>	<b>With Mitigation</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (3)	Local (1)	Local (3)	Local (1)
<b>Duration</b>	Long-term (4)	Medium-term (3)	Long-term (4)	Medium-term (3)
<b>Magnitude</b>	Medium (5)	Low (3)	Medium (5)	Low (3)
<b>Probability</b>	Probable (4)	Improbable (3)	Probable (4)	Improbable (3)
<b>Significance</b>	<b>Medium (48)</b>	<b>Low (21)</b>	<b>Medium (48)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	High	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Due to the disturbance at the site during decommissioning, alien plant species are likely to invade the site and a long-term control plan will need to be implemented for several years after decommissioning</li> <li>» Regular monitoring (bi-annual) for alien plants within the development footprint for 2-3 years after decommissioning.</li> <li>» Regular alien clearing should be conducted every year for 2 years using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.</li> <li>» Cleared and disturbed areas should be revegetated with a cover of indigenous grass or shrubs.</li> </ul>			
<b>Cumulative Impacts</b>	Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled then, then cumulative impacts from alien species would not be significant.			

<b>Residual Impacts</b>	If alien species at the site are controlled, then there will be very little residual impact. If erosion is controlled, then there will be very low residual impacts.
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### 1.3.2. Proposed Substation Impacts

#### Impact 1. Faunal Impacts During Decommissioning of the Substation

<b>Impact Nature:</b> Disturbance or persecution of fauna of the substation during the decommissioning phase may occur. Increased levels of noise, pollution, disturbance and human presence during decommissioning will be detrimental to fauna resident or utilising the site. Sensitive and shy fauna would move away from the area during the decommissioning phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the activities and might be killed. Some mammals and reptiles would also be vulnerable to illegal collection or poaching.				
	Alternative Substation (Orange)		Preferred Substation (Yellow)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (1)	Local (1)	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Medium (4)	Low (2)	Medium (4)	Low (2)
<b>Probability</b>	Probable (4)	Improbable (3)	Probable (4)	Improbable (3)
<b>Significance</b>	<b>Low (28)</b>	<b>Low (15)</b>	<b>Low (28)</b>	<b>Low (15)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	High	High	High	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes.			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.</li> <li>» Any accidental chemical, fuel, and oil spills that occur at the site during decommissioning should be cleaned up in the appropriate manner as related to the nature of the spill.</li> <li>» No open excavations, holes or pits should be left at the site as fauna can fall in and become trapped.</li> <li>» All disturbed areas should be rehabilitated with a cover of indigenous plants.</li> </ul>			
<b>Cumulative Impacts</b>	Cumulative impacts at the decommissioning phase are likely to be low.			
<b>Residual Impacts</b>	With avoidance measures there should be no residual impact on fauna.			

#### Impact 2. Degradation of Ecosystems following decommissioning of the Substation

<b>Impact Nature:</b> Alien plants are likely to invade the decommissioned substation sites as a result of disturbance created during decommissioning. This impact would be likely to persist from several years after decommissioning until such time as a cover of indigenous species recovered. Disturbance during
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decommissioning will leave the site vulnerable to soil erosion.				
	Alternative Substation (Orange)		Preferred Substation (Yellow)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (2)	Local (1)	Local (2)	Local (1)
<b>Duration</b>	Long-term (4)	Short-term (2)	Long-term (4)	Short-term (2)
<b>Magnitude</b>	Medium (4)	Low (2)	Medium (4)	Low (2)
<b>Probability</b>	Probable (4)	Improbable (3)	Probable (4)	Improbable (3)
<b>Significance</b>	<b>Medium (40)</b>	<b>Low (15)</b>	<b>Medium (40)</b>	<b>Low (15)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	High	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Due to the disturbance at the site during decommissioning, alien plant species are likely to invade the site and a long-term control plan will need to be implemented for several years after decommissioning</li> <li>» Regular monitoring (bi-annual) for alien plants within the development footprint for 2-3 years after decommissioning.</li> <li>» Regular alien clearing should be conducted every year for 2 years using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.</li> <li>» Cleared and disturbed areas should be revegetated with a cover of indigenous grass or shrubs.</li> </ul>			
<b>Cumulative Impacts</b>	Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled then, then cumulative impacts from alien species would not be significant.			
<b>Residual Impacts</b>	If alien species at the site are controlled, then there will be very little residual impact. If erosion is controlled, then there will be very low residual impacts.			

### 1.3.3. Proposed Existing Substation Impacts

#### Impact 1. Faunal Impacts During Decommissioning of the Existing Substation

**Impact Nature:** Disturbance or persecution of fauna during the decommissioning phase may occur. Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna resident or utilising the site. Sensitive and shy fauna would move away from the area during the decommissioning phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals and reptiles would also be vulnerable to illegal collection or poaching.

	Without Mitigation	With Mitigation
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Medium (3)	Low (2)
<b>Probability</b>	Probable (4)	Improbable (3)
<b>Significance</b>	<b>Low (24)</b>	<b>Low (15)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.</li> <li>» Any accidental chemical, fuel, and oil spills that occur at the site during decommissioning should be cleaned up in the appropriate manner as related to the nature of the spill.</li> <li>» No open excavations, holes or pits should be left at the site as fauna can fall in and become trapped.</li> <li>» All disturbed areas should be rehabilitated with a cover of indigenous plants.</li> </ul>	
<b>Cumulative Impacts</b>	Cumulative impacts at the decommissioning phase are likely to be low.	
<b>Residual Impacts</b>	With avoidance measures there should be no residual impact on fauna.	

## Impact 2. Degradation of Ecosystems following decommissioning of the Existing Substation

**Impact Nature:** Alien plants are likely to invade the decommissioned site of the old substation as a result of disturbance created during decommissioning. This impact would be likely to persist from several years after decommissioning until such time as a cover of indigenous species recovered. Disturbance during decommissioning will leave the site vulnerable to soil erosion.

	Without Mitigation	With Mitigation
<b>Extent</b>	Local (3)	Local (1)
<b>Duration</b>	Long-term (4)	Medium-term (3)
<b>Magnitude</b>	Medium (3)	Low (3)
<b>Probability</b>	Probable (4)	Improbable (3)
<b>Significance</b>	<b>Medium (40)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No

<b>Can impacts be mitigated?</b>	Yes
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Due to the disturbance at the site during decommissioning, alien plant species are likely to invade the site and a long-term control plan will need to be implemented for several years after decommissioning</li> <li>» Regular monitoring (bi-annual) for alien plants within the development footprint for 2-3 years after decommissioning.</li> <li>» Regular alien clearing should be conducted every year for 2 years using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.</li> <li>» Cleared and disturbed areas should be revegetated with a cover of indigenous grass or shrubs.</li> </ul>
<b>Cumulative Impacts</b>	Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled then, then cumulative impacts from alien species would not be significant.
<b>Residual Impacts</b>	<p>If alien species at the site are controlled, then there will be very little residual impact.</p> <p>If erosion is controlled, then there will be very low residual impacts.</p>

## 2. ASSESSMENT OF VISUAL IMPACTS

### 2.1. Construction Phase Impacts

The following assessment focuses first on general landscape change that will occur due to the proposed development which provides context for the assessment of impacts on identified sensitive receptors. Key receptors that are considered include;

- » Homesteads;
- » Travellers on the N14; and
- » residents of Olifantshoek

#### 2.1.1. Proposed Powerline Impacts

**Impact 1:** Impact of the Proposed Development on General Landscape Character for both powerline alternatives

<b>Impact Nature:</b> Degradation of the character of the existing landscape. This is particularly relevant to existing natural and urban areas (Lowland and Upland LCAs) where there is a possibility that the development could introduce industrial components.		
	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Local (2)	Local (2)
<b>Duration</b>	Long-term (4)	Medium-term (4)

<b>Magnitude</b>	Medium (4)	Low (2)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low/Medium (30)</b>	<b>Low (16)</b>
<b>Status</b>	Neutral - Negative	Neutral - Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Planning: Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude.</li> <li>» Ensure that vegetation is not unnecessarily removed during the construction period.</li> <li>» Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources.</li> <li>» The alignment of the proposed 132kV overhead power line should be as far from the N14 as possible.</li> <li>» Plan and implement screening for the substation.</li> <li>» Both Alignments - Align power line as far from homesteads as possible within the identified corridor.</li> <li>» Alternative Alignment - Undertake deviations around the closest homesteads within the development corridor.</li> <li>» Rehabilitate disturbed areas.</li> <li>» Both power line Alternatives - Align power line as far from the N14 as possible within the identified corridor.</li> <li>» Plan to use motion sensor triggered lighting at the substation.</li> <li>» Ensure that lighting is focused on the development with no light spillage outside the site.</li> <li>» Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities</li> </ul>	
<b>Cumulative Impacts</b>	<p>The affected natural landscape (Lowland and Upland LCAs) is not a highly natural area as it is already impacted by existing infrastructure including a larger 400kV overhead power line.</p> <p>The affected urban area is also currently affected by existing electrical infrastructure including LV cables and an existing substation</p> <p>The proposed 132kV overhead power line will add marginally to the local intensity of existing impacts within the Lowland LCA. They will also extend the impact into the Upland LCA as the alignments run along the N14 towards Olifantshoek.</p> <p>The Alternative Substation Location will increase the extent of electrical</p>	

