# PROPOSED ESKOM OPEN CYCLE GAS TURBINE POWER PLANT EXTENSION - MOSSEL BAY

## IMPACT ASSESSMENT FOR BIODIVERSITY

**PREPARED FOR NINHAM SHAND CONSULTING SERVICES, GEORGE**

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# 1. INTRODUCTION AND TERMS OF REFERENCE

## 1.1 INTRODUCTION

Ken Coetzee of *Conservation Management Services* was contracted by Mr Brett Lawson, representing Ninham Shand on behalf of their client Eskom, on the 18th of December 2006, to do an ecological impact study and assessment for the extension of the open cycle gas turbine (OCGT) power generation plant near Mossel Bay. (See Figure 1).

A botanical assessment of the OCGT site has already been done by botanist Nick Helme in August 2005 as part of the application for the already approved OCGT site. The present ecological assessment is based on Helme's report, but follows a more generally ecological approach, including the additional aspects of fauna, drainage and connectivity.

The site was visited on the 10th of January 2007 to collect biophysical and photographic information and the existing OCGT installation was inspected in the interests of possible further impact identification.

## 1.2 TERMS OF REFERENCE FOR IMPACT ASSESSMENT

### 1.2.1 ECOLOGICAL STUDY

- Describe the broad ecological characteristics of the site and its surrounds in terms patchiness, relative isolation of patches, connectivity, the need for corridors, disturbance and viability for long-term conservation.

- In terms of biodiversity pattern, identify or describe:

***Community and ecosystem level***

- The main animal habitat type, its extent and interaction with neighbouring types;
- The types of animal communities that occur in the vicinity of the site
- Threatened or vulnerable habitats.

***Species level***

- Identify Red Data species.
- The likelihood of other RDB species, or species of conservation concern, occurring in the vicinity.

***Other pattern issues***

- Determine the incidence of any significant landscape features or important vegetation associations such as seasonal wetlands, alluvium or seeps in relation to the fauna.
- The condition of the site in terms of current or previous land uses with particular reference to habitat transformation.

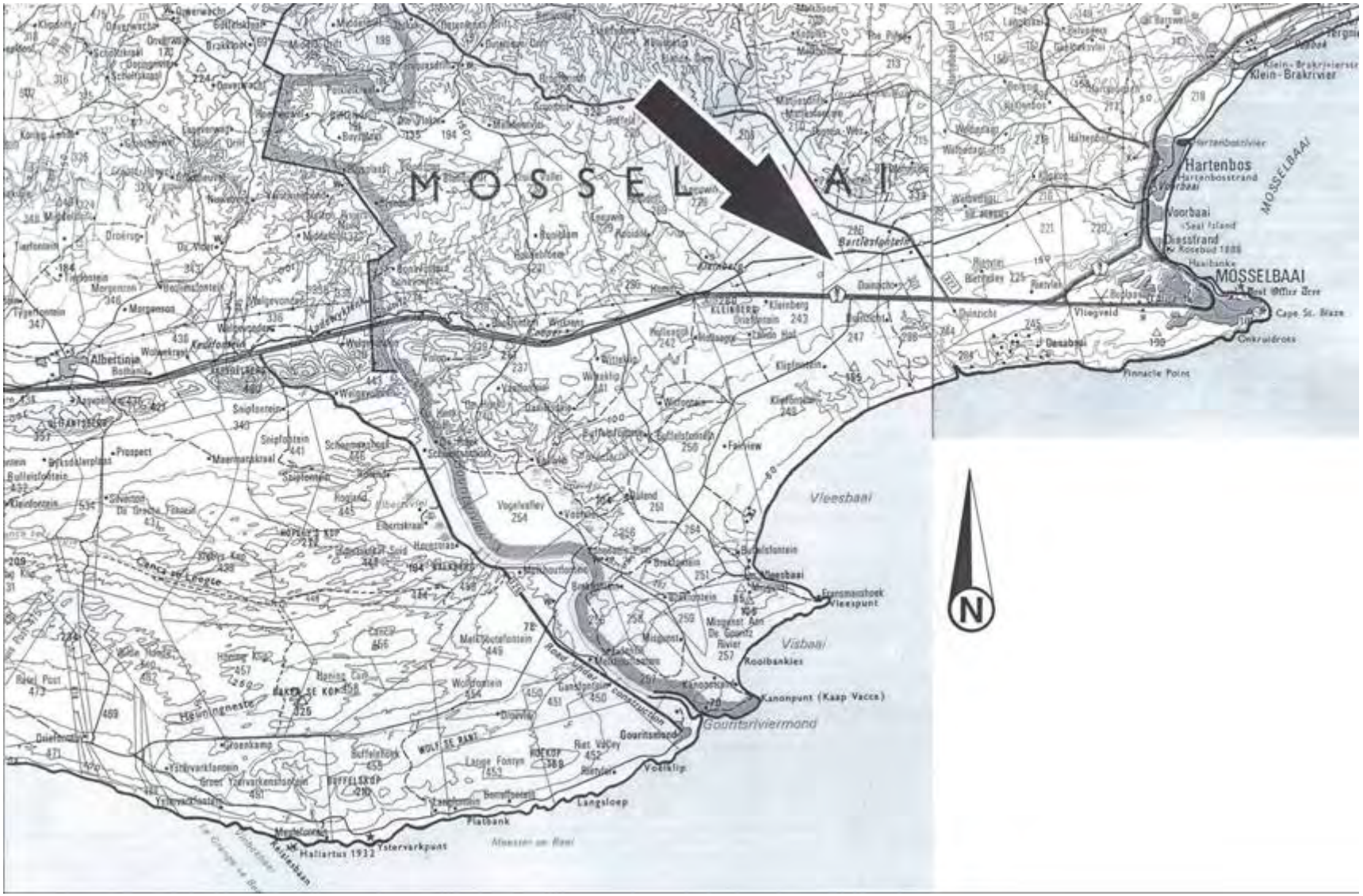


**FIGURE 1: LOCALITY OF THE OCGT STUDY AREA ON THE SOUTH CAPE COASTAL PLAIN.**

- In terms of biodiversity process, identify or describe:

  - The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.
  - Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes).
  - Any possible changes in key processes e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.

- Would the site or neighbouring properties potentially contribute to meeting regional conservation targets for both biodiversity pattern and ecological processes?

