

# **APPENDIX F**

## **Impact Assessment**

The impacts are assessed (rated) in terms of their significance (high, medium, low), status and confidence through a synthesis of the criteria in the table below. The criteria in the impact table is represented by the abbreviations for each criteria presented in brackets and bold italics.

**Table 1: Criteria used to determine the significance ratings**

CRITERIA	DESCRIPTION
<p><b>Spatial extent</b></p>	<p>The extent of impacts describes the region in which the impact will be experienced:</p> <ul style="list-style-type: none"> <li>• <b>Footprint:</b> The impacted area extends only as far as the activity, such as footprint occurring within the total site area.</li> <li>• <b>Site:</b> The impact could affect the whole, or a significant portion of the site.</li> <li>• <b>Regional:</b> The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.</li> <li>• <b>National:</b> The impact could have an effect that expands throughout the country (South Africa).</li> <li>• <b>International:</b> Where the impact has international ramifications that extend beyond the boundaries of South Africa.</li> </ul>
<p><b>Duration</b></p>	<p>The duration is the timeframe in which the impact will be experienced, measured in relation to the lifetime of the proposed development.</p> <ul style="list-style-type: none"> <li>• <b>Short term:</b> The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.</li> <li>• <b>Short to Medium term:</b> The impact will be relevant through to the end of a construction phase.</li> <li>• <b>Medium term:</b> The impact will last up to the end of the development phases, where after it will be entirely negated.</li> <li>• <b>Long term:</b> The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.</li> <li>• <b>Permanent:</b> This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.</li> </ul>
<p><b>Intensity or Magnitude of impact</b></p>	<p>The intensity describes the magnitude or size of the impact in whether it is destructive, destroys the impacted environment, alters the functioning or slightly alters the environment itself. The intensity is rated as:</p> <ul style="list-style-type: none"> <li>• <b>Low:</b> The impact alters the affected environment in such a way that the natural processes or functions are not affected.</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>Medium:</b> The affected environment is altered, but functions and processes continue, albeit in a modified way.</li> <li>• <b>High:</b> Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.</li> </ul>
<p><b>Probability</b></p>	<p>The probability of the impact occurring describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time. The classes are rated as follows:</p> <ul style="list-style-type: none"> <li>• <b>Improbable:</b> The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).</li> <li>• <b>Possible:</b> The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.</li> <li>• <b>Likely:</b> There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.</li> <li>• <b>Highly Likely:</b> It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.</li> <li>• <b>Definite:</b> The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.</li> </ul>
<p><b>Status</b></p>	<p>The status is the overall effect on the environment:</p> <ul style="list-style-type: none"> <li>• <b>Positive</b> - a 'benefit'</li> <li>• <b>Negative</b> - a 'cost'</li> <li>• <b>Neutral</b></li> </ul>
<p><b>Confidence</b></p>	<p>The degree of confidence in predictions based on available information and specialist knowledge:</p> <ul style="list-style-type: none"> <li>• Low, (<i>L</i>)</li> <li>• Medium, (<i>M</i>)</li> <li>• High, (<i>H</i>)</li> </ul>

**Table 2: Impact Identification and Assessment Methods**

CRITERIA	DESCRIPTION
<p><b>Mitigation</b></p>	<p>The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.</p>
<p><b>Determination of significance – without mitigation</b></p>	<p>Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance is rated on the following scale:</p> <ul style="list-style-type: none"> <li>• <b>No significance:</b> The impact is not substantial and does not require any mitigation action.</li> <li>• <b>Low:</b> The impact is of little importance, but may require limited mitigation.</li> <li>• <b>Medium:</b> The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.</li> <li>• <b>High:</b> The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.</li> </ul>
<p><b>Determination of Significance – With Mitigation</b></p>	<p>Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:</p> <ul style="list-style-type: none"> <li>• <b>No significance:</b> The impact will be mitigated to the point where it is regarded as insubstantial.</li> <li>• <b>Low:</b> The impact will be mitigated to the point where it is of limited importance.</li> <li>• <b>Low to medium:</b> The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.</li> <li>• <b>Medium:</b> Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.</li> <li>• <b>Medium to high:</b> The impact is of major importance but through the implementation of the</li> </ul>

	<p>correct mitigation measures, the negative impacts will be reduced to acceptable levels.</p> <ul style="list-style-type: none"> <li>• <b>High:</b> The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.</li> </ul>
<b>Assessment Weighting</b>	Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it was necessary to weigh and rank all the criteria.
<b>Ranking, Weighting and Scaling</b>	For each impact under scrutiny, a scaled weighting factor is attached to each respective impact ( <b>Error! Reference source not found.</b> ). The purpose of assigning such weights serve to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance.

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2	Low to medium 2	Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4	High 4	Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

**Figure 1: Description of biophysical assessment parameters with its respective weighting**

<b>Identifying the Potential Impacts without Mitigation Measures (WOM)</b>	<p>Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).</p> <p><b>Equation 1:</b>  <b>Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor</b></p>
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<p><b>Identifying the Potential Impacts with Mitigation Measures (WM)</b></p>	<p>In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it was necessary to re-evaluate the impact.</p>
<p><b>Mitigation Efficiency (ME)</b></p>	<p>The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.</p> <p>Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.</p> <p><b>Equation 2:</b>  <b>Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency.</b>  <b>or WM = WOM x ME</b></p>
<p><b>Significance Following Mitigation (SFM)</b></p>	<p>The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.</p>

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

### Alternative 1: Zandkopsdrift 132kV Powerline route

#### CONSTRUCTION PHASE

**Direct impacts:**

1. Increased soil erosion:

<i>Activity</i>	<b>Removal of vegetation along the servitude route / at the substation and switching station sites</b>	
<i>Nature of the impact</i>	<b>Increased storm water run-off and thus a potential increase in soil erosion</b>	Status -
<i>Receiving environment</i>	<b>Direct environment surrounding the route and substations/switching stations</b>	
<i>Magnitude</i>	<i>Extent</i>	Site
	<i>Intensity</i>	Medium
	<i>Duration</i>	Short to medium
	<i>Probability</i>	Definite
<i>Significance</i>	<i>Without mitigation (WOM)</i>	<i>(Extent + Intensity + Duration + Probability) x Weighting Factor</i> $(2 + 3 + 2 + 5) \times 2 = 24$ Low to Medium
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $24 \times 0.4 = 9.6$ Low
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>	
<i>Irreversibility</i>	Low	
<i>Impact on Irreplaceable resources</i>	NO	
<i>Confidence level</i>	Medium	

Source and Description of the Impact

The increased storm water run-off is a result of the removal of vegetation along the route servitudes and substation/switching stations sites may potentially lead to an increase in soil erosion. Soil erosion is further exacerbated by poor design of infrastructure, such as road or track construction, and unmanaged activities such as improper/undisciplined use of construction vehicles.

Mitigation Measures

- Undertake vegetation clearing during the dry season;
- Only clear vegetation where absolutely necessary; and
- Stockpile areas will be decided and approved by the Project Manager and appointed ECO before construction commences on site and should not be located within drainage lines.

Significance of the impact

The extent of the impact is rated as site specific as the removal of vegetation for this impact will only occur along the proposed servitude routes and on the whole of portion of the proposed construction sites. The intensity is rated as short – medium term as the affected environment is altered, but functions and processes will be able to continue albeit in a modified way. The duration of the impact is rated as permanent as the servitude route will continue to be there for use even after the project is completed. These servitude routes will be used for regular planned inspections and servicing of the powerline on an on-going basis. The probability of the impact occurring is rated as definite as vegetation will definitely be removed along the proposed servitude routes during the construction phase. Therefore the significance of the impact prior to any mitigation measures is rated as Low - Medium. The mitigation efficiency is rated as Medium - High resulting in the impact significance after mitigation as Low.

2. Surface Water Contamination and degradation:

<i>Activity</i>	<b>Oil and fuel leaks from construction vehicles</b>	
<i>Nature of the impact</i>	<b>Surface water quality deteriorates as it has been compromised</b>	Status <b>-</b>
<i>Receiving environment</i>	<b>Affected Watercourses where the powerline is proposed to span over</b>	
<i>Magnitude</i>	<i>Extent</i>	Site
	<i>Intensity</i>	Medium
	<i>Duration</i>	Short to medium
	<i>Probability</i>	Likely
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 3 + 2 + 3) \times 5 = 25$ Low to Medium
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $25 \times 0.6 = 15$ Low
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>	
<i>Irreversibility</i>	Low	
<i>Impact on Irreplaceable resources</i>	NO	
<i>Confidence level</i>	Medium	

### Source and Description of the Impact

When oil and fuel leaks occur from transportation and construction vehicles as well as accidental spills, they may come into contact with surface water and it will compromise the quality of the water, hence cause it to deteriorate.

### Mitigation Measures

- All construction vehicles should be kept in good working condition;
- All construction vehicles should be parked in demarcated areas when not in use, and the soil in this area should be rehabilitated (if required);
- Drip trays should be placed under construction vehicles when not in use; to collect any spillages/leaks;
- Construction activities associated with the establishment access roads through wetlands or drainage lines (if unavoidable) should be restricted to a working area 10 m in width either side of the road, and these working areas should be clearly demarcated. No vehicles, machinery, personnel, construction material, cement, fuel, oil or waste should be allowed outside of the demarcated working areas;
- No fuel storage, refuelling, vehicle maintenance or vehicle depots should be allowed within 30 m of the edge of any wetlands or drainage lines;
- Refuelling and fuel storage areas, and areas used for the servicing or parking of vehicles and machinery, should be located on impervious bases and should have bunds around them. Bunds should be sufficiently high to ensure that all the fuel kept in the area will be captured in the event of a major spillage;
- Vehicles and machinery should not be washed within 30 m of the edge of any wetland or drainage line;
- No effluents or polluted water should be allowed to discharge into any drainage lines or wetland areas;
- If construction areas are to be pumped of water (e.g. after rains), this water should be pumped into an appropriate settlement area, and not allowed to flow straight into any drainage lines or wetland areas;
- Freshwater ecosystems located in close proximity to construction areas (i.e. within ~30 m) should be inspected on a regular basis by the ECO for signs of disturbance from construction activities, and for signs of sedimentation or pollution. If signs of disturbance, sedimentation or pollution are noted, immediate action should be taken to remedy the situation and, if necessary, a freshwater ecologist should be consulted for advice on the most suitable remediation measures;
- The construction footprint along the watercourse must be limited to as small a footprint as possible; and
- If a hydrocarbon spillage occurs, clean it up immediately and dispose of at an appropriate registered landfill site.