	<p>infrastructure that is obvious within the urban area. The Preferred Alternative will largely impact the urban fringe / Upland LCA.</p> <p>Cumulative impacts of power line alternatives is assessed as Medium but with mitigation becomes low.</p> <p>Cumulative impacts of the Substation Alternatives is assessed as Medium but may be mitigated to low.</p> <p>Cumulative impacts of the Preferred Substation Location is assessed as Low/Medium but may be mitigated to low.</p>
<b>Residual Impacts</b>	Lack of rehabilitation on decommissioning is likely to result in degraded areas

### 2.1.2. Proposed Substation Impacts

**Impact 1:** Impact of the Proposed Development on General Landscape Character for both powerline alternatives

<b>Impact Nature:</b> As Above				
	<b>Alternative Substation (Orange)</b>		<b>Preferred Substation (Yellow)</b>	
	<b>Without Mitigation</b>	<b>With Mitigation</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (2)	Local (2)	Local (2)	Local (2)
<b>Duration</b>	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Medium (6)	Low (4)	Low (4)	Low (2)
<b>Probability</b>	Probable (4)	Probable (3)	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (48)</b>	<b>Low/Medium (30)</b>	<b>Low/Medium (30)</b>	<b>Low (16)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	High	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes			
<b>Mitigation</b>	As Above			
<b>Cumulative Impacts</b>	As Above			
<b>Residual Impacts</b>	As Above			

## 2.2. Operation Phase Impacts

Potential visual impacts on sensitive receptors that have been identified through the site visit, these include;

- » The visibility of the facility to and visual impact on Local homesteads.
- » The visibility of the facility to and visual impact on the N14.
- » The visibility of the facility to and visual impact on urban residential areas.
- » The impact of lighting.

### 2.2.1. Proposed Powerline Impacts

**Impact 1:** Impact regarding the visibility of the facility to, and visual impact on, rural homesteads

<b>Nature of impact:</b> Four homesteads located either within or close to the eastern side of the development corridor within the Lowland LCA are at risk of impact. Developing the proposed overhead power line to the west of the existing power line (Alternatives Alignment) and as close to the western edge of the development corridor as possible would largely address this issue. It is only the powerline that will impact on rural homesteads. The substation alternatives are therefore not included in this section of the assessment.				
	Alternative Power Line (Purple)		Preferred Power Line (Green)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (2)	Local (2)	Local (2)	Local (2)
<b>Duration</b>	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
<b>Magnitude</b>	High (8)	Medium (6)	Low (4)	Low (3)
<b>Probability</b>	Probable (4)	Probable (3)	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (56)</b>	<b>Medium (36)</b>	<b>Low/Medium (30)</b>	<b>Low (18)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	High	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Retain and maintain natural vegetation in all areas outside of the development footprint/servitude.</li> <li>» Ensure that vegetation is not unnecessarily removed during the operation or maintenance period.</li> <li>» Restrict the activities and movement of workers and vehicles during maintenance and operation of the site and existing access roads.</li> </ul>			



	<ul style="list-style-type: none"> <li>» Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.</li> <li>» Reduce and control construction dust using approved dust suppression techniques as and when required.</li> <li>» Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude.</li> <li>» Rehabilitate all disturbed areas immediately after the completion of maintenance works.</li> <li>» Maintain the general appearance of the power line servitude as a whole</li> <li>» Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish</li> <li>» Screen planting that was specifically established to minimise the intrusiveness of the power line or substation must be maintained and dead or sick plants replaced for a determinate period after construction and throughout operation</li> <li>» Both Alignments - Align power line as far from homesteads as possible within the identified corridor.</li> <li>» Alternative Alignment - Undertake deviations around the closest homesteads within the development corridor.</li> </ul>
<b>Cumulative Impacts</b>	The cumulative impact of the Alternative Alignment is assessed as a medium significance both with and without mitigation. The cumulative impact of Preferred Alignment is assessed as a low to medium significance without mitigation and low significance with mitigation
<b>Residual Impacts</b>	Lack of rehabilitation on decommissioning is likely to result in degraded areas

**Impact 2:** Impact regarding the visibility of the facility to, and visual impact on, the N14

**Impact Nature:** Degradation of the character of the existing landscape. This is particularly relevant to existing natural and urban areas (Lowland and Upland LCAs) where there is a possibility that the development could introduce industrial components.

	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Local (2)	Local (2)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Medium (6)	Low (3)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (36)</b>	<b>Low (27)</b>
<b>Status</b>	Neutral - Negative	Neutral - Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	

<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Both Powerline Alternatives - Align power line as far from the road as Retain and maintain natural vegetation in all areas outside of the development footprint/servitude.</li> <li>» Ensure that vegetation is not unnecessarily removed during the operation or maintenance period.</li> <li>» Restrict the activities and movement of workers and vehicles during maintenance and operation of the site and existing access roads.</li> <li>» Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.</li> <li>» Reduce and control construction dust using approved dust suppression techniques as and when required.</li> <li>» Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude.</li> <li>» Rehabilitate all disturbed areas immediately after the completion of maintenance works.</li> <li>» Maintain the general appearance of the power line servitude as a whole</li> <li>» Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish</li> </ul>
<b>Cumulative Impacts</b>	Cumulative impacts associated with both power line alternatives is assessed as medium significance. This may be reduced to low significance with mitigation.
<b>Residual Impacts</b>	Lack of rehabilitation on decommissioning is likely to result in degraded areas

### 2.2.2. Proposed Substation Impacts

**Impact 1:** Impact regarding the visibility of the facility to, and visual impact on, the N14

**Nature of impact:** The proposed substations are also likely to be visible to the N14. The Alternative Location will be located away from the road but a short view will be possible through vegetation and buildings. The Preferred Location will be located closer to the road on the urban edge. Existing vegetation is likely to result in views of this alternative only being obvious as the viewer is close to and opposite the facility but without additional mitigation the full extent of the substation is likely to be open to view

	Alternative Substation (Orange)		Preferred Substation (Yellow)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (2)	Local (2)	Local (2)	Local (2)
<b>Duration</b>	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (2)	Small (0)	Low (4)	Low (2)
<b>Probability</b>	Improbable (2)	Improbable (2)	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (14)</b>	<b>Low (12)</b>	<b>Low/Medium (30)</b>	<b>Low (16)</b>

<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	High	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Ensure that vegetation is not unnecessarily removed during the operation or maintenance period.</li> <li>» Restrict the activities and movement of workers and vehicles during maintenance and operation of the site and existing access roads.</li> <li>» Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.</li> <li>» Reduce and control construction dust using approved dust suppression techniques as and when required.</li> <li>» Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts of the substation</li> <li>» Rehabilitate all disturbed areas immediately after the completion of maintenance works.</li> <li>» Maintain the general appearance of the substation</li> <li>» Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish</li> <li>» Screen planting that was specifically established to minimise the intrusiveness of the power line or substation must be maintained and dead or sick plants replaced for a determinate period after construction and throughout operation</li> </ul>			
<b>Cumulative Impacts</b>	The cumulative impact of the Alternative Alignment is assessed as a medium significance both with and without mitigation. The cumulative impact of Preferred Alignment is assessed as a low to medium significance without mitigation and low significance with mitigation			
<b>Residual Impacts</b>	Lack of rehabilitation on decommissioning is likely to result in degraded areas			

**Impact 2:** Impact regarding the visibility of the facility to, and visual impact on, urban residential areas

<b>Nature of impact:</b> The Alternative Substation Location is located within the urban area close to existing homes. The Preferred Substation Location is located approximately 80m from and will be visible to a small number of dwellings within an existing informal settlement area on the edge of Olifantshoek.				
	Alternative Substation (Orange)		Preferred Substation (Yellow)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (2)	Local (2)	Local (2)	Local (2)
<b>Duration</b>	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (4)	Low (3)	Low (3)	Low (2)

<b>Probability</b>	Probable (3)	Probable (3)	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low/Medium (30)</b>	<b>Low (27)</b>	<b>Low (27)</b>	<b>Low (16)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	High	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Ensure that vegetation is not unnecessarily removed during the operation or maintenance period.</li> <li>» Restrict the activities and movement of workers and vehicles during maintenance and operation of the site and existing access roads.</li> <li>» Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.</li> <li>» Reduce and control construction dust using approved dust suppression techniques as and when required.</li> <li>» Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts of the substation</li> <li>» Rehabilitate all disturbed areas immediately after the completion of maintenance works.</li> <li>» Maintain the general appearance of the substation as a whole</li> <li>» Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish</li> <li>» Screen planting that was specifically established to minimise the intrusiveness of the power line or substation must be maintained and dead or sick plants replaced for a determinate period after construction and throughout operation</li> </ul>			
<b>Cumulative Impacts</b>	<p>The Alternative Substation Location – Low to medium negative impact without mitigation, low impact with mitigation.</p> <p>The Preferred Substation Location - Low to medium positive impact without mitigation, medium positive impact with mitigation.</p>			
<b>Residual Impacts</b>	Lack of rehabilitation on decommissioning is likely to result in degraded areas			