## 1.2.2 IMPACT ASSESSMENT

A report is required that briefly describes vegetation, fauna and fauna habitat. The impact assessment will need to consider the potential negative as well as positive impacts that would result from the proposed development and should include measures to mitigate the negative impacts.

The report must include all aspects that will impact on the vegetation and fauna (e.g. ecological disturbance) together with future management recommendations that would be included in the Environmental Management Plan.

## 1.2.3 CRITERIA FOR ASSESSMENT

The EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989 list the following criteria, which must be used in the assessment:

- Nature of the impact
- Extent of the impact
- Duration of the impact
- Intensity of the impact
- Probability of occurrence.
- Significance of impact
- Confidence of prediction.

## 1.2.4 METHODOLOGY USED FOR THE STUDY AREA

The methodology used to predict occurrence and the degree of impact that the proposed development may have on the study site is as follows:

a) Identify and describe the vegetation units and fauna habitats based on detailed field evaluation.
b) Determine faunal occurrence on site. (Vegetation has already been done).
c) Examine fauna sensitivity (Red Data species).

d) Assess impacts on fauna and fauna habitat.
e) Determine mitigatory measures for impacts.
f) Examine vegetation and fauna occurrence and sensitivity in a landscape context (corridors).
g) Make recommendations in terms of vegetation and fauna impacts and habitat conservation.

**SHORTCOMINGS (OR LIMITATIONS) OF THE METHODOLOGY APPLIED**

Shortcomings of the listed methodology include the following:

a) Faunal occurrence can only be predicted, using the best information available. Presence within the study area is thus an estimate based on known distribution data, habitat preference data, as well as personal observation and experience.

b) The estimates of occurrence of fauna within a particular habitat type do not specify whether occupation is full-time, part-time or occasional. The importance of each habitat was thus estimated based on permanent occupation.

c) Many animals adapt relatively easily to anthropogenic disturbance. It is not known to what extent each species will be disturbed by the proposed developments. Judgements were made based on the published literature for the vertebrate groups and estimates of the severity of the likely impacts. This evaluation is thus completely subjective, but it is based on published information and experience.

d) Up-to-date general distribution data for reptiles is not available (currently under review).

e) Red-listing for reptiles is out of date (currently under review).

f) Very little is actually known about the efficacy of landscape corridors. We do have published literature to use as a foundation for our estimates, very little if any, of which relates to South African or Southern Cape conditions.

g) The ultimate severity of the impacts can only be estimated using past experience as a reference.

The results of the investigations, determinations and assessments are contained within the following chapters of this assessment report.

# 2. DESCRIPTION OF THE STUDY SITE

## 2.1 TOPOGRAPHY AND SITE LAYOUT

Figure 2 shows the schematic layout of the study area, the boundaries and dimensions of which were taken from aerial photography. (See Appendix 1). The exact size and position of the current OCGT site are estimates. Topographically, the area is relatively flat. A low watershed lies along the northern edge of the study area with most of the drainage of surface runoff or subsurface water off the study area being to the south.

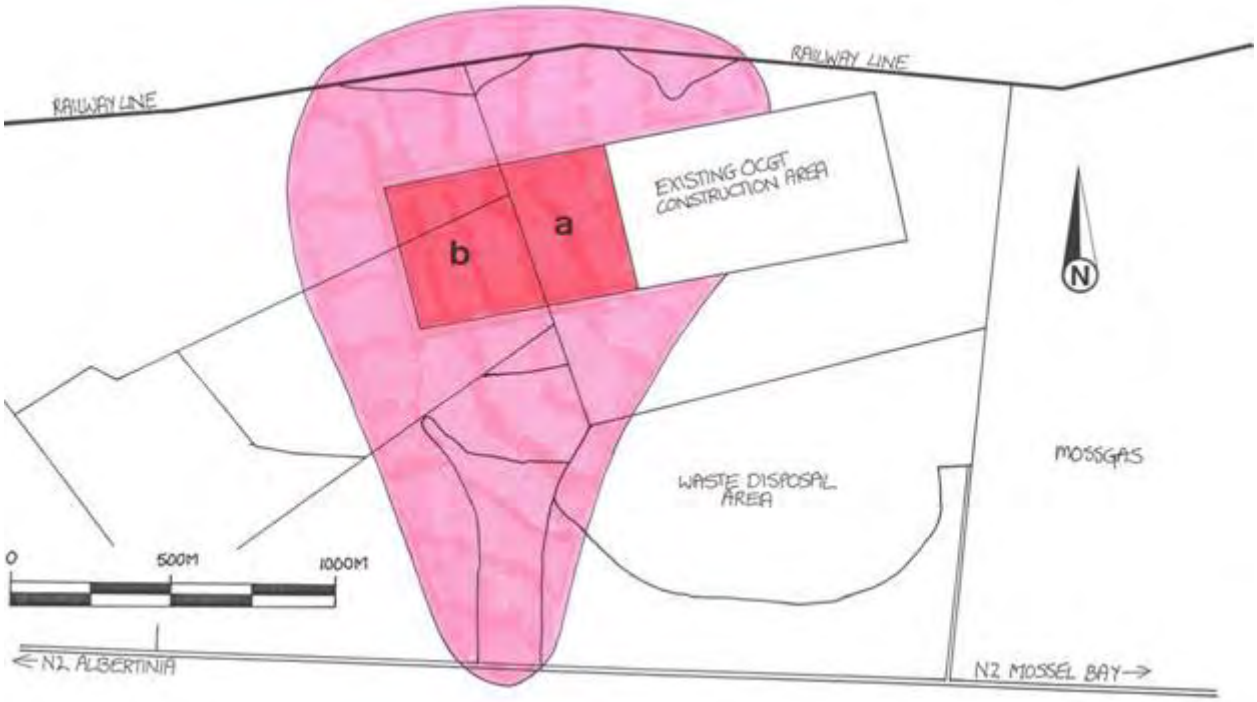


**FIGURE 2: SCHEMATIC LAYOUT OF THE OCGT EXTENSION AREA - SHOWING IT AS A CORE AREA OF THE GREATER ECOLOGICAL STUDY AREA.**

**Greater study area**

**OCGT EXTENSION AREA:**

**a** **Cleared area for which an ROD has already been issued**

**b** **Area for which an application is to be made - core study area**

## 2.2 ECOLOGICAL COMPONENTS AND LANDSCAPE FEATURES

### 2.2.1 NATURAL VEGETATION

Helme (2005) described the vegetation of the greater study area in detail as part of the original application process for the OCGT installation which is currently under construction. Helme classified all of the natural vegetation patches, as shown in Figure 3, as having a high botanical sensitivity. With reference to Helme (2005), the individual areas of natural vegetation can be summarised as follows: (See Figure 3).