### Significance of the impact

The extent of the impact is rated as regional as the impact could affect the area including the neighbouring farms and surrounding communities nearby. The intensity is rated as medium due to the affected environment being altered, but functions and processes will be able to continue, albeit in a modified way. The impact will only last up until the end of the construction period, hence the duration is rated as short - medium term. It is likely that the impact will occur and the significance rating before mitigation measures is therefore rated to be medium. The mitigation efficiency is rated as medium and therefore results in the significance after mitigation measures

being rated as low.

**3. Degradation of watercourses:**

<i>Activity</i>	<b>Construction of the proposed powerline and associated infrastructure</b>		
<i>Nature of the impact</i>	<b>Construction activities within the watercourse and drainage lines will cause degradation</b>	Status	-
<i>Receiving environment</i>	<b>Affected Watercourses where the phylon structures will be located within</b>		
<i>Magnitude</i>	<i>Extent</i>	Site	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Short to Medium	
	<i>Probability</i>	Highly Likely	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 3 + 2 + 4) \times 5 = 55$ Medium	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $55 \times 0.6 = 33$ Low – Medium	
<i>Significance With Mitigation (WM)</i>	<b>LOW – MEDIUM</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	Medium		

Source and Description of the Impact

The study area is in an arid area and the soils are mostly deep and sandy. There are few surface wetlands, but various watercourses occur in the study area, including tributaries of the, Sout River. It is possible that there may be underground movement of water through the sandy soils, but this is not evident from surface patterns. Impacts on watercourses and drainage areas are therefore potentially of concern for the current project. The proposed powerline crosses drainage lines and/or watercourses in various places. The main impact of the powerline is due to construction of the phylon structures, each of which occupies only a very small local. The phylon structures however can be positioned to avoid drainage lines and watercourses. It is also probable that service and access roads will cross various watercourses, unless existing roads and tracks can be used.

Mitigation Measures

- Ensure that phylon structures are kept a minimum of 50m outside of the outer edge of any watercourse or drainage line
- Use existing access roads as far as possible;
- Construction impacts must be contained within the servitude of the powerline;
- No mixing of cement/concrete should take place within 30m of aquatic features;

- All wetlands and drainage lines should generally be treated as “no-go” areas and appropriately demarcated as such. No vehicles, machinery, personnel, construction materials, cement, fuel, oil or waste should be allowed into these areas without the express permission of and supervision by the ECO;
- Construction activities associated with the establishment access roads through wetlands or drainage lines (if unavoidable) should be restricted to a working area 10 m in width either side of the road, and these working areas should be clearly demarcated. No vehicles, machinery, personnel, construction material, cement, fuel, oil or waste should be allowed outside of the demarcated working areas;
- Construction camps, toilets and temporary laydown areas should be located at least 30 m from the edge of any wetlands and drainage lines;
- No fuel storage, refuelling, vehicle maintenance or vehicle depots should be allowed within 30 m of the edge of any wetlands or drainage lines;
- Refuelling and fuel storage areas, and areas used for the servicing or parking of vehicles and machinery, should be located on impervious bases and should have bunds around them. Bunds should be sufficiently high to ensure that all the fuel kept in the area will be captured in the event of a major spillage;
- Vehicles and machinery should not be washed within 30 m of the edge of any wetland or drainage line;
- No effluents or polluted water should be allowed to discharge into any drainage lines or wetland areas;
- If construction areas are to be pumped of water (e.g. after rains), this water should be pumped into an appropriate settlement area, and not allowed to flow straight into any drainage lines or wetland areas;
- No spoil material, including stripped topsoil, should be temporarily stockpiled within 30 m of the edge of any wetland or drainage line;
- Freshwater ecosystems located in close proximity to construction areas (i.e. within ~30 m) should be inspected on a regular basis by the ECO for signs of disturbance from construction activities, and for signs of sedimentation or pollution. If signs of disturbance, sedimentation or pollution are noted, immediate action should be taken to remedy the situation and, if necessary, a freshwater ecologist should be consulted for advice on the most suitable remediation measures;
- Workers should be made aware of the importance of not destroying or damaging the vegetation along drainage lines and in wetland areas, of not undertaking activities that could result in the pollution of drainage lines or wetlands, and of not killing or harming any animals that they encounter. This awareness should be promoted throughout the construction phase (and decommissioning phase, if this takes place);
- Ensure that unnecessary impacts on watercourse do not occur; and
- Proper erosion control structures must be constructed

#### Significance of the impact

The extent of the impact is rated as regional as the impact could affect the area including the neighbouring farms and surrounding communities nearby. The intensity is rated as medium due to the affected environment being altered, but functions and processes will be able to continue, albeit in a modified way. The impact will only last up until the end of the construction period, hence the duration is rated as short - medium term. It is highly likely that the impact will occur and the significance rating before mitigation measures is therefore rated to be medium. The mitigation efficiency is rated as medium and therefore results in the significance after mitigation

measures having taken place being rated as low - medium.

**4. Floral destruction and faunal displacement:**

<i>Activity</i>	<b>Vegetation clearance taking place along the proposed powerline routes, servitude routes as well as on the proposed construction sites for the substations/switching station.</b>		
<i>Nature of the impact</i>	<b>Flora destruction and Faunal displacement as well as, injured and killed due to bush and vegetation clearing activities taking place during the construction phase</b>	Status	-
<i>Receiving environment</i>	<b>Flora and Fauna of the area</b>		
<i>Magnitude</i>	<i>Extent</i>	Site	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Short to Medium	
	<i>Probability</i>	Definite	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 3 + 2 + 5) \times 3 = 36$ Low to Medium	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $36 \times 0.4 = 14.4$ Low	
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	Medium		

Source and Description of the Impact

The bush and vegetation clearing activities may result in flora destruction and faunal species being displaced, disturbed, injured or killed due to loss of their habitats. The Grant's golden Mole, White-tailed Rat and Namaqua Planted Lizard animal species of conservation concern could potentially occur on site and may therefore be of concern for development within the study area.

Mitigation Measures

- Construction impacts must be contained within the footprint of the pylon structures and / or the servitude routes of the powerline;
- Ensure that unnecessary impacts on natural vegetation do not occur;
- Use existing access roads as far as possible;
- Undertake a targeted survey for the Grant's Golden Mole in identifying a potentially suitable

habitat during a site walk through prior to construction;

- Vegetation clearance should be conducted systematically from the start to the end of the route to allow fauna to move away;
- Avoid strip clearing;
- Vegetation should be removed only where construction is to take place;
- Sequential construction should occur in order to allow faunal species to move away from the area of disturbance;
- Construction activities should be restricted to daylight hours when the majority of faunal species are inactive; and
- No animals may be snared, captured or wilfully damaged or killed.

Significance of the impact

The extent of the impact is rated as site specific as faunal displacement, disturbance, injury or death will only occur on the proposed site and along the identified proposed powerline routes. The intensity is rated as medium as the affected environment is altered, but functions and processes continue albeit in a modified way. The duration of the impact is rated as short - medium term as the impact will cease after the construction phase. The probability of the impact occurring is rated as definite as bush-clearing will definitely be taking place during the construction phase. Therefore the significance of the impact prior to any mitigation measures is rated as Low to Medium. The mitigation efficiency is rated as medium - high resulting in the impact significance after mitigation as Low.

5. Increased Noise Generation:

<i>Activity</i>	<b>Construction activities and the movement of construction vehicles</b>		
<i>Nature of the impact</i>	<b>Increased noise pollution during construction</b>	Status	-
<i>Receiving environment</i>	<b>Surrounding environment and land owners</b>		
<i>Magnitude</i>	<i>Extent</i>	Regional	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Short - Medium term	
	<i>Probability</i>	Highly Likely	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(3 + 3 + 2 + 4) \times 2 = 24$ Low to Medium	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $24 \times 0.6 = 14.4$ Low	
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	Medium		

Source and Description of the Impact

Construction activities and the movement of construction vehicles moving in and out of the proposed site will cause increased noise within the area during the construction phase. The presence of construction workers will also most likely contribute to the increased amount of noise levels. Increased disturbance of aquatic and semi-aquatic fauna will occur as a result of the noise from construction teams and their machinery working within or in close proximity to wetlands and rivers.

Mitigation Measures

- Construction time must be restricted to working hours (07:00-17:00) Monday to Friday excluding public holidays (unless prior permission is obtained from the landowners);
- All noise and sounds generated during the proposed activity must comply with the relevant SANS codes and standards;
- All construction equipment or machinery should be switched off when not in use;
- Construction equipment must be kept in good working condition;
- Plant and vehicles must be in good working order and inspected daily; and
- Use silencers on all equipment, where appropriate.

Significance of the impact

The extent of the impact is rated as regional as the impact could affect the area including the neighbouring farms, transport routes and adjoining towns. The intensity of the impact is medium as the affected environment is altered, but functions and processes will continue, albeit in a modified way. The duration of the impact is rated as short – medium term as the impact will last up to the end of the construction phase. It is most likely that the impact will occur at some stage of the development; hence the probability of the impact is rated as highly likely. Therefore the significance of the impact prior to mitigation measures is rated as low - medium. The mitigation efficiency is rated as medium resulting in the impact significance after mitigation measures remaining rated as low.

6: Increased Dust Generation:

<b>Activity</b>	<b>The clearing of vegetation, construction activities and earthworks</b>		
<b>Nature of the impact</b>	<b>Increased dust pollution during construction activities</b>	Status	-
<b>Receiving environment</b>	<b>Surrounding land owners and workers on site</b>		
<b>Magnitude</b>	<i>Extent</i>	Regional	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Short - Medium term	
	<i>Probability</i>	Highly likely	
<b>Significance</b>	<i>Without mitigation (WOM)</i>	<i>(Extent + Intensity + Duration + Probability) x Weighting Factor</i> $(3 + 2 + 2 + 4) \times 2 = 22$ Low to Medium	
	<i>With</i>	$WOM \times ME = WM$	

	<i>mitigation (WM)</i>	22 x 0.4 = 8.8 Low
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>	
<i>Irreversibility</i>	Low	
<i>Impact on Irreplaceable resources</i>	NO	
<i>Confidence level</i>	Medium	

Source and Description of the Impact

Construction activities and more specifically, the clearing of vegetation will result in increased dust generation within the area, also affecting the neighbouring farms, transport routes and the adjoining towns. This could cause health effects to workers who have respiratory diseases and eye problems.

