

**TERRESTRIAL ECOLOGICAL ASSESSMENT AS PART OF
THE ENVIRONMENTAL ASSESSMENT AND
AUTHORISATION PROCESS FOR THE PROPOSED
CONSTRUCTION OF THE TRANSIENT INTERIM STORAGE
FACILITY (TISF) AT KOEBERG NUCLEAR POWER
STATION, WESTERN CAPE PROVINCE.**

Prepared for

SRK Consulting

August 2015

Prepared by:	Scientific Aquatic Services
Report authors	L. Zdanow (BSc Hons UCT) C. Hooton
Report reviewers	S. van Staden (Pr. Sci. Nat) N. van de Haar (Pr. Sci. Nat)
Report reference:	SAS 215149
Date:	August 2015

Scientific Aquatic Services C/

CC Reg No 2003/078943/23

Vat Reg. No. 4020235273

PO Box 751779

Gardenview

2047

Tel: 011 616 7893

Fax: 011 615 6240

E-mail: admin@sasenvironmental.co.za



Declaration

This report has been prepared according to the requirements of Section 23 (5) of the Environmental Impact Assessments EIA Regulations, 2014 (No. R. 982). We (the undersigned) declare the findings of this report free from influence or prejudice.

Stephen van Staden *Pr Sci Nat* (Ecological Sciences) 400134/05
BSc. Hons (Aquatic Health) (RAU);
M.Sc. Environmental Management Rau.

Date: 16/07/2015

Stephen van Staden

Natasha van de Haar *Pr Sci Nat* (Botanical Science) 400229/11
M.Sc. Botany

Date: 13/07/2015

Natasha van de Haar

EXECUTIVE SUMMARY

Scientific Aquatic Services cc (SAS cc) was appointed to conduct a terrestrial ecology (vegetation and faunal) assessment as part of the environmental assessment and authorisation process for the proposed construction of the used nuclear fuel Transient Interim Storage Facility (TISF) at the Koeberg Nuclear Power Station (KNPS) within the Western Cape Province.

The proposed TISF will allow for the storage of a combination of dry storage systems that may include metal and concrete casks. The dry storage casks will accommodate used fuel which has been removed from the reactor vessel and has sufficiently cooled in the spent fuel pools (SFPs). The TISF will operate in parallel with the SFP wet storage, which will continue to be necessary for the cooling and storage of used fuel recently removed from the reactor vessel. The cooling period of used fuel in wet storage depends on the fuel characteristics and the cask design selected.

The TISF facility is proposed to consist of a concrete slab with surrounding security fencing and will cover an area of approximately 12 800m². This facility will be designed to accommodate storage of casks for used nuclear fuel generated at KNPS up to the end of operational life of the plant. However, the facility will be filled with casks in a modular manner until the Central Interim Storage Facility (CISF) becomes available.

Two viable site alternatives for the TISF have been identified and are within the owner-controlled area (OCA). The Cask Storage Building (CSB) site, hereafter referred to as Alternative 1, is the preferred site and is located adjacent to the Low Level Waste (LLW) complex, on the northern boundary of the KNPS, whilst the Ekhaya Site, hereafter referred to as Alternative 2 is located along the southern boundary of the KNPS adjacent to the Ekhaya building.

DESKTOP ASSESSMENT

The following general conclusions were drawn on completion of the desktop assessment:

- Both Alternative 1 and Alternative 2 are located within areas indicated as urban build up (National Land Cover, 2009). However, indigenous¹ vegetation, although historically disturbed, is present within the areas proposed for the construction footprint of both the site alternatives;
- Both site alternatives are located within the Cape Flats Dune Strandveld vegetation type which, according to the National List of Threatened Terrestrial Ecosystems (2011), is Endangered within the region. The Cape Flats Dune Strandveld is associated with a high number of threatened plant species with up to 66 Species of Conservation Concern (SCC) known to occur (Government Gazette No 34809, 9 December 2011). It is therefore important that the unnecessary disturbance and loss of vegetation from this vegetation type is avoided where possible;
- According to the National Biodiversity Assessment (NBA, 2011) neither of the site alternatives is located within a formally or informally protected area. However, according to the Koeberg Nature Reserve Management Plan (2015), the “Koeberg Private Nature Reserve” was proclaimed in 1991 in terms of the Ordinance 19 of 1974. The NEM: Protected Areas Act (2003) which came into effect after the proclamation of the nature reserve regards previously declared nature reserves as a protected area in terms of the new Act;
- According to the City of Cape Town Biodiversity Network (CoCT BioNet, 2013), neither of the site alternatives is located within a Critical Biodiversity Area (CBA) or an Ecological Support Area (ESA); and
- According to the Koeberg Nature Reserve Management Plan (2015), both Alternative 1 and 2 are located within the developed area of the nature reserve within an Industrial Development Zone. This zone includes areas with extensive development, partially degraded or transformed land.

¹ Disturbance took place more than 10 years ago. Therefore the vegetation within both the site alternatives can be considered indigenous according to the NEMA definition; “Indigenous vegetation: refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years.”



VEGETATION ASSESSMENT

The following general conclusions were drawn on completion of the vegetation assessment:

- Both Alternative 1 and Alternative 2 are located within the City of Cape Town Metropolitan Municipality and are located within the Fynbos biome and the Western Strandveld bioregion;
- The vegetation type indicated by Mucina and Rutherford (2009) is Cape Flats Dune Strandveld which is considered to be Endangered within the region;
- The following findings were made upon assessment of Alternative 1:
 - The vegetation associated with Alternative 1 has been disturbed as a result of historical construction related activities associated with the development of the KNPS and as a result of gravel road development through the area which has resulted in the loss of naturally occurring Cape Flats Dune Strandveld vegetation from the site. However, vegetation has subsequently begun to re-establish within the area;
 - The vegetation is characterised by the presence of clumps of shrubby vegetation with an open, shorter shrub and grassy layer;
 - The vegetation is dominated by the pioneer shrub *Chrysanthemoides incana* which is indicative of the past disturbance which took place on the site. However, additional indigenous floral species were also encountered scattered throughout the area;
- The following findings were made upon assessment of Alternative 2:
 - Vegetation associated with Alternative 2 was historically disturbed as a result of activities associated with the construction of the KNPS and as a result of the development of a laydown area. However, over the years dune movement has resulted in the movement of sand over the disturbed area and Cape Flats Dune Strandveld vegetation has re-established in the area;
 - Floral species diversity within Alternative 2 is considered to be higher than that associated with Alternative 1 with a higher floral species richness and evenness encountered. However, species diversity is not likely to be as high as in surrounding, undisturbed Cape Flats Dune Strandveld;
- A single possible SCC², *Lampranthus cf explanatus* (Near Threatened) was encountered within the construction footprint of Alternative 1 at the time of the assessment. Individuals of this species were largely encountered within the western portion of the site, to the west of the existing gravel road;
- No SCC were encountered within the construction footprint of Alternative 2 at the time of the assessment, however, the presence of individuals of the SCC *Lessertia canescens* was confirmed during a previous assessment of the site in 2013 (Pers. comm. – Nick Helme).; and
- Three floral species which are protected under the Western Cape Nature Conservation Laws Amendment Act (WCNCLAA) were also encountered within the construction footprint of Alternative 1 and Alternative 2 at the time of the assessment. These include *Carpobrotus acinaciformis* (encountered within both sites), *Drosanthemum* sp. (encountered within Alternative 2) and *Lampranthus cf explanatus* (encountered within Alternative 1) (all members of the Mesembryanthemaceae family)³.

FAUNAL ASSESSMENT

The following general conclusions were drawn on completion of the faunal assessment:

- Both Alternative 1 and 2 are unlikely to support a large diversity of faunal species, however Alternative 2 is considered to have a more intact faunal habitat in comparison to Alternative 1;
- Faunal species that are expected to utilise both the site alternatives for either breeding or foraging are considered least threatened within the region (IUCN 2015);
- One mammal species *Rhodomys pumilio* (Four striped grass mouse) was identified by on site ecologists within both the site alternatives and is considered to be very common within the area;

² Was not in flower at the time of the assessment which created a limitation to the identification of the species. The species would have to be confirmed during an additional assessment undertaken in the correct flowering season.

³ Should protected and indigenous species to be cut, disturbed, damaged or destroyed, applications for such activities must be made to CapeNature.



- All avifaunal species expected to occur at both site alternatives are listed as species of least concern (IUCN, 2015) and are common species for the region;
- In terms of faunal migratory connectivity, both of the site alternatives provide no form of connectivity for faunal species due to their location and the presence of a movement barrier to larger species in the form of a security fence. However, the site alternatives will provide foraging habitat to an extent for smaller faunal species that can pass through or over the security fence;
- Species expected to occur within the site alternatives would most likely be common to the region, and will probably move in and out of both site alternatives on a regular basis;
- From the desktop data analysis it is considered unlikely that either of the site alternatives will be inhabited by any amphibian SCC. Any amphibian species that may occur within the site alternatives are considered to be common, and will relocate naturally to the surrounding natural areas with the commencement of construction activities; and
- No endangered or protected faunal species are expected to occur within either of the site alternatives.

SENSITIVITY MAPPING

Habitat sensitivity was determined based on the irreplaceability of the habitat, on observations of the abundance and diversity of floral species present at the time of the assessment, on the presence of floral and/or faunal SCC and protected species within the habitat, on the presence of CBAs and ESAs and on the degree of disturbance encountered as a result of historical and current activities. The sensitivity of the site alternatives is discussed below.