**FIGURE 3: VEGETATION OF THE STUDY AREA**

**Unploughed fence-line belt**

**Cultivated wheatlands and pastures**

**Transformed areas**

**Renosterveld remnants**

**Drainage wetland**

**Natural Vegetation**

**Highly transformed/disturbed/cleared**

***SITE 1:*** **NATURAL WETLAND AREA:** The vegetation is of moderate conservation significance. It consists of a drainage line which has been transformed with an earth dam and livestock grazing. The vegetation is dominated by grasses and sedges and pioneer thicket shrubs like *Rhus lucida, Grewia occidentalis* and *Diospyros dichrophylla*. (See Plate 1). The vegetation is currently dense and rank and the drainage well stabilized and protected against flash-flooding. This site is an important habitat for amphibians, birds, small mammals and reptiles. (See Section on fauna).

**PLATE 1: The natural wetland south of the OCGT extension area. Note dense ground and drainage channel cover and dense shrub cover.**

***SITE 2*: REMNANT SHALE RENOSTERVELD PATCH:** This small "triangle" of untransformed vegetation is dominated by a dense stand of Red Data-listed *Bobartia robusta* (blombiesie) and a number of typical renosterveld dwarf shrubs such as *Indigofera alopecvroides* and *Eriocephalus africanus.* A few small, low thicket patches also occur. Ground cover consists of a variety of grasses including *Hyparrhenia hirta, Cynodon dactylon* and *Sporobolus africanus*. (See Plate 2). This patch is classed as having a moderate local and regional conservation value.

**PLATE 2: Remnant shale renosterveld patch, dominated by the Red Data-listed *Bobartia robusta*. This patch is marked '2' in Figure 3.**

***SITE 3*: REMNANT SHALE RENOSTERVELD PATCH:** This patch occurs within a 10m wide belt immediately south of the railway line. Species diversity is reduced due to heavy utilization by livestock but still includes the following species:
*Barleria pungens, Gnidia laxa, Gerbera piloselloides, Pycreaus polystachyos, Hermannia saccifera, Aspalathus hispida, Drimia capensis* and *Scabiosa columbaria*.

Grasses include *Cynodon dactylon, Digitaria velutina, Sporobolus fimbriatus* and *Sporobolus africanus*. This patch has a moderate local and regional conservation value.

***SITE 4*: REMNANT SHALE RENOSTERVELD PATCH:** This patch is considered to be sensitive and is similar to Site 2 in that it is dominated by the Red Data-listed *Bobartia robusta*. Other species include *Rhus lucida, Metalasia pungens, Cynodon dactylon, Hypoxis setosa* and *Falckia repens*. Numerous geophytes are likely to be common, some of which may be rare or localised (endemic). This site has a very high local and regional conservation value.

**UNPLOUGHED FENCE-LINE BELT:** An unploughed belt (±3 - 4m wide) of relatively natural vegetation cover occurs along all of the fence-lines on both sides. The plant cover indicates disturbance, consisting mostly of grasses and dominated by *Eragrostis curvula* and *Cynodon dactylon*. Occasional patches of low shrubs, including *Lycium cinereum* (kriedoring), *Rhus lucida* and *Diospyros dichrophylla* occur sporadically along the fence-lines and are important refuges for a variety of animal life. (See the section on fauna). This area has a low conservation significance in botanical terms, but is of local importance to fauna. The soils of the unploughed belt are loose as a result of prolific mole-rat activity. (See Plates 3 & 4).

**PLATES 3 & 4: The unploughed fence-line belt with a cover of indigenous grasses and few shrubs. Note the molerat activity in Plate 4.**

**TRANSFORMED WHEAT FIELD AREA:** This area is regularly ploughed over in preparation for grain cropping. Currently it sports harvested grain stubble, kweekgras and a variety of weeds. These areas have a very low local and regional conservation value, in terms of both vegetation and fauna. (See Plates 5 & 6).

**PLATES 5 & 6: The completely transformed wheat field area (left) shows a habitat with poor diversity. The pasture (right) shows a cover of *Cynodon dactylon* grass and nothing else within the field.**

In summary, the vegetation landscape of the study area can be described as follows:

| | HABITAT | HABITAT SENSITIVITY |
|---|---|---|
| Study area – Natural vegetation | Remnant Renosterveld patches | Sensitive and moderate to high biodiversity conservation value |
| Study area – Natural vegetation | Wetland/ Drainage | Sensitive and moderate bio-diversity conservation value |
| Study area – Transformed vegetation | Fence-line belt | Low conservation significance for plants, moderate for fauna |
| Study area – Transformed vegetation | Wheatlands | Very low biodiversity conservation significance |

## 2.2.2 VERTEBRATE FAUNA

The study area consists largely of highly transformed habitats, the effect of which has been the reduction of both plant species and habitat diversity. The original diverse renosterveld thicket vegetation has been largely replaced with an agricultural monoculture crop cover, ephemeral weeds and grasses. In addition, most of the vegetation "architecture" was also reduced, resulting in a single strata of low habitat potential. Only very small remnants, themselves modified through livestock impact, remain in the area.

**A. BIRDS:**

Birds attracted to open croplands such as white storks, Stanley's bustard, blue cranes, rock pigeons and Egyptian geese are a feature of transformed agricultural habitats. All four species have been observed in the general area, but not within the study area. On the study area, sign was found of intensive guinea fowl activity (sand bathing holes, faeces, scratching, feathers and hides in low scrub). A flock was observed on the study area as well, within the unploughed fence-line belt.

Within the crop stubble, pipits (probably the grassveld pipit) were observed. These birds are typical of transformed and open habitats.

Frequent use is made of fence poles by small birds of prey, using them as feeding perches, resting or prey spotting points. The remains of a rodent prey were found at the base of such a feeding perch. Ubiquitous birds of prey such as black-shouldered kite, rock kestrel and steppe bustard are most likely to make use of the site, being attracted by the high population of rodents. The much rarer black harrier is also known to occur in the general area.