### Impact 3: Lighting impact associated with the facility

<b>Nature of impact</b>	Lighting may be associated with the substation in the form of flood lighting and / or possibly security lighting. The area within which the substations are located are either close to (Preferred Location) or within the urban area (Alternative Location). The issue of light pollution within an otherwise dark night time landscape is therefore not relevant. More relevant however, it's the possibility that lighting could cause a nuisance to neighbours. No specific detail has been provided regarding lighting of the substation. However, observations on site and reference to Plate 25 indicates that the existing substation is floodlit.		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;"><b>Alternative Substation (Orange)</b></td> <td style="width: 50%; text-align: center;"><b>Preferred Substation (Yellow)</b></td> </tr> </table>	<b>Alternative Substation (Orange)</b>	<b>Preferred Substation (Yellow)</b>
<b>Alternative Substation (Orange)</b>	<b>Preferred Substation (Yellow)</b>		

	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
<b>Extent</b>	Local (2)	Local (2)	Local (2)	Local (2)
<b>Duration</b>	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (4)	Low (2)	Low (2)	Small (0)
<b>Probability</b>	Probable (3)	Improbable (2)	Improbable (2)	Improbable (1)
<b>Significance</b>	<b>Low/Medium (30)</b>	<b>Low (16)</b>	<b>Low (16)</b>	<b>Low (6)</b>
<b>Status</b>	Negative	Negative	If the lights are generally not impacting on a residential area then the impact is likely to be seen is neutral	
<b>Reversibility</b>	Moderate	High	Moderate	High
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	Yes			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» All lighting, especially perimeter security lighting at the substation must be shielded to minimise light spillage and pollution. No direct light sources must be seen from outside the site</li> <li>» Plan to motion sensor triggered lighting;</li> <li>» Ensure that lighting is focused on the development with no light spillage outside the site</li> </ul>			
<b>Cumulative Impacts</b>	The Alternative Substation Location could result in a low to medium negative impact but with appropriate mitigation will result in a low positive cumulative impact. The Preferred Substation Location could result in a low positive impact without mitigation and a medium positive impact with mitigation.			
<b>Residual Impacts</b>	Lack of rehabilitation on decommissioning is likely to result in degraded areas			

### 2.3. Decommissioning Phase Impacts

None. No impacts, visually, are expected from the decommissioning of the powerline and the substation, as well as the existing substation. Possible impacts here may relate to the positive impact of the removal of infrastructure in the landscape.

### 3. ASSESSMENT OF AVIFAUNAL IMPACTS

The tables below provide an assessment of the potential impacts associated with the proposed project. As both power line options traverse, similar habitat the potential impacts will be the same for both power line options and subsequently the impact statements provided below are applicable for both power line options. Furthermore, most impacts are applicable, and similar, for both the construction, operational as well as decommissioning phase and thus the statement will only be provided once (will be mentioned within statement to what phase it has relevance)

Overall it was concluded that with the necessary mitigation measures implemented this **development will have little impact on the avifaunal character of the area with minimal loss due to collision**. Both line options traverse similar habitats and subsequently will have similar impacts. However, regarding the substations, the preferred option is definitely the best option as the alternative option will impact on the *Acacia karroo* thicket which is moderately-high in avifaunal diversity. Furthermore, by selecting the preferred location a portion of the line, which may cross the flight path of water fowl and waders moving between the sewage works and gravel dam, will be significantly shortened thus furthermore lowering the threat of this line.

#### 3.1. Construction Phase Impacts

##### 3.1.1. Proposed Powerline Impacts

**Impact 1:** Potential impact of habitat destruction

**Nature:** During the **construction** of the power line, some habitat destruction and alteration will occur, although this will be limited. These activities may have a very slight impact on foraging, breeding and roosting ecology of avian species within the area through modification of habitat.

It is envisaged that the only Red Data species that may be potentially displaced (temporarily) by the activities and habitat transformation that will take place as a result of construction are Kori bustard (*Ardeotis kori*). This displacement will only be from a very restricted area. The impact on smaller, non-Red Data species that are potentially breeding in the area will be local and very restricted in extent, and will not have a significant effect on regional or national populations.

	Both Lines (Without Mitigation)	Both Lines (With Mitigation)
<b>Extent</b>	Low (1)	Low (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Minor (2)	Small (0)
<b>Probability</b>	Highly Probable (4)	Probable (3)
<b>Significance</b>	<b>Low (28)</b>	<b>Low (15)</b>

<b>Status</b>	Negative	
<b>Reversibility</b>	High	
<b>Irreplaceable loss of resources</b>	Only very slight loss of resources	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The temporal and spatial footprint of the development should be kept to a minimum.</li> <li>» The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.</li> <li>» Provide adequate briefing for site personnel on the possible important (Red Data) species occurring and/or nesting in the area and the procedures to be followed (for example notification of ECO and avoidance of area until appropriate recommendations has been provided by ECO).</li> <li>» The above measures must be covered in a site specific EMPr and monitored by an ECO.</li> </ul>	
<b>Cumulative Impacts</b>	<p>Low. The proposed development will be largely situated within the existing servitude of the 275kV &amp; 400kV lines and subsequently the cumulative impact of the development will be low.</p> <p>Minimal additional destruction and alteration of habitats will occur, cumulative and thus, will also have limited impact on foraging, breeding and roosting ecology of avian species.</p>	
Residual Impacts	Low	

## Impact 2: Potential impacts of disturbance

### Nature: Disturbance

The disturbance of avifauna during the **construction** of the power line may occur. Species sensitive to disturbance include ground-nesting species resident within the development footprint. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories.

Disturbance could have a negative impact on the breeding activities of various species, particularly if this occurs during a sensitive period in the breeding cycle.

Species of concern are Kori Bustard. Other small avian species do occur within the development footprint but these species are non-Red Data species.

The proposed site is located within an agricultural habitat close to National and Domestic roads. Therefore, species within this landscape often experience disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. The relatively small scale of the development (in relation to the large agricultural

<p>landscape) is unlikely to have a significant impact on avifauna. However, species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational (maintenance) phases.</p>		
	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Low (1)	Low (1)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Highly Probable (4)	Probable (3)
<b>Significance</b>	<b>Low (28)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	
<b>Reversibility</b>	High reversibility	
<b>Irreplaceable loss of resources</b>	Only a slight loss of resources	
<b>Can impacts be mitigated?</b>	Impacts can be mitigated to a large extent.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Strict control must be maintained over all activities during construction, in line with an approved construction EMPr.</li> <li>» During construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and where deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such buffer the ECO may contact an avifaunal specialist for advice.</li> <li>» The construction equipment camps must be as close to the site as possible.</li> <li>» Contractors and working staff should remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted.</li> <li>» Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads running through the study area during the construction phase.</li> </ul>	
<b>Cumulative Impacts</b>	The proposed development will be largely situated within the existing servitude of the 275kV line and subsequently the cumulative impact of the development will be low	
<b>Residual Impacts</b>	Low	

### 3.1.2. Proposed Substation Impacts

#### Impact 1: Habitat Destruction

##### Nature: Disturbance

During the **construction** of the substation, some habitat destruction and alteration will occur, although this will be limited. These activities may have a very slight impact on foraging, breeding and roosting



ecology of avian species within the area through modification of habitat.		
It is envisaged that the only Red Data specie that may be potentially displaced (temporarily) by the activities and habitat transformation that will take place as a result of construction are Kori bustard ( <i>Ardeotis kori</i> ). This displacement will only be from a very restricted area. The impact on smaller, non-Red Data species that are potentially breeding in the area will be local and very restricted in extent, and will not have a significant effect on regional or national populations		
	<b>Both Substation alternatives (Without Mitigation)</b>	<b>Both Substation alternatives (With Mitigation)</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Minor (2)	Small (0)
<b>Probability</b>	Highly Probable (4)	Probable (3)
<b>Significance</b>	<b>Low (28)</b>	<b>Low (15)</b>
<b>Status</b>	Negative	
<b>Reversibility</b>	High reversibility	
<b>Irreplaceable loss of resources</b>	Only a slight loss of resources	
<b>Can impacts be mitigated?</b>	Impacts can be mitigated to a large extent.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The temporal and spatial footprint of the development should be kept to a minimum.</li> <li>» The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.</li> <li>» Provide adequate briefing for site personnel on the possible important (Red Data) species occurring and/or nesting in the area and the procedures to be followed (for example notification of ECO and avoidance of area until appropriate recommendations have been provided by a specialist).</li> <li>» The above measures must be covered in a site specific EMP and monitored by an ECO.</li> </ul>	
<b>Cumulative Impacts</b>	The proposed development will be largely situated within the existing servitude of the 275kV line and subsequently the cumulative impact of the development will be low	
<b>Residual Impacts</b>	Low	

### Impact 2: Disturbance

**Nature:** The disturbance of avifauna during the **construction** of the substation may occur. Species sensitive to disturbance include ground-nesting species resident within the development footprint. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories.

Disturbance could have a negative impact on the breeding activities of various species, particularly if this occurs during a sensitive period in the breeding cycle.

Species of concern are Kori Bustard. Other small avian species do occur within the development footprint but these species are non-Red Data species.

The proposed site is located within an agricultural habitat close to National and Domestic roads. Therefore, species within this landscape often experience disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. The relatively small scale of the development (in relation to the large agricultural landscape) is unlikely to have a significant impact on avifauna. However, species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational (maintenance) phases.

