PROPOSED WESKUSFLEUR SUBSTATION IN THE VICINITY OF KOEBERG SUBSTATION:

FAUNA & FLORA SPECIALIST IMPACT ASSESSMENT REPORT

Lidwala
Environmental & Planning Services

PRODUCED FOR LIDWALA CONSULTING ENGINEERS

BY

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DECLARATION OF CONSULTANTS' INDEPENDENCE

I Simon Todd, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Note: The terms of reference must be attached.

Simon Todd Pr.Sci.Nat 400425/11.

June 2015

This report has been prepared by Simon Todd, but includes some input on avifauna contributed by Dr. Andrew Jenkins of Avisense Consulting.

1 INTRODUCTION

Eskom Holdings SOC Limited intends to develop a new substation in order to service the Koeberg Nuclear Power Station. The current 400kV GIS substation has been in operation for almost 30 years and there are concerns regarding its reliability as it is difficult to repair as a result of discontinued technology. There is also no space for additional 132 kV feeder bays at Koeberg Substation to accommodate future requirements for new lines. In order to overcome these problems and limitations Eskom has proposed the construction of a new substation to be known as the Weskusfleur Substation. The stated objectives of the new substation are as follows:

- Improve the existing 400kV reliability
- Cater for load growth on the 132 kV network for the 20-year horizon.
- Prevent overloading of existing 400kV busbar
- Replace 30 year old technology/equipment

Before Eskom can proceed with the development of the above proposed Weskusfleur Substation, environmental authorization from the Department of Environmental Affairs is required. Lidwala Consulting Engineers is conducting the EIA process on behalf of Eskom and has appointed Simon Todd Consulting to provide specialist ecological input for the EIA process. This ecological specialist study details the ecological characteristics of the affected areas and provides an assessment of the likely ecological impacts associated with the development of the proposed substation. Impacts are assessed for the preconstruction, construction and operational phases of the development. A variety of avoidance and mitigation measures associated with each identified impact are recommended to reduce the likely impact of the development which should be included in the EMPr for the development. The full scope of study is detailed below.

1.1 SCOPE OF STUDY

The scope of the study includes the following activities

- a description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed project
- a description and evaluation of environmental issues and potential impacts (incl. using direct, indirect and cumulative impacts) that have been identified
- a statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts
- an indication of the methodology used in determining the significance of potential environmental impacts
- an assessment of the significance of direct indirect and cumulative impacts in terms of the following criteria :

- the nature of the impact, which shall include a description of what causes the effect, what will be affected and how it will be affected
- the extent of the impact, indicating whether the impact will be local (limited to the immediate area or site of development), regional, national or international
- the duration of the impact, indicating whether the lifetime of the impact will be of a short-term duration (0-5 years), medium-term (5- 15 years), long-term (> 15 years, where the impact will cease after the operational life of the activity) or permanent
- the probability of the impact, describing the likelihood of the impact actually occurring, indicated as improbable (low likelihood) probable (distinct possibility), highly probable (most likely), or definite (Impact will occur regardless of any preventable measures)
- the severity/beneficial scale indicating whether the impact will be very severe/beneficial (a permanent change which cannot be mitigated/permanent and significant benefit with no real alternative to achieving this benefit) severe/beneficial (long-term impact that could be mitigated/long-term benefit) moderately severe/beneficial (medium- to long-term impact that could be mitigated/ medium- to long-term benefit), slight or have no effect
- the significance which shall be determined through a synthesis of the characteristics described above and can be assessed as low medium or high
- the status which will be described as either positive, negative or neutral
- the degree to which the impact can be reversed
- the degree to which the impact may cause irreplaceable loss of resources
- the degree to which the impact can be mitigated

- a description and comparative assessment of all alternatives
- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Programme (EMPr)
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- a description of any assumptions uncertainties and gaps in knowledge
- an environmental impact statement which contains :
    - a summary of the key findings of the environmental impact assessment;
    - an assessment of the positive and negative implications of the proposed activity;
    - a comparative assessment of the positive and negative implications of identified alternatives

1.2 ASSESSMENT APPROACH & PHILOSOPHY

The assessment will be conducted according to the EIA Regulations, published by the Department of Environmental Affairs and Tourism (2014) in terms of the Environmental Conservation Act No. 73 of 1989 as well as within the best-practice guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers et al. (2005).

This includes adherence to the following broad principles:

- That a precautionary and risk-averse approach be adopted towards projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. Critical Biodiversity Areas (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas.

- Demonstrate how the proponent intends complying with the principles contained in section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), which, amongst other things, indicates that environmental management should.

    - In order of priority aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
    - Avoid degradation of the environment;
    - Avoid jeopardising ecosystem integrity;
    - Pursue the best practicable environmental option by means of integrated environmental management;
    - Protect the environment as the people's common heritage;
    - Control and minimise environmental damage; and
    - Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

These principles serve as guidelines for all decision-making concerning matters that may affect the environment. As such, it is incumbent upon the proponent to show how proposed activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by the NEMA.

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:

The study will include data searches, desktop studies, site walkovers / field survey of the property and baseline data collection, describing:

- A description of the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of **pattern**, the following will be identified or described:

Community and ecosystem level

- The main vegetation type, its aerial extent and interaction with neighbouring types, soils or topography;
- Threatened or vulnerable ecosystems (cf. SA vegetation map/National Spatial Biodiversity Assessment, fine-scale systematic conservation plans, etc).

Species level

- Red Data Book species (giving location if possible using GPS)
- The viability of an estimated population size of the RDB species that are present (include the degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High=70-100% confident, Medium 40-70% confident, low 0-40% confident)
- The likelihood of other RDB species, or species of conservation concern, occurring in the vicinity (include degree of confidence).

Fauna

- Describe and assess the terrestrial fauna present in the area that will be affected by the proposed development.
- Conduct a faunal assessment that can be integrated into the ecological study.
- Describe the existing impacts of current land use as they affect the fauna.
- Clarify species of special concern (SSC) and that are known to be:
- endemic to the region;
- that are considered to be of conservational concern;
- that are in commercial trade (CITES listed species);
- or, are of cultural significance.
- Provide monitoring requirements as input into the Environmental Management Plan (EMP) for faunal related issues.

Avifauna

- A description of the site in terms of the avifaunal habitats present;
- A list of bird species and priority bird species likely to occur on the proposed site, with information on the relative value (in terms of breeding, nesting, roosting and foraging) of the site for these birds;

- A description of the likely seasonal variation in the presence/absence of priority species and preliminary observations of their movements;
- A preliminary delineation of areas that are potentially highly sensitive, no-go areas that may need to be avoided by the development;
- A description of the nature of the impact that the proposed development may have on the bird species present;
- A description of any mitigation measures that may be required to manage impacts related to the monitoring and assessment of the site.

Other pattern issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
- The condition of the site in terms of current or previous land uses.

In terms of **process**, the following will be identified or described:

- 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, coastal linkages or inland-trending dunes, and vegetation boundaries such as edaphic interfaces, upland-lowland interfaces or biome boundaries)
- Any possible changes in key processes, e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.
- Furthermore, any further studies that may be required during or after the EIA process will be outlined.
- All relevant legislation, permits and standards that would apply to the development will be identified.
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

2 METHODOLOGY

2.1 DATA SOURCING AND REVIEW

Data sources from the literature consulted and used where necessary in the study includes the following:

Vegetation:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (Mucina and Rutherford 2006 and the revised 2009 map) as well as the National List of Threatened Ecosystems (2011), where relevant.
- The site also falls within the planning domain of the City of Cape Town Biodiversity Network (2009), available from the BGIS website. This coverage provides habitat condition of indigenous vegetation remnants as assessed by botanical experts in the field and provides a prioritisation of remnants of indigenous vegetation.
- Information on plant and animal species recorded for Quarter Degree Square (QDS) 3318 CB was extracted from the SABIF/SIBIS database hosted by SANBI. This is a considerably larger area than the study area, but this is necessary to ensure a conservative approach as well as counter the fact that the site itself has no t been well sampled in the past.
- The IUCN conservation status (Table 1) of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2013).
- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011).
- Important catchments and protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and various spatial databases (ADU, SANBI's SIBIS and BGIS databases).
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, Friedmann and Daly (2004) and Skinner and Chimimba (2005) for mammals.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as a preliminary assessment of the availability and quality of suitable habitat at the site.
- The conservation status of each species is also listed, based on the IUCN Red List Categories and Criteria version 2014.3 (See Figure 1) and where species have not been assessed under these criteria, the CITES status is reported where possible. These lists are adequate for mammals and amphibians, the majority of which have been assessed, however the majority of reptiles have not been assessed and therefore, it is not adequate to assess the potential impact of the development on reptiles, based on those with a listed conservation status alone. In order to address this shortcoming, the distribution of reptiles was also taken into account such that any narrow endemics or species with highly specialized habitat requirements occurring at the site were noted.

Avifauna

- Bird data for the site was gathered from the South African Bird Atlas Project data (SABAP1, Harrison et al 1997 as well as SABAP 2) and the Birds in Reserves project (BIRP) for the quarter degree squares covering the study area as well as the SABAP 2 pentads (3340_1825, 3335_1825), and the Koeberg Nature Reserve. This information was refined by a more specific assessment of the actual habitats affected and general knowledge of birds in the region, to draw up an inclusive list of expected species (Appendix 1).
- Existing data from research done on key species in the general vicinity, including monitoring and/or tracking of Black Harriers *Circus maurus*, African Marsh Harriers *Circus ranivorus*, Peregrine Falcons *Falco peregrinus*, Great White Pelicans *Pelecanus onocrotalus* and the local passerine community (Curtis et al. 2004, Nalwange et al. 2004, Jenkins et al. 2014, A.R. Jenkins Pers. obs, F. Potgieter Pers. comm.)
- The conservation status and endemism of all species considered likely to occur in the area was determined from the national Red-list for birds (Barnes 2000, but updated in Taylor In press.), the most recent iteration of the global list of threatened species (http://www.iucnredlist.org), and the most up to date and comprehensive summary of Southern African bird biology (Hockey et al. 2005).

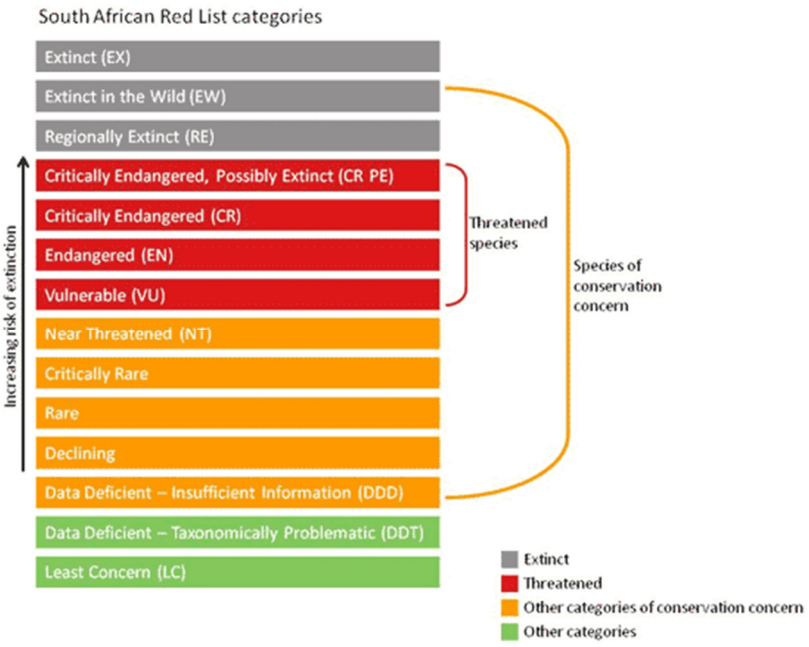

Figure 2. Schematic representation of the South African Red List categories. Taken from http://redlist.sanbi.org/redcat.php

2.2 Site Visits & Field Assessment

The sites were visited on numerous occasions between February 2013 and April 2015. The majority of fieldwork was conducted in October 2013 when the vegetation was in a good condition and the majority of species were in flower. It was a relatively wet and late season and the abundance of forbs and aliens was high and conditions were considered ideal for sampling and there are no limitations resulting from the timing of the sampling. During the site visits, the different biodiversity features, habitat, and

landscape units present within the affected areas were identified and mapped in the field. Specific features visible on the satellite imagery of the site were also marked for field inspection and were verified and assessed during the site visits. Walk-through-surveys were conducted within representative areas across the different habitat units identified and all plant and animal species observed were recorded. Active searches for reptiles and amphibians were also conducted within habitats likely to harbour or be important for such species. The presence of sensitive habitats, features and species were noted in the field where present and recorded on a GPS and mapped onto satellite imagery of the site.

In addition, camera traps were used within Koeberg to assess the extent of larger faunal use of potentially affected areas and habitats at the site. It is also important to note that a large number of options were included at the Scoping Phase and into the initial stages of the EIA phase with the result that a much wider area was assessed in the field than will ultimately be affected by the final options that are considered here.

Avifauna were observed and recorded opportunistically during all the site visits. However, systematic surveys were hampered by the lack of the final layout for the development as the options being considered were changed numerous times and specific fieldwork within the footprints of the final options was only conducted in April 2015. However, given the relatively limited extent of the final development areas and the previous experience in the same areas, this is not seen a significant limitation of the study.