Fiscal shrikes were observed to use the fence poles as hunting observation perches, from which to dart down onto locusts and other prey.

The nests of a number of small passerine birds were located in thorny shrubs (*Lycium*) along the fence-lines. These sites are likely to appeal to cisticolas, chats and prinias, all of which were observed in the general area.

**B. MAMMALS:**

Dominant mammals are undoubtedly rodents - the tunnels, runs and holes of which can be found throughout the unploughed fence-line belt. The African molerat is probably responsible for all the soil-turning and their activities are observable everywhere except within the ploughed lands. (See Plate 4). The primary rodent is the vlei rat which creates extensive tunnel runways under dense grassy cover. Feeding sites and droppings further identify this animal and a skull found below a bird feeding perch confirms the identification. (See Plate 7).

**PLATE 7: Vlei rat runways and feeding sites in the low shrubs in the fence-line belt areas.**

The burrow systems of one of the gerbils, most likely the hairy-footed gerbil, were also located. Large rock piles at the corners of ploughed lands create favourable refuges for a variety of other rodents which may include the pouched mouse and pygmy mouse, both of which typically use similar habitats in the general area. (See Plate 8).

**PLATE 8: One of the stone piles (removed from ploughed area and stockpiled in the fence-line belt) of the study area, providing cover and habitat for a variety of small animals.**

## C. HERPTILES:

Two common padloper tortoises were observed within one of the remnant renosterveld patches (Site 2 in Figure 3), further showing the importance of these patches for the local conservation of remnant nature. (See Plate 9). The rock piles also provide good refuges for geckos, lizards and snakes. The mole snake is sure to occur on the site as it is the primary predator of the abundant mole rats.

PLATE 9: The common padloper (parrot-beaked tortoise) which occurs in patches of remnant natural vegetation.

## D. FAUNA SUMMARY AND SENSITIVITY:

The following Table lists the species discussed and provides an indication of sensitivity status:

| SPECIES | SCIENTIFIC NAME | SENSITIVITY STATUS * |
|---|---|---|
| White stork | *Ciconia ciconia* | Not listed in Red Data book |
| Blue crane | *Anthropoides paradiseus* | Listed in Red Data book category: Vulnerable |
| Stanley's bustard | *Neotis denhami* | Listed in Red Data book category: Vulnerable |
| Egyptian goose | *Alopochen aegyptiacus* | Common and widespread |
| Rock pigeon | *Columba guinea* | Common and widespread |
| Guinea fowl | *Numida meleagris* | Common and widespread |
| Grassveld pipit | *Anthus cinnamomeus* | Common and widespread |
| Black-shouldered kite | *Elanus caeruleus* | Common and widespread |
| Steppe buzzard | *Buteo buteo* | Common and widespread |
| Rock kestrel | *Falco tinnunculus* | Common and widespread |
| Black harrier | *Circus maurus* | Near-threatened |
| Fiscal shrike | *Lanius collaris* | Common and widespread |
| Fan-tailed cisticola | *Cisticola juncidis* | Common and widespread |
| Spotted prinia | *Prinia hypoxantha* | Common and widespread |
| Familiar chat | *Cercomela familiaris* | Common and widespread |
| African molerat | *Cryptomys hottentotus* | Common and widespread |
| Vlei rat | *Ottomys irroratus* | Common and widespread |
| Hairy-footed gerbil | *Gerbillurus paeba* | Common and widespread |
| Pouched mouse | *Saccostomys campestris* | Common and widespread |
| Pygmy mouse | *Mus minutoides* | Common and widespread |
| Common padloper (parrot-beaked tortoise) | *Homopus aerolatus* | Common and widespread |

**TABLE 1: Summary of the fauna likely to occur on or near to the study area and their sensitivity classification.**
***Birds: Barnes (2000)**
***Mammals: Friedman & Daly (2004)**
***Reptiles: Boycott & Borquin (2000).**

From the above discussion on fauna, it is clear that the very restricted study area is unlikely to permanently and exclusively provide habitat for any sensitive fauna. The Red Data-listed blue crane, Stanley's bustard and black harrier would only make occasional use of the study area, if at all. Their habitat requirements include extensive ranges. The loss of potential habitat on the study area should thus not impact negatively on local populations of these species.

The other species (molerats, vlei rats, etc) will be displaced by the extensions of the OCGT development, but suitable habitat will continue to surround the OCGT development area. In fact, it is mostly cultivated land that will be lost and this does not represent the most generally favoured habitat for fauna.

The common padloper is a Cites Appendix 11 species, but they occur in all unmodified natural habitat patches and the area in which they were found is, in any case, not within the OCGT extension area. The patches of remnant natural habitat should, however, be considered for both habitat and fauna conservation.

## 2.2.3 PRECIPITATION, DRAINAGE AND RUNOFF

The annual rainfall for the OCGT project area (Mossel Bay) is approximately 400 - 600mm with monthly averages ranging from 28 - 40mm. Figure 4 shows the drainage patterns for the study area. A low watershed lies along the northern edge of the study area just south of the railway line. This results in a southward flow of all rainfall runoff on most of the study area. The OCGT extension area thus drains to the south. The study area has deep, sandy soils which largely eliminate overland runoff.

There are no discernable drainage lines that connect the OCGT extension area with the drainage line to the south. (See Figure 4). It appears that in historical times, the study area itself was, in fact, the catchment for the minor drainage line that connects with the Blinde River south of the N2. (See aerial photograph in Appendix 1).

Runoff from the OCGT extension area is currently controlled by the contour ploughing and banking that was created when the wheat field was first laid out. The result of this is that any runoff is spread and dispersed for better infiltration along numerous contours, rather than channelled. As there are no drainages, gulleys or rills across the study area, it is clear that this management of runoff water is effective.

The OCGT extension will result in hard surfaces which will harvest and accumulate runoff through reduced infiltration (into the soil). This accumulated runoff will be channelled back to a dual system of holding ponds that will accommodate runoff for the area currently under construction.

There will thus be no additional or accelerated or accumulated runoff from the OCGT extension area, as it will be channelling into the above runoff management system.

Until the runoff management system is in place (ie: during the early construction phase), unpolluted runoff from the OCGT extension area can simply be spread as is currently the case, for natural infiltration. This can be via the wheat fields, or it can be spread either north or south of the existing OCGT site.

