



76 Valley View Road, Morningside, Durban, 4001  
PO Box 37069, Overport, Durban, 4067

Tel: +27 (0)31 3032835  
Fax: +27 (0)86 692 2547

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## FAUNAL IMPACT ASSESSMENT

### PROPOSED SALDANHA BAY NETWORK STRENGTHENING PROJECT, SALDANHA BAY LOCAL MUNICIPALITY, WESTERN CAPE PROVINCE.

JAUNAURY 2016



**Prepared by:**  
Afzelia Environmental Consultants  
P.O. Box 37069  
Overport, 4067  
Tel: 031 303 2835  
Fax: 086 692 2547  
Email: info@afzelia.co.za

**Prepared for:**  
Savannah Environmental (Pty)Ltd  
Tel: 011 656 3237  
Fax: 086 684 0547  
Email: Sheila@savannahsa.com

## DECLARATION

I, **Craig Widdows**, declare that -

- I act as the independent specialist in this application;
- I do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the National Environmental Management Act (Act 107 of 1998)(NEMA), regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the NEMA Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity; and
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; all the particulars furnished by me in this form are true and correct.

### Signature of the specialist:

**Date:**

**Specialist:**

**Contact person:**

**Qualification:**

**Postal address:**

**Postal code:**

**Telephone:**

**E-mail:**

**Professional  
affiliation(s) (if any)**

Craig Widdows for Afzelia Environmental Consultants		
Craig Widdows		
MSc Ecology (UKZN)		
76 Valley View Road, Morningside		
4001	Cell:	083 7818 725
031 303 2835	Fax:	031 312 0896
Craig@afzelia.co.za		
IAIAAsa		

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## **EXECUTIVE SUMMARY**

Afzelia Environmental Consultants (Pty) Ltd were appointed by Savannah Environmental (Pty) Ltd to undertake a faunal scoping assessment for the proposed construction of the Saldanha Bay Network Strengthening Project, Saldanha Bay Local Municipality, Western Cape. The strengthening project will consist of:

- Construction of a new 400/132kV Transmission Substation in the Saldanha Bay area with a planned capacity of 3 x 500 MVA transformers;
- Construction of a new 132/66kV Distribution Substation near the current Blouwater Substation in the Saldanha Bay area;
- The construction of 2 x 400kV power lines (approximately 35 - 40 km) from the Aurora Substation to the new proposed distribution and transmission substations;
- Replace two of the four existing 250 MVA 400/132kV transformers with 2 x 500 MVA transformers at Aurora Substation; and
- Establishing 2 x 132 kV feeder bays around Aurora Substation.

The desktop study indicated that the study area falls within the range of 37 mammals, 6 amphibians and 44 reptile species. Faunal species likely to be impacted by the proposed substation and power line development are smaller, less mobile species (certain reptiles and amphibians). This includes the endemic Cape Caco, Cape Dwarf Chameleon and the Bloubergstrand Dwarf Burrowing Skink.

The impacts associated with the proposed substation and power line developments include:

- Loss of faunal habitat and ecological structure;
- Mortality or injuries to faunal species; and
- Disturbance to faunal communities.

The construction of the proposed substation at site alternative A is considered the most favourable from a faunal perspective as the alternative sites B and C are located within close proximity to a sensitive wetland faunal habitats (wetlands and pans). The construction of the two 400kV power line corridor alternatives 2 and 3 are considered to be the most favourable sites from a faunal perspective. These sites will pose a limited threat to the fauna occurring in the vicinity of the new infrastructure. This is largely due to the disturbance already experienced within the area coupled with the shorter length (16km) of the proposed power line.

Given the relative homogeneity of the habitat within the study area as well as existing levels of disturbance (existing roads, urban development, power lines and substations, agricultural and stock farming), the proposed strengthening project is unlikely to have a significant, long-term impact on the local faunal populations. The findings of the scoping report and severity of the associated impacts will be verified by a detailed site visit during the EIA phase.

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## 1. INTRODUCTION

### 1.1 Background and locality of the assessment

Afzelia Environmental Consultants (Pty) Ltd were appointed by Savannah Environmental (Pty) Ltd to undertake a faunal scoping assessment for the proposed Saldanha Bay Network Strengthening Project, Saldanha Bay Local Municipality, Western Cape.

Eskom Holdings SOC Ltd is proposing the construction of new dual 400kV power lines of approximately 35km as well as a new transmission substation (Tx) and a new distribution (Dx) substation in the Saldanha Bay area of the Western Cape. The construction development footprint for the Transmission Substation is 600m x 600m and the Distribution Substation is 120m x 120m. The infrastructures associated with the proposed development include:

- Construction of a new 400/132kV Transmission Substation in the Saldanha Bay area with a planned capacity of 3 x 500 MVA transformers
- Construction of a new 132/66kV Distribution Substation near the current Blouwater Substation in the Saldanha Bay area
- The construction of 2 x 400kV power lines from the Aurora Substation to the new proposed distribution and transmission substations
- Replace two of the four existing 250 MVA 400/132kV transformers with 2 x 500 MVA transformers at Aurora Substation
- Establishing 2 x 132 kV feeder bays around Aurora Substation.

The proposed development will form part of the Saldanha Bay Network Strengthening Project that will increase the power output within the area. The establishment of the Transmission and Distribution Substations will assist in resolving the transmission capacity constraints at Aurora Substation and will play an important role in addressing the forecasted load requirements from industrial customers, the Industrial Development Zone (IDZ), local distributors and facilitate the integration of renewable generation in the area.

The proposed development is located in the Saldanha Bay area, within the Saldanha Bay Local Municipality, Western Cape Province (**Figure 1**). The site is located approximately 4.5 km from Saldanha Bay, between the R27 and R45. The study area borders the West Coast National Park to the south of the development. There are three substation site alternatives and six power line route alternatives, all of which are situated within the quarter-degree squares 3218CC and 3318AA (**Figure 2**).

### 1.2 Scope of work

In summary, the objectives of this faunal scoping assessment report were to describe and evaluate the study area from a faunal sensitivity perspective:



- A description of the environment that will be affected by the proposed development;
- A description of the current fauna within the study area and the identification of Red Data species potentially affected by the proposed substation and power line development;
- The use of previous ecological surveys conducted within the vicinity of the proposed development and literature investigations to supplement field data where necessary;
- Identify and describe potential negative ecological impacts on the faunal diversity and species composition at the site of the proposed development and assess the significance of these impacts; and
- To provide recommendations regarding the alternative that will have the least impact on the faunal communities within the study area and recommend studies for the EIA phase.

### **1.3 Sources of information**

The study site and surrounding areas were identified and mapped at a desktop level. This was conducted using aerial photography. The desktop assessment was verified during the fieldwork. The study made use of the following data sources:

- Google Earth™ satellite imagery was used at the desktop level;
- Geographic Information System data was used to determine conditions of habitats, vegetation types, special areas/features of concern, sensitive habitats and ecological corridors;
- A literature search on Red Data Book species predicted to occur in the study area;
- Faunal distribution data obtained from the Animal Demography Unit of the University of Cape Town, in order to ascertain species within the study area;
- The conservation status of all faunal species occurring in the aforementioned degree squares was then determined based on the IUCN Red List Categories and Criteria version 3.1 (2012);
- Further literature consulted include Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, Skinner and Chimimba (2005) for mammals;
- Faunal species lists are based on species which are known to occur in the broad geographical area, supplemented by a preliminary assessment of the availability and quality of suitable habitat at the site; and
- A classification of the vegetation types in the study area was obtained from Mucina & Rutherford (2006).