Mitigation Measures

- Apply appropriate dust suppression methods;
- No potable water may be used for dust suppression (as far as is practically possible). Alternative dust suppression methods (such as shade cloths) must be used instead;
- Water to be used sparingly and only where no water restrictions are in effect;
- Water to be sourced from an approved supplier;
- The option to use grey water should be investigated prior to construction;
- The soil must be dampened with water during/ after vegetation removal (where practical);
- The clearing of vegetation must be kept to the minimal; and
- Avoid unnecessary movement of construction vehicles on site.

Significance of the impact

The extent of the impact is rated as regional as the impact could affect neighbouring farms, transport routes and adjoining towns. The intensity is rated as medium as the affected environment is altered, but functions and processes will continue to take place, albeit in a modified way. The impact will last up to the end of the construction phase and the duration of the impact is therefore rated as short – medium term. The probability of the impact is rated as highly likely as the impact will occur at some stage of the development. Therefore the significance of the impact before mitigation measures is rated as low – medium. The mitigation efficiency is rated as medium – high, hence the significance after mitigation measures is rated as low.

7. Increased occurrence of fires:

<i>Activity</i>	<b>The increased occurrence of fires</b>	
<i>Nature of the impact</i>	<b>Floral destruction and faunal displacement and injury due to unmanaged occurrence of fires and its increased severity due to human interference</b>	Status -
<i>Receiving environment</i>	<b>Landowners, surrounding communities, Flora and fauna of the area</b>	

<i>Magnitude</i>	<i>Extent</i>	Regional
	<i>Intensity</i>	Medium
	<i>Duration</i>	Medium term
	<i>Probability</i>	Possible
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(3 + 3 + 3 + 2) \times 3 = 33$ Low to Medium
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $33 \times 0.4 = 13.2$ Low
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>	
<i>Irreversibility</i>	Low	
<i>Impact on Irreplaceable resources</i>	NO	
<i>Confidence level</i>	Medium	

Source and Description of the Impact

The defective management or negligence on site during the course of the project may result in unplanned and unmanageable fires occurring in the affected area, which may spread to impact on the neighbouring farms and surrounding communities.

Mitigation Measures

- Employ a fire officer for on-site control;
- Fire fighting equipment to be kept on site and serviced regularly; and
- No fires to be lit on site and smoking to occur in designated areas only.

Significance of the impact

The extent of the impact is rated as Regional as the fires occurring on site have the potential to spread further if the fire itself is not controlled and contained. The impact could affect the whole, or a significant portion of the site as well as the surrounding environment. The intensity is rated as medium as the affected environment is altered, but functions and processes will continue albeit in a modified way. The duration of the impact is rated as medium term as the impact will cease after the development phase. The probability of the impact occurring is rated as possible as fires on site is prone to occur when staff on site is not properly educated and managed as well as proper mitigation measures not being in place. Therefore the significance of the impact prior to any mitigation measures is rated as Low to Medium. The mitigation efficiency is rated as Medium to High resulting in the impact significance after mitigation being Low

8. Increased damage to farm roads:

<i>Activity</i>	<b>Continued travelling of vehicles on minor and gravel roads by land</b>
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	surveyors, engineers and Eskom staff during route and site investigations as well as during landowner negotiations	
Nature of the impact	Minor damage to the roads in the study area	Status -
Receiving environment	Direct environment where the roads are located	
Magnitude	Extent	Footprint
	Intensity	Low
	Duration	Short to medium term
	Probability	Definite
Significance	Without mitigation (WOM)	(Extent + Intensity + Duration + Probability) x Weighting Factor (1 + 1 + 2 + 5) x 2 = 18 Low
	With mitigation (WM)	WOM x ME = WM 18 x 0.6 = 10.8 Low
Significance With Mitigation (WM)	<b>LOW</b>	
Irreversibility	Low	
Impact on Irreplaceable resources	NO	
Confidence level	Medium	

#### Source and Description of the Impact

Damage to the roads in the study area could potentially result from continued travelling of vehicles on minor and gravel roads by the contractors, engineers and Eskom staff during the construction phase of the project. It is unlikely that the damage to the roads will occur or be noticeable over the short - medium term.

#### Mitigation Measures

- Limit construction vehicles to 20km/h on access roads and keep to the speed limit on public roads; and
- Regular monitoring of roads for damage must be undertaken, followed by immediate repair of any damage resulting from use of heavy machinery.

#### Significance of the impact

The extent of the impact is rated as footprint specific as minor and gravel road destruction will only occur on the existing footprint of the existing roads. The intensity is rated as low as the affected environment is altered, but the impact that it has on the surrounding environment poses to be of little importance. The impact alters the affected environment in such a way that the natural processes or functions are not affected and will continue to take place in an unmodified way as the damage to the roads during this impact will not be noticeable over the short - medium term that it is deemed to take place for. The duration of the impact is rated as Short to Medium

term as the impact will cease after the development phase. The probability of the impact occurring is rated as definite as minor and gravel roads will definitely be used during the construction phase. Therefore the significance of the impact prior to any mitigation measures is rated as low. The mitigation efficiency is rated as Medium resulting in the impact significance after mitigation remaining as Low

9. Increase in traffic volumes and associated congestion:

Activity	Transportation and construction vehicles travelling to and from the construction site		
Nature of the impact	Increased traffic congestion	Status	-
Receiving environment	Land owners and the surrounding community		
Magnitude	Extent	Regional	
	Intensity	Low	
	Duration	Medium term	
	Probability	Likely	
Significance	Without mitigation (WOM)	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(3 + 1 + 3 + 3) \times 1 = 10$ Low	
	With mitigation (WM)	$WOM \times ME = WM$ $10 \times 0.8 = 8$ Low	
Significance With Mitigation (WM)	<b>LOW</b>		
Irreversibility	Low		
Impact on Irreplaceable resources	NO		
Confidence level	Medium		

Source and Description of the Impact

Traffic volumes are likely to increase during the construction period due to the movement of transportation and construction vehicles to and from the construction site.

Mitigation Measures

- Limit construction vehicle movement during peak periods.

Significance of the impact

The extent of the impact is rated as regional as the impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns. The intensity is rated as Low seeing that the impact alters the affected environment in such a way that the natural processes or functions are not affected. The impact will continue or last for the entire lifetime of the development, but will be mitigated by direct human actions; hence the duration is rated as

medium term. It is likely that the impact will occur and therefore the significance rating before mitigation measures is Low. The mitigation efficiency is rated as Low - Medium and therefore results in the significance after the mitigation measures still rated as low.

**10. Change in visual aesthetics:**

<i>Activity</i>	<b>Construction activities, placement of construction equipment and disposal of construction waste material</b>		
<i>Nature of the impact</i>	<b>The construction phase presents an unpleasant view</b>	Status	-
<i>Receiving environment</i>	<b>Surrounding land owners and communities</b>		
<i>Magnitude</i>	<i>Extent</i>	Regional	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Medium term	
	<i>Probability</i>	Likely	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(3 + 3 + 3 + 3) \times 1 = 12$ Low	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $12 \times 0.8 = 9.6$ Low	
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	Medium		

Source and Description of the Impact

Negative impacts on the visual aesthetics of the surrounding environment can occur when construction sites close to the roads are not managed effectively, resulting in an untidy appearance in a scenic natural environment.

Mitigation Measures

- Follow requirements in the EMP to keep construction site presentable;
- Construction time must be restricted to working hours (07:00-17:00);
- Construction vehicles should be kept in demarcated areas only so as to reduce the visual intrusion of the construction activities;
- During construction, all materials and stockpiles will be covered with tarps to prevent erosion, as well as dust arising from it, and to mitigate the visibility thereof;
- Construction workers must ensure and implement good housekeeping practises to minimise the visual impact of waste and discarded materials; and
- Construction activities to be kept to normal daytime working hours as far as possible to prevent the impact of floodlights and other sights during resting hours.

Significance of the impact

The extent of the impact is rated as regional as the impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns. The intensity of the impact is medium as the affected environment is altered, but functions and processes continue, albeit in a modified way. The duration of the impact is rated as medium as the impact will be relevant through to the end of the development phases. It is likely that the impact will occur and the significance rating before mitigation is therefore measured as being Low. The mitigation efficiency is rated as Low - Medium, hence the significance following mitigation measures having taken place is therefore rated as Low.

11. Soil contamination:

Activity	<b>Spillage of hazardous substances, oil and fuel leaks at the construction site from the transportation and construction vehicles as well as accidental spillages</b>		
Nature of the impact	<b>Soil contamination and its associated effects</b>	Status	-
Receiving environment	<b>The proposed site</b>		
Magnitude	Extent	Site	
	Intensity	Medium	
	Duration	Short to Medium	
	Probability	Likely	
Significance	Without mitigation (WOM)	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 3 + 2 + 3) \times 3 = 30$ Low to Medium	
	With mitigation (WM)	$WOM \times ME = WM$ $30 \times 0.4 = 12$ Low	
Significance With Mitigation (WM)	<b>LOW</b>		
Irreversibility	Low		
Impact on Irreplaceable resources	NO		
Confidence level	Medium		

Source and Description of the Impact

Several activities can cause the spillage of hazardous substances, causing contamination of the receiving environment at the construction site. During construction activities accidental spillages and leaks of hydrocarbons may occur from construction vehicles. These include spillages from unmanaged ablution facilities, spillages of fuels and oils, spillage of concrete and cement and run-off of contaminated cement waste water. Once these leaks get into contact with the soil they could contaminate the soil.

Mitigation Measures

- Store fuels and chemicals in a bunded area;
- Provide staff with hazardous materials training;
- Chemical toilets to be used on site, grey water should be disposed of off-site at a licensed waste treatment works;
- No storage of fuel on site, vehicles to be fuelled off-site;
- No mixing of cement/concrete should take place within 30m of aquatic features or in natural vegetation;
- No servicing or repair of vehicles on site;
- No concrete mixing on site unless on a mortar board;
- Water used to clean concrete off of machinery should be treated as grey water and disposed of at a licensed water treatment works;
- Construction vehicles should be maintained on a regular basis so as to prevent oil spills/leaks;
- Drip trays should be placed under vehicles when not in use; and
- If a hydrocarbon spillage occurs, it must be cleaned up immediately and disposed of at an appropriate registered landfill site.