2.3 SENSITIVITY MAPPING & ASSESSMENT

An ecological sensitivity map of the site was produced by integrating the information collected on-site with the available ecological and biodiversity information available in the literature and various spatial databases. This includes delineating the different habitat units identified in the field and assigning sensitivity values to the units based on their ecological properties, conservation value and the potential presence of species of conservation concern. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- Low – Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. Most types of development can proceed within these areas with little ecological impact.
- Medium- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- High – Areas of usually intact habitat where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. These areas may contain or be important habitat for faunal species or provide important ecological services such as water flow regulation or forage provision. Development within these areas is undesirable and

should only proceed with caution as it may not be possible to mitigate all impacts appropriately.

- Very High – Critical and unique intact habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.

In some situations, areas were also classified between the above categories, such as Medium-High, where it was deemed that an area did not fit well into a certain category but rather fell most appropriately between two sensitivity categories.

2.4 LIMITATIONS & ASSUMPTIONS

Ideally, a site should be visited several times during different seasons to ensure that the full complement of plant and animal species present are captured. Where this has not been done, the representivity of the species sampled at the time of the site visits should be critically evaluated. In the current study the affected areas were evaluated in summer as well as in spring when conditions for sampling were very good with a high abundance of annuals and geophytes. As a result, it is likely that the majority of species present within the affected areas were visible and sampled during the site visits. Consequently, the timing of the site visits is not considered to be a limiting factor which might compromise the results in any way.

The lists of avifauna, amphibians, reptiles and mammals for the site are based on those observed at the site in the current study and in previous studies at the site as well as those likely to occur in the area based on their distribution and habitat preferences. A relatively large number of studies have been conducted at the site with the result that the fauna and flora of Koeberg has been fairly well characterized. These studies are used as and where appropriate to supplement the information available in the various public access spatial databases and GIS coverages. This includes a comprehensive plant species list for the Koeberg Private Reserve area as well as various vegetation community descriptions and faunal lists. This represents a sufficiently conservative and cautious approach which takes the study limitations into account.

2.5 RELEVANT ASPECTS OF THE DEVELOPMENT

A variety of Alternatives were considered during the Scoping Phase, of which Alternatives 1 and 4 are considered viable alternatives that are considered in the EIA phase. The details of the two options are described briefly here but are fully described in the main EIA report and are not repeated in full here.

Alternative 1.

- Located approximately 250 m from the Koeberg Power Station and a part of the site is partially transformed. This site is the closest to Koeberg power station with an existing HV yard, thus line deviations will be shorter
- All lines will come from one side, thus lines will stay almost completely within the Koeberg security area

- No crossing of transmission lines will be necessary
- Utilises a large portion of the existing lines which has known reliability.

Although an AIS and GIS were considered at the site, only the GIS alternative is considered a viable alternative due to space constraints and the large footprint required to accommodate the AIS.

Alternative 4.

- The site is located on private property east of the R27 in an area that has been intensively invaded by alien vegetation.
- Very few transmission line crossings are needed but there is a lot more space to accommodate this.
- Provides possibility of keeping the existing GIS at Koeberg after integration with the new AIS and swap between the AIS and GIS if there is a problem with one.
- Suitable overhead line route for the connection from the Gen Transformers to the new 400kV yard. (New lines might be required due to the 400kV insulation level requirement)
- Existing 400kV lines can be used for the connection from the Station Transformers to the new 132kV yard.
- The AIS only options without the existing GIS will allow for the removal of a few lines after completion of the project when the new yard has proven reliability.
- Within the 5km restriction zone of Koeberg and allowed since it supports the operation of Koeberg.

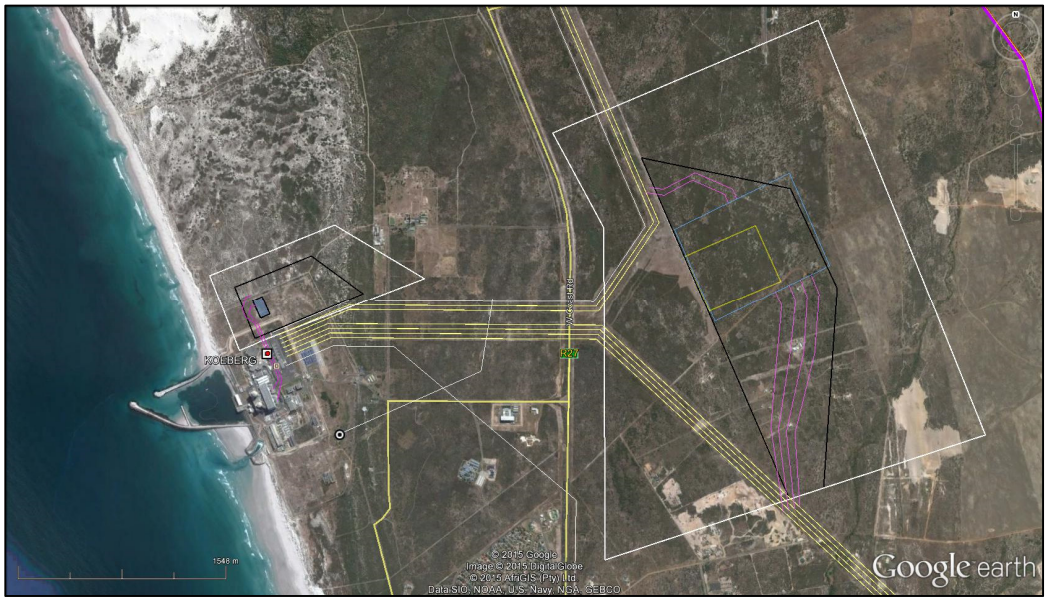

Figure 1. Map showing the two options for the location of the proposed Weskusfleur Substation. Alternative 1 is the GIS located at Koeberg and indicated by the small blue block and the Alternative 4 AIS is east of the R27 and indicated by the green outline. Existing transmission lines are indicated in yellow and white.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT- BASELINE

3.1 VEGETATION

3.1.1 Broad-Scale Vegetation Patterns

National Vegetation Types

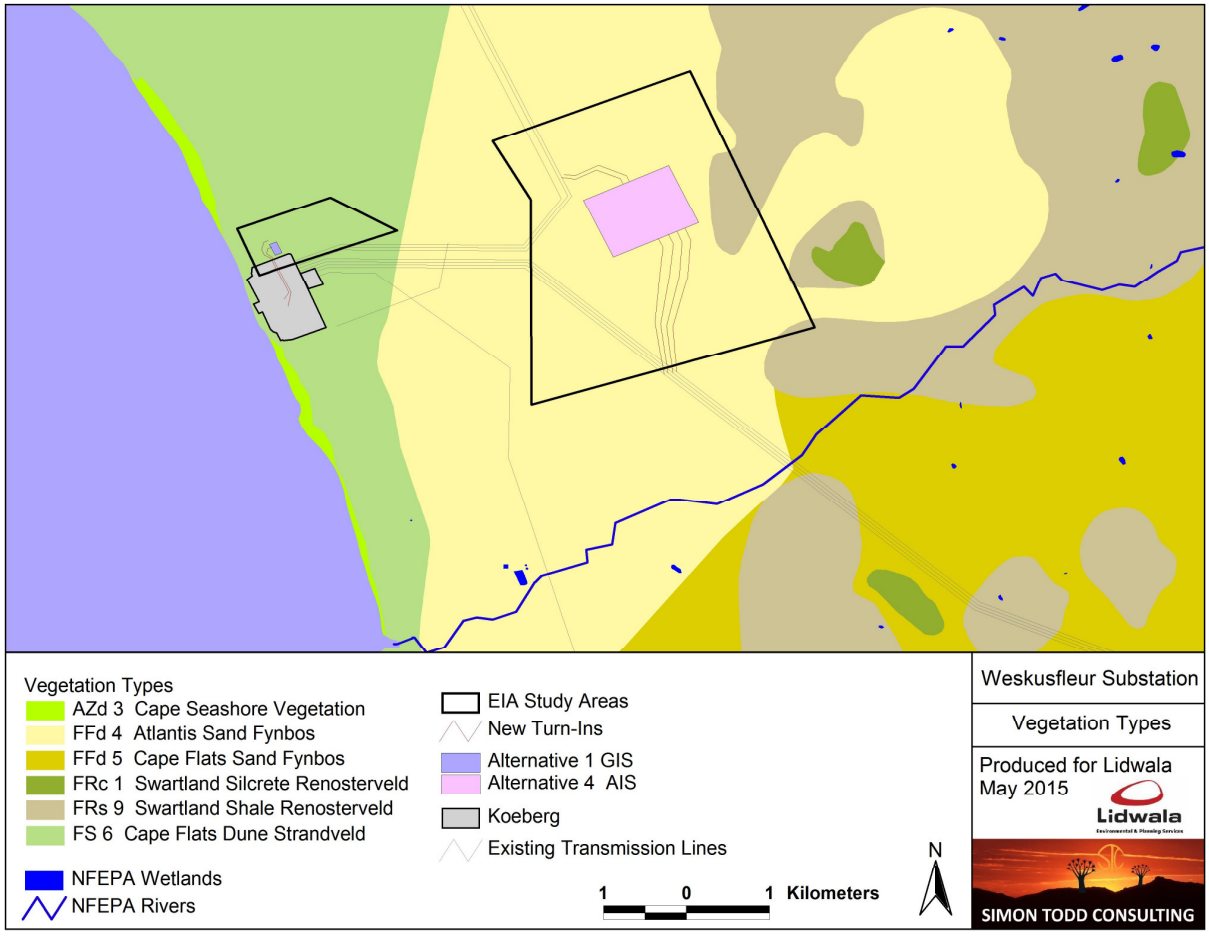

Figure 2. Broad-scale overview of the vegetation in and around the proposed Weskusfleur site alternatives. The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes rivers delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011). Note that this map indicates the original vegetation present and does not illustrate transformation.

According to the national vegetation map (Mucina & Rutherford 2006) (Figure 2), Alternative 1 falls within the Cape Flats Dune Strandveld Vegetation type. This vegetation type has an extent of 138 km2 and occurs in several discontinuous patches on dune fields of the Western Cape. The largest patch spans the south coast of False Bay and penetrates deep into the Cape Flats as a broad wedge as far

north as Bellville, the other patch spans Silverstroomstrand and Table Bay and includes the Atlantis dune plume, the third region is a series of small patches covering coastal dune pockets on the Cape Peninsula, while the last patch is on Robben Island.

Alternative 4 occurs on Atlantis Sand Fynbos which has a total extent of 433 km^2 and occurs from Rondeberg to Blouberg on the West Coast coastal flats; along the Groen River on the eastern side of the Dassenberg-Darling Hills through Riverlands to the area between Atlantis and Kalbaskraal, as well as between Klipheuwel and the Paardeberg with outliers west of the Berg River east and north of Riebeek-Kasteel between Hermon Heuningberg. Atlantis Sand Fynbos is associated with moderately undulating to flat sand plains with dense, moderately tall, ericoid shrubland dotted with emergent, tall sclerophyllous shrubs and an open short restiod stratum. Restioid and proteoid fynbos are dominant, with asteraceous fynbos and patches of ericaceous fynbos in seepages.

Although Mucina & Rutherford (2006) include descriptions of the above vegetation types in terms of dominant and characteristic species, these descriptions are not repeated here as the actual affected vegetation is described in detail in a forthcoming section of this report.

3.1.2 Site Descriptions

Alternative 1

Alternative 1 is located immediately adjacent to the Koeberg Power Station and the existing substation. The affected area has already been disturbed, probably during the construction of the power station and a significant amount of natural vegetation has returned to the area. However, it is also heavily invaded by alien species, especially alien grasses such as *Bromus*. Common and dominant species include *Searsia laevigata*, *Chrysanthemoides incana*, *Passerina corymbosa*, *Cladoraphis cyperoides*, *Cynodon dactylon*, *Carpobrotus edulis*, *Senecio arenarius*, *Senecio burchellii*, *Pelargonium capitatum*, *Trachyandra divaricata*, *Crassula expansa* and *Ehrharta villosa*. The abundance of alien species in this area is also high and includes species such as *Bromus pectinatus*, *Hordeum murinum*, *Lolium multiflorum*, *Erodium cicutarium*, *Medicago polymorpha*, *Pennisetum clandestinum*, *Sonchus oleraceus* and *Rapistrum rugosum*. No species of conservation concern were observed in this area, which can be ascribed to the previous disturbance in the area. The abundance of weedy species and grasses does however make this area attractive to the mammalian herbivores of the Reserve which can frequently be found grazing in this area. The area is also used extensively by molerats and gerbils which are not negatively affected by the lower plant cover across most of the area. Given the relatively low species richness of the area and its' previously disturbed nature, this area is not considered highly sensitive. Although the footprint of the substation is only 1ha, with fences and other boundary clearing, it is assumed that up to 3ha could be required or at least impacted by the development.

View over the disturbed area next to the Koeberg substation that would be partly affected by the substation at Alternative 1. The vegetation is disturbed and dominated by weedy and alien species.

Looking over the site of Alternative 1 from towards the sea, showing the fence around the power station and the existing substation on the right. The vegetation has been disturbed in the past and is dominated by dense *Searsia laevigata* stands with a lot of alien *Bromus pectinatus* visible in the foreground. The proximity and noise generate by the power station does not deter springbok from using the area which are habituated to the facility.

Alternative 4.