## 1.4 Assumptions and limitations

It is difficult to apply pure scientific methods within a natural environment without limitations, and consequential assumptions need to be made. The following constraints may have affected this assessment.

- The scoping report is largely a desktop study and although the study site was visited briefly, a detailed site visit and faunal survey was not completed;
- Furthermore, many faunal species of conservation importance (Red Data Species) are secretive and difficult to observe even during intensive field surveys;
- It is important to note that, although the predicted impacts are mostly concerned with Red Data species, non-Red Data species will also benefit from the proposed mitigation measures as they share the same habitat and face the same potential impacts; and
- Conclusions of this report were based on experience of these and similar species in different parts of South Africa. Faunal behaviour cannot be entirely reduced to formulas that will hold true under all circumstances.

**The faunal species were evaluated in terms of their conservation priority according to the following categories as per the International Union for the Conservation of Nature (IUCN):**

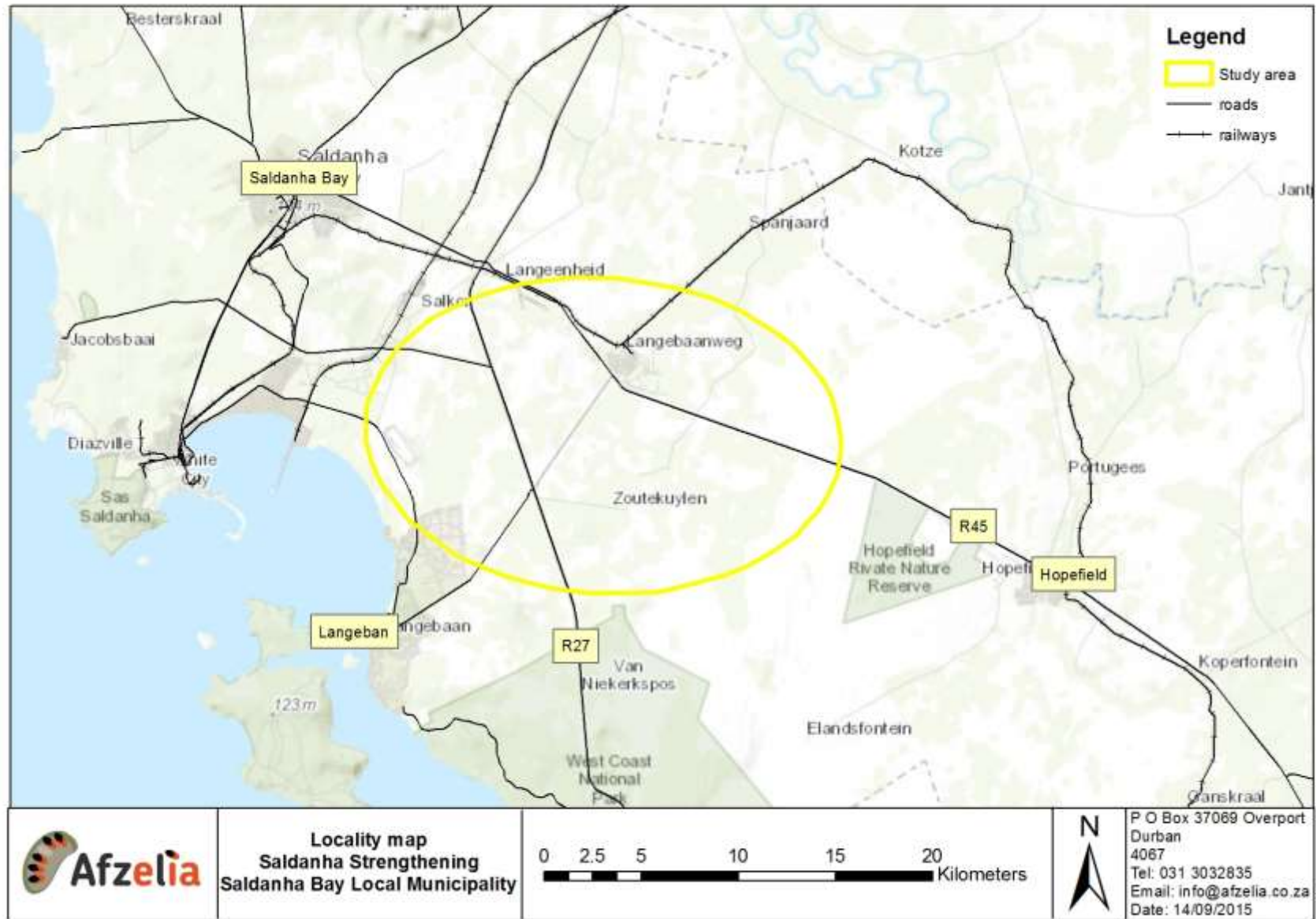
Critically endangered:	Species that are facing a very high risk of extinction in the immediate future. It is the highest risk category assigned to a species.
Endangered:	Species that are facing a high risk of extinction in the near future. If these species are not properly protected, they will become critically endangered and eventually extinct.
Vulnerable:	Species that are facing a high risk of extinction in the medium term future.
Near threatened:	Species that are facing a risk of extinction in the medium-long term.
Least concern:	Species that are not facing an eminent threat of extinction during the next five years.
Data deficient:	Inadequate data available to make a direct or indirect assessment of a species at risk of extinction.

## 2. METHODOLOGY

The faunal investigation focused on mammals, reptiles and amphibians in the proposed project area. The following methodology was applied:

- Data sets discussed under "sources of information" were collected/collated and examined to determine the focus species for this study;

- Similarly, the data was examined to determine the possible occurrence of any Red Data and non-Red Data species;
- A desk top examination of the site, using Google Earth imagery was done to compare the power line corridor options and substation site alternatives. These will be confirmed during the site visit in the EIA phase; and
- Information was supplemented by historical records, personal accounts from residents within the study area and a comprehensive literature review.