If there is the potential for contamination or any other contaminants in the runoff, then the same measures applicable to the existing OCGT site for pollutants must be applied within the OCGT extension area.

Runoff water management must, however, eventually be via the ponding system currently approved for the existing OCGT site.

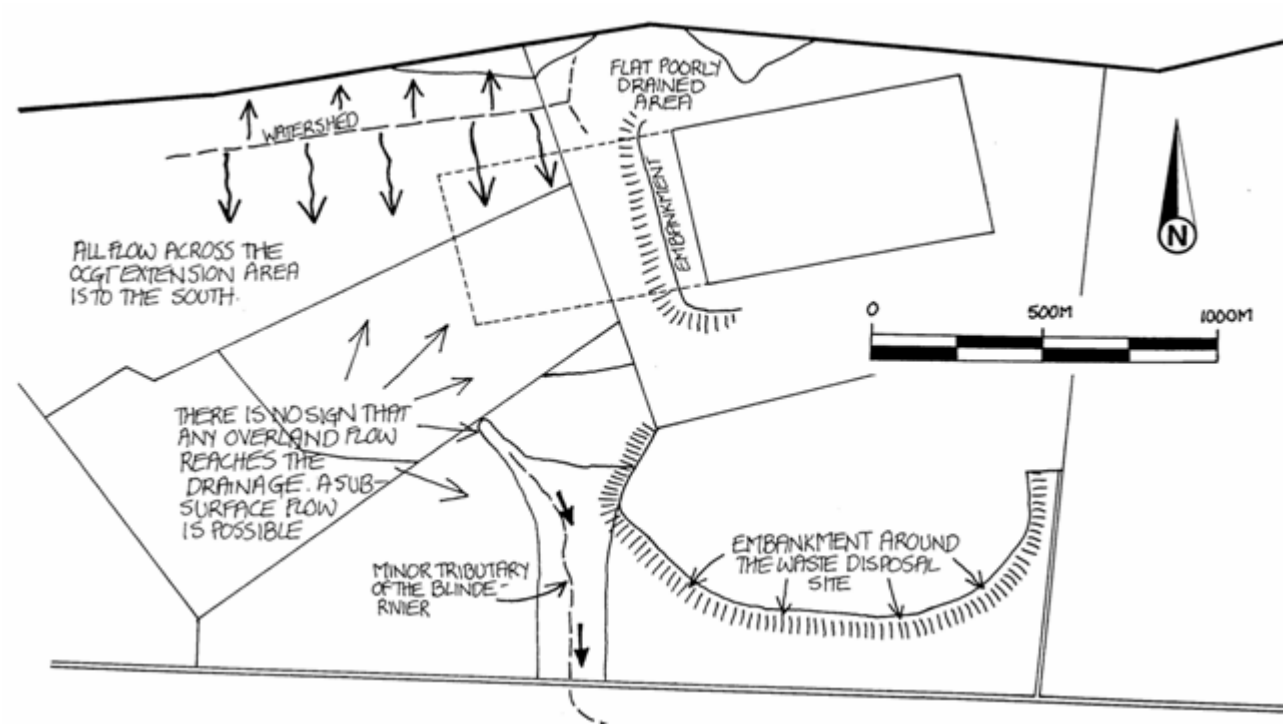


**FIGURE 4: THE DRAINAGE PATTERNS OF THE STUDY AREA.**

With these measures in place, it is unlikely that the Blinde River will in any way be impacted by the OCGT extension project, either through accelerated runoff, the lack of runoff or pollution.

## 2.2.4 LANDSCAPE CONNECTIVITY

The natural habitat patches of the study area are discontinuous and fragmented. There are thus no useful corridors that link Areas 1, 2, 3 & 4. (See Figure 5). These natural habitat patches are isolated by the highly transformed wheat fields and cleared areas around the existing OCGT site.

An extension of the OCGT site to the west will thus not permanently cut off or disrupt any important or critical existing corridor.

The unploughed fence-line belt areas, although also transformed habitat, could be viewed as better connecting habitat than the wheat fields and will again develop naturally around the outer edges of the OCGT extension area on completion of the new OCGT boundary fencing.

The OCGT extension will thus not disrupt any important landscape connectivity in the study area.

At the northern edge of the study area, a row of alien Eucalyptus trees occurs for some distance along the railway line. Although alien, these trees nevertheless form a useful corridor for a number of birds that rest or roost in trees (eg: guineafowl and small raptors). This artificial corridor will not be impacted in any way by the OCGT extension.