	<b>Both Substation alternatives (Without Mitigation)</b>	<b>Both Substation alternatives (With Mitigation)</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Highly Probable (4)	Probable (3)
<b>Significance</b>	<b>Low (28)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	
<b>Reversibility</b>	High reversibility	
<b>Irreplaceable loss of resources</b>	Only a slight loss of resources	
<b>Can impacts be mitigated?</b>	Impacts can be mitigated to a large extent.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Strict control must be maintained over all activities during construction, in line with an approved construction EMPr.</li> <li>» During construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and were deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such buffer the Environmental Officer (EO) may contact an avifaunal specialist for advice.</li> <li>» The construction equipment camps must be as close to the site as possible.</li> <li>» Contractors and working staff should remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted.</li> <li>» Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads associated with the project during the construction phase.</li> </ul>	
<b>Cumulative Impacts</b>	The proposed development will be largely situated within the existing servitude of the 275kV line and subsequently the cumulative	

	impact of the development will be low
<b>Residual Impacts</b>	Low

### 3.2. Operation Phase Impacts

#### 3.2.1. Proposed Powerline Impacts

**Impact 1:** Potential impact of habitat destruction

<b>Nature: Disturbance during Operation Phase due to maintenance activities</b>		
See description for construction disturbance impacts mentioned above		
	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Low (1)	Low (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (27)</b>	<b>Low (11)</b>
<b>Status</b>	Negative	
<b>Reversibility</b>	High reversibility	
<b>Irreplaceable loss of resources</b>	Only slight loss of resources	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Strict control must be maintained over all activities during construction, in line with an approved construction EMP.</li> <li>» Vehicle movements must be restricted to existing roads and a speed limit of 30km/h must be implemented on all roads running through the study area during the construction phase.</li> </ul>	
<b>Cumulative Impacts</b>	The proposed development will be largely situated within the existing servitude of the 275kV line and subsequently the cumulative impact of the development will be low	
<b>Residual Impacts</b>	Low	

**Impact 2:** Electrocution of birds due to overhead power lines

<p><b>Nature: Electrocution of birds on overhead power line</b></p> <p>Electrocution of birds on associated overhead power lines is an important cause of mortality for a variety of large bird species particularly storks, cranes and raptors in South Africa (Van Rooyen &amp; Ledger 1999). Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2004; Lehman et al. 2007).</p> <p>The impact assessment found the impact of electrocution to be of moderate significance before</p>
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mitigation, and low significance after the mitigation in the form of bird friendly structures.		
	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Medium (2)	Medium (2)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Moderate (36)</b>	<b>Low (20)</b>
<b>Status</b>	Negative	
<b>Reversibility</b>	Low (birds will be injured or killed)	
<b>Irreplaceable loss of resources</b>	Yes	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» A "Bird Friendly" structure, with a bird perch (as per standard Eskom guidelines) must be used for the tower structures.</li> <li>» All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting 2002).</li> <li>» Installation of artificial bird space perches and nesting platforms should be installed, at a safe distance from energised components (Goudie 2006; Prinsen et al. 2012).</li> <li>» Line inspections should be ongoing for the operational life of the line.</li> </ul>	
<b>Cumulative Impacts</b>	Potentially Low.	
<b>Residual Impacts</b>	Moderate. The power line will be within the area over a long period of time if not permanent. However, if the power line is removed the impacts associated (avian mortalities) will cease.	

### Impact 3: Collisions of Birds with overhead power line

#### **Nature: Collision with the power line**

Collisions are the biggest single threat posed by transmission power lines to birds in Southern Africa (van Rooyen 2004). Avian species most susceptible and impacted upon are bustards, storks and cranes. These species are heavy-bodied birds with limited manoeuvrability (as a result of high wing loading), which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (Van Rooyen 2004, Anderson 2001). Many of the collision sensitive species are considered threatened in Southern Africa.

The Red Data species that are vulnerable to power line collisions are generally long living, slow reproducing species. Furthermore, various species require specific conditions for breeding, resulting in very few successful breeding attempts and breeding might be restricted to very small areas. Consistent high adult mortality over an extensive period could have a serious long term effects on the population.

Potential collision impacts (risk) with the proposed power line by certain species such as Kori Bustard and Secretary bird are possible. This is particularly true for the Bustards which have low manoeuvrability once in flight. All three-species mentioned have been recorded within the top ten avian species in South Africa prone to collisions with overhead power lines.

Overall, the impact assessment found this risk impacts to be of moderate to low significance. This rating is related to the number and frequency of large avifaunal species such as bustard and korhaan inhabiting or visiting the traversed habitat.

	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Low (1)	Low (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Highly Probable (4)	Probable (3)
<b>Significance</b>	<b>Moderate (44)</b>	<b>Low (27)</b>
<b>Status</b>	Negative	
<b>Reversibility</b>	Low (birds will be injured or killed)	
<b>Irreplaceable loss of resources</b>	Yes	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Mark sections of line in high sensitivity areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart, and must be installed as soon as the conductors are strung</li> <li>» These line marking devices include spiral vibration dampers, strips, Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls (Prinsen et al. 2012).</li> <li>» Construction of the power line in close proximity to the existing power line will reduce the cumulative impacts and collision risk. All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting 2002).</li> <li>» Line inspections should be ongoing for the operational life of the line.</li> </ul>	
<b>Cumulative Impacts</b>	Moderate to Low. An existing 275kV power line as well as a new 400kV line runs parallel to proposed 132kV line. Thus the construction of the associated power line will increase the length of power line and subsequent risk.	
<b>Residual Impacts</b>	Moderate. The power line will be within the area over a long period of time if not permanent. However, if the power line is removed the impacts associated (avian mortalities) will cease.	

### 3.2.2. Proposed Substation Impacts

#### Impact 1: Potential impact of habitat destruction

<b>Nature: Disturbance during Operation Phase due to maintenance activities</b>		
See description for construction disturbance impacts mentioned above		
	<b>Both Substation alternatives (Without Mitigation)</b>	<b>Both Substation alternatives (With Mitigation)</b>
<b>Extent</b>	Low (1)	Low (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (27)</b>	<b>Low (11)</b>
<b>Status</b>	Negative	
<b>Reversibility</b>	High reversibility	
<b>Irreplaceable loss of resources</b>	Only slight loss of resources	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Strict control must be maintained over all activities during operation, in line with an approved operation EMPr.</li> <li>» Vehicle movements must be restricted to existing roads and a speed limit of 30km/h must be implemented on all roads associated with the power line during the operation phase.</li> <li>» Contractors and working staff should remain within the development footprint and movement outside these areas, especially into avian micro-habitats, must be restricted.</li> </ul>	
<b>Cumulative Impacts</b>	The proposed development will be largely situated within the existing servitude of the 275kV line and subsequently the cumulative impact of the development will be low	
<b>Residual Impacts</b>	Low	

#### Impact 2: Electrocution of Birds due to substation infrastructure

<b>Nature: Electrocution of birds on substations infrastructure</b>
Since there is live hardware in the substation yard, the potential exists for birds to bridge the gap between a phase and earth resulting in electrocution. However, very few electrocutions have been recorded on substations. Species likely to be affected are crows, ravens and other species that are tolerant of disturbance. Small raptors such as Lanner Falcons are sometimes attracted into substation yards in pursuit of species nesting there such as sparrows and canaries and may be susceptible to electrocutions.

<p>The impact assessment found the impact of electrocution from substation infrastructure to be much lower of significance once mitigation in the form of bird friendly structures and bird deterrent measures have been put in place. Species likely to be affected are crows and other non-threatened species with the majority of threatened species avoiding the substation yard as they are sensitive to disturbances.</p>		
	<b>Both Substation alternatives (Without Mitigation)</b>	<b>Both Substation alternatives (With Mitigation)</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (30)</b>	<b>Low (14)</b>
<b>Status</b>	Negative	
<b>Reversibility</b>	High reversibility	
<b>Irreplaceable loss of resources</b>	Only slight loss of resources	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting, 2002).</li> <li>» Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie, 2006; Prinsen et al., 2012).</li> </ul>	
<b>Cumulative Impacts</b>	The proposed development will be largely situated within the existing servitude of the 275kV line and subsequently the cumulative impact of the development will be low	
<b>Residual Impacts</b>	Low	

### 3.3. Decommissioning Phase Impacts

#### 3.3.1. Proposed Powerline Impacts

##### Impact 1: Disturbance

<b>Nature: Disturbance during Decommissioning Phase due to maintenance activities</b>		
See description for potential disturbance during operational phase above.		
	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Probability</b>	Highly Probable (4)	Probable (3)

<b>Significance</b>	<b>Low (28)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	
<b>Reversibility</b>	High reversibility	
<b>Irreplaceable loss of resources</b>	Only a slight loss of resources	
<b>Can impacts be mitigated?</b>	Impacts can be mitigated to a large extent.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Strict control must be maintained over all activities during decommissioning, in line with an approved construction EMPr.</li> <li>» During decommissioning, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and were deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such buffer the Environmental Officer (EO) may contact an avifaunal specialist for advice.</li> <li>» The decommissioning equipment camps must be as close to the site as possible.</li> <li>» Contractors and working staff should remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted.</li> <li>» Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads associated with the project during the construction phase.</li> </ul>	
<b>Cumulative Impacts</b>	Potentially Low.	
<b>Residual Impacts</b>	Moderate. The power line will be within the area over a long period of time if not permanent. However, if the power line is removed the impacts associated (avian mortalities) will cease	