Significance of the impact

The extent of the impact is rated as site specific. The rating of the intensity is medium as the affected environment is altered, but functions and processes continue, albeit in a modified way. The impact will be relevant through to the end of the construction phase, thus it is rated as short - medium term. The probability of the impact occurring is rated as likely as spillages and soil contamination is prone to occur when staff on site is not properly educated and managed as well as proper mitigation measures not being in place. The significance of the impact prior to any mitigation measure is therefore rated as low - medium. The mitigation efficiency is rated as medium – high and therefore results in having the significance after mitigation measures having taken place being low.

12. Increased domestic waste generation (Solid waste):

Activity	<b>General waste left unmanaged on site</b>		
Nature of the impact	<b>Attract vermin and resulting environmental contamination</b>	Status	-
Receiving environment	<b>Affected construction site</b>		
Magnitude	Extent	Site	
	Intensity	Medium	
	Duration	Short - Medium term	
	Probability	Likely	
Significance	Without mitigation (WOM)	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 3 + 2 + 3) \times 1 = 10$ Low	
	With mitigation (WM)	$WOM \times ME = WM$ $10 \times 0.6 = 6$ Low	
Significance With Mitigation	<b>LOW</b>		

(WM)	
Irreversibility	Low
Impact on Irreplaceable resources	NO
Confidence level	Medium

Source and Description of the Impact

General waste left unmanaged on site may attract vermin and result in environmental contamination. Incorrect storage may result in wind strewn litter and a negative visual impact, and may result in a bad odour.

Mitigation Measures

- Keep waste in vermin proof bins with lids; and
- Waste to be removed from site on a regular basis.

Significance of the impact

The extent of the impact is rated as site specific as the impact would only affect the whole, or a significant portion of the site. The intensity is rated as medium due to the environment being altered, but functions and processes will be able to continue, albeit in a modified way. The impact will last up to the end of the construction phase and the duration of the impact is therefore rated as Short to Medium term. The probability of the impact is rated as likely as the impact will occur at some stage of the development and the significance of the impact before mitigation measures is therefore rated as Low. Even though the mitigation efficiency is rated as Medium, the significance of the impact after mitigation measures having taken place Low.

13. Loss of riparian vegetation along drainage lines:

Activity	<b>Construction of the servitude routes</b>		
Nature of the impact	<b>Loss of some peripheral riparian vegetation</b>	Status	-
Receiving environment	<b>Road crossings and along the servitude routes</b>		
	Extent	Site	
	Intensity	Medium	
	Duration	Medium term	
	Probability	Highly Likely	
Significance	Without mitigation (WOM)	$(Extent + Intensity + Duration + Probability) \times Weighting$ $(2 + 3 + 3 + 4) \times 4 = 48$ Medium	
	With mitigation (WM)	$WOM \times ME = WM$ $48 \times 0.8 = 38.4$ Low - Medium	
Significance	<b>LOW – MEDIUM</b>		

<i>With Mitigation (WM)</i>	
<i>Irreversibility</i>	Low
<i>Impact on Irreplaceable resources</i>	NO
<i>Confidence level</i>	Medium

Source and Description of the Impact

The servitude may result in the loss of some peripheral riparian vegetation, particularly at road crossings, where necessary.

Mitigation Measures

- No access roads should be constructed within 32m of a hill slope seepage wetland and/or seasonal pan, unless no alternative is possible; and
- If access roads must pass through drainage lines, the footprint should be as small as possible.

Significance of the impact

The extent of the impact is rated as site specific and the intensity is rated as medium as the affected area is altered, but functions and processes continue in a modified way. The impact will last up to the end of the development phases, where it will be entirely negated, thus the rating for the duration of the impact is medium term. The probability of the impact occurring is highly likely at some stage or another of the development phase and the significance of the impact prior to any mitigation measure having taken place is therefore rated as medium. The mitigation efficiency is rated as medium - high, resulting in the significance after mitigation measures having taken place being low - Medium.

**14. Increased risk of alien invasion for vegetation species:**

<i>Activity</i>	<b>Unmanaged vegetation clearing taking place on site</b>		
<i>Nature of the impact</i>	<b>Establishment and spread of declared weeds and alien invader plants</b>	Status	-
<i>Receiving environment</i>	<b>The proposed site and directly affected environment</b>		
	<i>Extent</i>	Site	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Medium term	
	<i>Probability</i>	Likely	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 3 + 3 + 3) \times 3 = 33$ Low to Medium	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $33 \times 0.6 = 19.8$ Low - Medium	

<i>Significance With Mitigation (WM)</i>	<b>LOW – MEDIUM</b>
<i>Irreversibility</i>	Low
<i>Impact on Irreplaceable resources</i>	NO
<i>Confidence level</i>	Medium

Source and Description of the Impact

There is a moderate possibility that alien plants could be introduced to areas within the site of the proposed infrastructure in the absence of control measures. The potential consequences may be serious for surrounding natural habitats, whereas control measures could prevent the impact from occurring. Without proper management of vegetation clearing occurring on site and along the proposed servitude route, invasion of alien species is likely to occur. Additional species may be introduced during the vegetation clearing activities that may invade riparian habitats and have serious negative consequences on the directly affected and surrounding environment. Consequences of the impact may include:

Mitigation Measures

- An alien management plan must be implemented and long-term monitoring conducted prior to construction activities or as directed by the ECO.

Significance of the impact

The extent of the impact is rated as site specific and the intensity is rated as medium as the affected area is altered, but functions and processes continue in a modified way. The impact will last up to the end of the development phases, where it will be entirely negated, thus the rating for the duration of the impact is medium term. The probability of the impact occurring is likely during the construction phase of the project and the significance of the impact prior to any mitigation measure is therefore rated as low - medium. Even though the mitigation efficiency is rated as medium - high, the significance of the impact after mitigation measures having taken place still remains as being low - medium.

15. Loss of Avifauna breeding and roosting sites:

<i>Activity</i>	<b>Clearance of vegetation for powerline service roads and substation sites</b>		
<i>Nature of the impact</i>	<b>Interference of bird breeding habits, foraging and roosting</b>	Status	-
<i>Receiving environment</i>	<b>Surrounding avifauna</b>		
	<i>Extent</i>	Regional	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Medium term	
	<i>Probability</i>	Likely	
<i>Significance</i>	<i>Without</i>	$(Extent + Intensity + Duration + Probability) \times Weighting$	

	<i>mitigation (WOM)</i>	<i>Factor</i> $(3 + 3 + 3 + 3) \times 4 = 48$ <i>Medium</i>
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $48 \times 0.6 = 31.2$ <i>Low - Medium</i>
<i>Significance With Mitigation (WM)</i>	<b>LOW - MEDIUM</b>	
<i>Irreversibility</i>	Low	
<i>Impact on Irreplaceable resources</i>	NO	
<i>Confidence level</i>	Medium	

*Source and Description of the Impact*

Some habitat destruction and alteration inevitably takes place during the construction of powerlines, substations and associated roadways. Also, powerline service roads or servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, and to prevent vegetation from intruding into the legally prescribed clearance gaps between the ground and the conductors. These activities have an impact on birds breeding, foraging and roosting in or in close proximity to the servitude, and retention of cleared servitudes can have the effect of altering bird community structure along the length of any given powerline. Disturbance of resident / breeding raptors (especially Martial Eagle, possibly including Lanner Falcon and Black Harrier) from nesting and / or foraging areas by construction of the line may occur.

Alternative 1 traverse closer to the known Martial Eagle nest on an existing line just North of Hoekklip and is also marginally longer in distance compared to Alternative 2 (82km vs 81.5km). Impacts associated with the construction of the Alternative 1 route is anticipated to yield slightly higher bird impacts and therefore considered to be of a higher significance.

*Mitigation Measures*

- The construction corridor of the selected alignment should be closely inspected before the start of construction in order to locate any active nests;
- Reduce the construction time where possible and schedule construction activities around avian breeding schedules where practical;
- Lower the levels of associated noise; and
- Reduce the size of the inclusive development footprint by reducing the amount of active access roads.

*Significance of the impact*

The extent of the impact is rated as Regional as the impact could affect the area including neighbouring areas much wider than the site area and proposed route itself. The intensity of the impact is rated as medium as the affected area is altered, but functions and processes will be

able to continue in a modified way. The impact will last up to the end of the development phases, where it will be entirely negated, thus the rating for the duration of the impact is medium term. The probability of the impact occurring is likely and the significance of the impact prior to any mitigation measure is therefore rated as medium. The mitigation efficiency is rated as medium, resulting in the significance after mitigation measures having taken place being low - medium.

**16. Impacts on the Archaeological Heritage Resources:**

<i>Activity</i>	<b>Construction activities associated with the pylon structures</b>		
<i>Nature of the impact</i>	<b>Destruction of Archaeological resources</b>	Status	-
<i>Receiving environment</i>	<b>Archaeological resources</b>		
	<i>Extent</i>	Site	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Short to Medium	
	<i>Probability</i>	Probable	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 3 + 2 + 1) \times 1 = 8$ Low	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $8 \times 0.6 = 4.8$ Low	
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	Medium		

Source and Description of the Impact

Impacts to archaeological resources would take the form of excavations for pylons being placed and thus damage archaeological sites. It should be noted that archaeological sites are point occurrences and that the impacts will vary along the route. The majority of the route would have generally very low intensity impacts but in some areas where significant sites have been located these impacts could become more intense.

Mitigation Measures

- Any known sites (any graves and/or archaeological sites) should be avoided by both the pylons and any access roads that may need to be constructed; and
- Excavation of archaeological sites could be conducted if impacts to the site cannot be avoided.