Alternative 1

Terrestrial habitat associated with Alternative 1 is considered to be of a low to moderate sensitivity based on the following factors:

- The vegetation type associated with the area is listed as Endangered within the region;
- The site is located within the Koeberg Nature Reserve, however it is located within an Industrial Development Zone;
- The site is not indicated to fall within an ESA or a CBA;
- The vegetation is dominated by the pioneer shrub *Chrysanthemoides incana* which is indicative of past disturbance on the site. However additional indigenous floral species which are considered to be representative of the vegetation type were also encountered scattered within the area;
- A single possible floral SCC, *Lampranthus cf explanatus*, was encountered within Alternative 1;
- Two protected floral species, *Lampranthus cf explanatus* and *Carpobrotus acinaciformis*, were encountered within Alternative 1;
- No faunal SCC are expected to occur within the site; and
- Faunal species that may be encountered within the site are likely to be common and widespread throughout the region, and as such the development poses no threat to faunal species or the habitat thereof within the region.

Alternative 2

Terrestrial habitat associated with Alternative 2 is considered to be of a moderate sensitivity based on the following factors:

- The vegetation type associated with the area is listed as Endangered within the region;
- The site is located within the Koeberg Nature Reserve, however it is located within an Industrial Development Zone;
- The site is not indicated to fall within an ESA or a CBA;
- Floral species diversity within Alternative 2 is considered to be higher than that associated with Alternative 1 with a higher floral species richness and evenness encountered, and indigenous floral species encountered within the area are considered to be representative of the natural vegetation type;



- No SCC were encountered within the construction footprint of Alternative 2 at the time of the assessment, however, the presence of individuals of the SCC *Lessertia canescens* was confirmed during a previous assessment of the site in 2013 (Pers. comm. – Nick Helme);
- Two protected floral species, *Carpobrotus acinaciformis* and *Drosanthemum* sp. were encountered within Alternative 2;
- No faunal SCC were encountered within the site; and
- All faunal species occurring within the site are considered to be common and widespread, and as such the development poses no threat to faunal species or their habitat within the region.

IMPACT ASSESSMENT

The table below serves to summarise the significance of perceived impacts on the floral and faunal biodiversity of the site alternatives before mitigation measures are implemented. Also indicated is the impact significance of each perceived impact after the implementation of mitigation measures.

Table A: Summary of terrestrial impact significance before and after mitigation.

Habitat Unit	Consequence	Probability	Significance	Status	Confidence
IMPACT 1: LOSS OF VEGETATION AND ASSOCIATED FLORAL BIODIVERSITY AS WELL AS SCC AND PROTECTED FLORAL SPECIES					
Construction					
Alternative 1					
Without Mitigation	Medium	Definite	MEDIUM	–ve	Medium ⁴
With Mitigation	Low	Definite	LOW	–ve	Medium
Alternative 2					
Without Mitigation	Medium	Definite	MEDIUM	–ve	Medium
With Mitigation	Low	Definite	LOW	–ve	Medium
IMPACT 2: LOSS OF FAUNAL HABITAT AND ASSOCIATED FAUNAL BIODIVERSITY AND PROTECTED SPECIES					
Construction					
Alternative 1					
Without Mitigation	Medium	Definite	MEDIUM	–ve	Medium
With Mitigation	Very low	Definite	VERY LOW	–ve	Medium
Alternative 2					
Without Mitigation	Medium	Definite	MEDIUM	–ve	Medium
With Mitigation	Very low	Definite	VERY LOW	–ve	Medium
Operational					
Alternative 1					
Without Mitigation	Low	Probable	LOW	–ve	Medium
With Mitigation	Very Low	Possible	INSIGNIFICANT	–ve	Medium
Alternative 2					
Without Mitigation	Low	Probable	LOW	–ve	Medium
With Mitigation	Very Low	Possible	INSIGNIFICANT	–ve	Medium

Vegetation

The overall impact for the construction phase was determined utilising the impact assessment methodology supplied by the Environmental Assessment Practitioner (EAP) and was calculated to be

⁴ The confidence levels of the assessment were reduced slightly as a result of the seasonal constraints of the assessment. However, the level of detail undertaken in the study is considered sufficient to ensure that the results of the assessment accurately define the impact of the proposed development in order to provide the relevant planners and decision makers with sufficient information to formulate an opinion on the viability of the proposed development from a conservation view point.



of medium (negative) overall significance for Alternative 1 and for Alternative 2 prior to the implementation of mitigation measures. However, it is the opinion of the specialist that the overall impact should be considered to be of a low to medium (negative) significance for Alternative 1.

The implementation of mitigation measures such as the rehabilitation of the developed site during the decommissioning phase of the development is likely to reduce the intensity of the impact for both site alternatives. The overall impact after the implementation of mitigation measures was therefore calculated to be of a low (negative) significance for both Alternative 1 and 2.

Although the impact associated with both the site alternatives is considered to be of a low (negative) significance after the implementation of mitigation measures, vegetation associated with Alternative 1 is considered to be slightly less sensitive than that associated with Alternative 2 and the development of Alternative 1 will therefore result in a slightly lower relative impact when compared to the development of Alternative 2.

Fauna

From the above impact assessment it is clear that the proposed development will have a medium (negative) impact in terms of the loss of faunal habitat from both of the site alternatives prior to the implementation of mitigation measures, whilst post mitigation measures these impacts will be reduced to very low (negative) levels on faunal species and their habitat. Regardless of mitigation measures there will be a definite loss of faunal habitat within the site alternatives due to development, however if mitigated properly, surrounding faunal habitat will be adequately protected from impacts and continue to support any displaced faunal species.

From the results of the impact assessment for the operational phase it is evident that the proposed development of both site alternatives will have a low (negative) impact on faunal habitat, biodiversity and SCC/protected species prior to the implementation of mitigation measures. However, with the implementation of mitigation measures the impact may be reduced to an insignificant level.

Conclusion

After conclusion of the terrestrial assessment, it is the opinion of the ecologists that, from an ecological point of view, the proposed development of either Alternative 1 or Alternative 2 will not lead to an unacceptable loss of biodiversity or important ecological aspects and can be considered favourably, provided that the mitigation measures as presented in the impact assessment of this report are strictly adhered to. However, terrestrial habitat associated with Alternative 1 is considered to be slightly less sensitive than that associated with Alternative 2 and the development of Alternative 1 will therefore result in a slightly lower relative impact when compared to the development of Alternative 2. It is therefore the opinion of the specialists that Alternative 1 be selected as the more favourable site for development.



TABLE OF CONTENTS

EXECUTIVE SUMMARY	iii
TABLE OF CONTENTS	viii
LIST OF FIGURES.....	ix
LIST OF TABLES.....	ix
GLOSSARY OF TERMS.....	x
ACRONYMS	xi
1 INTRODUCTION	1
1.1 Background.....	1
1.2 Scope.....	3
1.3 Assumptions and Limitations	3
1.4 Indemnity and Terms of Use of this Report	4
1.5 Legislative requirements	4
2 METHOD OF ASSESSMENT	5
3 DESKTOP RESULTS.....	5
3.1 National Land Cover (2009).....	5
3.2 National List of Threatened Terrestrial Ecosystems for South Africa (2011)	5
3.3 National Biodiversity Assessment (NBA), 2011	6
3.4 Importance According to the City of Cape Town Biodiversity Network (CoCT BioNet), 2013	8
3.5 Koeberg Nature Reserve Management Plan (2015)	8
4 DESCRIPTION OF THE AFFECTED ENVIRONMENT: VEGETATION	8
4.1 Regional Context	8
4.2 Vegetation Descriptions.....	10
4.2.1 Alternative 1	10
4.2.2 Alternative 2	10
4.3 SCC and Protected Species Status Assessments	11
4.4 Exotic and Invader Species	12
4.5 Medicinal Plants	12
5 DESCRIPTION OF THE AFFECTED ENVIRONMENT: FAUNA	13
5.1 Regional Context	13
5.2 Mammals	14
5.2 Avifauna	14
5.3 Invertebrates	15
5.4 Amphibians	15
5.5 Reptiles	15
5.6 Arachnids.....	15
5.7 Species of Conservation Concern Sensitivity Index Score (SCCSIS).....	16
6 SENSITIVITY	16
7 IMPACT ASSESSMENT	19
7.1 Vegetation Impact Assessment	19
7.2 Faunal Impact Assessment	21
7.3 No-go Option.....	23
7.4 Cumulative Impacts	24
8 CONCLUSION	25
9 REFERENCES	30
APPENDIX A	32



LIST OF FIGURES

Figure 1:	Digital satellite image depicting the location of Alternative 1 and Alternative 2 in relation to surrounding areas.....	2
Figure 2:	National List of Threatened Terrestrial Ecosystems (2011).	7
Figure 3:	Vegetation types associated with Alternative 1 and Alternative 2 (Mucina & Rutherford, 2009).....	9
Figure 4:	Vegetation associated with Alternative 1.....	10
Figure 5:	Vegetation associated with Alternative 2.....	11
Figure 6:	Sensitivity map.....	18

LIST OF TABLES

Table 1:	Dominant exotic vegetation species identified during the general area assessment.	12
Table 2:	Traditional medicinal plants identified during the field assessment. Medicinal applications and application methods are also presented (van Wyk, Oudtshoorn, Gericke, 2012).....	13



GLOSSARY OF TERMS

<i>Alien Invasive vegetation</i>	Alien invaders are plants that are of exotic origin and are invading previously pristine areas or ecological niches.
<i>Biome</i>	A broad ecological unit representing major life zones of large natural areas – defined mainly by vegetation structure and climate.
<i>Protected species</i>	Any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category will include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
<i>Red Data listed species</i>	Organisms that fall into the Extinct in the Wild, Critically Endangered, Endangered, Vulnerable categories of ecological status as listed by the IUCN.
<i>Species of Conservation Concern</i>	Floral and faunal species that have a high conservation importance in terms of preserving South Africa's high floristic diversity and include not only threatened species, but also those classified in the categories Extinct in the Wild, Regionally Extinct, Near Threatened, Critically Rare, Rare, Declining and Data Deficient - Insufficient Information.
<i>Threatened species</i>	Species that are facing a high risk of extinction. Any species classified in the IUCN categories Critically Endangered, Endangered or Vulnerable is a threatened species.