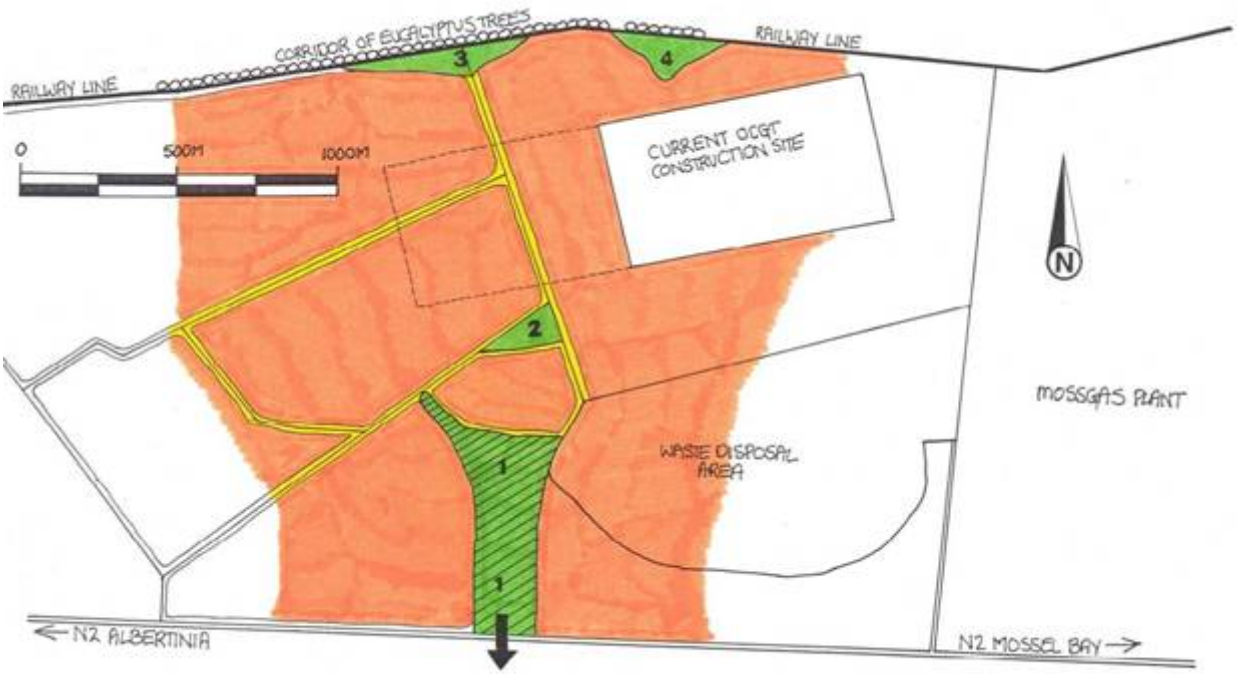


**FIGURE 5: LANDSCAPE CONNECTIVITY WITHIN THE STUDY AREA**

**Unploughed fence-line belts which offer some potential for fauna connectivity**

**Transformed areas of low potential for connectivity**

**Remnant patches of natural habitat**

**Only area of natural habitat that is still functionally connected (to the Blinde River)**

# 3. ASSESSMENT OF LIKELY IMPACTS

Based on the preceding review of ecological characteristics, the estimated impacts are as follows: Each potential impact is discussed separately and where relevant, mitigatory measures are recommended. Each of the impacts are individually evaluated in Appendices 2 - 6.

## 3.1 IMPACT 1: THE OCGT EXTENSION MAY IMPACT ON SENSITIVE NATURAL VEGETATION. (See Appendix 2).

Helme (2005) has shown that remnant patches of untransformed natural vegetation in the area are sensitivity and contain Red Data plant species. These patches have a moderate to very high local and regional conservation value. Development of any kind may destroy, disrupt or indirectly impact on these sensitive patches. (Indirect impacts relating to runoff are dealt with separately).

**MITIGATION:**

The area required for the OCGT extension is relatively small and consists entirely of transformed wheatlands. It fits in between two of the sensitive natural vegetation patches with room to spare. There will thus be no loss of natural vegetation, only a reduction of productive wheatland.

## 3.2 IMPACT 2: THE OCGT EXTENSION MAY IMPACT ON SENSITIVE VERTEBRATE FAUNA. (See Appendix 3).

Although not recorded within the study area, three Red Data-listed birds do occur in the general area. Two species (Stanley's bustard and blue crane) are classed as vulnerable and one (black harrier) as near-threatened in the Red Data Book for birds (Barnes, 2000). The common padloper tortoise also occurs in the study area, although not Red Data Book-listed, it is nevertheless a regionally endemic species and is listed as a Cites Appendix 11 species. Species with narrowly specialised habitat like the African mole rat will be impacted.

**MITIGATION:**

- The local Stanley's bustard, blue crane and black harrier populations will not be significantly impacted by the OCGT expansion, because the habitat on which the extension will take place is transformed wheatland, which is only secondary habitat for these birds. Extensive areas of wheatland will remain around the OCGT project area.

- The affected area is too small to support viable populations of either Red Data bird species. It is too small to sustainably support even single individuals of the three species, all of which use extensive ranges.

- The common padloper tortoise population is dependent on remnant renosterveld habitat patches for its survival. The transformed wheat land areas do not constitute suitable habitat for the tortoises and only wheat land will be impacted by the OCGT extension.

- The African molerat, although a narrow habitat specialist, is nevertheless a widespread and common small mammal that makes use of a great variety of subterranean habitat types. The OCGT extension will displace individuals of the local population, but it will not have any permanent significant effect on the conservation of the species locally, because extensive continuous suitable habitat is available throughout the coastal plain landscape.

## 3.3 IMPACT 3: THE OCGT EXTENSION MAY IMPACT ON THE DRAINAGE WETLAND TO THE SOUTH OF THE SITE. (See Appendix 4).

Helme (2005) identified the drainage wetlands of the study area as sensitive vegetation types. He stated that the botanical conservation value is low to moderate, but that the wetland areas have greater ecological value as habitat for a wide variety of amphibians, invertebrates and birds. The wetland south of the OCGT extension area represents the upper catchment area for the drainage which extends southward, under the N2, to join the Blinde River south of the N2. It is densely vegetated with typical wetland sedges and grasses and pioneer thicket shrubs. The cover is dense and the drainage channel well stabilized and protected against scouring floods. The concern is that the OCGT extension may disrupt runoff patterns resulting in pollution or changes within the wetland area and ultimately, the Blinde River lower down.

**MITIGATION:**

- Runoff from the study area is currently adequately spread along artificial ploughed contours. This, combined with the porous sandy soil, currently eliminates overland flow into the wetland.

- Hard surface runoff from the OCGT site will be channelled into the runoff treatment system that has already been approved for the existing OCGT site. There will thus be no excess accumulated or accelerated flow into the wetland area.

- Pollutants (mineral or chemical) must be controlled via a system of specially constructed containment dams or ponds. There will thus be no polluted flow towards the wetland. Pollution of the sub-surface flow must be prevented as approved for the existing OCGT site (ie: sealed containment of spills).

## 3.4 IMPACT 4: THE OCGT EXTENSION MAY DISRUPT OR FRAGMENT EXISTING ECOLOGICAL CORRIDORS. (See Appendix 5).

Connectivity between patches of natural habitat is critical for ecological services such as pollination, dispersal and genetic interchange. The concern is that the OCGT extension may disrupt or eliminate existing corridors.

**MITIGATION:**

- The remnant patches of natural habitat of the study area are already discontinuous and isolated. There are no natural corridors, only transformed habitat in between the patches.

- The only options for the continuation of ecosystem services between natural habitat islands are the unploughed fence-line belts. The OCGT extension will not remove this limited life-line, it will replace it with a new "unploughed" fence-line belt around the new boundary of the OCGT extension. A new unploughed belt will then develop between the farmland ploughed area and the OCGT boundary fence.

- Overland connectivity by winged animals (birds, bats and invertebrates) will, to some extent, be displaced by the OCGT installation, but can continue beyond it and all around it. The OCGT extension may thus result in the disruption of certain local direct "air" routes, but movement can continue all around it. The OCGT installation will not disrupt any known "flyway" or other important known bird migratory route.