Alternative 4 lies within an area that has been severely invaded by *Acacia saligna*. The density of trees is very high and in many parts it form impenetrable thickets. Due to the shading and leaf drop on the ground, few species can tolerate these conditions and large areas form near mono-specific stands. There are however some occasional openings or dunes which are not invaded where some residual indigenous species remain. Indigenous species observed within small remnant fragments include *Anthospermum spathulatum*, *Passerina corymbosa*, *Eriocephalus racemosus*, *Helichrysum revolutum*, *Othonna coronopifolia*, *Colpoon compressum*, *Euphorbia mauritanica*, *Aspalathus hispida*, *Aspalathus ternata*, *Pelargonium capitatum*, *Tribolium uniolae*, *Gymnosporia buxifolia*, *Lycium afrum*, *Ruschia indecora*, *Moraea fugax, Conicosia pugioniformis*, *Dischisma ciliatum*, *Searsia lucida*, *Searsia laevigata*, *Phylica cephalantha*, *Trichocephalus stipularis* and *Solanum africanum*. *Leucospermum hypophyllocarpodendron* subsp *canaliculatum* which is listed as Vulnerable was observed in the area as well, but not within the development footprint. Alien species include *Acacia saligna*, *Rapistrum rugosum*, *Raphanus raphanistrum*, *Echium plantagineum*, *Briza maxima*, *Polypogon monspeliensis* and *Leptospermum laevigatum*. It is important to note that the majority of the indigenous species were recorded outside of the footprint of the substation along the margins of the invaded area. The footprint of the substation is within an area of heavy invasion with few indigenous species left, as depicted in the images below. As such, this area is not considered highly sensitive and the direct impact of the development on species within the footprint would be relatively low. No species of conservation concern were observed within the footprint and it is not likely that many such species are present in the area.

Looking out over the dense *Acacia saligna* stands which characterise Alternative 4.

Although there are some open, less invaded areas present, these have been impacted in the past and are now largely dominated by alien and pioneer species. Here the grass layer consists of *Ehrharta villosa*, alien annual grasses such as *Briza maxima* and the creeping succulent *Carpobrotus edulis*.

3.1.3 Threatened Ecosystems

Figure 3 below illustrates the conservation status and remaining extent of the different vegetation types within the study area. Alternative 1 falls within Cape Flats Dune Strandveld which is classified as Threatened. An estimated 43% of the original extent remains and only 6% is currently conserved. A total of 66 Red Data plant species and 1 endemic plant species are known from the vegetation type. The high number of species of conservation concern known from this vegetation type suggest that such species are likely to be present in most existing remnants of Cape Flats Dune Strandveld. Alternative 4 lies within an area that has been mapped as intact Atlantis Sand Fynbos. This vegetation type is classified as Critically Endangered. An estimated 51% of this vegetation type remains and only 6% is currently conserved. A total of 84 endemic species and 6 vegetation-type endemic species are known from this vegetation type. The high conservation status and large number of listed species known from this vegetation type indicate that any further loss and transformation of this vegetation type is highly undesirable. However, the site visits reveal that this area is highly degraded as a result of alien plant invasion, mostly *Acacia saligna* and very little intact vegetation actually remains within this area.

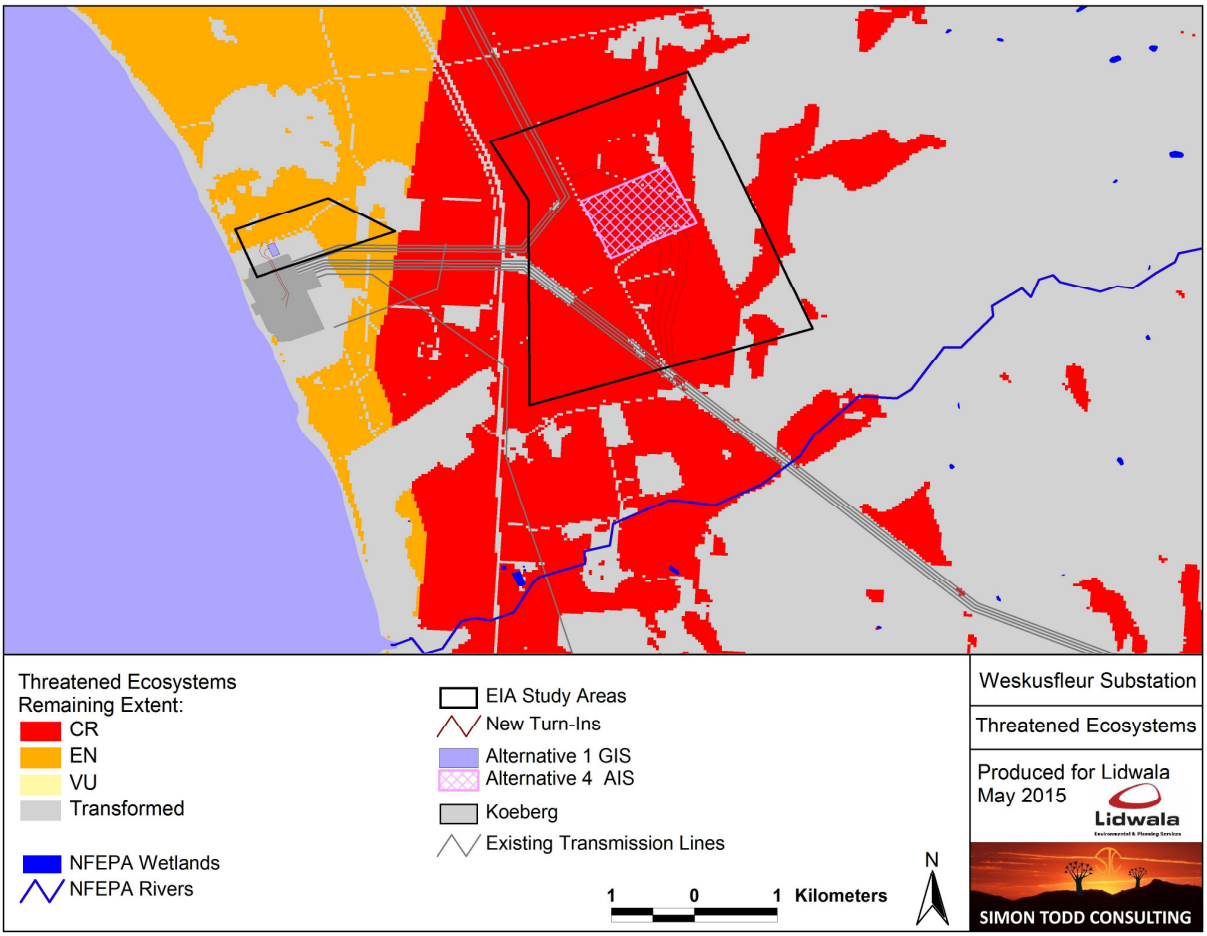

Figure 3. Remaining extent of threatened ecosystems within the study area as mapped by SANBI (2011): Threatened Ecosystems in South Africa: Descriptions and Maps.

3.2 Listed and Protected Plant Species

According to the SANBI SIBIS database, 823 plant species have been recorded from the quarter degree square 3318CB. This includes 122 species of conservation concern, which highlights the botanical sensitivity of the area. The listed species are dominated by species within the *Proteaceae* (22), *Iridaceae* (18), *Mesembryanthemaceae* (18), *Fabaceae* (12), *Asteraceae* (10) and *Rutaceae* (8). In terms of some of the previous studies that have been conducted at Koeberg, Low (2008) recorded 252 plant species for the whole of Koeberg, while Boucher (2010) recorded 166 species from 5 sites within Koeberg. Low (2008) listed 22 species of conservation concern in his list while Boucher observed 11. Although a number of listed species were observed during the site visits and field surveys, these were outside of the affected areas and would not be impacted by the current substation development alternatives.

Table 2. Numbers of the species within the different conservation status categories as indicated below, data derived from the SANBI SIBIS database. Species not evaluated are largely alien species.

Status/ IUCN Red List Category	No. Species
Critically Endangered (CR)	15
Endangered (EN)	35
Vulnerable (VU)	47
Near Threatened (NT)	20
Threatened	1
Critically Rare	2
Rare	0
Declining	4
Data Deficient - Insufficient Information (DDD)	0
Data Deficient - Taxonomically Problematic (DDT)	11
Least Concern	528
Not Evaluated	162
Total	**823**

3.3 Critical Biodiversity Areas & Broad-Scale Ecological Processes

The site lies within the planning domain of the Cape Town City Biodiversity Network which was developed by the City of Cape Town (Holmes et al. 2012). Although a large proportion of the Koeberg property has been proclaimed as part of the Koeberg Private Nature Reserve, the security area around the power station itself is not part of the reserve and consequently, Alternative 1 does not actually fall within the Nature Reserve itself. Alternative 4 lies within an area classified largely as CBA 1E with smaller amounts CBA 1C and CBA 1B. CBA 1E are areas identified as necessary for the maintenance of landscape connectivity and ecological processes and hard infrastructure is not considered to a compatible activity for these areas. CBA 1C are areas considered to be of high to medium condition within Endangered or Vulnerable ecosystems. CBA 1B areas are considered irreplaceable high and medium condition sites within Critically Endangered vegetation. Hard infrastructure is not considered compatible with either CBA 1C or 1B areas. Even though some of these areas are heavily invaded by alien species, they are required in order to meet conservation targets and should be rehabilitated and cleared of alien species.

In terms of the potential for the development to disrupt broad-scale ecological processes, it is clear that Alternatives 4 poses a greater risk. Alternative 4 is within natural or semi-natural habitat within an area that is likely to play an important role for landscape connectivity and act as corridors for the movement of fauna and flora. Given the transformed nature of the area to the east of Alternative 4, the substation would occupy a significant proportion of the corridor and would potentially result in a significant loss of

landscape connectivity through this area. The Alternative 1 GIS option is restricted largely to transformed habitat in close proximity to existing infrastructure and the additional contribution to the loss the landscape connectivity would be low.

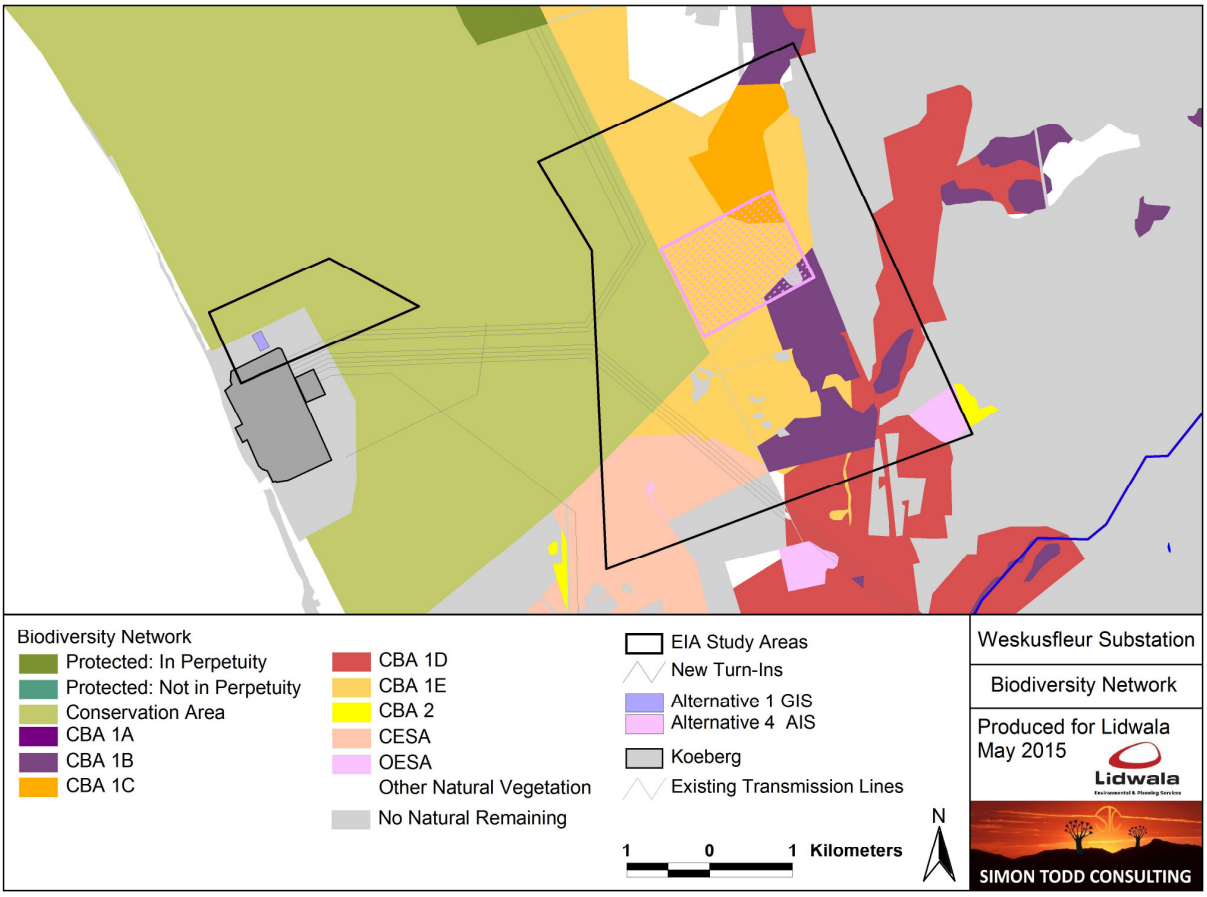

Figure 4. The 2013 Cape Town City Biodiversity Network map for the study area. Alternative 1 lies within a transformed area associated with Koeberg substation, while Alternative 4 lies within an area classified as CBA 1E and CBA 1C as well as a small amount of CBA 1B.