ACRONYMS

BGIS	Biodiversity Geographic Information Systems
BioNet	Biodiversity Network
CBA	Critical Biodiversity Area
CITES	Convention on International Trade in Endangered Species
CISF	Central Interim Storage Facility
CoCT	City of Cape Town
CSB	Cask Storage Building
DEA	Department of Environmental Affairs
DEADP	Department of Environmental Affairs and Development Planning
EAP	Environmental Assessment Practitioner
EIS	Ecological Importance and Sensitivity
ESA	Ecological Support Area
GIS	Geographic Information System
IUCN	International Union for Conservation of Nature and Natural Resources
KNPS	Koeberg Nuclear Power Station
LLW	Low Level Waste
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
OCA	Owner Controlled Area
PES	Present Ecological State
PRÉCIS	Pretoria Computer Information Systems
SANBI	South African National Biodiversity Institute
SAS	Scientific Aquatic Services
SCC	Species of Conservation Concern
Sp.	<i>Species</i>
TISF	Transient Interim Storage Facility
ToR	Terms of Reference
WCNCLAA	Western Cape Nature Conservation Laws Amendment Act



1 INTRODUCTION

1.1 Background

Scientific Aquatic Services cc (SAS cc) was appointed to conduct a terrestrial ecology (vegetation and faunal) assessment as part of the environmental assessment and authorisation process for the proposed construction of the used nuclear fuel Transient Interim Storage Facility (TISF) at the Koeberg Nuclear Power Station (KNPS) within the Western Cape Province.

The proposed TISF will allow for the storage of a combination of dry storage systems that may include metal and concrete casks. The dry storage casks will accommodate used fuel which has been removed from the reactor vessel and has sufficiently cooled in the spent fuel pools (SFPs). The TISF will operate in parallel with the SFP wet storage, which will continue to be necessary for the cooling and storage of used fuel recently removed from the reactor vessel. The cooling period of used fuel in wet storage depends on the fuel characteristics and the cask design selected.

The TISF facility is proposed to consist of a concrete slab with surrounding security fencing and will cover an area of approximately 12 800m². This facility will be designed to accommodate storage of casks for used nuclear fuel generated at KNPS up to the end of operational life of the plant. However, the facility will be filled with casks in a modular manner until the Central Interim Storage Facility (CISF) becomes available.

Two viable site alternatives for the TISF have been identified and are within the owner-controlled area (OCA). The Cask Storage Building (CSB) site, hereafter referred to as Alternative 1, is the preferred site and is located adjacent to the Low Level Waste (LLW) complex, on the northern boundary of the KNPS, whilst the Ekhaya Site, hereafter referred to as Alternative 2 is located along the southern boundary of the KNPS adjacent to the Ekhaya building.

The terrestrial ecology assessment, after consideration and description of the ecological sensitivity of the alternatives, will aim to guide the proponent, Environmental Assessment Practitioner (EAP) and authorities by means of recommendations as to the viability of the activity from an environmental perspective, with a specific focus on terrestrial ecology.





Figure 1: Digital satellite image depicting the location of Alternative 1 and Alternative 2 in relation to surrounding areas.



1.2 Scope

Terms of Reference (ToR) in terms of this report are as follows:

- Review available studies undertaken at Koeberg to determine baseline information available and to determine gaps in information;
- Undertake a field assessment of the entire area to be affected by construction activities as well as the immediate surrounding zone of influence to identify habitat types, conservation importance and ecological state;
- List any potentially threatened, endangered and endemic floral and faunal species in the area and indicate the importance of the identified species in a local, regional and national context;
- Map areas of higher and lower sensitivity on the site;
- Define applicable legislative requirements regarding any permit applications required;
- Identify potential impacts of the proposed Project on terrestrial ecology;
- Assess the impacts of the proposed Project on terrestrial ecology in the area using the prescribed impact assessment methodology;
- Identify and assess potential cumulative ecological impacts resulting from the proposed development in relation to proposed and existing developments in the surrounding area; and
- Recommend practicable mitigation measures to avoid and/or minimise/reduce impacts and enhance benefits. Assess the effectiveness of proposed mitigation measures using the prescribed impact assessment methodology.

1.3 Assumptions and Limitations

The following assumptions and limitations are applicable to this report:

- The terrestrial assessment was confined to areas within the boundaries of Alternative 1 and 2 as well as the immediate adjacent areas of relevance and does not include the neighbouring and adjacent properties. These were however considered as part of the desktop assessment;
- The vegetation assessment was undertaken in June 2015 and was therefore not undertaken in the peak spring flowering season for the region. Therefore, a lack of flowering perennial plant material and the absence of annual and bulbous species which only occur after winter rainfall, created a limitation to the identification of floral species and Species of Conservation Concern (SCC) in the area. However, the level of detail undertaken in the study is considered sufficient to ensure that the results of this assessment accurately define the Ecological Importance and Sensitivity (EIS) and the Present Ecological State (PES) of the site alternatives and to provide the relevant planners and decision makers with sufficient information to formulate an opinion on the viability of the proposed development from a conservation viewpoint;
- The faunal study component for this project was undertaken purely on a desktop basis, using information gained from online resources as well as previous studies conducted within the Koeberg Nature Reserve. This information was cross referenced with data and visual observation made during the vegetation assessment of the site alternatives, in order to determine habitat intactness and probability of species occurring in the site alternatives;
- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa within the site alternatives may therefore have been missed during the assessment; and
- Due to the nature and habits of most faunal taxa it is unlikely that all species would have been observed during a site assessment of limited duration. Therefore, site observations are compared with literature studies where necessary.



1.4 Indemnity and Terms of Use of this Report

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and SAS cc and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

Although SAS cc exercises due care and diligence in rendering services and preparing documents, SAS cc accepts no liability and the client, by receiving this document, indemnifies SAS cc and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages and expensed arising from or in connection with services rendered, directly or indirectly by SAS cc and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

1.5 Legislative requirements

National Environmental Management Act, (NEMA, Act 107 of 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) as amended and the associated Regulations (Listing No R. 983, No R. 984 and R. 985), states that prior to any development taking place which triggers any activity as listed within the abovementioned regulations, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment process or the Environmental Impact Assessment (EIA) process depending on the nature of the activity and scale of the impact.

National Environmental Management Biodiversity Act (NEMBA, Act No. 10 of 2004)

The objectives of this act are (within the framework of NEMA) to provide for:

- the management and conservation of biological diversity within the Republic of South Africa and of the components of such diversity;
- the use of indigenous biological resources in a sustainable manner; and
- the fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources.

This act alludes to the fact that management of biodiversity must take place to ensure that the biodiversity of surrounding areas is not negatively impacted upon, by any activity being undertaken, in order to ensure the fair and equitable sharing among stakeholders of benefits arising from indigenous biological resources.

Furthermore a person may not carry out a restricted activity involving either:

- a) a specimen of a listed threatened or protected species;
- b) a specimen of an alien species; or
- c) a specimen of a listed invasive species without a permit.

According to the NEMBA Alien and Invasive Species Regulations (GN R598 of 2014) alien and invasive species must be eradicated and controlled. The various alien and invasive floral species categories may be summarised as follows:

- Category 1a – Invasive species that require compulsory control;



- Category 1b – Invasive species that require control by means of an invasive species management programme;
- Category 2 – Commercially used plants that may be grown in demarcated areas, provided that there is a permit and that steps are taken to prevent their spread; and
- Category 3 – Ornamentally used plants that may no longer be planted. Existing plants may remain, except within the flood line of watercourses and wetlands, as long as all reasonable steps are taken to prevent their spread

Western Cape Nature Conservation Laws Amendment Act (WCNCLAA, Act No. 3 of 2000)

In terms of Section 62. (1):

- Subject to the provisions of this ordinance, no person shall without a permit, be in possession of, sell, buy, donate, receive as a donation, pick, or import into, export from or transport in or through the Province, any endangered flora.

2 METHOD OF ASSESSMENT

A site visit was undertaken on the 4th of June 2015 in order to determine the EIS of the terrestrial habitat associated with Alternative 1 and 2. A thorough 'walk through' of the sites was undertaken to determine the occurrence of the dominant floral communities, species and habitat diversities. Special emphasis was placed on areas that may potentially support floral SCC as listed by previous ecological assessments undertaken within and in the vicinity of the KNPS (Low, 2008, Todd, 2013 and Koeberg Nature Reserve Management Plan, 2015).

The faunal study component for this project was undertaken purely on a desktop basis, using information gained from online resources as well as previous studies conducted within the Koeberg Nature Reserve (Harrison 2008, Todd, 2013 and the Koeberg Nature Reserve Management Plan, 2015). This information was cross referenced with data and visual observation made during the vegetation assessment of the site alternatives, in order to determine habitat intactness and probability of species occurring in the site alternatives.