Significance of the impact

The extent of the impact is rated as site specific and the intensity is rated as medium as the affected area is altered, but functions and processes continue in a modified way. The duration of the impact is rated as short – medium term as the impacts on heritage resources will only occur up until the end of the construction phase. The probability of the impact occurring is probable and therefore results in the significance of the impact prior to any mitigation measure being rated as low. Even though the mitigation efficiency is rated as medium, the significance of the impact after mitigation measures having taken place still remains as being low

**17. Increase in crime:**

<i>Activity</i>	<b>Construction of the access roads as per the proposed routes</b>		
<i>Nature of the impact</i>	<b>Increased occurrence of crime in the area</b>	Status	-
<i>Receiving environment</i>	<b>The landowners and surrounding community</b>		
<i>Magnitude</i>	<i>Extent</i>	Regional	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Short to Medium	
	<i>Probability</i>	Possible	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(3 + 3 + 3 + 2) \times 1 = 11$ Low	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $11 \times 0.8 = 10.4$ Low	
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	High		

Source and Description of the Impact

Increased access to private land might lead to a potential increase in crime.

Mitigation Measures

- Workers will not be allowed to stay overnight at the crew camps unless authorised by the ECO.

Significance of the impact

The extent of the impact is rated as Regional as the impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns. The intensity of the impact is

rated to be medium as the affected area is altered, but functions and processes will be able to continue in a modified way. The impact will continue even after the proposed project has been completed for as long as the proposed powerline and associated infrastructure is to be located along the route, thus the rating for the duration of the impact is permanent. The probability of the impact occurring is likely and the significance of the impact prior to any mitigation measure is therefore rated as low. The mitigation efficiency is rated as low - medium, resulting in the significance after mitigation measures having taken place remaining as low.

**18. Temporary Job Creation:**

The creation of temporary jobs is likely to be the net effect of implementing the proposed project. This impact is likely to have a **High positive impact** on the local workforce.

**Indirect impacts:**

**1. Impact on the conservation status of vegetation within the CBA located adjacent to the Hoekklip substation:**

<i>Activity</i>	<b>Construction of the proposed substation and associated powerline.</b>		
<i>Nature of the impact</i>	<b>Potential degradation of the CBA</b>	Status	-
<i>Receiving environment</i>	<b>The proposed Hoekklip substation site and associated powerline section.</b>		
	<i>Extent</i>	Footprint	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Medium term	
	<i>Probability</i>	Likely	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 3 + 3 + 3) \times 4 = 44$ Medium	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $44 \times 0.6 = 26.4$ Low - Medium	
<i>Significance With Mitigation (WM)</i>	<b>LOW - MEDIUM</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	Medium		

**Source and Description of the Impact**

Loss of a population or individuals listed as a threatened plant species, could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations.



	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $11 \times 0.8 = 8.8$ Low
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>	
<i>Irreversibility</i>	Low	
<i>Impact on Irreplaceable resources</i>	NO	
<i>Confidence level</i>	Medium	

Source and Description of the Impact

Placement of the phylon structures in existing and potential farm lands may result in a minor loss of arable land or potential expansion of farming activities by affected farmers. The loss of the arable land is possibly off-set by compensation by the client as agreed upon with affected farmers.

Mitigation Measures

- Locate phylon structures within natural fire breaks within the currently farmed areas (where possible).

Significance of the impact

The extent of the impact is rated as site specific and the intensity is rated as low as the impact affects the environment in such a way that the natural processes or functions are not affected. The impact will continue even after the project has finished for as long as the powerline is to be located on the proposed route, thus the rating for the duration of the impact is medium term. The probability of the impact occurring is definite and the significance of the impact prior to any mitigation measure is therefore rated as low. The mitigation efficiency is rated as low-medium, resulting in the significance after mitigation measures having taken place still remaining as low.

## OPERATIONAL PHASE

**Direct Impacts:**

1. Economic growth and development:

The current power distribution and supply to the Zandkopsdrift mine is very unreliable to non existant and therefore the strengthening of the network will ensure that the supply to the mine is more stable, reliable and will allow the mine to develop to its full potential. This is therefore considered to be a **High positive** impact.

2. Increased theft and vandalism:

<i>Activity</i>	<b>Theft and vandalism of the distribution line and associated infrastructure</b>
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Nature of the impact	<b>Potential deaths, interruption in electricity supply and increased maintenance intervals</b>		Status	-
Receiving environment	<b>The client, landowners and surrounding community</b>			
Magnitude	Extent	Regional		
	Intensity	Medium		
	Duration	Permanent		
	Probability	Possible		
Significance	Without mitigation (WOM)	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(3 + 3 + 5 + 2) \times 1 = 13$ Low		
	With mitigation (WM)	$WOM \times ME = WM$ $13 \times 0.8 = 10.4$ Low		
Significance With Mitigation (WM)	<b>LOW</b>			
Irreversibility	Low			
Impact on Irreplaceable resources	NO			
Confidence level	High			

Source and Description of the Impact

Theft and vandalism of the distribution line and associated infrastructure leads to the potential deaths, interruption in electricity supply and the increased maintenance intervals of the powerline itself.

Mitigation Measures

- Install anti-climb pylons;
- Erect warning signs all around to warn the surrounding landowners and community; and
- Access control at the substation and switching station needs to be implemented.

Significance of the impact

The extent of the impact is rated as Regional as the impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns. The intensity of the impact is rated to be medium as the affected area is altered, but functions and processes will be able to continue in a modified way. The impact will continue even after the proposed project has been completed for as long as the proposed powerline and associated infrastructure is to be located along the route, thus the rating for the duration of the impact is permanent. The probability of the impact occurring is likely and the significance of the impact prior to any mitigation measure is therefore rated as low - medium. The mitigation efficiency is rated as medium - high, resulting in the significance after mitigation measures having taken place being low.

**3. Increased risk of alien invasion for vegetation species:**

Activity	<b>Disturbance in the landscape</b>		
Nature of the impact	<b>Establishment and spread of declared weeds and alien invader plants</b>	Status	-
Receiving environment	<b>The proposed site and directly affected environment</b>		
	Extent	Regional	
	Intensity	Medium	
	Duration	Permanent	
	Probability	Likely	
Significance	Without mitigation (WOM)	$(Extent + Intensity + Duration + Probability) \times Weighting\ Factor$ $(3 + 3 + 5 + 3) \times 3 = 42$ Low - Medium	
	With mitigation (WM)	$WOM \times ME = WM$ $42 \times 0.4 = 16.8$ Low	
Significance With Mitigation (WM)	<b>LOW</b>		
Irreversibility	Low		
Impact on Irreplaceable resources	NO		
Confidence level	Medium		

Source and Description of the Impact

The existence of infrastructure represents a disturbance in the landscape that could advance conditions in which declared weeds and alien invader plants could potentially be favoured especially during maintenance activities.

Mitigation Measures

- Existing concentrations of alien plants within the site should be eradicated;
- Areas disturbed due to maintenance activities should be rehabilitated as quickly as possible;
- Soil stockpiles should not be translocated from areas with alien plants into the site;
- Within the site, alien plants on stockpiles must be controlled so as to avoid the development of a solid seed bank of alien plants within the stock-piled soil;
- Any alien plants must be immediately controlled to avoid establishment of a soil seed bank; and
- Create an integrated alien invasive management programme.

Significance of the impact

The extent of the impact is rated as Regional as the impact could affect the area including the neighbouring farms and surrounding communities. The impact will occur for as long as the proposed powerline is to be located along the proposed routes, thus the duration of the impact is deemed to be of a permanent nature. The probability of the impact occurring is likely during the

operational phase of the project and the significance of the impact prior to any mitigation measure is therefore rated as low-medium. The mitigation efficiency is rated as medium - high, resulting in the significance after mitigation measures having taken place being low.

**4. Increased electrocution of Avifauna:**

Activity	<b>Large birds that build nests on pylon structures are prone to electrocution.</b>		
Nature of the impact	<b>Mortality of large terrestrial bird species</b>	Status	-
Receiving environment	<b>Avifauna in the affected area</b>		
Magnitude	Extent	Regional	
	Intensity	Medium to high	
	Duration	Permanent	
	Probability	Highly likely	
Significance	Without mitigation (WOM)	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(3 + 4 + 5 + 4) \times 3 = 42$ Medium	
	With mitigation (WM)	$WOM \times ME = WM$ $42 \times 0.4 = 16.8$ Low	
Significance With Mitigation (WM)	<b>LOW</b>		
Irreversibility	Low		
Impact on Irreplaceable resources	NO		
Confidence level	High		

Source and Description of the Impact

Electrocution of avifaunal species may lead to the loss of the local biodiversity and / or the loss of endangered species. Avian electrocutions occur when a bird perches or attempts to perch on an electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. Electrocution risk is strongly influenced by the voltage and design of the powerlines erected, and mainly affects larger, perching species, such as vultures, eagles and storks, easily capable of spanning the spaces between energized components.

Mitigation Measures

- Employ mechanisms (perch guards; insulator shields etc.) to discourage birds from building nests on pylon structures;
- Establish a practical and sustainable management plan (in line with Eskom management practices) for dealing with raptor stick-nest built on the new line. These may include nest sites of red-listed species such as Martial Eagle and Lanner Falcon;

- Ensure that all new power infrastructure is adequately insulated and bird-friendly in configuration; and
- Comprehensive insulation of such areas.

Significance of the impact

The extent of the impact is rated as Regional as the impact could affect neighbouring areas much wider than the site area itself. The intensity is rated as medium as the affected area is altered, but functions and processes continue in a modified way. The impact will continue even after the proposed project has been completed, thus the rating for the duration of the impact is permanent. The probability of the impact occurring is highly likely and the significance of the impact prior to any mitigation measures is therefore rated as medium. The mitigation efficiency is rated as medium - high, resulting in the significance after mitigation measures having taken place being low.

**5. Increased risk for collisions of Avifaunal species:**

<i>Activity</i>	<b>Construction of overhead powerlines</b>		
<i>Nature of the impact</i>	<b>Cause harm, injury and death to the Avifaunal bird species found in the area</b>	Status	-
<i>Receiving environment</i>	<b>Avifaunal and collision prone bird species in the area</b>		
	<i>Extent</i>	Regional	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Permanent	
	<i>Probability</i>	Highly Likely	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(3 + 3 + 5 + 4) \times 3 = 45$ Medium	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $45 \times 0.4 = 18$ Low	
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	Medium		

Source and Description of the Impact

Overhead powerlines pose a collision risk to all birds, but particularly collision prone birds are generally either (i) large species and/or species with high ratios of body weight to wing surface area, which confers low manoeuvrability, (ii) species which fly at high speeds, (iii) species which are distracted in flight - predators or species with aerial displays, (iv) species which habitually fly in low light conditions, and (v) species with narrow fields of forward binocular vision.