**Figure 1: Locality of study area for the proposed substations and associated power line infrastructure.**

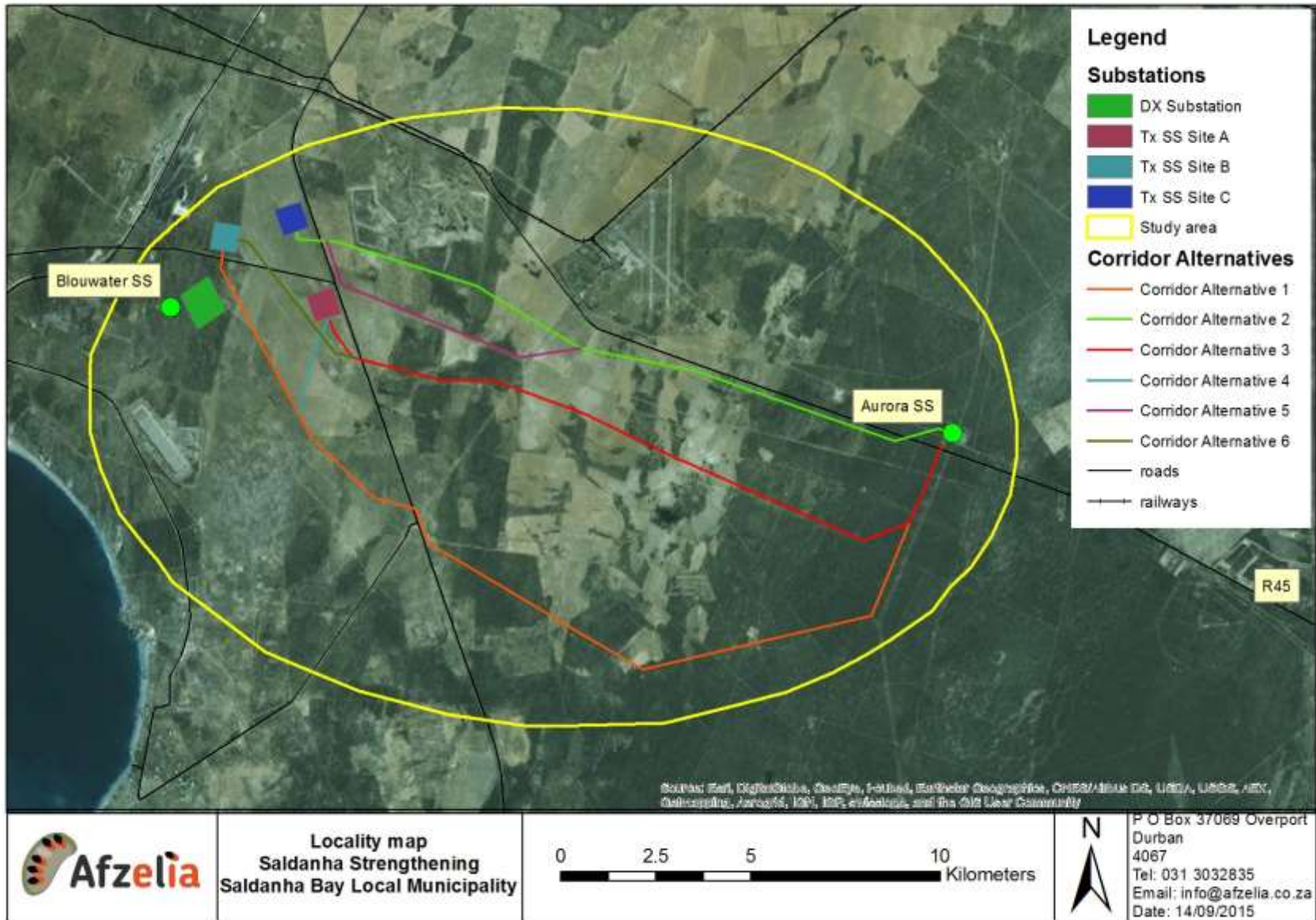


Figure 2. Site description map of the proposed substation site alternatives and power line corridor alternatives.



### **3. DESCRIPTION OF AFFECTED ENVIRONMENT**

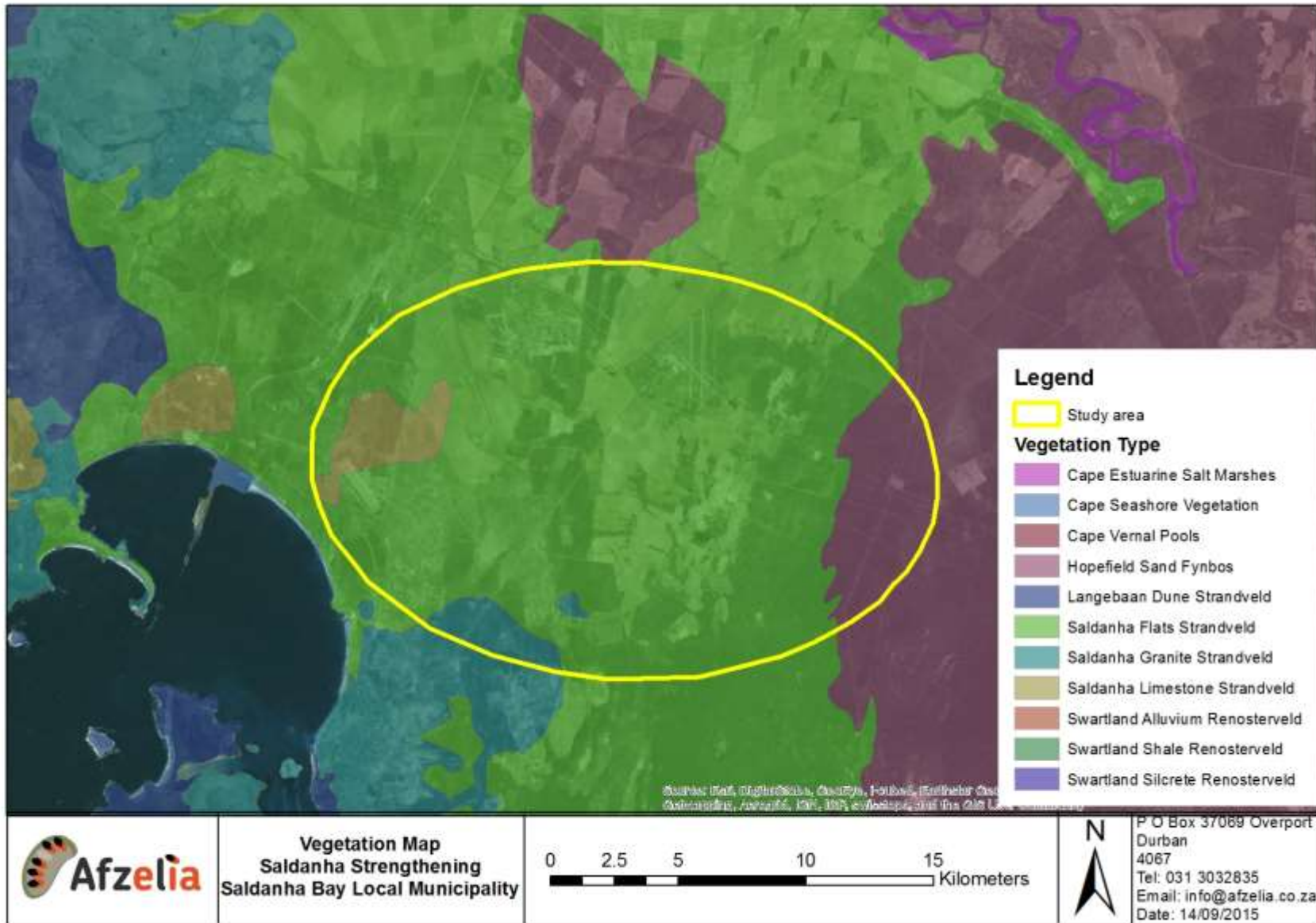
#### **3.1 Climate and vegetation**

The Saldanha Bay area is characterised by a winter rainfall pattern with some rain occurring in summer. The mean annual precipitation is approximately 250mm per year. It receives the lowest rainfall in February (1mm) and the highest in June (49mm). The average daily maximum temperatures range from 16.4 °C in July to 25.1 °C in February. The region is the coldest in June with minimum temperatures of 8.0 °C (Mucina and Rutherford 2006).