3.4 FAUNAL COMMUNITIES

3.4.1 Mammals

The study area falls within the distribution range of 54 terrestrial mammals, of which 26 can be confirmed as being present based on the previous studies and the species list for the reserve provided by Eskom. An additional 19 are considered highly likely to be present, while the remaining 6 species are less likely to occur in the area. A number of the larger mammals present such as Springbok, Eland, Plains Zebra, Gemsbok and Blue Wildebeest have been introduced and apart from the Eland, would not

have occurred naturally in the area. The presence of these species in the reserve has a visible impact and the majority of the area is visibly grazed. Within the reserve, the larger herbivores were observed to be concentrated on the previously transformed areas dominated by stoloniferous grasses such as *Cynodon* (kweek) and kikuyu (*Pennisetum clandestinum*). As the larger mammals present are already habituated to human presence, the presence of a new substation would in itself not create a significant disturbance source for these animals which probably avoid the immediate vicinity of the power station. Although the development of Alternative 1 would result in some loss of grazing habitat for larger fauna, this is of minor extent and is not considered highly significant for these species. Apart from the larger introduced mammals such as Eland, Zebra and Springbok, species observed in the intact dunes east of Alternative 1 using the camera traps include Duiker *Sylvicapra grimmia*, Steenbok *Raphicerus campestris*, Cape Porcupine *Hystrix africaeaustralis*, Caracal *Caracal caracal* and Striped Polecat *Ictonyx striatus*. Although these species probably forage in the open areas around the power station on occasion, they prefer the cover afforded by the dunes and the development of Alternative 1 would not be likely to generate significant habitat loss for these species. The affected area is however used by Cape Gerbil *Gerbilliscus afra* and Cape Dune Mole Rat *Bathyergus suillus* which are not affected by the loss of woody vegetation or favour areas of lower vegetation cover. These species would experience a small amount of local habitat loss but as these species are common at Koeberg, their local populations would not be significantly impacted.

The situation at Alternative 4 is similar, with the exception that the introduced larger mammals of Koeberg are not present. Although the site is degraded, the woody vegetation also provides cover for species such as Caracal, which are able to use the area despite the proximity to human activity and the urban fringe. Given the large footprint of the AIS, the potential for habitat loss and disruption of landscape connectivity at Alternative 4 is significant and there are few available options to mitigate these impacts.

Two listed species occur in the area, the Honey Badger *Mellivora capensis* (SARDB Endangered) and the White-tailed Mouse *Mystromys albicaudatus* (Endangered). As both these species are widely distributed in the country, the development would not constitute significant overall habitat loss for these species. However, in terms of local populations, the Honey Badger is certainly present in the area and would suffer greater potential impact from Alternative 4 in terms of habitat loss as well as landscape connectivity.

3.4.2 Reptiles

The site lies in or near the distribution range of 48 reptile species, indicating that the reptile diversity at the site is likely to be of moderate diversity. According to the SARCA database 25 species have been recorded from the area, including four listed species. Listed species known from the area include the Cape Dwarf Chameleon *Bradypodion pumilum*, Cape Sand Snake *Psammophis leightoni* and Southern Adder *Bitis armata* which are classified Vulnerable and the local endemic Bloubergstrand Dwarf Burrowing Skink *Scelotes montispectus* which is classified as Near Threatened and is confirmed for Koeberg (Harrison 1998 and this study). The Bloubergstrand Dwarf Burrowing Skink was observed

within the dunes east of Koeberg and is not likely to occur within the disturbed footprint of Alternative 1 or within the heavily invaded area affected by Alternative 4. Other species observed in the vicinity of the Alternatives include Boomslang *Dispholidus typus typus*, Mole Snake *Pseudaspis cana*, Rhombic Egg-eater *Dasypeltis scabra* , Angulate Tortoise *Chersina angulata*, Cape Skink *Trachylepis capensis* and Knox's Desert Lizard *Meroles knoxii*.

Neither of the two alternatives can be considered a priority area or key habitat for reptiles in the area, given the disturbance and alien invasion which characterise the sites. Both sites are however semi-natural and are used by a variety of reptiles. Due to the large extent of Alternative 4 as compared to Alternative 1, the latter is identified as the clear preferred alternative in terms of potential impacts on reptiles. It is also important to note that apart from the footprint of the substation itself, Alternative 4 would require a hardened access road, which would further fragment and disrupt the habitat for subterranean species.

The Bloubergstrand Dwarf Burrowing Skink *Scelotes montispectus* is a recently described and poorly known species which has been recorded from Koeberg several times including during this study, indicating the area is likely to be a key habitat for this species. It is however associated with the coastal dune field inland of the power station and is not likely to be significantly affected by either Alternative.

Boomslang *Dispholidus typus typus*, is one of the more common snakes of the site and occurs within the area affected by both Alternatives.

3.4.3 Amphibians

The site lies within the distribution range of ten amphibian species, of which at least five are highly likely to occur at the site. The only listed species which is likely to occur in the area is the Cape Caco *Cacosternum capense* which is restricted to low lying flat or gently undulating areas with poorly drained clay or loamy soils. There does not appear to be any suitable breeding habitat for this species in the vicinity of the proposed alternatives. There are a number of natural and artificial seepages and wetlands at the broader site which would provide breeding habitat for most of the amphibians resident in the area. Species likely to be present include the Raucous Toad, Cape River Frog and Common Plantanna. Development within the transformed and alien invaded habitats characteristic of the two alternatives is not likely to have a significant direct impact on amphibians.

Potential impacts on amphibians would include pollution of breeding habitats from silty runoff or petrochemical or other pollutants associated with the operation of construction machinery during the construction phase of the development as well as increased road traffic resulting in increased numbers of frogs being run over during periods of frog movement as may occur during the breeding season. There are no wetlands in the immediate vicinity of the proposed sites themselves and it is not likely that any breeding habitats would be directly impacted by the proposed substation alternatives. In the long-term the development would result in a small amount of habitat loss for amphibians which would be of low consequence for Alternative 1 and moderate consequence for Alternative 4. Alternative 1 is preferable to Alternative 4 as it would result in significantly less habitat loss and the smaller footprint would also generate less runoff than the Alternative 4 AIS which would potentially have negative impacts on amphibian habitats in the vicinity if not properly managed.

3.4.4 Avifauna

Avian habitats

The inclusive impact area of the proposed development (and its immediate surrounds) features four, broad habitats for birds – (i) areas of relatively intact or recovering natural vegetation (Strandveld or Sand Fynbos), (ii) areas of heavily degraded and/or alien infested natural vegetation (Strandveld or Sand Fynbos), (iii) scattered permanent or ephemeral wetlands, and (iv) completely transformed areas, occupied by rural homesteads, farm buildings or light-heavy industrial development. Although Alternative 1 covers a much smaller area, the habitat of this site is less degraded than that of Alternative 4 (much of which is heavily infested by alien vegetation), and its proximity to the relatively pristine Koeberg Nature Reserve could suggest a greater potential to support priority bird species.

Bird populations

The inclusive area could support up to 201 bird species, of which 15 are Red-listed, 44 are regional endemics or near-endemics, and three species are Red-listed endemics (Appendix 1). Of four avian habitats identified, the natural (if generally degraded) Strandveld/Fynbos areas and wetlands probably

support the bulk of the local avian diversity and most of the Red-listed and endemic species. The Koeberg Nature Reserve immediately adjacent to development area Alternative 1 is known to support multiple breeding pairs of Black Harrier and at least one breeding pair of African Marsh Harrier (Curtis et al. 2004, A.R. Jenkins Pers. obs), while a pair of Peregrine Falcons is resident and breeds on the met tower at the Koeberg Weather Station (A.R. Jenkins Pers. obs, F. Potgieter Pers. comm.), and the relatively intact Strandveld vegetation of the nature reserve supports high densities of a variety of regionally endemic passerines (Nalwange et al. 2004). Also, the broader development area lies on the assumed flight path of Great White Pelicans commuting between their breeding colony on Dassen Island to the north and important foraging sites (including the Vissershok waste disposal facility) to the south, and presumably on a similar flight line used by Greater *Phoenicopterus roseus* and Lesser Flamingos *Phoeniconaias minor* between local wetland resource areas. In light of the above, nine bird species were considered to be a priorities for this assessment in terms their conservation status, the relative importance of likely populations on site, and their susceptibility to the negative impacts of habitat loss and power infrastructure on birds – namely collision, electrocution, and habitat loss and disturbance (Table 3).

Table 3. Priority species considered likely to occur within the impact zone of the proposed substation and its associated infrastructure with estimates of their relative susceptibility to the environmental impacts of the construction and operational phases of the development. National and global conservation status is listed as per the most recent assessment (Taylor In press, http://www.iucnredlist.org/search.

Common name	Scientific name	SA conservation status (Global status)	Regional endemism	Relative importance of local population[1]	Susceptibility to habitat loss / disturbance	Risk of electrocution mortality	Risk of collision mortality
Blue Crane	*Anthropoides paradiseus*	Near-threatened (Vulnerable)	Near-endemic	Low	Moderate	-	High
African Marsh Harrier	*Circus ranivorus*	Endangered (Least concern)	-	Moderate	High	-	Moderate
Black Harrier	*Circus maurus*	Endangered (Vulnerable)	Endemic	High	High	Low	Moderate
Secretarybird	*Sagittarius serpentarius*	Vulnerable (Vulnerable)	-	Low	Moderate	Low	High
Lanner Falcon	*Falco biarmicus*	Vulnerable (Least concern)	-	Moderate	Low	Moderate	High
Peregrine Falcon	*Falco peregrinus*	(Least concern)	-	Moderate	Low	Moderate	High
Greater Flamingo	*Phoenicopterus ruber*	Near-threatened (Least concern)	-	Moderate	-	-	High
Lesser Flamingo	*Phoenicopterus minor*	Near-threatened (Near-threatened)	-	Moderate	-	-	High
Great White Pelican	*Pelecanus onocrotalus*	Near-threatened (Least concern)	-	High	-	-	High

[1]Relative to the national/global population

4 FINDINGS

In this section the impacts associated with each of the two options are identified and detailed, for each Alternative, as well as for the transmission lines and the no-go option.

4.1 SUBSTATION

4.1.1 Alternative 1.

Construction Phase

The construction phase will generate a lot of physical and noise-related disturbance at the site. This will result in the loss of currently intact or near-natural vegetation, the loss of habitat for fauna as well as direct impact on fauna unable to move away from the construction activities. The following impacts are considered to be associated with the construction of the GIS at the Alternative 1 location:

- Impacts on vegetation and protected plant species

  Vegetation clearing during construction will lead to the loss of currently intact or near-natural habitat within the development footprint. This is an inevitable consequence of the development that cannot be mitigated or avoided. It is however unlikely that there are any listed plant species within the footprint as the affected area has been disturbed in the past and the remaining species are weedy or pioneer species.

- Direct Faunal Impacts
  Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction and only limited mitigation is possible.

- Avifaunal Impacts
  Given the proximity of the substation to existing power infrastructure and associated roads, storage and lay-down facilities, collateral physical damage to Strandveld habitat surrounding the development footprint is likely to be minimal. However, disturbance impacts on nearby harrier nesting areas may be considerable and mitigation by timing activities to coincide with least sensitive times (ideally outside of the spring/summer breeding season) will be important.

Operational Phase

During operation, disturbance associated with the operation and maintenance of the substation will be low. The substation will be fenced and there will be little scope for interaction between fauna and the substation infrastructure. There will however be some residual impact from the construction phase that

will need to be managed during operation. This includes the potential for erosion within the previously disturbed parts of the site as well as alien plant invasion within the same areas. Wind in the area is very strong and any exposed soils will be highly vulnerable to mobilisation, which will be difficult to control once initiated and would also have negative consequences for the operation of the substation. The following impacts are considered to be associated with the operation of the GIS at the Alternative 1 location:

- Soil erosion and associated degradation of ecosystems
  The large amount of disturbance created during construction would potentially leave the site vulnerable to soil erosion. The area experiences high winds and disturbance leading to the loss of plant cover will certainly increase the risk of wind and water erosion at the site.

- Alien Plant Invasion
  The disturbance created during construction is highly likely to encourage the invasion of the disturbed areas by alien species. Although there are not a lot of alien species present within the undisturbed parts of Koeberg reserve, there were many aliens present in disturbed areas such as in the previously disturbed area around the power station. Such species will rapidly increase in abundance and expand into the disturbed areas if given the opportunity.

Decommissioning

Decommissioning would result in similar levels of disturbance to the construction phase as it is assumed that the infrastructure will be dismantled and the site returned to a near-natural state. Although in the long-term this would potentially result in a positive impact, in the short term, impacts are likely to be negative and specific attention would need to be paid to alien plant invasion and wind erosion of the site following disturbance. The following impacts are considered to be associated with the decommissioning of the GIS at the Alternative 1 location:

- Soil erosion and associated degradation of ecosystems
  The large amount of disturbance created during the decommissioning activities would potentially leave the site vulnerable to soil erosion. The area experiences high winds and disturbed areas with low plant cover will certainly increase the risk of wind and water erosion at the site.

- Alien Plant Invasion
  The disturbance created during decommissioning is likely to encourage the invasion of the disturbed areas by alien species. Although there are not a lot of alien species present within the undisturbed parts of Koeberg reserve, there were many aliens present in disturbed areas such as in the previously disturbed area around the power station. Such species will rapidly increase in abundance and expand into the disturbed areas if given the opportunity.