Mitigation Measures

- Informed selection of low impact alignments for new powerlines relative to movements and concentrations of high risk species;
- Use of either static or dynamic marking devices to make the lines and the earthwires more conspicuous;
- Ensure that all new lines are marked with bird flight diverters along their entire length using industry standard markers and marker fitting protocols;
- Identified high risk sections of the powerline needs to be installed with a suitable anti-bird collision marking device approved by Eskom, and as per the Eskom standards; and
- Preliminary high risk sections for bird collisions have been identified in the avifauna specialist report attached as Appendix D must be taken into consideration during the final positioning of the powerline.

Significance of the impact

The extent of the impact is rated as Regional as the impact could affect neighbouring areas much wider than the site area itself. The impact will be exerted onto the area's avifaunal species even after the powerline has been constructed and the project has come to an end, thus the rating for the duration of the impact is permanent. The probability of the impact occurring is highly likely. Therefore the significance of the impact prior to any mitigation measure is rated as medium. The mitigation efficiency is rated as medium - high, resulting in the significance after mitigation measures having taken place being low.

6. Increased alteration of hydrology of drainage lines and wetlands:

<i>Activity</i>	<b>Establishment of access roads and distribution line towers within or immediately adjacent to freshwater ecosystems.</b>		
<i>Nature of the impact</i>	<b>Construction activities within the drainage lines and wetlands will cause degradation</b>	Status	-
<i>Receiving environment</i>	<b>Affected drainage lines and wetland areas where the access roads and transmission line towers will be located within</b>		
	<i>Extent</i>	Regional	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Permanent	
	<i>Probability</i>	Highly Likely	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	<i>(Extent + Intensity + Duration + Probability) x Weighting Factor</i> $(3 + 3 + 5 + 4) \times 3 = 45$ Medium	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $45 \times 0.4 = 18$ Low	
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		

Confidence level	Medium
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Source and Description of the Impact

Increased erosion and alteration of hydrology of drainage lines and wetlands, as a result of the establishment of distribution line towers and access roads within or immediately adjacent to the identified freshwater ecosystems may occur within the servitude of the proposed powerline. Effective mitigation of impacts associated with the Alternative 1 route will be more difficult to achieve due to the higher density of drainage lines along the route compared to Alternative 2.

Mitigation Measures

- Ensure that none of the pylons for the transmission line are located within any drainage lines or wetlands or recommended buffer areas for freshwater ecosystems;
- Use existing access roads where possible;
- Formalise road crossings over drainage lines (if unavoidable) by using properly designed structures that minimise the alteration of flows; and
- Install adequate sub-surface drainage under any access road for which the crossing of wetland areas is unavoidable.

Significance of the impact

The extent of the impact is rated as Regional as the impact could affect neighbouring areas much wider than the site area itself. The impact will be exerted onto the wetland areas even after the powerline has been constructed and the project has come to an end, thus the rating for the duration of the impact is permanent. The probability of the impact occurring is highly likely. Therefore the significance of the impact prior to any mitigation measure is rated as medium. The mitigation efficiency is rated as medium - high, resulting in the significance after mitigation measures being implemented is low.

7. Floral destruction and faunal displacement:

Activity	<b>Clearing or trimming of natural vegetation located within the servitude of the powerline as part of routine maintenance operations.</b>		
Nature of the impact	<b>Flora destruction and Faunal displacement as well as, injured and killed due to vegetation clearing activities taking place during the operational phase as part of routine maintenance.</b>	Status	-
Receiving environment	<b>Flora and Fauna of the area</b>		
Magnitude	Extent	Site	
	Intensity	Medium	
	Duration	Short to Medium	
	Probability	Likely	
Significance	Without mitigation (WOM)	<i>(Extent + Intensity + Duration + Probability) x Weighting Factor</i> $(2 + 3 + 2 + 3) \times 3 = 30$	

		<i>Low to Medium</i>
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $30 \times 0.4 = 12$ <i>Low</i>
<i>Significance With Mitigation (WM)</i>	<b>LOW</b>	
<i>Irreversibility</i>	Low	
<i>Impact on Irreplaceable resources</i>	NO	
<i>Confidence level</i>	Medium	

Source and Description of the Impact

The vegetation clearing activities may result in flora destruction and faunal species being displaced, disturbed, injured or killed due to loss of their habitats especially if these activities take place in and around wetlands and drainage lines located within the servitude of the powerline. The Grant's golden Mole, White-tailed Rat and Namaqua Planted Lizard animal species of conservation concern could potentially occur on site and may therefore be of concern for development within the study area.

Mitigation Measures

- Construction impacts must be contained within the footprint of the phylon structures and / or the servitude routes of the powerline;
- Ensure that unnecessary impacts on natural vegetation do not occur;
- Use existing access roads as far as possible;
- Vegetation clearance should be conducted systematically from the start to the end of the route to allow fauna to move away;
- Avoid strip clearing;
- Vegetation should be removed only where construction is to take place;
- Sequential construction should occur in order to allow faunal species to move away from the area of disturbance;
- Construction of taller pylons in certain areas high enough to allow for the growth of relatively tall vegetation (where ESKOM safety standards allow);
- A detailed threatened plant species assessment should be undertaken by a suitable qualified botanical specialist during an appropriate season and at different times of the year;
- Regular monitoring of the condition of vegetation within untransformed areas along the powerline servitude by a botanical specialist with knowledge of wetland and riparian vegetation;
- Construction activities should be restricted to daylight hours when the majority of faunal species are inactive; and
- No animals may be snared, captured or wilfully damaged or killed.

Significance of the impact

The extent of the impact is rated as site specific as faunal displacement, disturbance, injury or death will only occur on the proposed site and along the identified proposed powerline routes. The intensity is rated as medium as the affected environment is altered, but functions and processes continue albeit in a modified way. The duration of the impact is rated as short - medium term as the impact will cease after the construction phase. The probability of the impact occurring is rated as definite as bush-clearing will definitely be taking place during the construction phase. Therefore the significance of the impact prior to any mitigation measures is rated as Low to Medium. The mitigation efficiency is rated as medium - high resulting in the impact significance after mitigation as Low.

**Indirect Impacts:**

1. Increased soil Erosion:

Activity	<b>Deterioration of access roads</b>		
Nature of the impact	<b>Minor erosion to occur along access roads</b>	Status	-
Receiving environment	<b>Directly affected environment surrounding the access roads</b>		
Magnitude	Extent	Site	
	Intensity	Low	
	Duration	Permanent	
	Probability	Possible	
Significance	Without mitigation (WOM)	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 1 + 5 + 2) \times 3 = 30$ Low - Medium	
	With mitigation (WM)	$WOM \times ME = WM$ $30 \times 0.4 = 12$ Low	
Significance With Mitigation (WM)	<b>LOW</b>		
Irreversibility	Low		
Impact on Irreplaceable resources	NO		
Confidence level	High		

Source and Description of the Impact

Access roads area created during the construction phase and maintained for the purpose of accessing electrical utility structures for maintenance activities and emergency events. The deterioration of access roads can lead to the maintenance staff having to create additional tracks for accessing the proposed powerline, thus causing erosion to take place in the surrounding

environment. Erosion can be prevented in this instance if access roads are effectively managed.

#### Mitigation Measures

- Apply the appropriate erosion protection measures where erosion is identified;
- Regular maintenance of the identified access roads as and when required;
- Improve the access of the identified access roads to ensure suitable passage for equipment, erosion control and maintenance of proper drainage; and
- Maintenance staff to stay on the designated access roads at all times.

#### Significance of the impact

The extent of the impact is rated as site specific and the intensity is rated as low as the impact alters the affected environment in such a way that the natural processes or function will not be affected. The impact will continue to occur for as long as the proposed powerline will be located along the outlined route and access to the powerline is required for routine maintenance and inspections, thus the rating for the duration of the impact is deemed to be of a permanent nature. The probability of the impact occurring is possible and the significance of the impact prior to any mitigation measure is therefore rated as low - medium. The mitigation efficiency is rated as medium - high, resulting in the significance after mitigation measures having taken place being low.

#### **Cumulative Impacts:**

##### 1. Stimulation and Growth of the local economy:

The provision of stable electricity supply to the Zandkopsdrift mine located in the Northern Cape, will allow the steady growth and economic development of the surrounding regions. The construction of the 132kV powerline is therefore expected to have a **High Positive Impact** on the local economy of the surrounding communities.

#### Mitigation Measures

- Infrastructure maintenance should be prioritised to ensure that the provision of stable electricity is not interrupted.

##### 2. Increased visual impact of additional powerlines:

The addition of the proposed powerlines in the vicinity of existing powerlines (close to the proposed Hoekklip substation) in the study area may have an increased negative cumulative impact on the surrounding environment in terms of the cumulative visual impact. Given the location and number of visual receptors, the additional powerline is therefore expected to have a Low negative impact on the surrounding environment and community.

## DECOMMISSIONING PHASE

### **Direct Impact:**

It should be noted that due to the nature and purpose of the proposed development, decommissioning is not envisaged. However, should decommissioning occur, the following impacts would be applicable.

#### 1. Waste generation:

Activity	<b>Decommissioning activities</b>		
Nature of the impact	<b>Generation of metal and concrete waste</b>	Status	-
Receiving environment	<b>The proposed site and directly affected environment</b>		
Magnitude	Extent	Site	
	Intensity	Medium	
	Duration	Short to Medium	
	Probability	Highly Likely	
Significance	Without mitigation (WOM)	$(Extent + Intensity + Duration + Probability) \times Weighting\ Factor$ $(2 + 3 + 2 + 4) \times 3 = 33$ Low - Medium	
	With mitigation (WM)	$WOM \times ME = WM$ $33 \times 0.4 = 13.2$ Low	
Significance With Mitigation (WM)	<b>LOW</b>		
Irreversibility	Low		
Impact on Irreplaceable resources	NO		
Confidence level	High		

#### Source and Description of the Impact

The decommissioning activity will result in the generation of metal and concrete waste.

#### Mitigation Measures

- Waste generation must be managed according to international best practice; and
- All materials that can be recycled, must be recycled where possible.