According to the national vegetation map (Mucina & Rutherford 2006) four vegetation types occur within the study area (**Figure 2**). Saldanha Flats Strandveld is the dominant vegetation type located within the study area while the Saldanha Limestone Strandveld occupies the western edge of the study area. This vegetation type consists of low Sclerophyllous shrublands with an open succulent layer forming in the undergrowth. Both vegetation types are considered endangered with at least 50% transformed mostly by cultivation, development of coastal settlements and road development. (Mucina and Rutherford, 2006).

A small outcrop of Saldanha Granite Strandveld is located along the southern section of the site and Hopefield Sand Fynbos Vegetation traverses the northern boundary. Again, both vegetation types are considered Endangered with approximately 70% and 40% transformed by cultivation, urban development and grazing land respectively (Mucina and Rutherford, 2006). Within the study area, these different vegetation types are structurally very similar and all consist of low shrub land and fynbos with varying amounts of grass, succulents, forbs and geophytes depending on the aspect and landscape position. Although the fynbos biome has a high floral species diversity, this vegetation type does not support a large diversity of faunal species.

The main topographical aspect within the study area consists of flat plains with limited undulations and ridgelines which are characteristic of the west coast coastal plains. The Berg River is the main water course located in the study area which drains northwards and is located 15km to the east of the proposed site alternatives.



**Figure 3. Vegetation types located within the study area and surrounds.**

### 3.2 Faunal micro-habitats

In determining how suitable the study area is for faunal species, it is necessary to look at the habitats available to determine where the relevant species will most likely occur within the study area. These “micro habitats” do not always correspond to vegetation types and are determined by a combination of vegetation type, topography, land use, food sources and other various intrinsic factors.

Investigation of the study area revealed the following important micro-habitats. In each case, some of the species likely to make use of the various micro habitats have been described.

#### ***Water bodies***

Bodies of water such as pans, rivers, streams, estuaries and other wetland systems provide suitable habitats for a variety of faunal species. These include endemic species and those of conservation importance. Various amphibians present within the study area will be localised around these micro-habitats. Various faunal species rely on these wetland areas as a water source as well as providing suitable habitats for roosting, foraging and breeding. The western section of the study area contains seasonal pans as well as an unchannelled valley bottom wetland north of the power line alternatives (**Figure 4**). Pans are defined as a near-level shallow depression or basin, usually containing an intermittent supply of water. At certain times of the year, they are characterised by slow flowing water and tall emergent vegetation. These factors provide habitats for various faunal species.



**Figure 4. One of several pans located within the western portion of the study area.**



### ***Strandveld Shrublands***

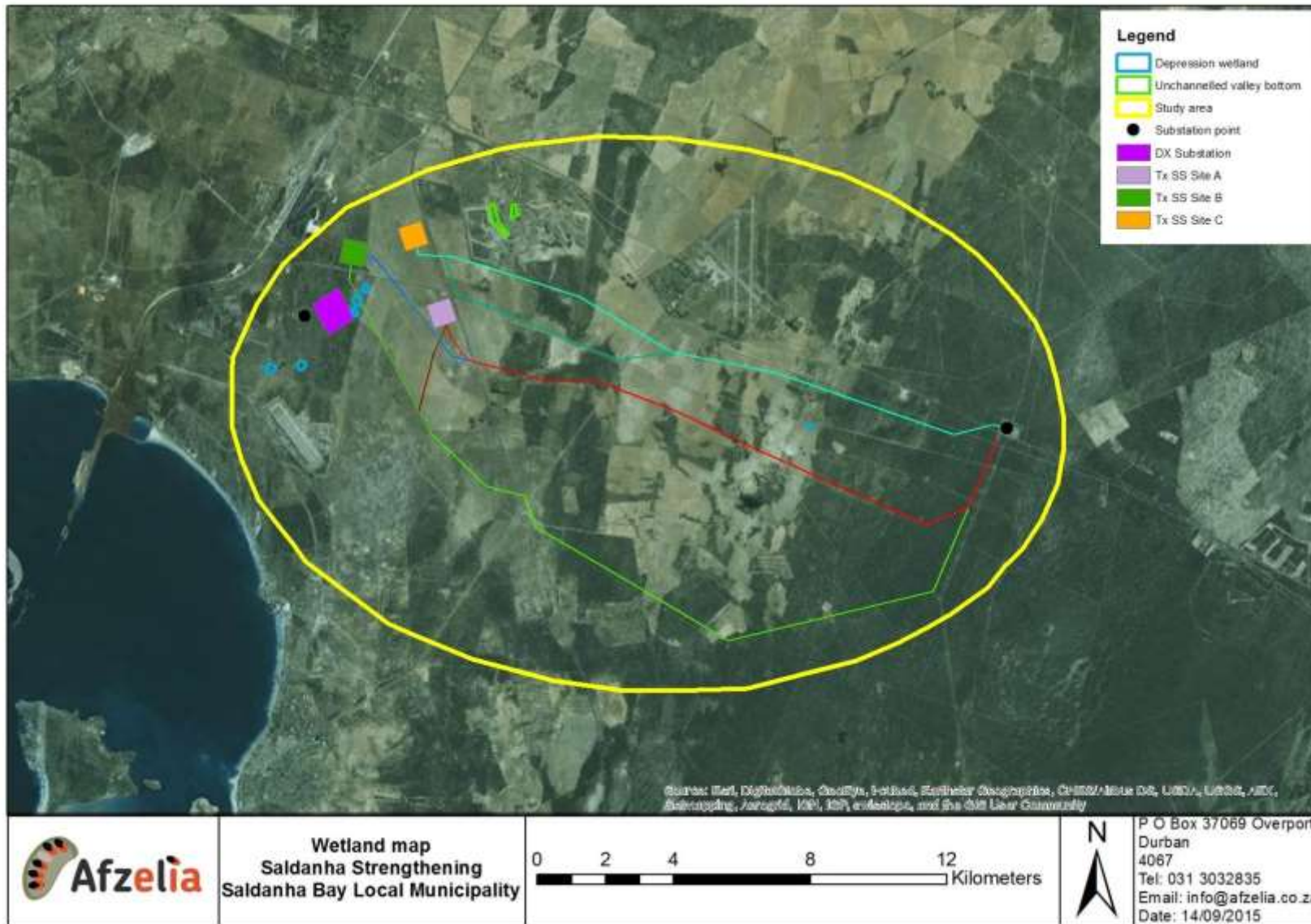
Strandveld low shrublands occupy the central and southern boundaries of the study area (**Figure 5**). These shrubland areas support certain species such as Golden Moles, burrowing reptiles and several rain frogs. Although the shrublands within the area are negatively impacted due to the disturbance and encroachment from agricultural land and power line infrastructure, they still provide important corridors of natural vegetation, cover and foraging opportunities for many faunal species within the largely anthropogenically disturbed landscape.



**Figure 5. The Strandveld shrubland habitat which occupies the central and southern sections of the study area.**

### ***Rocky outcrops***

Many faunal species, particularly reptiles and mammals, utilise rock habitats. Within the relatively homogenous nature of the vegetation, rocky outcrops provide a unique habitat for faunal species.



**Figure 6. Wetland areas located within the study area**

#### 4. FAUNAL ASSESSMENT

This scoping study focused on the current status of threatened faunal species (mammals, reptiles and amphibians) occurring or likely to occur within the proposed study area.

Present impacts on faunal communities within the proposed development footprint include;

- The study area is located within a largely anthropogenically modified environment. A series of power lines exiting the Aurora substation radiate through the landscape and the presence of a phosphate mine near Elandsfontein Private Nature Reserve has had an impact on the environment.
- Numerous informal access roads occur throughout the study area.