Cumulative Impacts

The amount of development and infrastructure at Koeberg is steadily increasing and the current development will contribute to the cumulative loss of habitat in the area. This may result in the loss of irreplaceable vegetation units which will compromise the countries' ability to meet its conservation targets. In addition, the development will increase the fragmentation of habitat in the area which is likely to impact on broad-scale ecological processes such as dispersal.

- Reduced ability to meet conservation obligations & targets
  The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. Alternative 1 is located within Cape Flats Dune Strandveld which is listed as Threatened and further loss of this vegetation type will reduce future conservation options. However, the total extent of habitat loss would be relatively small and would be within an area considered to be of poor condition.

- Impact on broad-scale ecological processes
  Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the large amount of development in the area, this is a likely cumulative impact of the development and would be especially prevalent in terms of potential disruption of the coastal corridor.

4.1.2 Alternative 4.

Construction Phase

The construction phase will generate a lot of physical and noise-related disturbance at the site. This will result in the loss of some near-natural and alien-infested vegetation, the loss of habitat for fauna as well as direct impact on fauna unable to move away from the construction activities. The following impacts are considered to be associated with the construction of the AIS at the Alternative 4 location:

- Impacts on vegetation and protected plant species
  Vegetation clearing during construction will lead to the loss of alien infested habitat with some areas of near-natural habitat within the development footprint. This is an inevitable consequence of the development that cannot be mitigated or avoided. It is however unlikely that there are any listed plant species within the footprint as the affected area has been severely invaded by alien species which has significantly reduced diversity and abundance of indigenous species.

- Direct Faunal Impacts
  Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some

impact on fauna is highly likely to occur during construction and only limited mitigation is possible. Due the high level of alien infestation, the abundance and diversity of fauna within this area is however likely to relatively low and restricted to more ruderal and tolerant species.

- Avifaunal Impacts
  Development of Alternative 4 will likely require more peripheral damage to habitat during construction given that there is relatively little other development in the immediate vicinity. However, this is offset by the degraded nature of the area generally, suggesting that this damage is unlikely to be significant for any key bird species. Likewise, disturbance is unlikely to be an important factor as no key species are known to be nesting in the immediate vicinity.

Operational Phase

During operation, disturbance associated with the operation and maintenance of the substation will be low. The substation will be fenced and there will be little scope for interaction between fauna and the substation infrastructure. There will however be some residual impact from the construction phase that will need to be managed during operation. This includes the potential for erosion within the previously disturbed parts of the site as well as alien plant invasion within the same areas. Wind in the area is fairly strong and any exposed soils will be vulnerable to mobilisation. The following impacts are considered to be associated with the operation of the AIS at the Alternative 4 location:

- Soil erosion and associated degradation of ecosystems
  The large amount of disturbance created during construction would potentially leave the site vulnerable to soil erosion. The area experiences strong winds and disturbance leading to the loss of plant cover will certainly increase the risk of wind and water erosion at the site.

- Alien Plant Invasion
  The disturbance created during construction is highly likely to encourage the invasion of the disturbed areas by alien species. The site is already very heavily invaded with the result that alien species already have an established seedbank at the site and will respond as soon as conditions allow. Active alien management would be required on a regular basis if this Alternative were to be chosen. However, as the existing environment is already heavily invaded, this would not constitute an additional impact but rather the entrenchment of the alien species at the site.

Decommissioning

Decommissioning would result in similar levels of disturbance to the construction phase as it is assumed that the infrastructure will be dismantled and the site returned to a near-natural state. Although in the long-term this would potentially result in a positive impact, in the short term, impacts are likely to be negative and specific attention would need to be paid to alien plant invasion and wind erosion of the site following disturbance. The following impacts are considered to be associated with the decommissioning of the AIS at the Alternative 4 location:

- Soil erosion and associated degradation of ecosystems
  The large amount of disturbance created during the decommissioning activities would potentially leave the site vulnerable to soil erosion. The area experiences strong winds and disturbed areas with low plant cover will certainly increase the risk of wind and water erosion at the site.

- Alien Plant Invasion
  The disturbance created during decommissioning is likely to encourage the invasion of the disturbed areas by alien species. This would occur rapidly given the low abundance of indigenous species that could recover naturally and the existing high levels in infestation in the area.

Cumulative Impacts

The amount of development along the West Coast, Cape Farms area is steadily increasing and the current development will contribute to the cumulative loss of habitat in the area. This may result in the loss of irreplaceable vegetation units which will compromise the countries' ability to meet its conservation targets. In addition, the development will increase the fragmentation of habitat in the area which is likely to impact on broad-scale ecological processes such as dispersal.

- Reduced ability to meet conservation obligations & targets
  The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. Alternative 4 is located within Atlantis Sand Fynbos which is listed as Critically Endangered and further loss of this vegetation type will certainly reduce future conservation options. Despite the fact that the area is invaded by alien species, it still retains some potential conservation value and rehabilitation potential. It is considered to be ecologically significant as illustrated by the high conservation value attributed to the area by the City of Cape Town Biodiversity Network.

- Impact on broad-scale ecological processes
  Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The area has been identified by the City of Cape Town Biodiversity Network as an important ecological corridor and the current development would occupy a significant proportion of the this area and certainly impact the ecological functioning of the area as an ecological corridor.

4.1.3 No-Go Alternative

From an ecological perspective, the no-go alternative would retain the status quo and would not generate any direct negative impact. Although some continued degradation of ecosystems by alien invasion and other forms of disturbance is likely to occur, the development would not halt or reduce

these effects and as such, there are no significant positive effects that can be considered to be associated with the construction of the substation. Therefore, in terms of the no-go alternative, it is considered neutral in terms of ecological impact and no impacts will be assessed for the this Alternative.

4.2 TRANSMISSION LINES

4.2.1 Alternative 1 Corridor.

The amount of alteration of the existing power line alignments for this option would be minimal and the new lines would be restricted to the already disturbed area within the ground of the power station and the adjacent disturbed areas. As a result, no significant impacts are likely to result from the small extent of the power lines required for this Alternative. Consequently, no impacts will be assessed for the power line associated with Alternative 1 as no additional impact beyond the status quo is anticipated. However, to ensure that impacts are reduced as far as possible, a number of mitigation are recommended for these power lines.

4.2.2 Alternative 4 Corridor

Alternative 4 would require several kilometres of new power lines, which would potentially generate a number of impacts. Each new line would require 3-4 new pylons which would generate some but not a very large terrestrial impact, while the woody vegetation under the line would also be cleared to comply with Eskom power line management policies. Where these policies are sensibly applied, this can have a positive impact on biodiversity as the woody aliens are cleared and the indigenous fynbos is able to persist or recover. Plant diversity under the existing 400kV line in the vicinity of Alternative 4 is significantly higher than in the adjacent heavily invaded areas. However, there is also a tendency to mow the power line corridors too low, with the result that taller reseeding proteaceae are lost from these areas and they tend to become dominated by species of low stature. Given the high density of woody aliens along the Alternative 4 power line corridors, the power line would have a neutral to potentially positive impact on terrestrial biodiversity and a moderate negative to low negative impact on avifauna. The following impacts are considered to be associated with the Alternative 4 power line corridors:

Construction Phase

- Impacts on vegetation and protected plant species
  Vegetation clearing during construction will lead to the loss of alien infested habitat and some areas of near-natural habitat within the footprint of the pylons. In addition, there will be vegetation clearing beneath the power which will have a negative impact if not conducted in a sensitive manner. It is however unlikely that there are any listed plant species within the footprint as the affected area has been severely invaded by alien species which has significantly reduced diversity and abundance of indigenous species.

- Direct Faunal Impacts
  Increased levels of noise, pollution, disturbance and human presence during construction of the power line will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction and only limited mitigation is possible. Due the high level of alien infestation, the abundance and diversity of fauna within this area is however likely to relatively low and restricted to more ruderal and tolerant species.

- Impact on Avifauna due to power line construction activities
  Alternative 4 will require new turns-ins to the substation and the construction of these additional power lines is likely to generate an impact on resident avifauna due physical disturbance and loss of habitat as well as noise.

Operational Phase

- Impact on Avifauna due to power line collisions
  Alternative 4 will require new turns-ins to the substation and these additional power lines may generate an impact on susceptible avifauna. Even though the impact at any one time is likely to be low, the power lines have a long lifespan and may generate a significant long-term impact on local populations of vulnerable species. It is however likely that this potential impact can be reduced to an acceptable level through mitigation of the risks to birds.

Decommissioning

Decommissioning would result in similar levels of disturbance to the construction phase as it is assumed that the infrastructure will be dismantled and the site returned to a near-natural state. Although in the long-term this would potentially result in a positive impact, in the short term, impacts are likely to be negative and specific attention would need to be paid to alien plant invasion and wind erosion of the site following disturbance. The following impacts are considered to be associated with the decommissioning of the Alternative 4 power lines:

- Soil erosion and associated degradation of ecosystems
  The large amount of disturbance created during the decommissioning activities would potentially leave the site vulnerable to soil erosion. The area experiences strong winds and disturbed areas with low plant cover will certainly increase the risk of wind and water erosion at the site.
- Alien Plant Invasion
  The disturbance created during decommissioning is likely to encourage the invasion of the disturbed areas by alien species. This would occur rapidly given the low abundance of indigenous species that may be present and the existing high levels in infestation in the area.

Cumulative Impact

The Alternative 4 power line corridors will contribute to cumulative impacts on birds due to power lines. It will also potentially contribute to the cumulative loss of Critically Endangered Atlantis Sand Fynbos in the area. Both these impacts can likely be reduced to relatively low levels through appropriate mitigation and avoidance. Nevertheless, as these are potentially significant impacts, they are considered in the assessment as follows:

- Contribution to Cumulative Impact on Avifauna due to power line collisions
  Alternative 4 will increase the amount of power line infrastructure in the area and in so doing increase the cumulative negative impact on birds due to the power line infrastructure in the area. Although mitigation can be applied, it is not 100% effective and some residual impact and contribution to cumulative effects is likely.

- Reduced ability to meet conservation obligations & targets
  The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. The Alternative 4 power line are located within Atlantis Sand Fynbos which is listed as Critically Endangered and further loss of this vegetation type will potentially reduce future conservation options. Despite the fact that the area is invaded by alien species, it still retains some potential conservation value and rehabilitation potential. It is considered to be ecologically significant as illustrated by the high conservation value attributed to the area by the City of Cape Town Biodiversity Network. The extent of habitat loss associated with the power lines could however be kept to fairly low level and if managed properly, the corridors could improve habitat quality and generate a net positive impact on biodiversity in the area.

5 ASSESSMENT OF IMPACTS

A summary assessment of the different impacts associated with the two alternatives is provided below in Table 4. The majority of impacts are considered to be of moderate significance before mitigation and can be reduced to relatively low levels with mitigation applied. The major factors that lead to the relatively low assessed impacts are the low footprint of Alternative 1 and the disturbed nature of the site and for Alternative 4, the high abundance of woody aliens at the site and the low diversity of indigenous plant species within the affected area. On a comparative basis, for most impacts, there is not a lot of difference between the two sites. The environment around Alternative 1 is considered more sensitive given its location within the Koeberg Nature Reserve and the known presence of a variety of species of conservation concern in both fauna and flora. Alternative 4 is considered less sensitive given the degraded nature of the affected area, but the size of the development is significantly larger which to some extent compensates for the lower sensitivity. Differentiating factors include the small size of the GIS at Alternative 1 which poses less overall threat to the environment and the greater potential for Alternative 4 to disrupt the connectivity of the landscape in the affected area which has been identified as an important corridor despite its degraded nature.

Table 4. Summary of assessed impacts for the two substation alternatives and the power line corridor for Alternative 4, with and without mitigation measures implemented.

Phase	Impact	Alternative 1		Alternative 4		Alternative 4 Power Line Corridor	
		With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation
Construction	Impacts on vegetation and protected plant species	Low (35)	Medium (45)	Medium (35)	Medium (50)	Low (21)	Medium (36)
	Direct Faunal Impacts	Low (18)	Low (28)	Low (24)	Medium (35)	Low (16)	Low (24)
	Avifaunal Impacts	Medium (35)	Medium (50)	Low (24)	Medium (50)	Low (24)	Medium (40)
Operation	Soil erosion and associated degradation of ecosystems	Low (15)	Medium (32)	Low (15)	Medium (32)	-	-
	Alien Plant Invasion	Low (15)	Medium (36)	Low (16)	Medium (36)	-	-
	Impact on Avifauna due to power line collisions	-	-	-	-	Low (24)	Medium (52)
Decommissioning	Soil erosion and associated degradation of ecosystems	Low (15)	Medium (32)	Low (15)	Medium (32)	-	-
	Alien Plant Invasion	Low (15)	Medium (36)	Low (15)	Medium (36)	Low (15)	Medium (36)
Cumulative	Reduced ability to meet conservation obligations & targets	Low (28)	Medium (40)	Low (28)	Medium (44)	Low (28)	Medium (48)
	Impact on broad-scale ecological processes	Low (14)	Low (30)	Low (30)	Medium (52)	-	-
	Cumulative Impact on Avifauna due to power line collisions	-	-	-	-	Low (21)	Medium (48)

6 MITIGATION & IMPACT MANAGEMENT MEASURES

The following mitigation measures are recommended in order to reduce and avoid the potential impacts of the development of the new substation at Koeberg.

6.1 CONSTRUCTION PHASE

During construction, the major threat sources associated with the development would come from the operation of heavy machinery and construction vehicles at the site, site preparation and clearing as well as the presence of a large number of construction personnel. The following mitigation and avoidance measures should be implemented before or during the construction phase of the development.