#### Significance of the impact

The extent of the impact is rated as site specific and the intensity is rated as medium as the affected area is altered, but functions and processes continue in a modified way. The impact will

cease to continue after the development phases of the project, thus the rating for the duration of the impact is short - medium term. The probability of the impact occurring is likely. Therefore the significance of the impact prior to any mitigation measure is rated as low - medium. The mitigation efficiency is rated as medium - high, resulting in the significance after mitigation remaining as low.

### 2. Soil contamination:

During the decommissioning process, hydrocarbon spills may occur from vehicles to be used to carry out various decommissioning activities. Should any spills occur the contaminated soil must be removed and disposed of at an appropriate registered landfill site. Based on the size of the area, this impact is rated as having a **low significance**.

### 3. Increased alteration of hydrology of drainage lines and wetlands:

The potential impacts on freshwater ecosystems that are likely to be associated with the decommissioning of the proposed powerline would be very similar to the construction phase impact. The recommended mitigation measures for the decommissioning phase are therefore the same as those for the construction phase and the significance of the potential impacts on freshwater ecosystems is likely to be similar. Effective mitigation of impacts associated with the Alternative 1 route will be more difficult to achieve due to the higher density of drainage lines along the route compared to Alternative 2.

**Alternative 2 (Preferred alternative): Zandkopsdrift 132kV Eskom  
Powerline Preferred route**

**CONSTRUCTION PHASE**

**THE PROPOSED IMPACTS WILL BE THE SAME AS THAT FOR ALTERNATIVE 1  
WITH THE EXCEPTION OF:**

**Direct Impacts:**

1 Surface Water Contamination and degradation:

<i>Activity</i>	<b>Oil and fuel leaks from construction vehicles</b>		
<i>Nature of the impact</i>	<b>Surface water quality deteriorates as it has been compromised</b>	Status	-
<i>Receiving environment</i>	<b>Affected Watercourses where the powerline is proposed to span over</b>		
<i>Magnitude</i>	<i>Extent</i>	Site	
	<i>Intensity</i>	High	
	<i>Duration</i>	Short to medium	
	<i>Probability</i>	Likely	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	<i>(Extent + Intensity + Duration + Probability) x Weighting Factor</i> $(2 + 5 + 2 + 3) \times 4 = 48$ Medium	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $48 \times 0.6 = 28.8$ Low to Medium	
<i>Significance With Mitigation (WM)</i>	<b>LOW - MEDIUM</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	Medium		

Source and Description of the Impact

When oil and fuel leaks occur from transportation and construction vehicles as well as accidental spills, they may come into contact with surface water and it will compromise the quality of the water, hence cause it to deteriorate. The Alternative 2 routing option will cross the Sout River and two of its major tributaries which is potentially the most significant resource area for wetland fauna and flora in the general area. Alternative 2 will cross an approximate 20 drainage lines less than with Alternative 1 and the impact is therefore deemed to be of a lesser significance.

Mitigation Measures

- All construction vehicles should be kept in good working condition;
- All construction vehicles should be parked in demarcated areas when not in use, and the soil in this area should be rehabilitated (if required);
- Drip trays should be placed under construction vehicles when not in use; to collect any spillages/leaks;
- The construction footprint along the watercourse must be limited to as small a footprint as possible; and
- If a hydrocarbon spillage occurs, clean it up immediately and dispose of at an appropriate registered landfill site.

Significance of the impact

The extent of the impact is rated as regional as the impact could affect the area including the neighbouring farms and surrounding communities nearby. The intensity is rated as high, although functions and processes will be able to continue, albeit in a modified way. The impact will only last up until the end of the construction period, hence the duration is rated as short - medium term. It is likely that the impact will occur and the significance rating before mitigation measures is therefore rated to be medium. The mitigation efficiency is rated as medium and therefore results in the significance after mitigation measures being rated as low – medium. The impact for Alternative 2 is still considered to be of a lower significance as compared to that of Alternative 1 as there will be approximately 20 less drainage lines affected.

2. Degradation of watercourses:

<i>Activity</i>	<b>Construction of the proposed powerline and associated infrastructure</b>		
<i>Nature of the impact</i>	<b>Construction activities within the watercourse and drainage lines will cause degradation</b>	Status	-
<i>Receiving environment</i>	<b>Affected Watercourses where the pylon structures will be located within</b>		
<i>Magnitude</i>	<i>Extent</i>	Site	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Short to Medium	
	<i>Probability</i>	Likely	
<i>Significance</i>	<i>Without mitigation (WOM)</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$ $(2 + 3 + 2 + 3) \times 4 = 40$ Medium	
	<i>With mitigation (WM)</i>	$WOM \times ME = WM$ $40 \times 0.6 = 24$ Low – Medium	
<i>Significance With Mitigation (WM)</i>	<b>LOW – MEDIUM</b>		
<i>Irreversibility</i>	Low		
<i>Impact on Irreplaceable resources</i>	NO		
<i>Confidence level</i>	Medium		

Source and Description of the Impact

The study area is in an arid area and the soils are mostly deep and sandy. There are few surface wetlands, but various watercourses occur in the study area, including tributaries of the Sout River. It is possible that there may be underground movement of water through the sandy soils, but this is not evident from surface patterns. Impacts on watercourses and drainage areas are therefore potentially of concern for the current project. The proposed powerline crosses drainage lines and/or watercourses in various places. The main impact of the powerline is due to construction of the pylon structures, each of which occupies only a very small local. The pylon structures however can be positioned to avoid drainage lines and watercourses. It is also probable that service and access roads will cross various watercourses, unless existing roads and tracks can be used.

The potential for the encroachment into the freshwater ecosystems is slightly lower for Alternative 2 than it is for Alternative 1. The density of drainage lines occurring along Alternative 2 is therefore less concentrated than it is for Alternative 1 and the impact is considered to be of a lesser significance.

Mitigation Measures

- Ensure that pylon structures are kept a minimum of 50m outside of the outer edge of any watercourse or drainage line (where practical);
- Use existing access roads as far as possible;
- No mixing of cement/concrete should take place within 30m of aquatic features;
- Construction impacts must be contained within the servitude of the powerline;
- Ensure that unnecessary impacts on watercourse do not occur; and
- Proper erosion control structures must be constructed

Significance of the impact

The extent of the impact is rated as regional as the impact could affect the area including the neighbouring farms and surrounding communities nearby. The intensity is rated as medium due to the affected environment being altered, but functions and processes will be able to continue, albeit in a modified way. The impact will only last up until the end of the construction period; hence the duration is rated as short - medium term. It is highly likely that the impact will occur and the significance rating before mitigation measures is therefore rated to be medium. The mitigation efficiency is rated as medium and therefore results in the significance after mitigation measures having taken place being rated as low - medium.

**3. Loss of riparian vegetation along drainage lines:**

<i>Activity</i>	<b>Construction of the servitude routes</b>		
<i>Nature of the impact</i>	<b>Loss of some peripheral riparian vegetation</b>	Status	-
<i>Receiving environment</i>	<b>Road crossings and along the servitude routes</b>		
	<i>Extent</i>	Site	
	<i>Intensity</i>	Medium	
	<i>Duration</i>	Medium term	
	<i>Probability</i>	Likely	
<i>Significance</i>	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times Weighting Factor$	

	(WOM)	$(2 + 3 + 3 + 3) \times 3 = 33$ Low to Medium
	With mitigation (WM)	$WOM \times ME = WM$ $33 \times 0.8 = 26.4$ Low - Medium
Significance With Mitigation (WM)	<b>LOW – MEDIUM</b>	
Irreversibility	Low	
Impact on Irreplaceable resources	NO	
Confidence level	Medium	

Source and Description of the Impact

The servitude may result in the loss of some peripheral riparian vegetation, particularly at road crossings, where necessary. The potential for the encroachment into the freshwater ecosystems is slightly lower for Alternative 2 than it is for Alternative 1. The density of drainage lines occurring along Alternative 2 is therefore less concentrated than it is for Alternative 1 and the impact is considered to be of a lesser significance.

Mitigation Measures

- No access roads should be constructed within 32m of a hill slope seepage wetland and/or seasonal pan, unless no alternative is possible; and
- If access roads must pass through drainage lines, the footprint should be as small as possible.

Significance of the impact

The extent of the impact is rated as site specific and the intensity is rated as medium as the affected area is altered, but functions and processes continue in a modified way. The impact will last up to the end of the development phases, where it will be entirely negated, thus the rating for the duration of the impact is medium term. The probability of the impact occurring is highly likely at some stage or another of the development phase and the significance of the impact prior to any mitigation measure having taken place is therefore rated as medium. The mitigation efficiency is rated as medium - high, resulting in the significance after mitigation measures having taken place being low - Medium.

4. Impacts on the Archaeological Heritage Resources:

Impacts to archaeological resources would take the form of excavations for pylons being placed and thus damage archaeological sites. It should be noted that archaeological sites are point occurrences and that the impacts will vary along the route. The majority of the route would have generally very low intensity impacts but in some areas where significant sites have been located these impacts could become more intense. Alternative 2 traverse closer to Rietpoort and its rock art sites as well as cross a potentially sensitive area in the south. The impact on Heritage Archaeological resources during the construction phase of the project is therefore considered to

be of a higher significance compared to Alternative 1.

\*Please note that the mitigation measures for this impact will be the same as for Alternative 1.

5. Loss of Avifauna breeding and roosting sites:

Some habitat destruction and alteration inevitably takes place during the construction of powerlines, substations and associated roadways. Also, powerline service roads or servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, and to prevent vegetation from intruding into the legally prescribed clearance gaps between the ground and the conductors. These activities have an impact on birds breeding, foraging and roosting in or in close proximity to the servitude, and retention of cleared servitudes can have the effect of altering bird community structure along the length of any given powerline.

Alternative 2 steers further away from the known Martial Eagle nest on an existing line just North of Hoekklip and is also marginally shorter than Alternative 1 (81.5km vs. 82km). Impacts associated with the construction of the Alternative 2 route is anticipated to yield slightly lower bird impacts and therefore considered to be of a lower significance.

\*Please note that the mitigation measures for this impact will be the same as for Alternative 1.