This combination of factors has resulted in habitat transformation and subsequent reduction in suitable habitats for faunal species. These impacts have had a direct negative impact on the remaining fauna living within the study area.

##### 4.1 Mammal species composition

According to distribution maps, thirty seven different terrestrial mammals may occur within the proposed development area (Skinner and Chimimba 2005; Stuart 2015). These include six insectivores, five Chiropterans, ten rodents, six viverrids, three felids and two canids. Of these, seven are listed as endemic to the region. It is predicted that 15 mammalian species are highly likely to be present within the study area.

**Table 1. Mammals likely to be present within the proposed study area.**

COMMON NAME	SCIENTIFIC NAME
Large Grey Mongoose	<i>Herpestes ichneumon</i>
Marsh Mongoose	<i>Atilax paludinosus</i>
Yellow Mongoose	<i>Cynictis penicillata</i>
Bat-eared Fox	<i>Otocyon megalotis</i>
Small Grey Mongoose	<i>Herpestes pulverulenta</i>
Small-spotted Genet	<i>Genetta genetta</i>
Springbok	<i>Antidorcas marsupialis</i>
Cape Grysbok	<i>Raphicerus melanotis</i>
Steenbok	<i>Raphicerus campestris</i>
Cape Golden Mole	<i>Chrysochloris asiatica</i>
Karoo Bush Rat	<i>Otomys unisulcatus</i>
Xeric Four-striped Grass Mouse	<i>Rhabdomys pumilio</i>
Karoo Bush Rat	<i>Otomys unisulcatus</i>
Southern African Pygmy Mouse	<i>Mus (Nannomys) minutoides</i>

The ecological factors that influence the distribution of mammalian species within the Cape Floristic Region are complex and the available literature only permits broad scale interpretations. The distribution of many medium sized mammals is influenced by the availability of suitable habitat and food requirements and as a result, the distribution is often patchy (Boshoff and Kerley 2001). Furthermore, large scale movements of species plays an integral role in many mammalian life histories. The proposed development is likely to have an impact on smaller mammals that rely on the shrubland habitats for cover to reduce the risk of predation.

Five Red Listed species are likely to occur within the study area (Table 2). The Honey Badger (*Mellivora capensis*) categorised as Near Threatened and the White Tailed Mouse (*Myodomys albicaudatus*) categorised as Endangered; both have a wide distribution within Southern Africa and as a result, the development is not predicted to have a significant influence on the regional populations. This also holds true for the Brown Hyena (*Hyaena brunnea*).

**Table 2. Red Listed mammal species recorded in the 2821CA and 3318AA quarter degree square within which the proposed substations and power line infrastructure are located.**

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS
Cape Golden Mole	<i>Chrysochloris asiatica</i>	Data Deficient
Cape Mountain Zebra	<i>Equus zebra zebra</i>	Vulnerable
Honey Badger	<i>Mellivora capensis</i>	Near Threatened
Brown Hyena	<i>Hyaena brunnea</i>	Near Threatened
Cape Horseshoe Bat	<i>Rhinolophus capensis</i>	Near Threatened
White-Tailed Mouse	<i>Myodomys albicaudatus</i>	Endangered

Given the transformed nature of large portions of the area due to settlements, agricultural practices and urban expansion, the majority of these species would not have resident populations within the proposed development area.

The large area (600m x 600m) required for the Transmission substation will result in the transformation of natural habitats making the land uninhabitable for many faunal species. Furthermore, if the substation is placed within areas containing important micro-habitats, the development will have a negative impact on landscape connectivity and influence the movement of mammalian species.

The substation site alternatives are located in open areas, with limited cover and high levels of human disturbance. These areas would largely be avoided by mammalian

species and the new substation development is unlikely to have a significant impact on mammalian species.

#### 4.2 Amphibian species composition

The study area falls within the distribution range of six amphibian species of which three are highly likely to be present (Table 3). A series of wetland habitats (unchannelled valley bottom) and pan habitats located within the study area provides suitable breeding and foraging habitats for resident amphibian species. Species likely to be present include Clicking stream frog (*Strongylopus grayii*), Cape River Frog (*Amietia fuscigula*) and Raucous Toad (*Amietophrynus rangeri*). This will be confirmed during the EIA phase of the project.

The only Red Listed species which may occur within the study area is the Cape Caco (*Cacosternum capense*) and has been listed as Vulnerable. *C. capense* inhabits low lying areas with poorly drained, loamy or clay soils and the preferred habitat consists of Renosterveld. Due to the lack of suitable natural habitat (the site falls within Strandveld vegetation) and breeding habitats coupled with the fact that the study area is on the edge of its recorded distribution, it is not predicted that *C. capense* will have resident populations within the study area.

**Table 3. Amphibian species recorded in the 2821CA and 3318AA quarter degree square within which the proposed substations and power line infrastructure are located.**

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS
Namaqua Rain Frog	<i>Breviceps namaquensis</i>	Least Concern
Sand Rain Frog	<i>Breviceps rosei</i>	Least Concern
Clicking Stream Frog	<i>Strongylopus grayii</i>	Least Concern
Sand Toad	<i>Bufo angusticeps</i>	Least Concern
Cape Caco	<i>Cacosternum capense</i>	Vulnerable
Cape Sand Frog	<i>Tomopterna delandii</i>	Least Concern

Potential impacts on amphibian species associated with the proposed development include habitat loss, direct mortality, and pollution and degradation of wetland habitats. The pollution of suitable breeding habitats due to excessive dust, runoff and petrochemical pollutants is cause for concern. This is particularly true for line alternative corridor 2 and substation alternative B which appear to be located within close proximity of wetland systems. Amphibians have a semi-permeable skin and this makes them susceptible to pollutants within water bodies. These areas will be investigated in further detail and delineated during the EIA phase. During the construction and maintenance phase there will be an increase in vehicle activity and subsequently increased probability



of frog mortalities on the access roads. These impacts will be amplified during the breeding season, during which frog activity and dispersal is increased.

It is not envisaged that the development would result in long term impacts on amphibian populations within the area. All species within the site have a relatively wide distribution and are not confined to the study area and the development is therefore not expected to have an impact on regional populations.

### 4.3 Reptile species composition

The study area falls within the distribution range of 44 reptile species and the South African Reptile Conservation Assessment (SARCA) indicated that 37 species have been recorded within the study area (Appendix 2).

The proposed substation developments will result in the natural habitat being replaced and largely unusable for various reptile species and the species diversity within this area will be lower than adjacent natural alternatives. This is particularly true for burrowing species such as the Near Threatened Bloubergstrand Dwarf Burrowing Skink (*Scelotes montispectus*) and Gronovi's Dwarf Burrowing Skink (*Scelotes gronovii*) as the hardened surface will restrict movement as these species avoid movement above the ground. However, various species, usually those not sensitive to anthropogenic disturbance, such as Variegated Skink (*Trachylepis variegata*), Red Lipped Herald Snake (*Crotaphopeltis hotamboeia*) and Mole Snakes (*Pseudaspis cana*) will still use the transformed area.

According to SARCA, five Red listed species could be present within the study area (Table 4).