Vegetation/General

- There should be a preconstruction walk-through of the development footprint in order to locate species of conservation concern. This should inform the plant rescue and protection plan for the development. Listed species of geophytes, succulents and other types which are likely to survive translocation should be identified, located and translocated to an adjacent safe area before construction commences. A permit from CapeNature is required. Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.
- Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.
- The area to be cleared should be clearly demarcated and the construction area, within which all construction activities should be confined, should also be clearly demarcated with construction tape or similar.
- All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.
- Any temporary lay-down areas or construction site management infrastructure should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.
- Dust suppression and erosion management should be an integrated component of the construction approach. Bare and disturbed areas may need to be protected from wind erosion through the use of wind barriers and soil savers.

Fauna

- Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.
- All construction vehicles should adhere to a low speed limit (<30km/h) to avoid collisions with susceptible species such as snakes and tortoises.

- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- If trenches need to be dug for electrical cabling or other purpose, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.

Avifauna

- Ensure that all new power infrastructure is adequately insulated and bird-friendly in configuration (Lehman et al. 2007).
- All new lines should be marked with bird flight diverters along their entire length (Jenkins et al. 2010), using industry standard markers and marker fitting protocols (e.g. Van Rooyen 2004). In situations where new lines traverse in parallel with existing, unmarked power lines, this has the added benefit of reducing the collision risk posed by the older line.
- Any raptor or other species of conservation concern which may be nesting in the immediate vicinity of the site should be identified before construction commences. This can occur during the preconstruction walk-through of the facility for other fauna and flora related issues. Where necessary, then some adjustment of the timing or location of certain activities may be required to allow breeding to be completed.

6.2 OPERATIONAL PHASE

During operation, the major risk factors associated with the development would arise from residual impacts associated with the construction of the substation and from the daily operation and maintenance of the substation and associated infrastructure. The following mitigation and avoidance measures should be implemented during the operational phase of the development.

Vegetation/General

- Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. There should be regular monitoring for alien plants within the development footprint as and adjacent areas with clearing and control implemented as necessary. Alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.
- Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques, using indigenous, locally sourced species only.

Fauna

- Any potentially dangerous fauna such snakes or fauna threatened by maintenance and operational activities should be removed to a safe location.
- If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.
- The substation will be fenced to Eskom standards which is likely to involve several layers of fencing. However, on the outer fence, no electrified strands should be placed within 30cm of the ground as come species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside.

Avifauna

- Disturbance impacts associated with the maintenance of the new infrastructure should be minimised, by abbreviating maintenance times, scheduling maintenance activities around avian breeding schedules where necessary, and lowering levels of associated noise.
- Any birds killed by the power line should be recorded and additional mitigation should be applied if repeated mortality is associated with certain section or components of the line.

6.3 DECOMMISSIONING

During decommissioning it is assumed that the infrastructure would be removed and the site restored or rehabilitated to a semi-natural condition. The major threat sources associated with decommissioning would come from the operation of heavy machinery and construction vehicles at the site, site remediation as well as the presence of construction personnel. The following mitigation and avoidance measures should be implemented during the decommissioning phase of the development.

Vegetation/General

- Environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.
- The deconstruction area, within which all decommissioning activities should be confined, should be clearly demarcated with construction tape or similar. This should not exceed the original extent of the construction area and all sensitive features within this area should also be demarcated and protected from impact.
- All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.

- Any temporary use areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.
- Regular dust suppression should take place during decommissioning to ensure that dust impacts are kept to a minimum.
- All cleared areas should be protected from erosion with wind barriers and sediment traps as necessary.
- All cleared areas should be revegetated or rehabilitated with locally occurring and sourced species and should be monitoring to ensure that adequate survival and ground cover has been attained.

Fauna

- Any fauna threatened by the decommissioning activities should be removed to safety by the ECO or appropriately qualified environmental officer.
- All construction vehicles should adhere to a low speed limit (<30km/h) to avoid collisions with susceptible species such as snakes and tortoises.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- No litter or rubble from the infrastructure should be left on-site, this should all be removed and recycled or taken to a waste disposal site for proper disposal as appropriate.

Avifauna

- Any raptor or other species of conservation concern which may be nesting in the immediate vicinity of the site should be identified before decommissioning commences. This may include raptors nesting in the power line infrastructure and it may be necessary to leave a pylon standing if it contains a nest of a species of high conservation concern which would not have alternative nesting site. Where necessary, then some adjustment of the timing or location of certain activities may be required to allow breeding to be completed.

7 CONCLUSION & RECOMMENDATIONS

Although the broader environment around Alternative 1 is clearly more sensitive than that around Alternative 4, the total footprint of Alternative 1 would not be likely to exceed 7 to 8ha, which compares to more than 70ha for Alternative 4. Provided that sufficient care is taken during construction to mitigate the likely impacts associated with construction at Alternative 1, then it is highly unlikely that it would generate significant ecological impact. The affected area is already disturbed and does not contain any biodiversity of significant concern. As the footprint is low and immediately adjacent to the existing footprint of the power station, the addition impact on landscape level processes would be minimal. In contrast, the footprint of Alternative 4 is relatively large and would occur within an area that is currently not developed. Although the affected area is severely invaded and impacted by woody

aliens, it retains some ecological functions, in particular providing cover for fauna to move through the area. The development of the substation at Alternative 4 would be highly likely to significantly impact and disrupt the connectivity of the landscape in this area. In addition, Alternative 4 requires significant additional power line infrastructure, which is minimal for Alternative 1 and would pose a long-term threat to avifauna.

Overall, it is clear that Alternative 1 is the preferred Alternative for the Weskusfleur substation site. With the appropriate mitigation and avoidance measures applied, it is highly unlikely that it would generate significant long-term impact on biodiversity. There are no red-flag issues or fatal flaws associated with this Alternative and as such, there are no compelling ecological reasons to oppose the development of the substation at this site.

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9 LIST OF MAMMALS

List of mammals which are known or likely to occur in the vicinity of Koeberg. Habitat notes and distribution records are based on Skinner & Chimimba (2005), while conservation status is from the IUCN Red Lists 2014.2 and South African Red Data Book for Mammals (Friedmann & Daly 2004).

Scientific Name	Common Name	Status	Habitat	Likely Presence
Afrosoricida (Golden Moles):				
Chrysochloris asiatica	Cape Golden Mole	LC	Coastal parts of the Northern and Western Cape	Confirmed
Macroscledidea (Elephant Shrews):				
Elephantulus edwardii	Cape Rock Elephant Shrew	LC	From rocky slopes, with or without vegetation, from hard sandy ground bearing little vegetation, quite small rocky outcrops	Low
Tubulentata:				
Orycteropus afer	Aardvark	LC	Wide habitat tolerance, being found in open woodland, scrub and grassland, especially associated with sandy soil	Low
Hyracoidea (Hyraxes)				
Procavia capensis	Rock Hyrax	LC	Outcrops of rocks, especially granite formations and dolomite intrusions in the Karoo. Also erosion gullies	Low
Lagomorpha (Hares and Rabbits):				
Lepus capensis	Cape Hare	LC	Dry, open regions, with palatable bush and grass	Confirmed
Lepus saxatilis	Scrub Hare	LC	Common in agriculturally developed areas, especially in crop-growing areas or in fallow lands where there is some bush development.	High
Rodentia (Rodents):				
Bathyergus suillus	Cape Dune Mole Rat	LC	Restricted to sandy habitats along the coast or alluvial sand	Confirmed
Cryptomys hottentotus	African Mole Rat	LC	Wide diversity of substrates, from sandy soils to heavier compact substrates such as decomposed schists and stony soils	High
Georychus capensis	Cape Mole Rat	LC	Sandy soils, in coastal dunes, in sandy alluvium along river systems and montane regions of the Western Cape	High
Hystrix africaeaustralis	Cape Porcupine	LC	Catholic in habitat requirements.	Confirmed
Acomys subspinosus	Cape Spiny Mouse	LC	Associated with rocky areas on mountain slopes in Fynbos	Low
Rhabdomys pumilio	Four-striped Grass Mouse	LC	Essentially a grassland species, occurs in wide variety of habitats where there is good grass cover.	Confirmed
Mus minutoides	Pygmy Mouse	LC	Wide habitat tolerance	High
Myomyscus verreauxii	Verreaux's Mouse	LC	Scrub on grassy hillsides and riverine forest	High

Aethomys namaquensis	Namaqua Rock Mouse	LC	Catholic in their habitat requirements, but where there are rocky koppies, outcrops or boulder-strewn hillsides they use these preferentially	Low
Otomys irroratus	Vlei Rat	LC	Abundant in habitats associated with damp soil in vleis or along streams and rivers.	Confirmed
Desmodillus auricularis	Cape Short-tailed Gerbil	LC	Tend to occur on hard ground, unlike other gerbil species, with some cover of grass or karroid bush	High
Gerbillurus paeba	Hairy-footed Gerbil	LC	Gerbils associated with Nama and Succulent Karoo preferring sandy soil or sandy alluvium with a grass, scrub or light woodland cover	High
Gerbilliscus afra	Cape Gerbil	LC	Confined to areas of loose, sandy soils of sandy alluvium. Common on cultivated lands.	Confirmed
Mystromys albicaudatus	White-tailed Mouse	EN	Variable vegetation, but live in cracks or burrows in the soil	Moderate
Malacothrix typica	Gerbil Mouse	LC	Found predominantly in Nama and Succulent Karoo biomes, in areas with a mean annual rainfall of 150-500 mm.	Moderate
Dendromus melanotis	Grey Climbing Mouse	LC	Often associated with stands of tall grass especially if thickened with bushes and other vegetation	High
Dendromus mesomelas	Brants' Climbing Mouse	LC	Associated with rank vegetation, especially tall grass and scrub	High
Steatomys krebsii	Krebs's Fat Mouse	LC	Prefer a sandy substrate.	High
Primates:				
Papio ursinus	Chacma Baboon	LC	Can exploit fynbos, montane grasslands, riverine courses in deserts, and simply need water and access to refuges.	Low
Eulipotyphla (Shrews):				
Myosorex varius	Forest Shrew	LC	Prefers moist, densely vegetated habitat	High
Suncus varilla	Lesser Dwarf Shrew	LC	Often associated with termitaria, little else known	High
Crocidura cyanea	Reddish-Grey Musk Shrew	LC	Occurs in relatively dry terrain, with a mean annual rainfall of less than 500 mm. Occur in karroid scrub and in fynbos often in association with rocks.	High
Crocidura flavescens	Greater Red Musk Shrew	LC	Wide habitat tolerance	High
Carnivora:				
Proteles cristata	Aardwolf	LC	Common in the 100-600mm rainfall range of country, Nama-Karoo, Succulent Karoo Grassland and Savanna biomes	Low
Caracal caracal	Caracal	LC	Caracals tolerate arid regions, occur in semi-desert and karroid conditions	Confirmed
Felis silvestris	African Wild Cat	LC	Wide habitat tolerance.	Low
Genetta genetta	Small-spotted genet	LC	Occur in open arid associations	Confirmed
Genetta tigrina	Large-spotted genet	LC	Fynbos and savanna particularly along riverine areas	High
Herpestes pulverulentus	Cape Grey Mongoose	LC	Wide habitat tolerance	Confirmed

Cynictis penicillata	Yellow Mongoose	LC	Semi-arid country on a sandy substrate	Confirmed
Atilax paludinosus	Marsh Mongoose	LC	Associated with well-watered terrain, living in close association with rivers, streams, marshes, etc.	High
Vulpes chama	Cape Fox	LC	Associated with open country, open grassland, grassland with scattered thickets and coastal or semi-desert scrub	Moderate
Aonyx capensis	African Clawless Otter	LC	Predominantly aquatic and do not occur far from permanenet water	Low
Ictonyx striatus	Striped Polecat	LC	Widely distributed throughout the sub-region	High
Mellivora capensis	Ratel/Honey Badger	IUCN LC/SA RDB EN	Catholic habitat requirements	High
Rumanantia (Antelope):				
Sylvicapra grimmia	Common Duiker	LC	Presence of bushes is essential	Confirmed
Raphicerus campestris	Steenbok	LC	Inhabits open country,	Confirmed
Raphicerus melanotis	Cape Grysbok	LC	Thick scrub bush, particularly along the lower levels of hills	High
Chiroptera (Bats)				
Rousettus aegyptiacus	Egyptian Rousette	LC	Require fruit and caves for roosting in the vicinity	High
Sauromys petrophilus	Flat-headed free-tailed bat	LC	Rocky areas and the availability of narrow rock fissures essential requirements	Low
Neoromicia capensis	Cape Serotine Bat	LC	Wide habitat tolerances, but often found near open water	High
Tadarida aegyptiaca	Egyptian Free-tailed Bat	LC	In arid areas. often associated with water sources	High
Nycteris thebaica	Egyptian Slit-faced Bat	LC	Wide habitat tolerance	High
Miniopterus natalensis	Natal long-fingered bat	NT	Cave dwelling and suitable caves are an essential habitat requirement	High
Eptesicus hottentotus	Long-talied serotine bat	LC	Wide habitat tolerance	High
Rhinolophus clivosus	Geoffroy's horsehoe bat	LC	Wide habitat tolerance but Roost in caves	High
Rhinolophus capensis	Cape horseshoe bat	LC	Many records from coastal caves	High

10 LIST OF REPTILES

List of reptiles which were observed in the current study or which are known to occur in the Koeberg area according to the SARCA database. Conservation status of from Bates et al. (2014).