A detailed explanation of the terrestrial method of assessment is provided in Appendix A.

3 DESKTOP RESULTS

3.1 National Land Cover (2009)

Land cover and land use changes often indicate major impacts on biodiversity, especially if those changes show the loss of natural habitat due to urban sprawl, cultivation, etc. Both the site alternatives are located within areas indicated as urban build up. However, indigenous vegetation⁵, although historically disturbed, is present within the areas proposed for the construction footprint of both the sites.

3.2 National List of Threatened Terrestrial Ecosystems for South Africa (2011)

The NEMBA (Act 10 of 2004) provides for listing of threatened or protected ecosystems, in one of four categories: Critically Endangered, Endangered, Vulnerable or Protected. Threatened ecosystems are

⁵ Disturbance took place more than 10 years ago. Therefore the vegetation within both the site alternatives can be considered indigenous according to the NEMA definition; "Indigenous vegetation: refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years."



listed in order to reduce the rate of ecosystem and species extinction by preventing further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to conserve sites of exceptionally high conservation value (SANBI, Biodiversity Geographic information Systems (BGIS)).

Both Alternative 1 and Alternative 2 are located within the Cape Flats Dune Strandveld vegetation type which, according to the National List of Threatened Terrestrial Ecosystems (2011), is Endangered within the region (Figure 3). The Cape Flats Dune Strandveld is associated with a high number of threatened plant species with up to 66 SCC known to occur (Government Gazette No 34809, 9 December 2011). It is therefore important that the unnecessary disturbance and loss of habitat from this vegetation type is avoided where possible.

3.3 National Biodiversity Assessment (NBA), 2011

The NBA (2011) provides an assessment of South Africa's biodiversity and ecosystems, including headline indicators such as ecosystem threat status and ecosystem protection level, and national maps for the terrestrial, freshwater, estuarine and marine environments. The NBA (2011) includes a summary of spatial biodiversity priority areas that have been identified through systematic biodiversity plans at national, provincial and local levels.

Neither of the site alternatives are indicated as protected areas by the NBA (2011). However, according to the Koeberg Nature Reserve Management Plan (2015), on the 12 July 1988, Eskom submitted an application in terms of section 12(4) of the Cape Provincial Nature and Environmental Conservation Ordinance 19 of 1974 to declare the Koeberg site as a private nature reserve. In the application, Eskom raised the need for possible additional future nuclear development on the Koeberg site. The concern was raised that the land earmarked for development was included in the land proposed for the nature reserve and its sustainability was questioned. The authorities at the time responded that any development within the nature reserve is Eskom's prerogative and as such the land earmarked for development was included in the nature reserve. The "Koeberg Private Nature Reserve" was proclaimed in 1991 in terms of the Ordinance 19 of 1974. The NEM: Protected Areas Act (2003) which came into effect after the proclamation of the nature reserve regards previously declared nature reserves as a protected area in terms of the new Act.



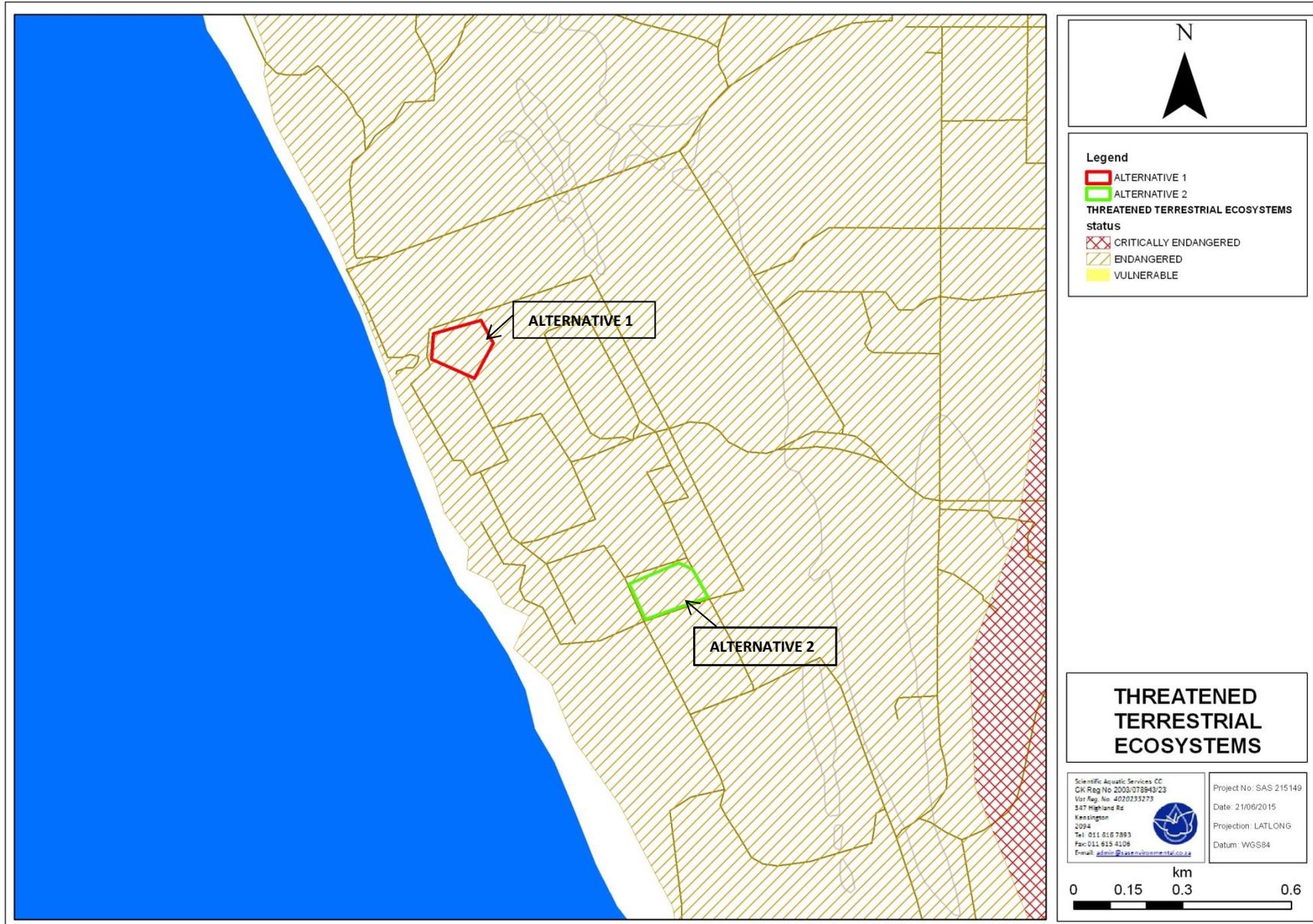


Figure 2: National List of Threatened Terrestrial Ecosystems (2011).



3.4 Importance According to the City of Cape Town Biodiversity Network (CoCT BioNet), 2013

The CoCT BioNet (2013) includes those areas that are the viable minimum needed to conserve a representative sample of Cape Town's unique biodiversity and thus promote sustainable development. The CoCT BioNet (2013) enables the conservation of CBAs which are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning.

According to the CoCT BioNet (2013), neither of the site alternatives is located within a CBA or an ESA.

3.5 Koeberg Nature Reserve Management Plan (2015)

According to the Koeberg Nature Reserve Management Plan (2015), both Alternative 1 and 2 are located within the developed area of the nature reserve within an Industrial Development Zone. This zone includes areas with extensive development, partially degraded or transformed land. The objectives for this zone are operations and developments associated with KNPS and the management guidelines for this zone are that possible negative impacts on the Conservation Zone surrounding the Developed Zone are to be minimised.

4 DESCRIPTION OF THE AFFECTED ENVIRONMENT: VEGETATION

4.1 Regional Context

Alternative 1 and 2 are located within the City of Cape Town Metropolitan Municipality and are located within the Fynbos biome and the Western Strandveld bioregion. The vegetation type indicated by Mucina and Rutherford (2009) is Cape Flats Dune Strandveld (Figure 4) which is considered to be Endangered within the region (National list of threatened ecosystems for South Africa, 2011). The Cape Flats Dune Strandveld occurs as four discontinuous regions. 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 (False Bay form). 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 situated on Robben Island (Mucina and Rutherford, 2006). The Cape Flats Dune Strandveld vegetation type can be subdivided into two forms, the False Bay form and the West Coast Form. The False Bay form occurs on the False Bay shoreline from Muizenberg to Gordons Bay (south and east of the city bowl), and the West Coast form occurs on the western shoreline from Cape Town to Bokbaai (north of the City bowl) (City of Cape Town Biodiversity Fact Sheet 5: Cape Flats Dune Strandveld, 2011).

Cape Flats Dune Strandveld is characterised by high levels of transformation as a result of urban sprawl, road building, sand mining and cultivation. Approximately 56% of the vegetation type as a whole has been transformed and only 7% is statutorily conserved. Approximately 7% of the False Bay and 7% of the West Coast form are in proclaimed reserves, with the West Coast form also having 16% in the private Koeberg Nature Reserve (City of Cape Town Biodiversity Fact Sheet 5: Cape Flats Dune Strandveld, 2011). The conservation target for the Cape Flats Dune Strandveld (24%) has not yet been reached and any unnecessary loss of this vegetation type as a result of development activities should be avoided, where possible.