## 3.5 IMPACT 5: CERTAIN IMPORTANT MICRO-HABITATS WILL BE LOST. (See Appendix 6).

Important micro-habitats for fauna, such as stone piles and fence-line shrub clumps and grass cover and fence pole raptor perches will be permanently lost due to the OCGT extension. The concern is that micro-habitat loss will result in a biodiversity reduction. (These micro-habitats occur within the unploughed fence-line belt areas).

**MITIGATION:**

- Micro habitat created by clumps of shrubs and grasses along the fence-lines will re-establish naturally and quickly along the new outer boundary of the OCGT extension, as is the case with all other fence-lines around ploughed lands in the area.

- Small raptor perches (fence poles) will be re-positioned along the new OCGT extension boundary and can continue to be used for resting, spotting and feeding by these (and other) birds.

- Locally indigenous shrubs and grasses can be established along the new fence-line in order to advance the availability of habitat cover (both sides of the fence).

- The single stone pile that will be affected by the extension can simply be moved to a new site at another spot along the fence-line. This site can either be north or south of the extension or it can be put along the new fence-line boundary of the extension.

- The OCGT boundary fence will provide bird perches. If the specifications are not suitable, then wooden poles can be specifically planted for perching raptors.

# 4. DISCUSSION

From this assessment it can be concluded that:

i. The proposed OCGT extension is predicted to have a very low impact on the remnant patches of sensitive renosterveld vegetation.

ii. The OCGT extension is predicted to have a very low impact on sensitive as well as more common resident vertebrate fauna.

iii. The OCGT extension is predicted to have a completely neutral (negligible) impact on the drainage tributary of the Blinde River, which lies to the south of the proposed development area. This is provided that the recommended mitigatory measures are effectively implemented.

iv. The proposed OCGT extension is predicted to have a neutral (negligible) impact on ecological corridors. No critical or even useful natural corridors exist on the study area. The only possible corridor, although also a transformed habitat, will quickly establish itself around the extension area, and will thus not be permanently lost. The status-quo will thus be maintained.

v. The OCGT extension will not significantly result in the loss of any important micro-habitat features. (Estimated impact is neutral). Those that are affected can simply be moved (stone piles) or re-established (shrubby/grassy fence-line belt).

# 5. CONCLUSION AND RECOMMENDATIONS

## 5.1 CONCLUSION

Ecological habitat components, for both vegetation and vertebrate fauna were investigated. Sensitive remnant renosterveld and wetland patches were found to be impacted by livestock grazing and also discontinuous and fragmented from each other.

A brief fauna study revealed that 3 species, birds that may make occasional use of the study area, are listed as vulnerable in the South African Red Data Book for birds. The balance of the fauna considered likely to occur on the site is common and widespread.

Impact assessment evaluation (Appendices 1 - 5) revealed that overall impact of the OCGT extension project will be very low or neutral. The ecological components evaluated were vegetation, fauna, drainage, landscape connectivity and loss of micro-habitat.

A number of mitigatory measures have been recommended. Diligent application of these measures will ensure that overall impact remains very low and thus negligible.

It can be concluded that the proposed OCGT extension is predicted to have little or no negative ecological impact on the environment in which it will be built.

## 5.2 RECOMMENDATIONS

i. All of the hard surface runoff that will originate from the OCGT extension installation must be channelled to the runoff water management system which has already been approved for the existing OCGT power plant installation.

ii. During the construction phase, and before final runoff water management infrastructure is in place, any excess runoff that may occur can simply be spread via the contour berms that are already in place in the wheatland area. Care must be taken to “arrest” overland runoff flow and prevent any downslope channelling of accumulated water which may cause soil erosion or siltation of the wetland area.

iii. The potential of pollutant (diesel fuel and other chemicals) spills reaching the drainage runoff management system (or groundwater) must be prevented by providing an alternative specially sealed containment dams or ponds for spill containment. This is relevant to the large volumes of diesel fuel that will be stored on site.

iv. Stone piles that will be lost in the OCGT construction phase must be moved to a site beyond the influence of the construction activities. The stone pile must be established in a similar site to the original, ie: within the fence-line belt.

v. Although the unploughed fence-line belt is an artificial habitat, it is nevertheless a useful corridor for fauna movement. These fence-line belts should be retained as they are the only connection between the remnant renosterveld and wetland patches. The belts can be improved by the establishment of locally occurring shrubs, renosterveld dwarf shrubs and grasses.

vi. Reconstruct the new OCGT extension boundary fence to similar specifications as at present (ie: use of wooden poles). If other specifications are necessary then single wooden poles (1,4m high) can be planted along and next to the new fence to serve the needs of perching raptors. These poles should be about 2m away from the boundary fence.

vii. The drainage wetland south of the OCGT extension site should be visually monitored, particularly during periods of heavy precipitation. Regular inspection is necessary. The inspection should focus on the formation of new overland drainage channels with their source in the OCGT extension site. These inspections will help to guide the need for further action. Fixed-point photographic monitoring is recommended.

# 6. REFERENCES


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**APPENDIX 1 : AERIAL PHOTOGRAPH OF THE LANDSCAPE AROUND THE PROPOSED OCGT EXTENSION AREA**

# APPENDIX 2

| IMPACT NO 1 | THE OCGT EXTENSION MAY IMPACT ON SENSITIVE NATURAL VEGETATION | | | |
|---|---|---|---|---|
| NATURE OF IMPACT | Negative | | | |
| STAGE | CONSTRUCTION PHASE | | OPERATIONAL PHASE | |
| DEVELOPMENT OPTION | 1<br>NO-GO OPTION | 2<br>PROPOSAL | 1<br>NO-GO OPTION | 2<br>PROPOSAL |
| EXTENT | Site-specific | Site-specific | Site-specific | Site-specific |
| DURATION | N/A | Construction period | Medium term | Medium term |
| INTENSITY OR MAGNITUDE | Zero | Very low | Zero | Very low |
| PROBABILITY | Unlikely | Unlikely | Unlikely | Unlikely |
| SIGNIFICANCE | Neutral | Very low | Neutral | Very low |
| CONFIDENCE | Certain | Certain | Certain | Certain |
| MITIGATION & MITIGATORY MEASURES | N/A | - The OCGT extension phase does not overlap with any area of untransformed natural vegetation | N/A | - The OCGT extension phase does not overlap with any area of untransformed natural vegetation |
| LEVEL OF SIGNIFICANCE AFTER MITIGATION | N/A | Very low | N/A | Very low |