Family	Genus	Species	Subspecies	Common name	Red list category	No. records	QDS
Gekkonidae	*Pachydactylus*	*austeni*		Austen's Gecko	Least Concern	1	3318CB
Gekkonidae	*Pachydactylus*	*geitje*		Ocellated Gecko	Least Concern	5	3318CB
Gekkonidae	*Afrogecko*	*porphyreus*		Marbled Leaf-toed Gecko	Least Concern	5	3318CB
Chamaeleonidae	*Bradypodion*	*pumilum*		Cape Dwarf Chameleon	Vulnerable	1	3318CB
Chamaeleonidae	*Bradypodion*	*occidentale*		Western Dwarf Chameleon	Least Concern	1	3318CB
Agamidae	*Agama*	*atra*		Southern Rock Agama	Least Concern	1	3318CB
Lacertidae	*Meroles*	*knoxii*		Knox's Desert Lizard	Least Concern	5	3318CB
Lacertidae	*Tropidosaura*	*gularis*		Cape Mountain Lizard	Least Concern	1	3318C
Scincidae	*Acontias*	*meleagris*		Cape Legless Skink	Least Concern	1	3318CB
Scincidae	*Typhlosaurus*	*caecus*		Southern Blind Legless Skink	Least Concern	2	3318CB
Scincidae	*Trachylepis*	*capensis*		Cape Skink	Least Concern	2	3318CB
Scincidae	*Trachylepis*	*homalocephala*		Red-sided Skink	Least Concern	5	3318C
Scincidae	*Trachylepis*	*variegata*		Variegated Skink	Least Concern	2	3318CB
Scincidae	*Scelotes*	*bipes*		Silvery Dwarf Burrowing Skink	Least Concern	4	3318CB
Scincidae	*Scelotes*	*montispectus*		Bloubergstrand Dwarf Burrowing Skink	Near Threatened	5	3318CB
Cordylidae	*Chamaesaura*	*anguina*	*anguina*	Cape Grass Lizard	Least Concern	2	3318C
Cordylidae	*Cordylus*	*cordylus*		Cape Girdled Lizard	Least Concern	13	3318CB
Cordylidae	*Cordylus*	*niger*		Black Girdled Lizard	Near Threatened	22	3318C
Cordylidae	*Pseudocordylus*	*microlepidotus*	*microlepidotus*	Cape Crag Lizard	Least Concern	15	3318C
Gerrhosauridae	*Tetradactylus*	*seps*		Short-legged Seps	Least Concern	16	3318C
Gerrhosauridae	*Tetradactylus*	*tetradactylus*		Cape Long-tailed Seps	Least Concern	1	3318C
Typhlopidae	*Ramphotyphlops*	*braminus*		Brahminy Blind Snake	Not listed	2	3318C
Typhlopidae	*Rhinotyphlops*	*lalandei*		Delalande's Beaked Blind Snake	Least Concern	2	3318CB
Leptotyphlopidae	*Leptotyphlops*	*nigricans*		Black Thread Snake	Least Concern	2	3318C
Colubridae	*Lamprophis*	*aurora*		Aurora House Snake	Least Concern	4	3318C

Colubridae	*Lycodonomorphus*	*inornatus*		Olive House Snake	Least Concern	9	3318C
Colubridae	*Lycodonomorphus*	*rufulus*		Brown Water Snake	Least Concern	16	3318C
Colubridae	*Duberria*	*lutrix*	*lutrix*	South African Slug-eater	Least Concern	15	3318C
Colubridae	*Pseudaspis*	*cana*		Mole Snake	Least Concern	3	3318CB
Colubridae	*Crotaphopeltis*	*hotamboeia*		Red-lipped Snake	Least Concern	3	3318C
Colubridae	*Dispholidus*	*typus*	*typus*	Boomslang	Least Concern	4	3318CB
Colubridae	*Dasypeltis*	*scabra*		Rhombic Egg-eater	Least Concern	1	3318CB
Colubridae	*Psammophis*	*crucifer*		Cross-marked Grass Snake	Least Concern	2	3318CB
Colubridae	*Psammophis*	*leightoni*		Cape Sand Snake	Vulnerable	2	3318CB
Colubridae	*Psammophis*	*notostictus*		Karoo Sand Snake	Least Concern	1	3318C
Colubridae	*Psammophylax*	*rhombeatus*	*rhombeatus*	Spotted Grass Snake	Least Concern	2	3318CB
Atractaspididae	*Homoroselaps*	*lacteus*		Spotted Harlequin Snake	Least Concern	2	3318CB
Elapidae	*Hemachatus*	*haemachatus*		Rinkhals	Least Concern	1	3318C
Elapidae	*Naja*	*nivea*		Cape Cobra	Least Concern	1	3318CB
Viperidae	*Bitis*	*arietans*	*arietans*	Puff Adder	Least Concern	7	3318C
Testudinidae	*Chersina*	*angulata*		Angulate Tortoise	Least Concern	5	3318CB
Testudinidae	*Stigmochelys*	*pardalis*		Leopard Tortoise	Least Concern	4	3318C
Testudinidae	*Homopus*	*areolatus*		Parrot-beaked Tortoise	Least Concern	26	3318C
Cheloniidae	*Eretmochelys*	*imbricata*		Hawksbill Turtle	Near Threatened	2	3318CB
Pelomedusidae	*Pelomedusa*	*subrufa*		Central Marsh Terrapin	Least Concern	6	3318C
Viperidae	*Bitis*	*armata*		Southern Adder	Vulnerable	N/A	3318CB

11 LIST OF AMPHIBIANS

List of amphibians which are likely to occur in the Koeberg area. Habitat notes and distribution records are based on Du Preez and Carruthers (2009), while conservation status is from the IUCN Red Lists 2014 and Minter et al. (2004).

Scientific Name	Common Name	Status	Habitat	Distribution	Likely Presence	BCA
Breviceps rosei rosei	Sand Rain Frog	Least Concern	Well vegetated low-lying sandy areas in coastal lowlands	Endemic	High	Confirmed
Breviceps gibbosus	Cape Rain Frog	Vulnerable	Well drained soils on slightly sloping ground in the southwestern Cape	Endemic	High	Confirmed
Amietophrynus rangeri	Raucous Toad	Least Concern	Rivers and stream in grassland and fynbos	Endemic	High	
Vandijkophrynus angusticeps	Cape Sand Toad	Least Concern	Temporary rain-filled depressions in sandy soils	Endemic	High	Confirmed
Xenopus laevis	Common Platanna	Least Concern	Any more or less permanent water	Widespread	High	
Cacosternum capense	Cape Caco	Vulnerable	Restricted to low lying flat or gently undulating areas with poorly drained clay or loamy soils	Endemic	High	
Cacosternum platys	Flat Caco	Least Concern	Flooded grassland and seepages	Endemic	High	
Amietia fuscigula	Cape River Frog	Least Concern	Large still bodies of water or permanent streams and rivers.	Widespread	High	
Strongylopus grayii	Clicking Stream Frog	Least Concern	Winter and summer rainfall areas in the fynbos, Succulent and Nama Karoo	Widespread	High	Confirmed
Tomopterna delalandii	Cape Sand Frog	Least Concern	Lowlands in fynbos and Succulent Karoo	Endemic	High	Confirmed

12 LIST OF BIRDS

Annotated list of bird species likely to occur within the inclusive impact area of the proposed Eskom substation. **Species in bold** were observed during one or more of the site visits.

Common name	Scientific name	Regional Conservation status	Regional endemism	Preferred habitat				Susceptibility to		
				Intact natural vegetation	Infested or degraded natural vegetation	Wetlands	Developed areas	Collision	Electrocution	Habitat loss or Disturbance
Common Ostrich	***Struthio camelus***	**-**	**-**	**X**				**-**	**-**	**Moderate**
Grey-winged Francolin	*Scleroptila africanus*	-	Endemic	X				Moderate	-	Moderate
Cape Spurfowl	***Pternistis capensis***	**-**	**Endemic**	**X**				**Moderate**	**-**	**Moderate**
Common Quail	*Coturnix coturnix*	-	-	X					-	-
Helmeted Guineafowl	*Numida meleagris*	-	-		X			Moderate	-	Moderate
White-backed Duck	*Thalassornis leuconotus*	-	-			X		Moderate	-	-
Maccoa Duck	*Oxyura maccoa*	Near-threatened	-			X		Moderate	-	-
Egyptian Goose	***Alopochen aegyptiaca***	**-**	**-**			**X**		**High**	**High**	**-**
South African Shelduck	*Tadorna cana*	-	Endemic			X		High	-	-
Spur-winged Goose	*Plectropterus gambensis*	-	-			X		High	High	-
Cape Teal	*Anas capensis*	-	-			X		Moderate	-	-
African Black Duck	*Anas sparsa*	-	-			X		Moderate	-	-
Mallard Duck	*Anas platyrhynchos*	-	-			X		Moderate	-	-
Yellow-billed Duck	*Anas undulata*	-	-			X		Moderate	-	-
Cape Shoveler	*Anas smithii*	-	Endemic			X		Moderate	-	-
Red-billed Teal	*Anas erythrorhyncha*	-	-			X		Moderate	-	-
Hottentot Teal	*Anas hottentota*	-	-			X		Moderate	-	-
Southern Pochard	*Netta erythrophthalma*	-	-			X		Moderate	-	-
Greater Honeyguide	*Indicator indicator*	-	-		X			-	-	-
Lesser Honeyguide	*Indicator minor*	-	-		X			-	-	-

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Cardinal Woodpecker	*Dendropicos fuscescens*	-	-		X			-	-	Moderate
Acacia Pied Barbet	*Tricholaema leucomelas*	-	Near-endemic		X			-	-	Moderate
African Hoopoe	*Upupa africana*	-	-		X		X	-	-	Moderate
Malachite Kingfisher	***Alcedo cristata***	**-**	**-**			**X**		**-**	**-**	**-**
Giant Kingfisher	*Megaceryle maximus*	-	-			X		-	-	-
Pied Kingfisher	*Ceryle rudis*	-	-			X		-	-	-
European Bee-eater	*Merops apiaster*	-	-	X				-	-	-
White-backed Mousebird	*Colius colius*	-	Endemic	X	X			-	-	Moderate
Speckled Mousebird	*Colius striatus*	-	-	X	X			-	-	Moderate
Red-faced Mousebird	***Urocolius indicus***	**-**	**-**	**X**				**-**	**-**	**Moderate**
Red-chested Cuckoo	*Cuculus solitarius*	-	-		X			-	-	-
Klaas's Cuckoo	*Chrysococcyx klaas*	-	-	X	X			-	-	-
Diderick Cuckoo	*Chrysococcyx caprius*	-	-	X	X			-	-	-
Burchell's Coucal	*Centropus burchellii*	-	-		X	X		-	-	-
Alpine Swift	*Tachymarptis melba*	-	-	X		X		-	-	-
Common Swift	*Apus apus*	-	-	X		X		-	-	-
African Black Swift	*Apus barbatus*	-	-	X		X		-	-	-
Little Swift	*Apus affinis*	-	-	X		X	X	-	-	-
White-rumped Swift	*Apus caffer*	-	-	X		X	X	-	-	-
Barn Owl	*Tyto alba*	-	-	X	X		X	-	Moderate	-
Spotted Eagle-Owl	*Bubo africanus*	-	-	X	X		X	-	High	Moderate
Fiery-necked Nightjar	*Caprimulgus pectoralis*	-	-	X	X			-	-	Moderate
Rock Dove	***Columba livia***	**-**	**-**		**X**		**X**	**-**	**-**	**-**
Speckled Pigeon	***Columba guinea***	**-**	**-**	**X**	**X**			**-**	**-**	**-**
Laughing Dove	*Streptopelia senegalensis*	-	-	X			X	-	-	Moderate
Cape Turtle-Dove	***Streptopelia capicola***	**-**	**-**	**X**			**X**	**-**	**-**	**Moderate**

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Red-eyed Dove	*Streptopelia semitorquata*	-	-	X	X		X	-	-	Moderate
Namaqua Dove	*Oena capensis*	-	-	X				-	-	-
Southern Black Korhaan	*Afrotis afra*	Vulnerable	Endemic	X				Moderate	-	Moderate
Blue Crane	***Anthropoides paradiseus***	**Near-threatened**	**Endemic**	**X**		**X**		**High**	**-**	**Moderate**
Red-chested Flufftail	*Sarothrura rufa*	-	-	X				-	-	Moderate
African Rail	*Rallus caerulescens*	-	-			X		-	-	-
Black Crake	*Amaurornis flavirostris*	-	-			X		-	-	-
African Purple Swamphen	*Porphyrio madagascariensis*	-	-			X		-	-	-
Common Moorhen	*Gallinula chloropus*	-	-			X		-	-	-
Red-knobbed Coot	*Fulica cristata*	-	-			X		-	-	-
Namaqua Sandgrouse	*Pterocles namaqua*	-	Near-endemic	X				-	-	-
African Snipe	*Gallinago nigripennis*	-	-			X		-	-	-
Marsh Sandpiper	*Tringa stagnatilis*	-	-			X		-	-	-
Common Greenshank	*Tringa nebularia*	-	-			X		-	-	-
Wood Sandpiper	*Tringa glareola*	-	-			X		-	-	-
Common Sandpiper	*Actitis hypoleucos*	-	-			X		-	-	-
Curlew Sandpiper	*Calidris ferruginea*	-	-			X		-	-	-
Ruff	*Philomachus pugnax*	-	-			X		-	-	-
Greater Painted-snipe	*Rostratula benghalensis*	Vulnerable	-			X		-	-	-
African Jacana	*Actophilornis africanus*	-	-			X		-	-	-
Water Thick-knee	*Burhinus vermiculatus*	-	-			X		-	-	-
Spotted Thick-knee	*Burhinus capensis*	-	-	X				-	-	Moderate
African Black Oystercatcher	*Haematopus moquini*	-	Endemic			X		-	-	-