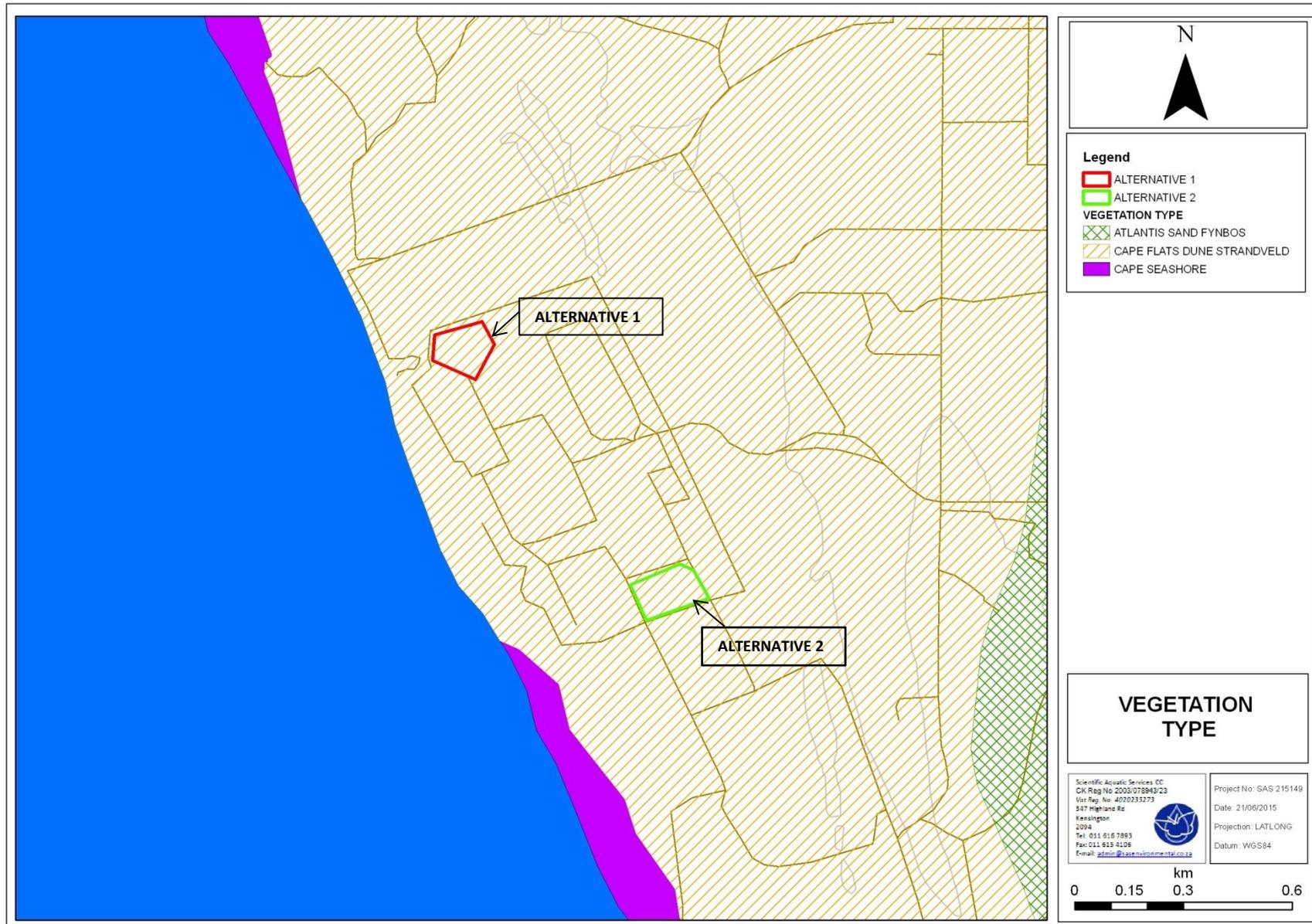


Figure 3: Vegetation types associated with Alternative 1 and Alternative 2 (Mucina & Rutherford, 2009).



4.2 Vegetation Descriptions

4.2.1 Alternative 1

Alternative 1 is located within the Cape Flats Dune Strandveld vegetation type. This vegetation type is characterised by a flat to slightly undulating (dune fields) landscape, covered by tall, evergreen, hard leaved shrubland with abundant grasses and annual herbs in gaps (Mucina and Rutherford, 2006). The vegetation associated with Alternative 1 has been disturbed as a result of historical construction related activities associated with the development of the KNPS and as a result of gravel road development through the area, which has resulted in the loss of naturally occurring Cape Flats Dune Strandveld vegetation from the site. However, vegetation has subsequently begun to re-establish within the area. The vegetation currently present on site is characterised by the presence of clumps of shrubby vegetation with an open, shorter shrub and grassy layer. Annuals and bulbous species are also likely to appear in these gaps during spring after sufficient rainfall. The vegetation is dominated by the pioneer shrub *Chrysanthemoides incana* which is indicative of past disturbance on the site. However, additional indigenous floral species including *Otholobium bracteolatum*, *Helichrysum niveum*, *Searsia glauca*, *Morella cordifolia*, *Thesium* cf *spicatum*, *Trachyandra divaricata*, *Solanum africanum*, *Thesidium fragile*, *Cladoraphis cyperoides*, *Metalasia muricata*, *Cynodon dactylon*, *Ficinia lateralis*, *Atriplex nummularia*, *Limonium peregrinum*, *Searsia laevigata*, *Carpobrotus acinaciformis*, *Chironia baccifera*, *Pelargonium capitatum* and *Lessertia* sp. were also encountered scattered within the area.



Figure 4: Vegetation associated with Alternative 1.

4.2.2 Alternative 2

Alternative 2 is also located within the Cape Flats Dune Strandveld vegetation type. Vegetation associated with Alternative 2 was historically disturbed as a result of activities associated with the construction of the KNPS and as a result of the development of a laydown area. However, over the years dune movement has resulted in the movement of sand over the disturbed area and Cape Flats Dune Strandveld vegetation has re-established in the area. Vegetation associated with Alternative 2 is characterised by the presence of dense stands of shrubby, hard leaved vegetation up to approximately 1.5m tall. Species diversity within the area proposed for Alternative 2 is considered to be higher than that associated with Alternative 1 with a higher floral species richness and evenness encountered. However, species diversity is not likely to be as high as in surrounding, undisturbed Cape Flats Dune Strandveld. Indigenous floral species encountered which are considered to be representative of the natural vegetation type included *Otholobium bracteolatum*, *Helichrysum niveum*, *Asparagus asparagoides*, *Seriphium plumosum*, *Searsia glauca*, *Searsia lucida*, *Thesidium fragile*, *Solanum africanum*, *Galium tomentosum*, *Helichrysum crispum*, *Morella cordifolia*, *Thesium* cf

spicatum, *Helichrysum* sp., *Trachyandra divaricata*, *Cladoraphis cyperoides*, *Metalasia muricata*, *Cynodon dactylon*, *Ficinia lateralis*, *Phyllica ericoides*, *Searsia laevigata*, *Carpobrotus acinaciformis*, *Chironia baccifera*, *Pelargonium capitatum*, *Lessertia* sp., *Psoralea* sp., *Senecio* sp. and *Drosanthemum* sp.



Figure 5: Vegetation associated with Alternative 2.

4.3 SCC and Protected Species Status Assessments

During the field assessment special emphasis was placed on the identification of floral SCC as listed by previous ecological assessments undertaken within and in the vicinity of the KNPS (Low, 2008, Todd, 2013 and Koeberg Nature Reserve Management Plan, 2015).

A single possible SCC⁶, *Lampranthus cf explanatus* (Near Threatened) was encountered within the construction footprint of Alternative 1. Individuals of this species were mostly encountered within the western portion of the site, to the west of the existing gravel road. Individuals of this species have also been listed to occur within the Koeberg Nature Reserve (Low, 2008) and are not restricted to the construction footprint of Alternative 1.

No SCC were encountered within the area proposed for the development of Alternative 2 at the time of the assessment, however, the presence of individuals of the SCC *Lessertia canescens* was confirmed during a previous assessment of the site in 2013 (Pers. comm. – Nick Helme). *Lessertia canescens* has yet to be formally Red Listed as threatened, due to recent taxonomic changes, but is likely to be listed as Vulnerable, and is restricted to coastal areas from Cape Town to Mossel Bay (Pers. comm. Nick Helme). *Lessertia canescence* is also likely to occur in other areas within the nature reserve.

In a previous study, Low (2008) listed 22 SCC for Koeberg (based on a composite species list generated in SaSFlora 1998-2007). Additional floral SCC, as listed by Low (2008), which have a possibility of occurring within the site alternatives include annuals and bulbs such as *Cotula duckittiae* (Vulnerable), *Capnophyllum africanum* (Near Threatened), *Steirodiscus cf tagetes* (Vulnerable) and *Satyrium cf carneum* (Near Threatened). Although the site alternatives have been historically disturbed, there is still a small possibility that these species may occur.

Three floral species which are protected under the WCNCLAA were also encountered within the site alternatives at the time of the assessment. These include *Carpobrotus acinaciformis* (encountered within both sites), *Drosanthemum* sp. (encountered within Alternative 2) and

⁶ Was not in flower at the time of the assessment which created a limitation to the identification of the species.

Lampranthus cf explanatus (encountered within Alternative 1) (all members of the Mesembryanthemaceae family).

Should SCC, protected species and indigenous species to be cut, disturbed, damaged or destroyed, permit applications for such activities must be made to CapeNature.