### 3.3.2. Proposed Substation Impacts

#### Impact 1: Disturbance

<b>Disturbance during Decommissioning Phase due to maintenance activities</b>		
See description for potential disturbance during operational phase above.		
	<b>Both Substation alternatives (Without Mitigation)</b>	<b>Both Substation alternatives (With Mitigation)</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Probability</b>	Highly Probable (4)	Probable (3)
<b>Significance</b>	<b>Low (28)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	



<b>Reversibility</b>	High reversibility	
<b>Irreplaceable loss of resources</b>	Only a slight loss of resources	
<b>Can impacts be mitigated?</b>	Impacts can be mitigated to a large extent.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Strict control must be maintained over all activities during decommissioning, in line with an approved construction EMPr.</li> <li>» During decommissioning, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and were deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such buffer the Environmental Officer (EO) may contact an avifaunal specialist for advice.</li> <li>» The decommissioning equipment camps must be as close to the site as possible.</li> <li>» Contractors and working staff should remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted.</li> <li>» Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads associated with the project during the construction phase.</li> </ul>	
<b>Cumulative Impacts</b>	Potentially Low.	
<b>Residual Impacts</b>	Moderate. The power line will be within the area over a long period of time if not permanent. However, if the power line is removed the impacts associated (avian mortalities) will cease	

#### 4. ASSESSMENT OF HYDROLOGICAL IMPACTS

The following direct and indirect impacts were assessed with regard to construction, operation and decommissioning impacts on the riparian areas and watercourses (As both power line options traverse, similar habitat the potential impacts will be the same for both power line options and subsequently the impact statements provided below are applicable for both power line options):

- » Impact 1: Loss of riparian systems and alluvial water courses
- » Impact 2: Potential impact on localised surface water quality
- » Impact 3: Impact on riparian systems through the possible increase in surface water runoff on riparian form and function
- » Impact 4: Increase in sedimentation and erosion

It is expected that impacts associated with the construction and decommissioning of the powerline options will be synonymous in nature, duration, extent, possibility and significance.

The existing substation is located outside of any watercourse or riparian zone and as such will not impact on the identified watercourses and riparian zones, subsequently no assessment was deemed necessary. Furthermore, the preferred substation option is located well beyond the boundaries of any watercourse and/or riparian zone and thus no impacts have been assessed for this option. Subsequently, potential impacts assessed are only applicable to the alternative substation option

#### 4.1. Construction and Decommissioning Phase Impacts

##### 4.1.1. Proposed Powerline Impacts

**Impact 1:** Loss of riparian systems and alluvial watercourses

**Nature:** The physical removal of the narrow strips of riparian zones and disturbance of any alluvial watercourses by pylon construction and road crossings, being replaced by hard engineered surfaces during construction. This biological impact would however be localised, as a large portion of the remaining catchment would remain intact

	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Minor (2)	Small (0)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (19)</b>	<b>Low (15)</b>
<b>Status</b>	Negative	Negative

<b>Reversibility</b>	High	High
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes, to a large extent	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Use as far as possible the existing service roads through the riparian zones as well as non-perennial watercourses.</li> <li>» Where watercourse crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (small footprint).</li> <li>» No vehicles to refuel within watercourses/ riparian vegetation.</li> <li>» With micro adjustments of the pylon positions, it is possible to place pylons outside of the riparian zones</li> </ul>	
<b>Cumulative Impacts</b>	Increase in surface run-off velocities, reduction in the potential for groundwater infiltration and the spread of erosion into downstream wetlands.	
<b>Residual Impacts</b>	Possible impact on the remaining catchment due to changes in run-off characteristics in the development site.	

**Impact 2:** Impact on localized surface water quality

**Nature:** During preconstruction, construction and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet concrete, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems. Appropriate ablution facilities should be provided for construction workers during construction of the power line and substation and on-site staff during the operation of the substation.

	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Moderate (6)	Minor (2)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (30)</b>	<b>Low (10)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Irreplaceable loss of resources</b>	Medium	Low
<b>Can impacts be mitigated?</b>	Yes, to a large extent.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Implement appropriate measures to ensure strict use and management of all hazardous materials used on site</li> <li>» Implement appropriate measures to ensure Strict management of potential sources of pollutants (e.g. litter</li> </ul>	

	<p>hydrocarbons from vehicles and machinery, cement during construction etc.)</p> <ul style="list-style-type: none"> <li>» Implement appropriate measures to ensure containment of all contaminated water by means of careful run-off management on the development site.</li> <li>» Implement appropriate measures to ensure strict control over the behavior of construction workers.</li> <li>» Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.</li> </ul>
<b>Cumulative Impacts</b>	None
<b>Residual Impacts</b>	Residual impacts will be negligible after appropriate mitigation.

**Impact 3:** Increase in sedimentation and erosion within the development footprint.

<b>Nature:</b> Increase in sedimentation and erosion within the development footprint. This may alter the local watercourse morphology and influence water quality downstream		
	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Very Short (1)
<b>Magnitude</b>	Low (2)	Small (0)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (21)</b>	<b>Low (4)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes, to a large extent	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Use only the existing service roads (of the 275kV power line) when crossing any watercourses.</li> <li>» Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.</li> <li>» All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.</li> <li>» Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.</li> <li>» Topsoil should be removed and stored separately and should</li> </ul>	

	<p>be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.</p> <ul style="list-style-type: none"> <li>» Where practical, phased development and vegetation clearing should be applied so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time.</li> <li>» Construction of gabions and other stabilisation features to prevent erosion, if deemed necessary.</li> <li>» There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.</li> </ul>
<b>Cumulative Impacts</b>	<p>Downstream erosion and sedimentation of the downstream systems. During flood events, any unstable banks (eroded areas) and sediment bars (sedimentation downstream) may be vulnerable to erosion. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.</p>
<b>Residual Impacts</b>	<p>Altered streambed morphology. Due to the extent and nature of the development this residual impact is unlikely to occur.</p>

#### 4.1.2. Proposed substation Impacts

##### Impact 1: Loss of riparian systems and alluvial watercourses

<b>Disturbance during Decommissioning Phase due to maintenance activities</b>		
See description for potential disturbance during operational phase above.		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Definite (5)	Highly Probable (4)
<b>Significance</b>	<b>Medium (45)</b>	<b>Medium (36)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes, to a limited extent	
<b>Mitigation</b>	» This potential impact can be avoided by selecting the preferred option as this option is located well outside of any	

	<p>watercourse and riparian boundary.</p> <ul style="list-style-type: none"> <li>» No vehicles to refuel within watercourses/ riparian vegetation.</li> <li>» Ensure the vegetation removal is minimised to an absolute minimum, restricted only to the footprint area.</li> </ul>
<b>Cumulative Impacts</b>	Potentially Low.
<b>Residual Impacts</b>	Moderate. The power line will be within the area over a long period of time if not permanent. However, if the power line is removed the impacts associated (avian mortalities) will cease

### Impact 2: Impact on localized surface water quality

**Nature:** During preconstruction, construction and to a **limited degree** the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet concrete, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems. Appropriate ablution facilities should be provided for construction workers during construction of the power line and substation and on-site staff during the operation of the substation.

	Without Mitigation	With Mitigation
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (30)</b>	<b>Low (21)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Irreplaceable loss of resources</b>	Medium	Low
<b>Can impacts be mitigated?</b>	Yes, to a large extent.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» This potential impact can be avoided by selecting the preferred option as this option is located well outside of any watercourse and riparian boundary.</li> <li>» Implement appropriate measures to ensure strict use and management of all hazardous materials used on site</li> <li>» Implement appropriate measures to ensure Strict management of potential sources of pollutants (e.g. litter hydrocarbons from vehicles and machinery, cement during construction etc.)</li> <li>» Implement appropriate measures to ensure containment of all contaminated water by means of careful run-off management on the development site.</li> <li>» Implement appropriate measures to ensure strict control over the behavior of construction workers.</li> <li>» Working protocols incorporating pollution control measures (including approved method statements by the contractor)</li> </ul>	

	should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.
<b>Cumulative Impacts</b>	None
<b>Residual Impacts</b>	Residual impacts will be negligible after appropriate mitigation.

**Impact 3:** Impact on localized surface water quality

<b>Nature:</b> Increase in sedimentation and erosion within the development footprint. This may alter the local watercourse morphology and influence water quality downstream		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Very Short (1)
<b>Magnitude</b>	Low (2)	Small (0)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (21)</b>	<b>Low (4)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes, to a large extent	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» This potential impact can be avoided by selecting the preferred option as this option is located well outside of any watercourse and riparian boundary.</li> <li>» Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.</li> <li>» All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.</li> <li>» Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.</li> <li>» Topsoil should be removed and stored separately and should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.</li> <li>» There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.</li> </ul>	
<b>Cumulative Impacts</b>	Downstream erosion and sedimentation of the downstream systems.	