**Table 4. Red Listed reptile species recorded in the 2821CA and 3318AA quarter degree square within which the proposed substations and power line infrastructure are located.**

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS
Cape Dwarf Chameleon	<i>Bradypodion pumilum</i>	Vulnerable
Large-scaled Girdled Lizard	<i>Cordylus macropholis</i>	Near Threatened
Black Girdled Lizard	<i>Cordylus niger</i>	Near Threatened
Gronovi's Dwarf Burrowing Skink	<i>Scelotes gronovii</i>	Near Threatened
Bloubergstrand Dwarf Burrowing Skink	<i>Scelotes montispectus</i>	Near Threatened

The large sections of natural Strandveld located within the central and southern portions of the study area are likely to provide habitat for a variety of reptile species including Puff adders (*Bitis arietans arietans*), Cape Dwarf Chameleon (*Bradypodion pumilum*) and several Skink species. Based on the desktop study, the study site had limited rocky areas to support Girdled Lizard species, snakes and geckos.

The development of the proposed strengthening project is unlikely to have a long term impact on reptilian populations within the area. Furthermore, these impacts would be on a local scale.

Although this assessment focuses on Red Data faunal species, other less threatened species will also be affected by the proposed development. Mitigation measures proposed for Red Data species will therefore also serve to protect the more common species.

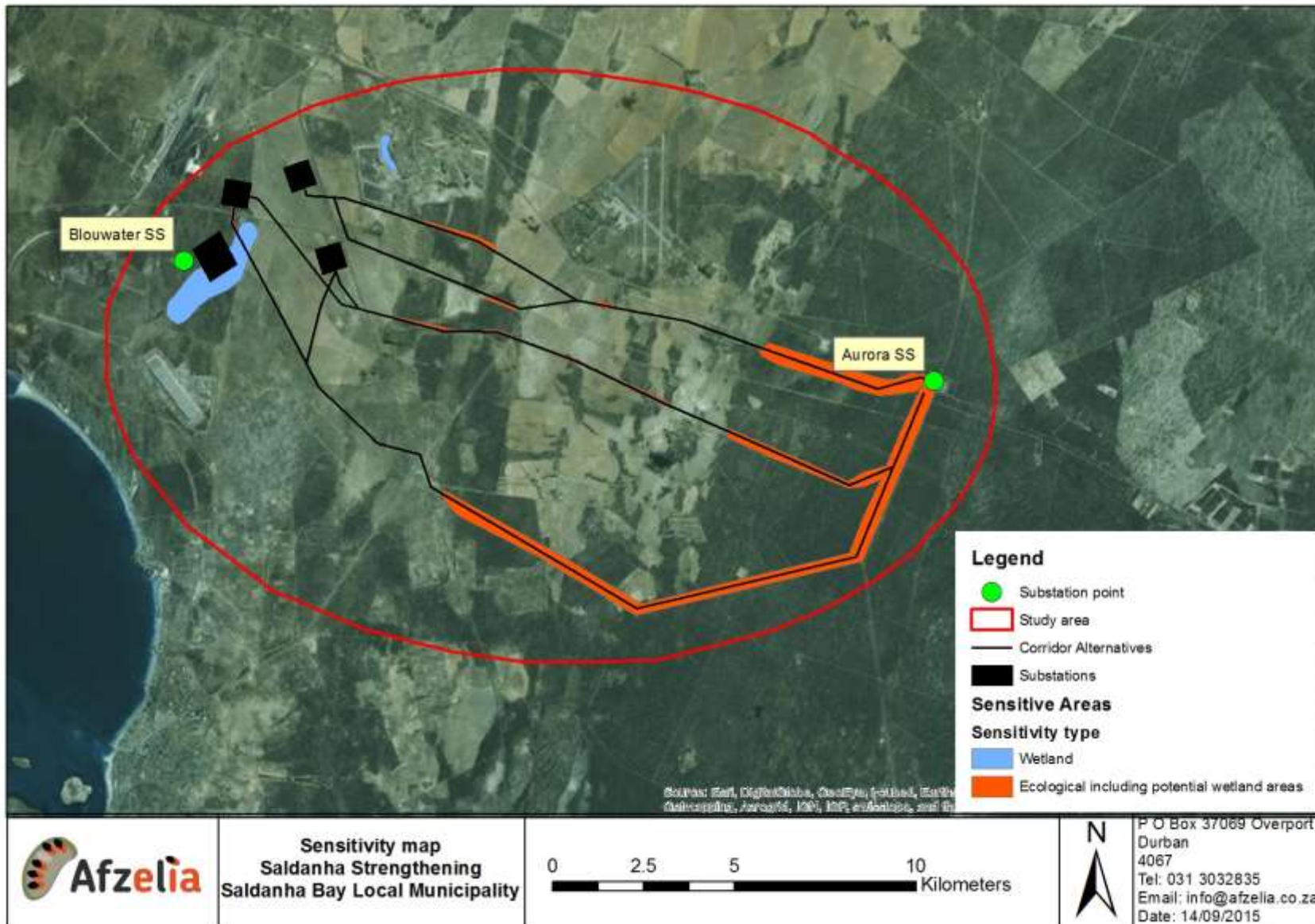
#### **4.4 Preliminary site sensitivity assessment**

The preliminary sensitivity assessment identifies those parts of the study area that have high conservation value or that may be sensitive to disturbance (Figure 7). The information provided in the preceding sections was used to compile a map of remnant natural habitats and areas important for conserving ecological processes in the study area. Broad scale mapping was used to provide information on the location of sensitive features. There are a number of features that need to be taken into account in order to evaluate sensitivity in the study area. These include the following:

- Faunal microhabitats of conservation importance: This is based primarily on the situation of the site within the ;
- Wetland and pan micro habitats such as those located in the western portion of the study area; and
- potential occurrence of Red List species that have been evaluated as having a high chance of occurrence within the study area.

These factors have all been taken into account in evaluating sensitivity within the study area. It must be emphasized that this is a preliminary sensitivity map (Figure 7), based on broad information compiled during a desktop assessment. It is therefore vitally important to establish, during the EIA phase, which areas constitute sensitive faunal habitats within the study area.





**Figure 7. Preliminary site sensitivity map**

## 5. COMPARISON OF SITE ALTERNATIVES

### **Substation site A:**

This is the central substation site and is largely transformed and located within close proximity to the R27 and 4.5km west of Langebaanweg. The desktop analysis identified no sensitive micro-habitats within close proximity of the proposed site and the development of the site is therefore likely to have low faunal sensitivity. Furthermore, the power line which enters the substation is also preferred from a faunal perspective (route alternative 3).

### **Substation Site B:**

This is the western-most substation site alternative and is situated in a degraded patch of Fynbos. A series of wetland depressions and pan micro-habitats are located within close proximity of the proposed site. Due to the presence of these sensitive faunal micro-habitats (and possible presence of Red listed amphibian and reptilian species) and the increased length of the associated power line this is not a preferred option from a faunal perspective.

### **Substation Site C:**

This is northern-most substation alternative and located 1km to the west of the West Coast Fossil Park. The vegetation surrounding the site is degraded and in close proximity to a road. Based on available aerial photography there does not appear to be any water bodies within the substation development footprint.

**Power line corridor alternative 1 and 4** are the longest corridor alternatives, 23km and 21.6km respectively. Corridor alternative 1 is the southernmost alternative and is the closest alternative to the Saldanha Bay. Corridor alternative 1 crosses a series of pan micro habitats that are considered sensitive to fauna.