4.4 Exotic and Invader Species

Alien invaders are plants that are of exotic origin and are invading previously pristine areas or ecological niches (Bromilow, 2001). Not all weeds are exotic in origin but, as these exotic plant species have very limited natural “check” mechanisms within the natural environment, they are often the most opportunistic and aggressively growing species within the ecosystem. Therefore, they are often the most dominant and noticeable within an area. Disturbances of the ground through trampling, excavations or landscaping often leads to the dominance of exotic pioneer species that rapidly dominate the area. Under natural conditions, these pioneer species are overtaken by sub-climax and climax species through natural veld succession. This process, however, takes many years to occur, with the natural vegetation never reaching the balanced, pristine species composition prior to the disturbance. There are many species of indigenous pioneer plants, but very few indigenous species can out-compete their more aggressively growing exotic counterparts.

Alien vegetation invasion causes degradation of the ecological integrity of an area, causing (Bromilow, 2001):

- A decline in species diversity;
- Local extinction of indigenous species;
- Ecological imbalance;
- Decreased productivity of grazing pastures; and
- Increased agricultural input costs.

Alien vegetation was very limited within both the site alternatives. A few *Acacia longifolia* saplings were encountered scattered within the vegetation of both sites. Additional alien and invasive species were largely limited to the outer boundary of the areas where disturbance has occurred as a result of previous road development.

Table 1: Dominant exotic vegetation species identified during the general area assessment.

<i>Scientific name</i>	Common name	NEMBA Category
TREES		
<i>Acacia longifolia</i>	Long-leaved Wattle	1b
<i>Pinus sp</i>	Pine	N/A
SHRUB AND FORBS		
<i>Atriplex nummularia</i>	Old-man Saltbush	2
<i>Plantago lanceolata</i>	Narrow-leaved Ribwort	N/A
GRASS		
<i>Pennistenum setaceum</i>	Fountain Grass	1b

NEMBA Category 1b - Invasive species that require control by means of an invasive species management programme, NEMBA Category 2 - Commercially used plants that may be grown in demarcated areas, provided that there is a permit and that steps are taken to prevent their spread

4.5 Medicinal Plants

Medicinal plant species were encountered scattered within the construction footprint areas of both the site alternatives. All medicinal plant species encountered are considered common within the region



and no medicinal species which are also considered to be SCC were encountered. Additional SCC which may be encountered within the site alternatives within the correct season could have medicinal value. However, there is a very low likelihood that these will be used for medicinal purposes due to the limited access into the site alternatives by members of the public.

Table 2: Traditional medicinal plants identified during the field assessment. Medicinal applications and application methods are also presented (van Wyk, Oudtshoorn, Gericke, 2012).

Scientific name	Common name	Plant part used	Uses
<i>Asparagus</i> sp	Katdoring	Rhizomes and fleshy roots	Asparagus species are traditionally used in southern Africa as a treatment for tuberculosis, kidney ailments and rheumatism.
<i>Carpobrotus acinaciformis</i>	Sourfig	Leaf juice or leaf pulp	The leaf juice is traditionally gargled to treat infections of the mouth and throat. It is taken orally for dysentery, digestive troubles, tuberculosis and as a diuretic and styptic. Juice is applied to treat eczema, wounds and burns, and is said to be effective against toothache, earache and oral and vaginal thrush.
<i>Chironia baccifera</i>	Bitterbossie	The whole plant	Traditionally used by the Khoi as a purgative and to treat boils. A decoction of the whole plant is taken as a blood purifier to treat acne, sores and boils. Infusions may be used as a remedy for diarrhoea, or for leprosy.
<i>Helichrysum</i> spp.	Everlasting	Leaves, roots, stems	Stomach complaints, chase evil spirits away, bladder and kidney problems, heart problems, headache, vomiting, fever, backache, wounds, blood purifier, spiritual connection medicine for sangomas with ancestors, chest complaints, skin infections, lung cleaning, stroke and high blood pressure.
<i>Lessertia frutescens</i>	Cancer Bush	Leaves	Old Cape remedy for stomach problems and internal cancers. It is a bitter tonic and is used topically for wounds and ailments of the eye. According to tradition, the virtues of the plant extend to include remedies for colds, influenza, chicken-pox, diabetes, varicose veins, piles, inflammation, liver problems, backache and rheumatism. It is used traditionally to treat stress-related ailments, shock, trauma, fits and severe depression.
<i>Pelargonium capitatum</i>	Rose-scented Geranium	Leaves	Grown commercially for the production of rose geranium oil.
<i>Thesium</i> spp	Roothug	Roots	Urinary system cleaning, blood disorder, infertility
<i>Solanum</i> spp	Nightshade	Bulb	Blood purifier

5 DESCRIPTION OF THE AFFECTED ENVIRONMENT: FAUNA

5.1 Regional Context

Alternative 1 and 2 are located within the Cape Flats Dune Strandveld vegetation types, which is characterised by a flat to undulating landscape, covered by shrubland with abundant grasses. Both



Alternatives are located within the Koeberg Power Station complex, which is surrounded by the Koeberg Nature Reserve. The site alternatives are separated from the Nature Reserve by a tall high security fence which can be considered a movement barrier for many terrestrial faunal species. The surrounding Koeberg Nature Reserve has a fairly large abundance and diversity of faunal species, with a number of the larger antelope species having been introduced into the area and not occurring naturally. The site alternatives are not expected to harbour the same faunal diversity and abundance as the surrounding Koeberg Nature Reserve, however small terrestrial species capable of moving through the fence line, as well as avifaunal species may occur within the site alternatives.

5.2 Mammals

The location of both site alternatives largely precludes the existence of medium to large mammal species as a result of the proximity of the sites to the existing infrastructure and resultant anthropogenic impacts. Also, it must be noted that both the site alternatives are located within the high security area, and as such are surrounded by a large security fence, which inhibits the movement of mammal species between the site alternatives and the surrounding natural habitat. However, smaller mammal species will be able to move through the fence structure and may inhabit the site alternatives either temporarily or permanently. Such mammals will likely comprise of the smaller Rodentia species, as noted through the observation of *Rhabdomys pumilio* (Four striped grass mouse) by the ecologists during the floral site assessment.

Due to the site alternatives being located within the main Koeberg compound, the high security fence creating an almost impassable barrier and the overall impacts from anthropogenic activities, it is highly unlikely that the site alternatives will provide usable and viable habitat to medium and large mammal species. It is likely that a significantly larger number of mammal species will be located outside of the site alternatives, on the opposite side of the security fence within the demarcated Koeberg Nature Reserve. The Nature Reserve has significantly lower levels of transformation in comparison to the site alternatives and is home to a number of introduced antelope species as well as indigenous small mammal species.

5.2 Avifauna

Data obtained from the South African Bird Atlas Project (SABAP2), habitat information from Section 4 of the report and previous studies of the areas surrounding both the alternatives sites, indicates that the site alternatives are likely to be inhabited and utilised by a number of common bird species of the region. Of importance and what needs to be considered in terms of the development of either Alternative 1 or Alternative 2, is the probability of avifaunal SCC occurring within the site alternatives, and the overall habitat suitability in terms of long term avifaunal sustainability. Both the site alternatives are located within the high security fence line, adjacent to existing infrastructure. Close proximity to human and noise disturbances within the complex combined with a lower habitat suitability of the site alternatives will most likely preclude avifaunal SCC from either of the alternatives. This is mainly attributable to anthropogenic impacts within the site alternatives along with less transformed and more suitable habitat in the direct vicinity for avifaunal SCC. Any avifaunal species that may currently be encountered within either Alternative 1 or 2, are likely to utilise the surrounding areas at the same time, and will not be completely restricted to either of the site alternatives. Furthermore, the lack of any wetlands or permanent water sources within either of the site alternatives will further result in decreased overall bird diversity. In addition, no priority avifaunal species as per the Western Cape State of Biodiversity Report (2012) are expected to occur within either of the site alternatives.



5.3 Invertebrates

Data obtained from previous studies within the area along with invertebrate distribution data was assessed along with the results of the floral component in Section 4 to determine the probability of invertebrate species occurrence within the site alternatives. Special attention was paid to the assessment of the probability of the occurrence of invertebrate SCC within either of the site alternatives. Historically the surrounding habitat of both Alternative 1 and Alternative 2 hosted the butterfly SCC *Chrysoritis dicksoni* (Dickson's Strandveld Copper), which is listed as Critically Endangered. However, all known populations from the area are now considered to be "extinct", with the remaining populations only known to occur near Witsand (East of De Hoop Nature Reserve) (Henning *et al*, 2009). As for avifauna, the habitat suitability of the surrounding areas is considered to be far greater than that of the site alternatives, and as such is capable of supporting any dispersing species from either of the site Alternatives.

5.4 Amphibians

No wetlands or typical or preferred amphibian habitat units occur within either of the site alternatives. The surrounding areas contain seasonal wetland habitats, and as such it is likely that amphibians within the area will congregate within these areas and largely avoid the site alternatives. The only amphibian SCC listed for the area is *Cacosternum capense* (Cape Caco), however the habitat specific requirements for this species is likely to exclude it from either Alternative 1 or 2. However, it is possible that this species will occur within the surrounding areas.

5.5 Reptiles

The location of both Alternative 1 and 2 within the high security fence line, as well as associated anthropogenic activities and disturbances, will likely preclude any reptile SCC from inhabiting the sites on a permanent basis. Although no reptile SCC are expected within the site alternatives, it is likely that other common reptile species will occur within both Alternative 1 and 2, however it is unlikely that these reptiles rely solely on the alternatives for survival and will relocate to natural habitats surrounding the site alternatives should construction commence. *Scelotes montispectus* (Bloubergstrand Dwarf Burrowing Skink) has been confirmed to occur within the areas surrounding the sites. As yet this species has not been identified as a SCC, however due to its perceived limited distribution range and the lack of data for this species the precautionary principle may well be applicable here. As such consideration needs to be given to the possibility that *S. montispectus* may occasionally traverse through either of the site alternatives, however it is unlikely that it will reside there on a permanent basis or be dependent on the site alternatives for survival as a result of anthropogenic activities and the disturbed habitat.