	During flood events, any unstable banks (eroded areas) and sediment bars (sedimentation downstream) may be vulnerable to erosion. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.
<b>Residual Impacts</b>	Altered streambed morphology. Due to the extent and nature of the development this residual impact is unlikely to occur.

## 4.2. Construction and Decommissioning Phase Impacts

### 4.2.1. Proposed Powerline Impacts

**Impact 1:** Increase in sedimentation and erosion within the development footprint, extending throughout the operational phase.

<b>Nature:</b> This may alter the local watercourse morphology and influence water quality downstream		
	<b>Both Lines (Without Mitigation)</b>	<b>Both Lines (With Mitigation)</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (2)	Low (2)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (21)</b>	<b>Low (14)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes, to a large extent	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Use only the existing service roads (of the 275kV power line) when crossing any watercourses.</li> <li>» Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.</li> <li>» All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.</li> <li>» Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring to assess the success of the remediation.</li> <li>» Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.</li> <li>» Construction of gabions and other stabilisation features to</li> </ul>	



	<p>prevent erosion, if deemed necessary.</p> <p>» There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.</p>
<b>Cumulative Impacts</b>	<p>Downstream erosion and sedimentation of the downstream systems. During flood events, any unstable banks (eroded areas) and sediment bars (sedimentation downstream) may be vulnerable to erosion. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.</p>
<b>Residual Impacts</b>	<p>Altered streambed morphology. Due to the extent and nature of the development this residual impact is unlikely to occur.</p>

#### 4.2.2. Proposed substation Impacts

**Impact 1:** Impact of hardened surfaces and the removal of vegetation on riparian system

<p><b>Nature:</b> Impact on riparian systems during operation as a result of hard engineered surfaces and the removal of vegetation during construction. This could possibly increase the surface water runoff on riparian form and function.</p>		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (33)</b>	<b>Low (27)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes, to a large extent	
<b>Mitigation</b>	<p>» Avoid the alternative substation option as this option will impact on the riparian habitat fringing the upper reaches (within the town boundary) of the Olifantsloop River.</p> <p>» If the alternative site is selected for some reason, any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities.</p> <p>» Ensure the vegetation removal is minimised to an absolute minimum, restricted only to the footprint area.</p>	
<b>Cumulative Impacts</b>	<p>Downstream erosion and sedimentation of the downstream systems. During flood events, any unstable banks (eroded areas) and</p>	

	sediment bars (sedimentation downstream) may be vulnerable to erosion. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.
<b>Residual Impacts</b>	Altered streambed morphology. Due to the extent and nature of the development this residual impact is unlikely to occur.

## SECTION B: ASSESSMENT OF CUMULATIVE IMPACTS

This Basic Assessment includes an assessment of the cumulative impacts associated with the proposed construction of the Olifantshoek 132/11kV substation, with a 10 MVA as well as the 31km 132kV overhead powerline connecting to the Emil Switching Station.

### 1. Ecological Cumulative Impacts:

There are a number of cumulative impacts in the area, most notably the mining activity towards Kathu. These are however largely associated with the rocky hills of the area with some infrastructure such as processing plants and railway infrastructure on the plains. The power line will however contribute little to cumulative impact as the ground layer will remain intact and the loss of some trees is not considered likely to generate significant cumulative impact as trees such as *Acacia erioloba* are widespread and abundant in the area.

However, it was observed that numerous *Acacia erioloba* trees had been felled (the stumps had been chemically treated) within the servitude below the existing 275kV line, south of the Emil switching station. If the clearing of *Acacia erioloba* trees under both the new 400kV line and the proposed 132kV line is to be undertaken extensively along the entire length of the Olifantshoek servitude, this will amount to the loss of hundreds of trees. Besides the ecological consequences of such clearing, the significant amount of cut wood could also encourage illicit trade and sale in camelthorn wood

**Impact 1:** Cumulative habitat loss and impacts on broad-scale ecological processes caused by the Powerline

<b>Impact Nature:</b> The power line would contribute to cumulative habitat loss and disruptions of broad-scale ecological processes in the area, the contribution is however likely to be low.				
	<b>Preferred (Green)</b>		<b>Alternative (Purple)</b>	
	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	Local (2)	Local (1)	Local (2)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (4)	Low (3)	Medium (4)	Low (3)
<b>Probability</b>	Probable (3)	Probable (3)	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (30)</b>	<b>Low (24)</b>	<b>Low (30)</b>	<b>Low (24)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	Moderate	Moderate	Moderate
<b>Irreplaceable loss of resources</b>	No	No	No	No

<b>Can impacts be mitigated?</b>	To a large extent but some impact will remain due to clearing along the power line corridor.
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.</li> <li>» Mitigation measures of the current site should align with neighbouring sites and other developments in the area.</li> </ul>
<b>Cumulative Impacts</b>	The development will contribute to cumulative impact, but the overall contribution will be low.
<b>Residual Impacts</b>	Residual impact would be restricted to a small amount of habitat loss and occasional disturbance due to maintenance activities along the line.

**Impact 2:** Cumulative habitat loss and impacts on broad-scale ecological processes caused by the Substation

<b>Impact Nature:</b> The substation could contribute to cumulative habitat loss and disruptions of broad-scale ecological processes in the area, the contribution is however likely to be low.				
	<b>Alternative substation (Orange)</b>		<b>Preferred substation (yellow)</b>	
	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	Local (1)	Local (1)	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (3)	Long-term (4)	Long-term (3)
<b>Magnitude</b>	Low (4)	Low (2)	Low (3)	Low (2)
<b>Probability</b>	Probable (3)	Probable (3)	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (27)</b>	<b>Low (24)</b>	<b>Low (24)</b>	<b>Low (24)</b>
<b>Status</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Moderate	Moderate	Moderate	Moderate
<b>Irreplaceable loss of resources</b>	No	No	No	No
<b>Can impacts be mitigated?</b>	To a large extent but some impact will remain due to clearing of trees on the site.			
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.</li> <li>» Mitigation measures of the current site should align with neighbouring sites and other developments in the area.</li> <li>» Site A will have more cumulative impacts given the location in proximity to existing development around Olifantshoek and the potential disruption of riparian ecosystem services.</li> </ul>			
<b>Cumulative Impacts</b>	The development will contribute to cumulative impact, but the overall contribution will be low.			
<b>Residual Impacts</b>	Residual impact would be restricted to a small amount of habitat loss.			

## 2. Visual Cumulative Impacts:

The proposed overhead power line will add additional infrastructure to corridors that are already impacted by the existing 275kV and 400kV overhead power line, the road and LV electrical infrastructure close to the N14, this is likely to result in the proposed development adding slightly to the intensity of existing impacts. This is not likely to be significant and is far more preferable than creating new development areas that impact on previously undeveloped landscapes. The exception to this however is the Preferred Alignment for the power line as it is likely to be significantly closer to homes than existing facilities.

Because the proposed project will result in decommissioning of the existing Olifantshoek substation which is located close to the centre of the urban area with homes in close proximity, with sensitive development and ensuring that the old substation site is put to a use that is compatible with adjacent residential use, there is potential for the development to result in a positive cumulative impact in terms of its influence on the urban area

The cumulative impact tables below assess both power line options as well as substation options in a single impact table.

**Impact 1:** General Landscape change and degradation of natural/urban landscape characteristics

**Nature of impact:** The affected natural landscape (Lowland and Upland LCAs) is not a highly natural area as it is already impacted by existing infrastructure including a larger 400kV and 275kV overhead power line. The affected urban area is also currently affected by existing electrical infrastructure including LV cables and an existing substation. The proposed 132kV overhead power line will add marginally to the local intensity of existing impacts within the Lowland LCA. They will also extend the impact into the Upland LCA as the alignments run along the N14 towards Olifantshoek. The propose substation Alternative Location will increase the extent of electrical infrastructure that is obvious within the urban area. The Preferred Alternative 3 will largely impact the urban fringe / Upland LCA.