**Power line corridor alternative 2 and 5** traverse within close proximity to the R45 and are the shortest corridor alternatives (16km) and both are proposed to enter into substation site alternative C. The reduction in the length of the power line will minimise the risk of habitat loss and degradation within the area. The alternatives are located to the south of urban development (Langebaanweg). The presence of an existing road structure within close proximity of the corridor alternatives will ensure that the need for development of new access roads will be reduced. A negative aspect associated with these corridor alternatives are that they traverse near an unchannelled valley bottom wetland system that may support a variety of faunal species.

### **Power line corridor alternative 3**

This corridor is 17km long and traverses through degraded fynbos habitat and agricultural land. The last portion of the line will cross the R27 and enter the substation alternative A (preferred site alternative). This corridor alternative is predicted to have a low impact on faunal species.

**Power line corridor alternative 6** is 19km long and enters the proposed substation site alternative A. This corridor follows a similar path as alternative 1 but deviates during the final stages.

Overall, substation site A is the preferred substation site alternative and the corridor alternatives 2 and 3 are the preferred power line corridors.

## 6. IMPACT ASSESSMENT

The implications of the proposed transmission and distribution substation development and associated power lines to faunal species are as follows:

- An area of approximately 600m x 600m and 120m x 120m of land will be altered and considered artificial, and largely unsuitable to faunal species.
- During the construction phase, disturbance levels will be significantly higher in the immediate vicinity than previously. This disturbance will consist of machinery and vehicle disturbance as well as other construction activities.
- During the operational phase, there will be some vehicle activity resulting in disturbance, particularly within the road access corridor.
- Due to the length of the overhead power lines (35km), this will result in a loss of faunal habitats and within the power line servitudes.
- Identified potential impacts and potential magnitude of these impacts are discussed further in Table 4.

### 6.1 Significance of identified impacts

Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase must be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high).
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5.

- The **consequences (magnitude)**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- 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*.

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

$S=(E+D+M)P$	
S = Significance weighting	M = Magnitude
E = Extent	P = Probability
D = Duration	

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

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

**Table 5. Potential impacts associated with the proposed substation and overhead power line development.**

ISSUE	NATURE OF IMPACT	EXTENT OF IMPACT	'NO GO' AREAS
<b>Construction phase</b>			
<b>Loss of faunal habitat and ecological structure</b>	<p>The construction of the proposed substation and power line development will result in the loss of faunal habitats and a loss of ecological connectivity within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on the foraging and breeding ecology of faunal species.</p> <p>The habitat is however already largely transformed and fragmented by settlements and urban development and the site is not a unique habitat within the landscape.</p> <p>The impact on smaller, non-Red Data species that are potentially breeding in the area will be local in extent, in that it will not have a significant effect on regional or national populations.</p>	Local	Wetland/pan habitats located along Corridor Alternative 1 and adjacent to the DX Substation
<b>Mortality or injuries to faunal species</b>	Activities involving the clearing of vegetation at tower positions and along access roads within the power line servitudes/harvesting of natural vegetation will result in the loss of faunal species. Various faunal species are vulnerable to	Local	None identified during the scoping phase

	poaching during the construction phase due to the increased human activity within the area. Furthermore, the increased in vehicular activity during the construction phase increases the likelihood of collisions with vehicles.		
<b>Disturbance</b>	<p>Disturbance created by noise-pollution associated with workers and construction activities will have an effect on local fauna using habitats within the study area. Sensitive faunal species are likely to disperse away from the area during the construction phase.</p> <p>This impact is likely to be short-term in extent. Smaller and less mobile species may be trapped and killed/injured during the construction phase of the project.</p>	Local	<p>None identified</p> <p>during the scoping phase</p>
<b>Operational Phase</b>			
<b>Mortalities</b>	Ongoing maintenance activities will have an impact on species within the vicinity of the infrastructure. The rise in human activity will increase the probability of faunal species being killed by vehicles or being trapped and collected.	Local	None identified during the scoping phase
<b>Disturbance</b>	During the operational phase, a further loss of faunal diversity and ecological integrity will occur due to the increase in human activity and potential poaching.	Local	None identified during the scoping phase

**DESCRIPTION OF EXPECTED SIGNIFICANCE OF IMPACT  
CONSTRUCTION PHASE**

<b>Impacts associated with the loss of faunal habitat and ecological structure</b>										
Impact	Probability		Duration		Extent		Magnitude		Significance scoring without mitigation	Significance scoring with mitigation
	Without	With	Without	With	Without	With	Without	With		
Loss of faunal habitat and ecological structure	5	4	2	2	2	1	8	6	60 (High)	36 (Moderate)

<b>Impacts associated with the mortality or injuries to faunal species</b>										
Impact	Probability		Duration		Extent		Magnitude		Significance scoring without mitigation	Significance scoring with mitigation
	Without	With	Without	With	Without	With	Without	With		
<b>Mortality or injuries to faunal species</b>	4	3	2	2	2	1	6	6	40 (Moderate)	27 (Moderate)



<b>Impacts associated with disturbance</b>										
<b>Impact</b>	Probability		Duration		Extent		Magnitude		Significance scoring without mitigation	Significance scoring with mitigation
	Without	With	Without	With	Without	With	Without	With		
<b>Disturbance</b>	5	4	2	2	2	1	6	6	50 (Moderate)	36 (Moderate)

**OPERATIONAL PHASE**

<b>Impacts associated with the mortality</b>										
<b>Impact</b>	Probability		Duration		Extent		Magnitude		Significance scoring without mitigation	Significance scoring with mitigation
	Without	With	Without	With	Without	With	Without	With		
<b>Mortality</b>	3	2	4	4	2	1	4	4	30 (Moderate)	18 (Low)

<b>Impacts associated with disturbance</b>										
<b>Impact</b>	Probability		Duration		Extent		Magnitude		Significance scoring without mitigation	Significance scoring with mitigation
	Without	With	Without	With	Without	With	Without	With		
<b>Disturbance</b>	3	2	4	4	2	1	4	4	30 (Moderate)	18 (Low)

The findings of this report and identification of potential impacts are based on preliminary desktop work. The specification of the duration, probability and reversibility of the impacts will be subject to change prior to a detailed site inspection. The significance of impacts stated below were calculated using prior knowledge of similar developments coupled with the desktop work detailed in this report. Furthermore, the precautionary principle will be applied with respect to impacts where there is uncertainty.

### **GAPS IN KNOWLEDGE AND RECOMMENDATIONS FOR FURTHER STUDY**

The scoping faunal assessment has identified a series of sensitive faunal micro habitats within the vicinity of route alternative 1 as well as adjacent to the DX substation. It is recommended that route alternative 2 or 3 and substation site A is the preferred options from a faunal perspective. These alternatives will minimise the impacts to faunal species and this will be investigated further during the EIA phase.

Proposed scope of work for the EIA phase includes:

- Revision of the conducted literature review
- Identification of key faunal species residing within the study area.
- Further inspection and delineation of faunal microhabitats and their ability to support Red Data listed or endemic species;
- Further investigation of identified impacts associated with the proposed development and revised scoring will be conducted;
- Sensitive faunal habitats within the study area will be identified and mapped.
- Assess and evaluate identified potential impacts. The impacts will be assessed as both pre and post implementation of mitigation measures.
- Propose and explain mitigation measures for unavoidable impacts. This will need to be incorporated into the Environmental Management Programme (EMPr).