5.6 Arachnids

Spider and scorpion species distribution has not been well documented and verified historically. However the data available from previous studies in the area has indicated that that no arachnid SCC are known to occur within either Alternative 1 or 2. No arachnid species are listed as protected according to the Western Cape Province State of Biodiversity Report 2012 or in the WCNCLAA. However it must be noted that that there is little data on arachnid distribution and abundance within the Western Cape. *Harpactira atra* (Common Baboon Spider) has been observed within the Koeberg Nature Reserve. As such it is possible that there may be *H. atra* individuals occurring within both Alternative 1 and 2, although this species is not protected and is common throughout the Western Cape.



5.7 Species of Conservation Concern Sensitivity Index Score (SCCSIS)

Habitat suitability, resource availability as well as site location are major factors when considering the probability of SCC occurring within the site alternatives. As such, it is unlikely that Alternative 1 or 2 are able to support a viable population of any SCC, due to the diminished qualities of the aforementioned factors in terms of habitat provision for faunal SCC. Most important is the level of anthropogenic activities that these sites may be exposed to as a result of their location within the Koeberg complex, which may have a limiting result on faunal species habitation of the sites. As such, in terms of faunal SCC both Alternative 1 and 2 are considered unimportant and any development within these areas is unlikely to pose a significant threat to faunal SCC within the region.

6 SENSITIVITY

Habitat sensitivity was determined based on the irreplaceability of the habitat, on observations of the abundance and diversity of floral species present at the time of the assessment, on the presence of floral and/or faunal SCC and protected species within the habitat, on the presence of CBAs and ESAs and on the degree of disturbance encountered as a result of historical and current activities. The sensitivity of the site alternatives is discussed below.

Alternative 1

Terrestrial habitat associated with Alternative 1 is considered to be of a low to moderate sensitivity based on the following factors:

- The vegetation type associated with the area is listed as Endangered within the region;
- The site is located within the Koeberg Nature Reserve, however it is located within an Industrial Development Zone;
- The site is not indicated to fall within an ESA or a CBA;
- The vegetation is dominated by the pioneer shrub *Chrysanthemoides incana* which is indicative of past disturbance on the site. However additional indigenous floral species which are considered to be representative of the vegetation type were also encountered scattered within the area;
- One possible floral SCC ⁷, *Lampranthus cf explanatus*, was encountered within Alternative 1;
- Two protected floral species, *Lampranthus cf explanatus* and *Carpobrotus acinaciformis*, were encountered within Alternative 1;
- No faunal SCC are expected to occur within the site; and
- Faunal species that may be encountered within the site are likely to be common and widespread throughout the region, and as such the development poses no threat to faunal species or the habitat thereof within the region.

Alternative 2

Terrestrial habitat associated with Alternative 2 is considered to be of a moderate sensitivity based on the following factors:

- The vegetation type associated with the area is listed as Endangered within the region;
- The site is located within the Koeberg Nature Reserve, however it is located within an Industrial Development Zone;
- The site is not indicated to fall within an ESA or a CBA;

⁷ Was not in flower at the time of the assessment which created a limitation to the identification of the species. The species would have to be confirmed during an additional assessment undertaken in the correct flowering season.



- Floral species diversity within Alternative 2 is considered to be higher than that associated with Alternative 1 with a higher floral species richness and evenness encountered, and indigenous floral species encountered within the area are considered to be representative of the natural vegetation type;
- No floral SCC were encountered at the time of the assessment, however, the presence of individuals of the SCC *Lessertia canescens* was confirmed during a previous assessment of the site in 2013 (Pers. comm. – Nick Helme);
- Two protected floral species, *Carpobrotus acinaciformis* and *Drosanthemum* sp. were encountered within Alternative 2;
- No faunal SCC were encountered within the site; and
- All faunal species occurring within the site are considered to be common and widespread, and as such the development poses no threat to faunal species or their habitat within the region.



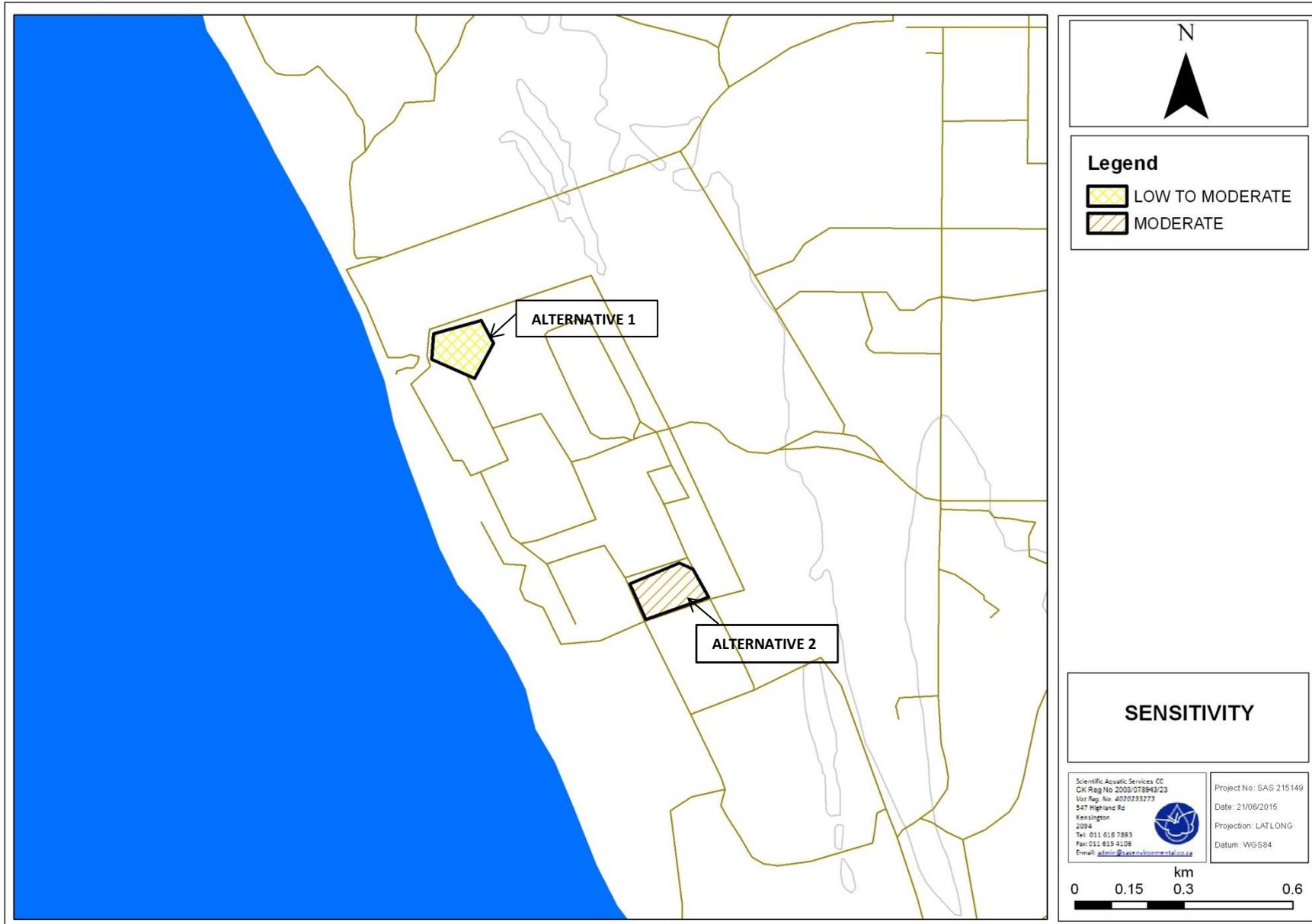


Figure 6: Sensitivity map.



7 IMPACT ASSESSMENT

The tables below serve to summarise the significance of potential impacts on the terrestrial ecology associated with the proposed development of the Koeberg TISF. Impacts associated with the proposed development have been assessed separately for Alternative 1 and Alternative 2 as well as for the no go option. Impacts associated with vegetation are relevant to the construction phase only, however impacts associated with fauna have been assessed for the construction phase as well as the operational phase of the development.

It should be noted that the possibility of the spillage of used fuel from the dry storage casks was not taken into consideration during the assessment of impacts. The possibility of a spillage occurring is considered to be very low due to the high security and safety measures which are likely to be implemented during the transportation and storage of the casks.

In the assessment of impacts prior to the implementation of mitigation measures the assumption has been made that all general good housekeeping measures as listed below will be strictly adhered to throughout all phases of the development.

The following good housekeeping practices must be implemented and integrated into the project Environmental Management Plan (EMP):

- Regularly inspect all construction vehicles for leaks;
- Carry out all servicing and refuelling of construction vehicles on a concrete platform with runoff traps and containment. If servicing of vehicles takes place in the field use drip trays at all times;
- Treat contaminated soils with an appropriate product and remove contaminated soil;
- Remove and appropriately dispose of any contaminated soil and water to a designated dump site as rapidly as possible following contamination;
- Implement suitable waste management practices;
- Provide sanitation facilities for the duration of the proposed construction activities and remove all waste to an appropriate facility;
- All waste, with special mention of waste rock and spoils and remaining building material must be removed from the site on completion of the construction phase; and
- Reduce airborne dust at construction sites through damping dust generation areas with freshwater.