	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	<p><b>Both Power Line Alternatives</b> Immediate surroundings, <b>(2)</b></p> <p><b>Both Substation Alternatives</b> Immediate surroundings, <b>(2)</b></p>	<p>Immediate surroundings, <b>(2)</b></p> <p>Immediate surroundings, <b>(2)</b></p>
<b>Duration</b>	<p><b>Both Power Line Alternatives</b> Immediate surroundings, <b>(4)</b></p> <p><b>Both Substation Alternatives</b> Immediate surroundings, <b>(4)</b></p>	<p>Long term, <b>(4)</b></p> <p>Long term, <b>(4)</b></p>
<b>Magnitude</b>	<p><b>Both Power Line Alternatives</b> Minor, <b>(2)</b></p>	<p>Small, <b>(0)</b></p>

	<p><b>Alternative Substation Location</b> Low, (4)</p> <p><b>Preferred Substation Location</b> Low, (4)</p>	<p>Minor, (2)</p> <p>Minor, (2)</p>
<b>Probability</b>	<p><b>Both Power Line Alternatives</b> Probable, (3)</p> <p><b>Alternative Substation Location</b> Highly probable, (4)</p> <p><b>Preferred Substation Location</b> Probable, (3)</p>	<p>Improbable, (2)</p> <p>Probable, (3)</p> <p>Improbable, (2)</p>
<b>Significance</b>	<p><b>Both Power Line Alternatives</b> Low, (24)</p> <p><b>Alternative Substation Location</b> Medium, (40)</p> <p><b>Preferred Substation Location</b> Low / Medium, (30)</p>	<p>Low, (12)</p> <p>Low, (24)</p> <p>Low, (16)</p>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Loss of Resources?</b>	No	No
<b>Confidence in findings</b>	High	
<b>Can impacts be mitigated?</b>	Yes	
<p><b>Mitigation / Management:</b></p> <p>Planning and construction:</p> <ul style="list-style-type: none"> <li>The alignment of the proposed 132kV overhead power line as far from the N14 as possible.</li> <li>Plan and implement screening for the substation.</li> <li>Ensure that the use of the use that the decommissioned substation site is put to is consistent with residential use.</li> <li>Rehabilitate decommissioned substation site and construction disturbance.</li> </ul> <p>Operational:</p> <ul style="list-style-type: none"> <li>Maintain screen planting around substations</li> </ul> <p>Decommissioning:</p> <ul style="list-style-type: none"> <li>Remove infrastructure not required for the post-decommissioning use of the site.</li> <li>Rehabilitate disturbed areas.</li> </ul>		

**Impact 2:** Visibility of the facility to Rural Homesteads

**Nature of impact:** Four homesteads located either within or close to the eastern side of the development corridor within the Lowland LCA are at risk of impact. Developing the proposed overhead power line to the west of the existing power line (Alternative Alignment) and as close to the western edge of the development corridor as possible would largely address this issue. It is only the power line proposals that will impact on rural homesteads. The substation alternatives are

therefore not included in this section of the assessment.		
	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	<b>Both Power Line Alternatives</b> Immediate surroundings, <b>(2)</b>	Immediate surroundings, <b>(2)</b>
<b>Duration</b>	<b>Both Power Line Alternatives</b> Immediate surroundings, <b>(4)</b>	Long term, <b>(4)</b>
<b>Magnitude</b>	<b>Preferred Alignment</b> High, <b>(8)</b>	Moderate, <b>(6)</b>
	<b>Alternative Alignment</b> Low, <b>(4)</b>	Minor to low, <b>(3)</b>
<b>Probability</b>	<b>Preferred Alignment</b> Highly probable, <b>(4)</b>	Probable, <b>(3)</b>
	<b>Alternative Alignment</b> Probable, <b>(3)</b>	Improbable, <b>(2)</b>
<b>Significance</b>	<b>Preferred Alignment</b> Medium, <b>(56)</b>	Medium, <b>(36)</b>
	<b>Alternative Alignment</b> Low to medium, <b>(30)</b>	Low, <b>(18)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Loss of Resources?</b>	No	No
<b>Confidence in findings</b>	High	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation / Management:</b>		
Planning and construction: <ul style="list-style-type: none"> <li>• Both alternatives - Align power line as far from homesteads as possible within the identified corridor.</li> <li>• Preferred Alignment - Undertake deviations around the closest homesteads within the development corridor.</li> <li>• Rehabilitate disturbed areas.</li> </ul> Decommissioning: <ul style="list-style-type: none"> <li>• Remove infrastructure not required for the post-decommissioning use of the site.</li> <li>• Rehabilitate disturbed areas.</li> </ul>		

### **Impact 3:** Visibility of the facility to the N14

**Nature of impact:** Only the southernmost portion of the proposed power line alternatives will impact on the N14 as they will cross the road and run close and parallel with it for approximately 6km. They will add to the extent of infrastructure including LV power lines that are visible in the landscape. The proposed substations are also likely to be visible to the N14. The Alternative Location is away from the road but a short view will be possible of them through vegetation and buildings. This is likely to be

similar in extent to the existing substation and so cumulative impacts are likely to be low. The Preferred Location is closer to the road on the urban edge. Existing vegetation is likely to result in views of this alternative only being obvious as the viewer is close to and opposite the facility but without additional mitigation the full extent of the substation is likely to be open to view. The proposed substation will however extend the views of development as seen from the N14.

	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	<p><b>Both Power Line Alternatives</b> Immediate surroundings, <b>(2)</b></p> <p><b>Both Substation Alternatives</b> Immediate surroundings, <b>(2)</b></p>	<p>Immediate surroundings, <b>(2)</b></p> <p>Immediate surroundings, <b>(2)</b></p>
<b>Duration</b>	<p><b>Both Power Line Alternatives</b> Long term, <b>(4)</b></p> <p><b>Both Substation Alternatives</b> Long term, <b>(4)</b></p>	<p>Long term, <b>(4)</b></p> <p>Long term, <b>(4)</b></p>
<b>Magnitude</b>	<p><b>Both Power Line Alternatives</b> Low, <b>(4)</b></p> <p><b>Alternative Substation Location</b> Small, <b>(0)</b></p> <p><b>Preferred Substation Location</b> Low, <b>(4)</b></p>	<p>Low, <b>(3)</b></p> <p>Low, <b>(4)</b></p> <p>Small, <b>(0)</b></p>
<b>Probability</b>	<p><b>Both Power Line Alternatives</b> Probable, <b>(3)</b></p> <p><b>Alternative Substation Location</b> Improbable, <b>(2)</b></p> <p><b>Preferred Substation Location</b> Probable, <b>(3)</b></p>	<p>Probable, <b>(3)</b></p> <p>Improbable, <b>(2)</b></p> <p>Improbable, <b>(2)</b></p>
<b>Significance</b>	<p><b>Both Power Line Alternatives</b> Medium, <b>(36)</b></p> <p><b>Alternative Substation Location</b> Low, <b>(12)</b></p> <p><b>Preferred Substation Location</b> Low to medium, <b>(30)</b></p>	<p>Low, <b>(27)</b></p> <p>Low, <b>(12)</b></p> <p>Low, <b>(16)</b></p>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Loss of Resources?</b>	No	No
<b>Confidence in findings</b>	High	



<b>Can impacts be mitigated?</b>	Yes
<b>Mitigation / Management:</b>	
Planning and construction:	
<ul style="list-style-type: none"> <li>Both Alternative Power Line Alignments - Align power line as far from homesteads as possible within the identified corridor.</li> <li>Preferred Power Line Alignment - Undertake deviations around the closest homesteads within the development corridor.</li> <li>Rehabilitate disturbed areas.</li> </ul>	
Decommissioning:	
<ul style="list-style-type: none"> <li>Remove infrastructure not required for the post-decommissioning use of the site.</li> <li>Rehabilitate disturbed areas.</li> </ul>	

#### Impact 4: Visibility of the facility urban residential areas

<b>Nature of impact:</b>		
Only the southernmost portion of the proposed power line alternatives that are linked to the alternative substation locations will impact on urban areas. These sections are common to both alternatives. This impact will therefore be subject to the location of the substation and is therefore included as part of the assessment of the substations.		
The Alternative Substations Location is within the urban area close to existing homes. The proposed development is significantly larger than the existing facility that it will replace. It will therefore increase the cumulative impact on the residential area.		
The Preferred Substation Location is approximately 80m from and will be visible to a small number of dwellings within an existing informal settlement area on the edge of Olifantshoek. The development will also result in the removal of the existing substation from within the residential area. It is likely therefore that this alternative will result in a positive cumulative impact.		
	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	<b>Both Substation Alternatives</b> Immediate surroundings, <b>(2)</b>	Immediate surroundings, <b>(2)</b>
<b>Duration</b>	<b>Both Substation Alternatives</b> Long term, <b>(4)</b>	Long term, <b>(4)</b>
<b>Magnitude</b>	<b>Alternative Substation Location</b> Low, <b>(4)</b>	Minor to low, <b>(3)</b>
	<b>Preferred Substation Location</b> Low, <b>(4)</b>	Moderate, <b>(6)</b>
<b>Probability</b>	<b>Alternative Substation Location</b> Probable, <b>(3)</b>	Probable, <b>(3)</b>
	<b>Preferred Substation Location</b> Probable, <b>(3)</b>	Highly probable, <b>(4)</b>
<b>Significance</b>	<b>Alternatives Substation Location</b> Low to medium, <b>(30)</b>	Low, <b>(27)</b>

	<b>Preferred Substation Location</b> Low to medium, <b>(30)</b>	Medium, <b>(48)</b>
<b>Status</b>	<b>Alternatives Substation Location</b> Negative  <b>Preferred Substation Location</b> Positive	Negative  Positive
<b>Reversibility</b>	High	High
<b>Loss of Resources?</b>	No	No
<b>Confidence in findings</b>	High	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation / Management:</b> Planning and construction: <ul style="list-style-type: none"> <li>• Implement screen planting for substations.</li> <li>• Rehabilitate decommissioned substation</li> </ul> Operations: <ul style="list-style-type: none"> <li>• Maintain screen planting around substations.</li> </ul> Decommissioning: <ul style="list-style-type: none"> <li>• Remove infrastructure not required for the post-decommissioning use of the site.</li> <li>• Rehabilitate disturbed areas.</li> </ul>		