**OPERATIONAL PHASE**

**THE PROPOSED IMPACTS WILL BE THE SAME AS THAT FOR ALTERNATIVE 1 WITH THE EXCEPTION OF:**

**Direct Impacts:**

1. Increased electrocution of Avifauna:

Electrocution of avifaunal species may lead to the loss of the local biodiversity and / or the loss of endangered species. Avian electrocutions occur when a bird perches or attempts to perch on an electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. Electrocution risk is strongly influenced by the voltage and design of the powerlines erected, and mainly affects larger, perching species, such as vultures, eagles and storks, easily capable of spanning the spaces between energized components.

Alternative 2 is marginally shorter than Alternative 1 (81.5km vs 82km). Electrocution risk associated with the Alternative 2 route is anticipated to be slightly lower and is therefore considered to be of a lower significance.

\*Please note that the mitigation measures for this impact will be the same as for Alternative 1.

2. Increased risk for collisions of Avifaunal species:

Overhead powerlines pose a collision risk to all birds, but particularly collision prone birds are

generally either (i) large species and/or species with high ratios of body weight to wing surface area, which confers low manoeuvrability, (ii) species which fly at high speeds, (iii) species which are distracted in flight - predators or species with aerial displays, (iv) species which habitually fly in low light conditions, and (v) species with narrow fields of forward binocular vision.

Alternative 2 is marginally shorter than Alternative 1 (81.5km vs. 82km). Collision risk associated with the Alternative 2 route is anticipated to be slightly lower and is therefore considered to be of a lower significance.

\*Please note that the mitigation measures for this impact will be the same as for Alternative 1.

**3. Increased alteration of hydrology of drainage lines and wetlands:**

Increased erosion and alteration of hydrology of drainage lines and wetlands, as a result of the establishment of transmission line towers and access roads within or immediately adjacent to the identified freshwater ecosystems may occur within the servitude of the proposed powerline. Effective mitigation of impacts associated with the Alternative 2 route will be easier to achieve due to the lower density of drainage lines along the route compared to Alternative 1. Significance of the impacts associated with Alternative 2 is therefore considered to be of a lower significance.

\*Please note that the mitigation measures for this impact will be the same as for Alternative 1.

**Cumulative Impacts:**

**1. Increased visual impact of additional powerlines:**

**THE PROPOSED IMPACTS WILL BE THE SAME AS THAT FOR ALTERNATIVE 1**

**DECOMMISSIONING PHASE**

**THE PROPOSED IMPACTS WILL BE THE SAME AS THAT FOR ALTERNATIVE 1**

## No-Go Option

This option in the context of this project implies that the powerline, substation and switching station is not to be constructed and therefore assumes that a conservative approach is followed. This would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the authorities decline the application, the 'No-Go' option will be followed and the status quo of the site will remain. The natural areas where the proposed servitude will be located as well as the site for the construction of the substation and switching stations will remain intact. With the No-Go alternative being followed, no additional jobs will be created during the construction and possibly during the operational phase. The current unstable supply of electricity to the Zandkopsdrift mine is likely to inhibit or slow down the economic growth and development of the surrounding regions in the Medium - Long term. The need for stable and reliable power supply to meet current and future demand will outweigh the potential impacts to the surrounding environment. The Impacts to the surrounding environment is expected to be of low to medium significance, at best, and can be proactively mitigated to acceptable levels.

**Therefore the no-go alternative is not preferred.**

***\*\*Mitigation measures stated here represents the most important mitigation, but must be considered together with all the specifications and mitigations provided in the Environmental Management Programme developed for the proposed activities of the project.***

### 3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

#### Alternative1: Zandkopsdrift 132kV Eskom powerline route

As described in Section 2 above the impacts associated with the preferred alternative as a whole are:

#### Construction Phase:

	Impact	Significance After Mitigation
<b>DIRECT IMPACTS</b>		
	Increased soil erosion	Low
	Surface Water Contamination and degradation	Low
	Degradation of watercourses	Low-Medium
	Floral Destruction and Faunal Displacement	Low
	Increased Noise Generation	Low
	Increased Dust Generation	Low
	Increased occurrence of fires	Low
	Increased damage to farm roads	Low
	Increase in traffic volumes and associated congestion	Low
	Change in visual aesthetics	Low
	Soil Contamination	Low
	Increased domestic waste generation (Solid waste)	Low
	Loss of riparian vegetation along drainage lines	Low - Medium
	Increased risk of alien invasion for vegetation species	Low - Medium
	Loss of Avifauna breeding and roosting sites	Low - Medium
	Impacts on the Archaeological Heritage Resources	Low

	Increase in crime	Low
	Temporary Job Creation	Positive Impact
<b>INDIRECT IMPACTS</b>		
	Impact on the conservation status of vegetation within the CBA located adjacent to	Low - Medium
	Potential increase in HIV/AIDS in the area	Low - Medium
	Impacts on agriculture potential and expansion	Low

**Operational Phase:**

	<b>Impact</b>	<b>Significance After Mitigation</b>
<b>DIRECT IMPACTS</b>		
	Economic growth and development	High Positive impact
	Increased theft and vandalism	Low
	Increased risk of alien invasion for vegetation species	Low
	Increased electrocution of Avifauna	Low
	Increased risk for collisions of Avifaunal species	Low
	Increased alteration of hydrology of drainage lines and wetlands	Low
	Floral destruction and faunal displacement	Low
<b>INDIRECT IMPACTS</b>		
	Increased soil Erosion	Low
<b>CUMULATIVE IMPACTS</b>		
	Stimulation and Growth of the local economy	High Positive Impact
	Increased visual impact of additional powerlines in the vicinity of the proposed Hoekklip substation.	Low negative Impact

**Decommissioning Phase:**

	<b>Impact</b>	<b>Significance After Mitigation</b>
<b>DIRECT IMPACTS</b>		
	Waste generation	Low
	Soil contamination	Low significance
	Increased alteration of hydrology of drainage lines and wetlands	Low

It has been illustrated that with the implementation of the above mitigation measures and Environmental Management Programme, all the identified impacts can be mitigated to acceptable levels, thus allowing the proposed development to proceed. Impacts along both alternative routes are very similar with only a few differences in significance for some identified impacts. For one, Alternative 1 traverses further away from Rietpoort and its rock art sites as compared to Alternative 2. This route will also avoid crossing a potentially sensitive heritage area in the south completely.

Furthermore, the potential for the encroachment of infrastructure associated with the proposed powerline into the freshwater ecosystems is a lot higher for Alternative 1 than it is for Alternative 2 due to the higher density of drainage lines occurring along the route. Alternative 1 has an approximate 20 drainage crossings more compared to Alternative 2, therefore the significance of impacts occurring along this route is considered to be higher.

From an Avifaunal perspective, there are no appreciable differences in the relative sustainability of the two route alternatives. However, Alternative 1 traverse closer to the known Martial Eagle nest on an existing line just North of Hoekklip. This option will yield slightly higher bird impacts.

Environmental impacts associated with Alternative 1 can be successfully mitigated to acceptable levels if the recommended mitigation measures in the EMPr are adhered to. The total length of Alternative 1, impacts associated on the area's Avifauna, ecological and wetland resources have thus proven the most influential factor in concluding that this option is not preferred.

**Alternative 2 (preferred alternative): Zandkopsdrift 132kV Eskom powerline Preferred route**

**Construction Phase:**

The proposed impacts will be the same as that for alternative 1 with the exception of:

	Impact	Significance After Mitigation
<b>DIRECT IMPACTS</b>		
	Surface Water Contamination and degradation	Low - Medium
	Degradation of watercourses	Low - Medium
	Loss of riparian vegetation along drainage lines	Low - Medium
	Impacts on the Archaeological Heritage Resources	Low
	Loss of Avifauna breeding and roosting sites	Low - Medium

**Operational Phase:**

The proposed impacts will be the same as that for alternative 1 with the exception of:

	Impact	Significance After Mitigation
<b>DIRECT IMPACTS</b>		
	Increased risk for collisions of Avifaunal species	Low
	Increased electrocution of Avifauna	Low
	Increased alteration of hydrology of drainage lines and wetlands	Low
<b>CUMULATIVE IMPACTS</b>		
	Stimulation and Growth of the local economy	High Positive Impact
	Increased visual impact of additional powerlines	Low negative

**Decommissioning Phase:**

The proposed impacts will be the same as that for alternative 1.

It has been illustrated that the impacts associated with Alternative 2 (Preferred alternative) are very similar to that of Alternative 1, however there are a few exceptions. Alternative 2 will be the least expensive to construct due to it being marginally shorter in distance (81.5km vs. 82km). All rivers in the immediate vicinity of the proposed powerline are non-perennial and the wetlands are non-permanent in terms of their inundation and saturation period. The most natural aquatic ecosystems in the study area are highly ephemeral due to the extremely low and inconsistent rainfall in this arid region. Micro-siting of all tower structures will be discussed with landowners before installation of the structures commence.

The potential for the encroachment of infrastructure associated with the proposed powerline into the freshwater ecosystems is lower for Alternative 2 than it is for Alternative 1 due to the lower density of drainage lines occurring along the route. Alternative 2 has an approximate 20 drainage crossings less compared to Alternative 1, therefore the significance of impacts occurring along this route is considered to be lower.

From an Avifaunal perspective, there are no appreciable differences in the relative sustainability of the two route alternatives. However, Alternative 2 does steer further away from the known Martial Eagle nest on an existing line just North of Hoekklip. This option will yield slightly lower bird impacts.

Environmental impacts associated with Alternative 2 (preferred alternative) can be successfully mitigated to acceptable levels if the recommended mitigation measures in the EMP are adhered to. **Based on the reasons provided above, the Alternative 2 routing option is supported as being the most sustainable and preferred development option.**

#### **No-go alternative (compulsory)**

This option in the context of this project implies that the powerline, substation and switching station is not to be constructed and therefore assumes that a conservative approach is followed. This would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the authorities decline the application, the 'No-Go' option will be followed and the status quo of the site will remain. The natural areas where the proposed servitude will be located as well as the site for the expansion or construction of the substation and switching stations will remain intact. With the No-Go alternative being followed, no additional jobs will be created during the construction and possibly during the operational phase. The current unstable supply of electricity to the Zandkopsdrift mine is likely to inhibit or slow down the economic growth and development of the surrounding regions in the Medium - Long term. The need for stable and reliable power supply to meet current and future demand will outweigh the potential impacts to the surrounding environment. The Impacts to the surrounding environment is expected to be of low to medium significance, at best, and can be proactively mitigated to acceptable levels.

Therefore the no-go alternative is not preferred.