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Black-winged Stilt	*Himantopus himantopus*	-	-			X		-	-	-
Pied Avocet	*Recurvirostra avosetta*	-	-			X		-	-	-
Common Ringed Plover	*Charadrius hiaticula*	-	-			X		-	-	-
Kittlitz's Plover	*Charadrius pecuarius*	-	-			X		-	-	-
Three-banded Plover	*Charadrius tricollaris*	-	-			X		-	-	-
White-fronted Plover	*Charadrius marginatus*	-	-			X		-	-	-
Blacksmith Lapwing	***Vanellus armatus***	**-**	**-**			**X**		**-**	**-**	**-**
Crowned Lapwing	*Vanellus coronatus*	-	-	X				-	-	Moderate
Kelp Gull	***Larus dominicanus***	**-**	**-**			**X**		**-**	**Moderate**	**-**
Hartlaub's Gull	***Larus hartlaubii***	**-**	**Endemic**			**X**		**-**	**-**	**-**
Caspian Tern	*Sterna caspia*	Vulnerable	-			X		-	-	-
Whiskered Tern	*Chlidonias hybrida*	-	-			X		-	-	-
White-winged Tern	*Chlidonias leucopterus*	-	-			X		-	-	-
Osprey	*Pandion haliaetus*	-	-			X		-	Moderate	-
Black-shouldered Kite	***Elanus caeruleus***	**-**	**-**	**X**	**X**			**-**	**-**	**Moderate**
Black Kite	*Milvus migrans*	-	-	X	X			-	-	Moderate
African Fish-Eagle	*Haliaeetus vocifer*	-	-			X		-	High	Moderate
Black-chested Snake-Eagle	*Circaetus pectoralis*	-	-	X				-	Moderate	-
Brown Snake-Eagle	*Circaetus cinereus*	-	-	X				-	Moderate	-
African Marsh-Harrier	*Circus ranivorus*	Endangered	-	X		X		-	-	Moderate
Black Harrier	*Circus maurus*	Endangered	Endemic	X		X		-	-	Moderate
African Harrier-Hawk	*Polyboroides typus*	-	-		X			-	-	-
African Goshawk	*Accipiter tachiro*	-	-		X			-	-	Moderate
Rufous-chested Sparrowhawk	*Accipiter rufiventris*	-	-	X	X			-	-	Moderate
Black Sparrowhawk	*Accipiter melanoleucus*	-	-	X	X			-	-	Moderate

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Steppe Buzzard	*Buteo vulpinus*	-	-	X	X			-	Moderate	-
Jackal Buzzard	***Buteo rufofuscus***	**-**	**Endemic**	**X**	**X**			**-**	**Moderate**	**Moderate**
Verreauxs' Eagle	*Aquila verreauxii*	Vulnerable	-	X				Moderate	High	-
Booted Eagle	*Aquila pennatus*	-	-	X				-	-	-
Martial Eagle	*Polemaetus bellicosus*	Endangered	-	X				Moderate	High	-
Secretarybird	*Sagittarius serpentarius*	Vulnerable	-	X				High	-	Moderate
Lesser Kestrel	*Falco naumanni*	-	-	X				-	-	-
Rock Kestrel	***Falco rupicolus***	**-**	**-**	**X**			**X**	**-**	**-**	**-**
Lanner Falcon	***Falco biarmicus***	**Vulnerable**	**-**	**X**				**High**	**Moderate**	**-**
Peregrine Falcon	***Falco peregrinus***	**-**	**-**	**X**				**High**	**Moderate**	**-**
Little Grebe	*Tachybaptus ruficollis*	-	-			X		-	-	-
Great Crested Grebe	*Podiceps cristatus*	-	-			X		-	-	-
Black-necked Grebe	*Podiceps nigricollis*	-	-			X		-	-	-
African Darter	*Anhinga rufa*	-	-			X		-	-	-
Reed Cormorant	***Phalacrocorax africanus***	**-**	**-**			**X**		**-**	**-**	**-**
White-breasted Cormorant	*Phalacrocorax lucidus*	-	-			X		-	Moderate	-
Little Egret	*Egretta garzetta*	-	-			X		-	-	-
Grey Heron	*Ardea cinerea*	-	-		X	X		-	Moderate	-
Black-headed Heron	***Ardea melanocephala***	**-**	**-**	**X**	**X**	**X**		**-**	**Moderate**	**-**
Purple Heron	*Ardea purpurea*	-	-			X		-	-	-
Cattle Egret	***Bubulcus ibis***	**-**	**-**	**X**		**X**		**-**	**-**	**-**
Black-crowned Night-Heron	*Nycticorax nycticorax*	-	-		X	X		-	-	-
Little Bittern	*Ixobrychus minutus*	-	-			X		-	-	-
Hamerkop	*Scopus umbretta*	-	-			X		-	-	-
Greater Flamingo	*Phoenicopterus roseus*	Near-threatened	-			X		High	-	-
Lesser Flamingo	*Phoeniconaias minor*	Near-threatened	-			X		High	-	-

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Glossy Ibis	*Plegadis falcinellus*	-	-			X		-	-	-
Hadeda Ibis	***Bostrychia hagedash***	**-**	**-**	**X**	**X**			**-**	**-**	**Moderate**
African Sacred Ibis	***Threskiornis aethiopicus***	**-**	**-**			**X**		**-**	**-**	**-**
African Spoonbill	*Platalea alba*	-	-			X		-	-	-
Great White Pelican	*Pelecanus onocrotalus*	Vulnerable	-			X		High	-	-
Black Stork	*Ciconia nigra*	Vulnerable	-			X		High	Moderate	-
White Stork	*Ciconia ciconia*	-	-			X		High	High	-
African Paradise-Flycatcher	*Terpsiphone viridis*	-	-		X			-	-	Moderate
Southern Boubou	*Laniarius ferrugineus*	-	Endemic		X			-	-	Moderate
Bokmakierie	*Telophorus zeylonus*	-	Near-endemic	X	X			-	-	Moderate
Cape Batis	*Batis capensis*	-	Endemic	X	X			-	-	Moderate
Cape Crow	*Corvus capensis*	-	-	X				-	-	-
Pied Crow	***Corvus albus***	**-**	**-**	**X**	**X**		**X**	**-**	**-**	**Moderate**
White-necked Raven	*Corvus albicollis*	-	-	X				-	-	-
Common Fiscal	*Lanius collaris*	-	-	X	X		X	-	-	Moderate
Cape Penduline-Tit	*Anthoscopus minutus*	-	Near-endemic	X				-	-	Moderate
Grey Tit	*Parus afer*	-	Endemic	X				-	-	Moderate
Brown-throated Martin	*Riparia paludicola*	-	-			X		-	-	-
Banded Martin	*Riparia cincta*	-	-			X		-	-	-
Barn Swallow	***Hirundo rustica***	**-**	**-**	**X**		**X**		**-**	**-**	**-**
White-throated Swallow	*Hirundo albigularis*	-	-			X		-	-	-
Pearl-breasted Swallow	*Hirundo dimidiata*	-	-	X		X		-	-	-
Greater Striped Swallow	*Hirundo cucullata*	-	-	X		X	X	-	-	-
Rock Martin	*Hirundo fuligula*	-	-	X				-	-	-
Common House-Martin	*Delichon urbicum*	-	-	X		X		-	-	-

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Cape Bulbul	***Pycnonotus capensis***	**-**	**Endemic**	**X**				**-**	**-**	**Moderate**
Cape Grassbird	*Sphenoeacus afer*	-	Endemic	X				-	-	Moderate
Long-billed Crombec	*Sylvietta rufescens*	-	-	X				-	-	Moderate
Little Rush-Warbler	*Bradypterus baboecala*	-	-			X		-	-	-
African Reed-Warbler	*Acrocephalus baeticatus*	-	-			X		-	-	-
Lesser Swamp-Warbler	*Acrocephalus gracilirostris*	-	-			X		-	-	-
Layard's Tit-Babbler	*Parisoma layardi*	-	Endemic	X				-	-	-
Chestnut-vented Tit-Babbler	***Parisoma subcaeruleum***	**-**	**Near-endemic**	**X**				**-**	**-**	**-**
Cape White-eye	***Zosterops virens***	**-**	**Endemic**	**X**	**X**		**X**	**-**	**-**	**Moderate**
Grey-backed Cisticola	***Cisticola subruficapilla***	**-**	**Near-endemic**	**X**				**-**	**-**	**Moderate**
Levaillant's Cisticola	*Cisticola tinniens*	-	-	X		X		-	-	Moderate
Zitting Cisticola	*Cisticola juncidis*	-	-	X				-	-	Moderate
Cloud Cisticola	*Cisticola textrix*	-	Near-endemic	X				-	-	Moderate
Karoo Prinia	***Prinia maculosa***	**-**	**Endemic**	**X**				**-**	**-**	**Moderate**
Cape Clapper Lark	*Mirafra apiata*	-	Endemic	X				-	-	Moderate
Karoo Lark	*Calendulauda albescens*	-	Endemic	X				-	-	Moderate
Cape Long-billed Lark	*Certhilauda curvirostris*	-	Endemic	X				-	-	Moderate
Grey-backed Sparrowlark	*Eremopterix verticalis*	-	Near-endemic	X				-	-	-
Red-capped Lark	*Calandrella cinerea*	-	-	X				-	-	Moderate
Large-billed Lark	*Galerida magnirostris*	-	Endemic	X				-	-	Moderate
Olive Thrush	*Turdus olivaceus*	-	-	X	X		X	-	-	Moderate
Fiscal Flycatcher	*Sigelus silens*	-	Endemic	X	X		X	-	-	Moderate
African Dusky Flycatcher	*Muscicapa adusta*	-	-		X			-	-	-

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Cape Robin-Chat	***Cossypha caffra***	**-**	**-**	**X**	**X**		**X**	**-**	**-**	**Moderate**
Karoo Scrub-Robin	***Cercotrichas coryphoeus***	**-**	**Endemic**	**X**				**-**	**-**	**Moderate**
African Stonechat	*Saxicola torquatus*	-	-	X				-	-	Moderate
Capped Wheatear	*Oenanthe pileata*	-	-					-	-	Moderate
Familiar Chat	*Cercomela familiaris*	-	-	X				-	-	Moderate
Red-winged Starling	***Onychognathus morio***	**-**	**-**	**X**			**X**	**-**	**-**	**Moderate**
Pied Starling	*Spreo bicolor*	-	Endemic	X				-	-	-
Wattled Starling	*Creatophora cinerea*	-	-	X				-	-	-
Common Starling	***Sturnus vulgaris***	**-**	**-**				**X**	**-**	**-**	**-**
Orange-breasted Sunbird	*Anthobaphes violacea*	-	Endemic	X				-	-	Moderate
Malachite Sunbird	*Nectarinia famosa*	-	-	X	X		X	-	-	Moderate
Southern Double-collared Sunbird	*Cinnyris chalybeus*	-	Endemic	X	X		X	-	-	Moderate
Cape Sugarbird	*Promerops cafer*	-	Endemic	X				-	-	Moderate
Cape Weaver	***Ploceus capensis***	**-**	**Endemic**	**X**	**X**	**X**	**X**	**-**	**-**	**Moderate**
Southern Masked-Weaver	*Ploceus velatus*	-	-	X	X	X	X	-	-	Moderate
Red-billed Quelea	*Quelea quelea*	-	-	X				-	-	-
Southern Red Bishop	*Euplectes orix*	-	-	X		X		-	-	Moderate
Yellow Bishop	*Euplectes capensis*	-	-	X		X		-	-	Moderate
African Quailfinch	*Ortygospiza atricollis*	-	-					-	-	-
Common Waxbill	*Estrilda astrild*	-	-	X		X		-	-	Moderate
Pin-tailed Whydah	*Vidua macroura*	-	-	X		X		-	-	-
House Sparrow	*Passer domesticus*	-	-				X	-	-	-
Cape Sparrow	***Passer melanurus***	**-**	**Near-endemic**	**X**	**X**		**X**	**-**	**-**	**Moderate**
Cape Wagtail	*Motacilla capensis*	-	-	X		X		-	-	Moderate
Cape Longclaw	*Macronyx capensis*	-	Endemic	X				-	-	Moderate
African Pipit	*Anthus cinnamomeus*	-	-	X				-	-	Moderate

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Plain-backed Pipit	*Anthus leucophrys*	-	-	X				-	-	Moderate
Long-billed Pipit	*Anthus similis*	-	-	X				-	-	Moderate
Cape Canary	*Serinus canicollis*	-	Endemic	X	X		X	-	-	Moderate
Yellow Canary	*Crithagra flaviventris*	-	Near-endemic	X				-	-	Moderate
White-throated Canary	*Crithagra albogularis*	-	Near-endemic	X				-	-	Moderate
Streaky-headed Seedeater	*Crithagra gularis*	-	-	X				-	-	Moderate
Cape Bunting	*Emberiza capensis*	-	Near-endemic	X				-	-	Moderate