## **7. CONCLUSION**

The desktop assessment indicated that there do not appear to be any obvious risks associated with the construction of the proposed substation and power line infrastructure from a faunal perspective. Various sections of the habitat within the study area is degraded and there is numerous power line infrastructure already present within the area. Due to the already high levels of environmental disturbance it is not predicted that any Red Data faunal species will be impacted by the proposed development. Substation site alternative A and power line route alternative 2 or 3 are recommended as the preferred alternatives at this stage in the process, as these are close to existing infrastructure and will minimise the risk to faunal species and loss of habitats.

Potential impacts identified during the scoping phase include loss of habitat and ecological structure, direct mortalities or injury and disturbance. Habitat destruction will also result from the construction of internal access roads, substation and the clearing of power line servitudes. These impacts will be quantified and investigated further during the EIA phase. The proposed development is not predicted to have a detrimental impact on regional populations or Red Data listed species.

The sensitivity map indicated in figure 7 must not be used to govern the final decision regarding sensitive fauna habitats but rather to identify areas that require in-depth attention during the EIA phase.

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**Appendix 1. Mammal species recorded in the 2821CA and 3318AA quarter degree square within which the proposed substations and power line infrastructure are located.**

<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>	<b>CONSERVATION STATUS</b>
Karoo Bush Rat	<i>Otomys unisulcatus</i>	Least Concern
Xeric Four-striped Grass Mouse	<i>Rhabdomys pumilio</i>	Least Concern
Karoo Bush Rat	<i>Otomys unisulcatus</i>	Least Concern
Southern African Pygmy Mouse	<i>Mus minutoides</i>	Least Concern
Southern African Vlei Rat	<i>Otomys irroratus</i>	Least Concern
Lesser Dwarf Shrew	<i>Suncus varilla</i>	Least Concern
Cape Dune Mole-rat	<i>Bathyergus suillus</i>	Least Concern
<b>Cape Golden Mole</b>	<b><i>Chrysochloris asiatica</i></b>	<b>Data Deficient</b>
Southern African Mole-rat	<i>Cryptomys hottentotus</i>	Least Concern
Cape Gerbil	<i>Gerbilliscus afra</i>	Least Concern
Steenbok	<i>Raphicerus campestris</i>	Least Concern
Cape Grysbok	<i>Raphicerus melanotis</i>	Least Concern
<b>Cape Mountain Zebra</b>	<b><i>Equus zebra zebra</i></b>	<b>Vulnerable</b>
Common Eland	<i>Tragelaphus oryx</i>	Least Concern
Common Duiker	<i>Sylvicapra grimmia</i>	Least Concern
Grey Rhebok	<i>Pelea capreolus</i>	Least Concern
Red Hartebeest	<i>Alcelaphus caama</i>	Least Concern
Kudu	<i>Tragelaphus strepsiceros</i>	Least Concern
Springbok	<i>Antidorcas marsupialis</i>	Least Concern
Caracal	<i>Caracal caracal</i>	Least Concern
Bat-eared Fox	<i>Otocyon megalotis</i>	Least Concern
Rock Hyrax	<i>Procavia capensis</i>	Least Concern
Small Grey Mongoose	<i>Herpestes pulverulenta</i>	Least Concern
<b>Honey Badger</b>	<b><i>Mellivora capensis</i></b>	<b>Near Threatened</b>
Yellow Mongoose	<i>Cynictis penicillata</i>	Least Concern
Cape Hare	<i>Lepus capensis</i>	Least Concern
Striped Polecat	<i>Ictonyx striatus</i>	Least Concern
Cape Fox	<i>Vulpes chama</i>	Least Concern
Large Grey Mongoose	<i>Herpestes ichneumon</i>	Least Concern
Marsh Mongoose	<i>Atilax paludinosus</i>	Least Concern
Cape Golden Mole	<i>Chrysochloris asiatica</i>	Least Concern
Black-backed Jackal	<i>Canis mesomelas</i>	Least Concern
Chacma Baboon	<i>Papio ursinus</i>	Least Concern
<b>Brown Hyena</b>	<b><i>Hyaena brunnea</i></b>	<b>Near Threatened</b>
<b>Cape Horseshoe Bat</b>	<b><i>Rhinolophus capensis</i></b>	<b>Near Threatened</b>
Cape Serotine	<i>Neoromicia capensis</i>	Least Concern

**Appendix 2. Reptile species recorded in the 2821CA and 3318AA quarter degree square within which the proposed substations and power line infrastructure are located.**

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>CONSERVATION STATUS</b>
<i>Agama hispida</i>	Spiny Ground Agama	Least Concern
<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	Least Concern
<i>Bradypodion occidentale</i>	Western Dwarf Chameleon	Least Concern
<i>Bradypodion pumilum</i>	Cape Dwarf Chameleon	Vulnerable
<i>Crotaphopeltis hotamboeia</i>	Red-lipped Herald Snake	Least Concern
<i>Dasypeltis scabra</i>	Rhombic Egg-eater	Least Concern
<i>Dispholidus typus</i>	Boomslang	Least Concern
<i>Psammophis crucifer</i>	Cross-marked Grass Snake	Least Concern
<i>Psammophis leightoni</i>	Cape Sand Snake	Vulnerable
<i>Psammophis notostictus</i>	Karoo Sand Snake	Least Concern
<i>Psammophylax rhombeatus</i>	Spotted Grass Snake	Least Concern
<i>Pseudaspis cana</i>	Mole Snake	Least Concern
<i>Chamaesaura anguina</i>	Cape Grass Lizard	Least Concern
<i>Cordylus cordylus</i>	Cape Girdled Lizard	Least Concern
<i>Cordylus macropholis</i>	Large-scaled Girdled Lizard	Near Threatened
<i>Cordylus niger</i>	Black Girdled Lizard	Near Threatened
<i>Karusasaurus polyzonus</i>	Karoo Girdled Lizard	Least Concern
<i>Naja nivea</i>	Cape Cobra	Least Concern
<i>Afrogecko porphyreus</i>	Marbled Leaf-toed Gecko	Least Concern
<i>Goggia lineata</i>	Striped Pygmy Gecko	Least Concern
<i>Pachydactylus austeni</i>	Austen's Gecko	Least Concern
<i>Pachydactylus geitje</i>	Ocellated Gecko	Least Concern
<i>Meroles knoxii</i>	Knox's Desert Lizard	Least Concern
<i>Pedioplanis lineocellata</i>	Common Sand Lizard	Least Concern
<i>Leptotyphlops nigricans</i>	Black Thread Snake	Least Concern
<i>Acontias meleagris</i>	Cape Legless Skink	Least Concern
<i>Scelotes bipes</i>	Silvery Dwarf Burrowing Skink	Least Concern
<i>Scelotes gronovii</i>	Gronovi's Dwarf Burrowing Skink	Near Threatened
<i>Scelotes montispectus</i>	Bloubergstrand Dwarf Burrowing Skink	Near Threatened
<i>Trachylepis capensis</i>	Cape Skink	Least Concern
<i>Trachylepis homalocephala</i>	Red-sided Skink	Least Concern
<i>Trachylepis variegata</i>	Variegated Skink	Least Concern
<i>Chersina angulata</i>	Angulate Tortoise	Least Concern
<i>Bitis arietans</i>	Puff Adder	Least Concern