# APPENDIX 3

| IMPACT NO 2 | THE OCGT EXTENSION MAY IMPACT ON SENSITIVE VERTEBRATE FAUNA | | | |
|---|---|---|---|---|
| **NATURE OF IMPACT** | **Negative** | | | |
| **STAGE** | **CONSTRUCTION PHASE** | | **OPERATIONAL PHASE** | |
| **DEVELOPMENT OPTION** | **1 NO-GO OPTION** | **2 PROPOSAL** | **1 NO-GO OPTION** | **2 PROPOSAL** |
| **EXTENT** | Site-specific | Site-specific | Site-specific | Site-specific |
| **DURATION** | N/A | Construction period | N/A | Medium term |
| **INTENSITY OR MAGNITUDE** | Zero | Low | Zero | Low |
| **PROBABILITY** | Unlikely | Possible | Unlikely | Possible |
| **SIGNIFICANCE** | Neutral | Very low | Neutral | Very low |
| **CONFIDENCE** | Certain | Sure | Certain | Sure |
| **MITIGATION & MITIGATORY MEASURES** | N/A | - Small area affected<br>- Only transformed habitat affected<br>- No natural habitat affected<br>- Extensive alternative habitat available | N/A | - Small area affected<br>- Only transformed habitat affected<br>- No natural habitat affected<br>- Extensive alternative habitat available |
| **LEVEL OF SIGNIFICANCE AFTER MITIGATION** | N/A | Very low | N/A | Very low |

# APPENDIX 4

| IMPACT NO 3 | THE OCGT EXTENSION MAY IMPACT ON THE DRAINAGE WETLAND TO THE SOUTH OF THE SITE | | | |
|---|---|---|---|---|
| **NATURE OF IMPACT** | **Negative** | | | |
| **STAGE** | **CONSTRUCTION PHASE** | | **OPERATIONAL PHASE** | |
| **DEVELOPMENT OPTION** | **1<br>NO-GO OPTION** | **2<br>PROPOSAL** | **1<br>NO-GO OPTION** | **2<br>PROPOSAL** |
| **EXTENT** | Local | Local | Local | Local |
| **DURATION** | N/A | Construction phase | N/A | Medium term |
| **INTENSITY OR MAGNITUDE** | Zero | Very low | Zero | Very low |
| **PROBABILITY** | Unlikely | Possible | Unlikely | Possible |
| **SIGNIFICANCE** | Neutral | Very low | Neutral | Very low |
| **CONFIDENCE** | Certain | Sure | Certain | Sure |
| **MITIGATION & MITIGATORY MEASURES** | N/A | - Spread runoff into wheatlands in interim<br>- Channel excess runoff into existing OCGT storm water management facility<br>- Monitor for impact | N/A | - Channel excess runoff into existing OCGT storm water management facility<br>- Monitor for impact |
| **LEVEL OF SIGNIFICANCE AFTER MITIGATION** | Neutral | Neutral | Neutral | Neutral |

# APPENDIX 5

| IMPACT NO 4 | THE OCGT EXTENSION MAY DISRUPT OR FRAGMENT IMPORTANT ECOLOGICAL CORRIDORS | | | |
|---|---|---|---|---|
| **NATURE OF IMPACT** | **Negative** | | | |
| **STAGE** | **CONSTRUCTION PHASE** | | **OPERATIONAL PHASE** | |
| **DEVELOPMENT OPTION** | **1 NO-GO OPTION** | **2 PROPOSAL** | **1 NO-GO OPTION** | **2 PROPOSAL** |
| **EXTENT** | Local | Local | Local | Local |
| **DURATION** | N/A | Construction phase | N/A | Medium term |
| **INTENSITY OR MAGNITUDE** | Zero | Very low | Zero | Very low |
| **PROBABILITY** | Likely | Possible | Unlikely | Possible |
| **SIGNIFICANCE** | Neutral | Very low | Neutral | Very low |
| **CONFIDENCE** | Certain | | Certain | Sure |
| **MITIGATION & MITIGATORY MEASURES** | N/A | - No natural corridors exist to disrupt.<br>- New fence-line corridor will develop.<br>- Planting will aid recovery.<br>- Direct aerial connectivity only marginally displaced. | N/A | - No natural corridors exist to disrupt.<br>- Maintain fence-line corridors.<br>- Additional planting will aid corridor development & effectivity.<br>- Direct aerial connectivity only marginally displaced. |
| **LEVEL OF SIGNIFICANCE AFTER MITIGATION** | Neutral | Neutral | Neutral | Neutral |

# APPENDIX 6

| IMPACT NO 5 | CERTAIN IMPORTANT MICRO-HABITATS WILL BE LOST | | | |
|---|---|---|---|---|
| **NATURE OF IMPACT** | **Negative** | | | |
| **STAGE** | **CONSTRUCTION PHASE** | | **OPERATIONAL PHASE** | |
| **DEVELOPMENT OPTION** | **1<br>NO-GO OPTION** | **2<br>PROPOSAL** | **1<br>NO-GO OPTION** | **2<br>PROPOSAL** |
| **EXTENT** | Site-specific | Site-specific | Site-specific | Site-specific |
| **DURATION** | N/A | Construction phase | N/A | Medium term |
| **INTENSITY OR MAGNITUDE** | Neutral | Very low | Neutral | Very low |
| **PROBABILITY** | Unlikely | Definite | Unlikely | Unlikely |
| **SIGNIFICANCE** | Neutral | Low | Neutral | Very low |
| **CONFIDENCE** | Certain | Certain | Certain | Sure |
| **MITIGATION & MITIGATORY MEASURES** | N/A | - Shrub cover will re-grow quickly.<br>- Stone piles can be moved.<br>- Shrubs and grass can be established to speed recovery.<br>- Fence poles will be re-positioned. | N/A | - Encourage and maintain shrub growth and grass along fence-line.<br>- Install raptor perches in fence-line belt. |
| **LEVEL OF SIGNIFICANCE AFTER MITIGATION** | Neutral | Neutral | Neutral | Neutral |