#### Impact 5: Lighting impacts

<b>Nature of impact:</b> Lighting impacts are likely to be associated with nuisance caused by light spill from substation lighting. The existing substation located close to the Alternative Substations Location already has floodlighting. The existing substation that is to be decommissioned is also located closer to existing houses than the Alternative. Because the Preferred Substation Location is outside the urban area, it is likely that positive cumulative impacts could be associated if. If planned appropriately, it is also possible that positive impacts could be associated with the Alternative Substation Location, with all alternatives if appropriate mitigation is undertaken.		
	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	<b>Both Substation Alternatives</b> Immediate surroundings, <b>(2)</b>	Immediate surroundings, <b>(2)</b>
<b>Duration</b>	<b>Both Substation Alternatives</b> Long term, <b>(4)</b>	Long term, <b>(4)</b>
<b>Magnitude</b>	<b>Alternative Substation Location</b> Small, <b>(0)</b>  <b>Preferred Substation Location</b> Small, <b>(0)</b>	Minor to low, <b>(3)</b>  Moderate, <b>(6)</b>
<b>Probability</b>	<b>Alternative Substation Location</b> Probable, <b>(3)</b>  <b>Preferred Substation Location</b>	Probable, <b>(3)</b>

	Probable, <b>(3)</b>	Probable, <b>(3)</b>
<b>Significance</b>	<b>Alternative Substation Location</b> Low, <b>(18)</b>  <b>Preferred Substation Location</b> Low, <b>(18)</b>	Low, <b>(27)</b>  Medium, <b>(36)</b>
<b>Status</b>	<b>Alternative Substation Location</b> Negative  <b>Preferred Substation Location</b> Positive	Positive  Positive
<b>Reversibility</b>	High	High
<b>Loss of Resources?</b>	No	No
<b>Confidence in findings</b>	Medium	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation / Management:</b>		
Planning and construction: <ul style="list-style-type: none"> <li>• Plan to motion sensor triggered lighting;</li> <li>• Ensure that lighting is focused on the development with no light spillage outside the site.</li> </ul>		

### 3. Avifaunal Cumulative Impacts:

#### Power Line Options

From an avifaunal perspective both power line options will have similar potential impact on the avifaunal character of the study area as these power lines traverse very similar habitat types. The impacts for both options are mostly regarded as low and the collective impact of both power line options on the avifaunal character can be regarded as low. As such both options can be considered in the final layout.

#### Substation Options

Regarding the substation options the situation is slightly different than for the power line options, with the preferred option being the favourable of the two options. The preferred option will be constructed within a habitat type largely consistent with that which will be traversed by the proposed power line options and as such impacts will be contained in fewer habitat types, impacting on a potential lower number of avifaunal species.

### Impact 1: Habitat Destruction

The proposed development will be largely situated within the existing servitude of the 275kV & 400kV lines and subsequently the cumulative impact of the development will be low.

Minimal additional destruction and alteration of habitats will occur, cumulative and thus, will also have limited impact on foraging, breeding and roosting ecology of avian species.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (3)	Small (0)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (24)</b>	<b>Low (10)</b>
<b>Status</b>	Neutral to Slightly Negative	Neutral to Slightly Negative
<b>Reversibility</b>	High	
<b>Irreplaceable loss of resources</b>	Very limited loss of resources	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The temporal and spatial footprint of the development should be kept to a minimum.</li> <li>» The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.</li> <li>» Provide adequate briefing for site personnel on the possible important (Red Data) species occurring and/or nesting in the area and the procedures to be followed (for example notification of ECO and avoidance of area until appropriate recommendations has been provided by ECO).</li> </ul> <p>The above measures must be covered in a site specific EMP and monitored by an ECO.</p>	
<b>Residual Impacts</b>	Low	

### Impact 2: Disturbance

the existing servitude of the 275kV & 400kV lines and subsequently the cumulative impact of the development will be low. Minimal additional disturbance of avifaunal species will occur and will have very little impact on sensitive ground-nesting species, cumulative, as well as on the community structure of avifauna of the region.

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
<b>Extent</b>	Local (1)	Local (1)

<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Minor (3)	Minor (2)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (24)</b>	<b>Low (14)</b>
<b>Status</b>	Neutral to Slightly Negative	
<b>Reversibility</b>	High	
<b>Irreplaceable loss of resources</b>	Very limited loss of resources	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» Strict control must be maintained over all activities associated with the development, in line with an approved EMPr.</li> <li>» During all phases associated with the development, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and were deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such buffer the Environmental Officer (EO) may contact an avifaunal specialist for advice.</li> <li>» The equipment camps must be as close to the site as possible.</li> <li>» Contractors and working staff should remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted.</li> <li>» Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads associated with the project during the construction phase.</li> </ul>	
<b>Residual Impacts</b>	Low	

### Impact 3: Electrocution of Birds due to substation infrastructure

Potential cumulative impacts are regarded as low and no additional potential deaths of avifaunal species (including Red Data) species will occur as this substation will not increase the threat, but will replace the existing power station and subsequently will only replace the threat. As such the power station, will not contribute to cumulative impacts.

	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Minor (2)	Small (0)
<b>Probability</b>	Slightly Probable (2)	Improbable (2)

<b>Significance</b>	<b>Low (16)</b>	<b>Low (10)</b>
<b>Status</b>	Neutral	
<b>Reversibility</b>	High	
<b>Irreplaceable loss of resources</b>	No additional loss of resources expected	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting, 2002).</li> </ul> Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie, 2006; Prinsen et al., 2012).	
<b>Residual Impacts</b>	None	

**Impact 4:** Electrocution of birds due to overhead power lines

The proposed power line is to be routed within the existing 275kV power line's servitude (as well as 400kV power line). As such, the additional line will not likely exponentially increase the risk of avian electrocutions as this risk already occurs.

	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (3)	Small (0)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (27)</b>	<b>Low (10)</b>
<b>Status</b>	Neutral	
<b>Reversibility</b>	High	
<b>Irreplaceable loss of resources</b>	No additional loss of resources expected	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» A "Bird Friendly" structure, with a bird perch (as per standard Eskom guidelines) must be used for the tower structures.</li> <li>» All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting 2002).</li> <li>» Installation of artificial bird space perches and nesting platforms should be installed, at a safe distance from energised components (Goudie 2006; Prinsen et al. 2012).</li> <li>» Line inspections should be ongoing for the operational life of the line.</li> </ul>	

<b>Residual Impacts</b>	None
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**Impact 5:** Collisions of Birds with overhead powerline

Potentially Low. The risk of birds colliding with the overhead power lines is not expected to exponentially increase as a result of this development as the proposed power line runs parallel to and in close proximity to the existing 275kV line as well as the new 400kV line and therefore will not pose an altogether new risk to avifauna in the area.

	<b>Cumulative Contribution of Proposed Project</b>	<b>Cumulative Impact without Proposed Project</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Low (24)</b>	<b>Low (14)</b>
<b>Status</b>	Negative	Neutral to Slightly Negative
<b>Reversibility</b>	High	
<b>Irreplaceable loss of resources</b>	No additional loss of resources expected	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>Mark sections of line in high sensitivity areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart, and must be installed as soon as the conductors are strung</li> <li>These line marking devices include spiral vibration dampers, strips, Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls (Prinsen et al. 2012).</li> <li>Construction of the power line in close proximity to the existing power line will reduce the cumulative impacts and collision risk. All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting 2002).</li> <li>Line inspections should be ongoing for the operational life of the line.</li> </ul>	
<b>Residual Impacts</b>	None	

#### 4. Hydrological Cumulative Impacts:

**Impact 1:** Compromise ecological processes as well as ecological functioning of important habitats

Transformation of intact habitat could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potentially disruption of habitat connectivity and furthermore impair their ability to respond to environmental fluctuations. This is especially of relevance for larger watercourses and wetlands serving as important groundwater recharge and floodwater attenuation zones, important microhabitats for various organisms and important corridor zones for faunal movement (mostly located downstream, outside of study area and associated mainly with Kuruman River).

	Cumulative Contribution of Proposed Project	Cumulative Impact without Proposed Project
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long Term (4)	Long Term (4)
<b>Magnitude</b>	Small (1)	Small (1)
<b>Probability</b>	Highly Improbable (1)	Highly Improbable (1)
<b>Significance</b>	<b>Low (6)</b>	<b>Low (6)</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.</li> <li>» Use existing service roads when crossing the watercourses.</li> <li>» Avoid placing pylons within the boundaries of the watercourses.</li> <li>» Avoid any activities within the depression wetlands.</li> <li>» Avoid clearing the fringing shrubby vegetation associated with the depression wetlands.</li> </ul>	



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## OVERALL CONCLUSION REGARDING THE POWER LINE

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From the specialist studies undertaken and the assessment by the EAP, the preferred options for the proposed Project are considered to be acceptable from an environmental perspective. The proposed power line corridor and facility substation locations are also considered technically and financially feasible based on detailed design and discussions with Eskom. Based on the findings of the studies undertaken, in terms of environmental constraints and opportunities identified through the Environmental Basic Assessment process, no environmental fatal flaws were identified to be associated with the construction of the proposed power line and substation facility. Impacts are expected to be **low** to Low-Moderate after the implementation of appropriate mitigation and it is recommended that the proposed development can therefore be implemented. With reference to the information available at this planning approval stage in the project cycle, the confidence in the environmental assessment undertaken is regarded as acceptable.