7.1 Vegetation Impact Assessment

IMPACT 1: LOSS OF VEGETATION AND ASSOCIATED FLORAL BIODIVERSITY AND SCC/PROTECTED SPECIES

Construction Phase

Activities leading to impact

- Clearing of vegetation;
- Disturbance of soils in surrounding areas; and
- Compaction of soils in surrounding areas.

Construction related activities will require the physical disturbance and removal of vegetation and soils, which will result in the removal of floral habitat and floral communities. Disturbance associated with construction activities may also result in the proliferation of alien and invasive species in the area.

The development of both Alternative 1 and Alternative 2 will result in the removal of Endangered vegetation (National List of Threatened Terrestrial Ecosystems) and SCC as well as protected floral species. However, neither of the alternatives are located within a CBA or ESA. Although the site



alternatives are located within the Koeberg Nature Reserve, they are located within the Industrial Development Zone which has been defined as a development area within the nature reserve.

The probability of the impact of loss of floral habitat, biodiversity and SCC/protected species for both the alternatives is considered to be definite, the extent of the impact will be local and the duration of the impact will be long term. The development of both site alternatives will result in the loss of a relatively small area of indigenous vegetation in the context of the larger Koeberg Nature Reserve and in the context of the remaining natural vegetation which forms part of the West Coast form of the Cape Flats Dune Strandveld. The intensity of the impact is therefore considered to be of a low to medium intensity for Alternative 1 and of a medium intensity for Alternative 2. The overall impact was determined utilising the impact assessment methodology supplied by the EAP and was calculated to be of medium (negative) overall significance for Alternative 1 and of a medium (negative) overall significance for Alternative 2 prior to the implementation of mitigation measures. However, it is the opinion of the specialist that the overall impact should be considered to be of a low to medium (negative) significance for Alternative 1.

The implementation of mitigation measures such as the rehabilitation of the developed site during the decommissioning phase of the development is likely to reduce the intensity of the impact for both alternatives, however, the probability and duration of the impact will remain definite and long term for both the alternatives. The overall impact after the implementation of mitigation measures was therefore calculated to be of a low (negative) significance for both Alternative 1 and 2.

Although the impact associated with both the site alternatives is considered to be of a low (negative) significance after the implementation of mitigation measures, vegetation associated with Alternative 1 is considered to be slightly less sensitive than that associated with Alternative 2 and the development of Alternative 1 will therefore result in a slightly lower relative impact when compared to the development of Alternative 2.

Without Mitigation	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Alternative 1	Local	Medium	Long-term	Medium	Definite	MEDIUM	- ve	Medium ⁸
	1	2	3	6				
Alternative 2	Local	Medium	Long-term	Medium	Definite	MEDIUM	- ve	Medium
	1	2	3	6				

Essential mitigation measures during the construction phase:

- Limit the footprint area of the construction activity to what is absolutely essential in order to minimise environmental damage;
- Clearly define the boundary of the construction footprint area and ensure that all activities remain within the defined footprint area;
- Confine construction vehicles to designated roadways and strictly prohibit the indiscriminate movement of construction vehicles through vegetation falling outside of the construction footprint;
- No temporary storage of building material or soil is allowed within natural areas of vegetation falling outside of the construction footprint area;
- SCC and protected species related mitigation measures in line with best practice⁹:
 - Once the final construction footprint has been pegged a suitably qualified botanist must mark SCC and protected species

⁸ The confidence levels of the assessment were reduced slightly as a result of the seasonal constraints of the assessment. However, the level of detail undertaken in the study is considered sufficient to ensure that the results of the assessment accurately define the impact of the proposed development in order to provide the relevant planners and decision makers with sufficient information to formulate an opinion on the viability of the proposed development from a conservation view point.

⁹ It should be noted that rescue and relocation is not supported by CapeNature as an acceptable mitigation measure for many species for various reasons. Therefore, although it is listed as an essential mitigation measure and must be implemented, rescue and relocation will not contribute to the lowering of the impact score.



within the area and a suitably experienced person must be hired to oversee the removal and rescue and relocation of the SCC;

- Undertake rescue and relocation of SCC prior to the commencement of construction related activities; and
 - A floral permit application will have to be made to CapeNature should SCC and protected species be removed from the construction footprint;
- Construction activities and the disturbance of soils are likely to result in the proliferation of alien and invasive species. It must therefore be ensured that all alien and weed species encountered within areas disturbed as a result of construction activities are removed in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998). Removal of species should take place throughout the construction phase of the development and should continue throughout the operational phase of the development.
- Where possible, remove alien species by hand;
 - Keep footprint areas as small as possible when removing alien plant species;
 - Dispose of removed alien plant material at a registered waste disposal site; and
- Rehabilitate the development footprint with species indigenous to the vegetation type during the decommissioning phase of the development. Rehabilitation must be undertaken or supervised by a suitably qualified professional.

Recommended mitigation measures during the construction phase:

- Restrict construction to the drier summer months, if possible, to avoid erosion of exposed soils and sedimentation of surrounding habitats.

With Mitigation	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Alternative 1	Local	Low	Long-term	Low	Definite	LOW	- ve	Medium
	1	1	3	5				
Alternative 2	Local	Low	Long-term	Low	Definite	LOW	- ve	Medium
	1	1	3	5				

7.2 Faunal Impact Assessment

IMPACT 2: LOSS OF FAUNAL HABITAT AND ASSOCIATED FAUNAL BIODIVERSITY AND PROTECTED SPECIES

Construction Phase

Activities leading to impact:

- Clearing of vegetation and destruction of habitat;
- Collision of vehicles with faunal species; and
- Hunting or trapping of faunal species.

The site alternatives are located within the fenced in high security area of the KNPS, and as such are subject to an increased level of anthropogenic activities. Furthermore, the fence line surrounding the site alternatives will act as a barrier to terrestrial faunal species movement.

As a result of the faunal study being conducted on a desktop basis, utilising available online data, historical reports as well as more recent site assessments in the vicinity of the site alternatives, the confidence levels for the impact are described as medium.

Vegetation clearing within the site alternatives will lead to a loss of nesting/ perching sites for avifaunal species, whilst ground dwelling species currently inhabiting the site alternatives will be displaced as a result of the construction activities. Furthermore, edge effects from the construction activities, increased anthropogenic activities as well as the increased movement of vehicles within the



areas could result in further loss of habitat and faunal biodiversity in the natural areas surrounding the site alternatives if edge effects are not managed.

However, due to the location of both the site alternatives it is unlikely that either of these areas supports a high level of faunal biodiversity and as such the development of the TISF is unlikely to have a large impact on faunal habitat or biodiversity of the greater area surrounding the TISF or within the region. No SCC are considered to occur within either of the site alternatives, and as such development within these areas is unlikely to impact upon SCC conservation within the region.

The construction of the TISF will involve the clearing of all the vegetation and this complete loss of faunal habitat within the selected site resulting in a long term impact on the site specific faunal habitat and species in terms of the duration of the impact. However, the availability of suitable primary habitat surrounding the site alternatives into which any displaced species can disperse will have a net effect of decreasing this level of impact to a medium (negative) impact. The availability of suitable habitat outside of the site alternatives combined with systematic site clearing towards the fence line, allowing for species to disperse into the Koeberg Nature Reserve, will have the net effect of reducing the overall significance of the impacts to a very low (negative) level provided mitigation measures are adhered to.

Without Mitigation	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Alternative 1	Local	Medium	Long-term	Medium	Definite	MEDIUM	- ve	Medium
	1	2	3	6				
Alternative 2	Local	Medium	Long-term	Medium	Definite	MEDIUM	- ve	Medium
	1	2	3	6				

Essential mitigation measures during the construction phase:

- Limit the disturbance of the footprint area to what is absolutely essential in order to minimise environmental damage;
- Clearly define the boundaries of disturbance footprint areas and ensure that all activities remain within defined footprint areas;
- Confine vehicles to designated roadways. The indiscriminate movement of vehicles through terrestrial habitat falling outside of the disturbance footprint must be strictly prohibited;
- As far as possible attempts must be made to flush any faunal species within the construction footprint towards more suitable habitat within the surrounding areas. Vegetation clearing must work towards the security fence line, thereby enabling any faunal species to naturally relocate through the fence into the surrounding natural areas; and
- Prohibit trapping or hunting of fauna.

Recommended mitigation measures during the construction phase:

- Restrict construction to the drier summer months, if possible, to avoid erosion of exposed soils and sedimentation of surrounding habitats.

With Mitigation	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Alternative 1	Local	Low	Medium-term	Very low	Definite	VERY LOW	- ve	Medium
	1	1	2	4				
Alternative 2	Local	Low	Medium-term	Very low	Definite	VERY LOW	- ve	Medium
	1	1	2	4				



Operational Phase

During the operational phase there is a possible risk of vehicle and faunal species collisions notably for small faunal species that are capable of traversing through the fence line. These faunal impacts are likely to be restricted to small reptile, amphibian and invertebrate species. However, ongoing operational activities and species natural disturbance/ threat avoidance habits will greatly minimise the threat of these collisions. In order to further minimise collision related impacts, vehicles must be restricted to the designated roadways and no off-road driving is to be permitted through areas of natural faunal habitat. Furthermore, edge effects from the operational activities may also result in a further loss of faunal habitat if mitigation measures are not managed, notably from the spreading of alien invasive plants which may transform the current faunal habitat and result in a lower species carrying capacity. The overall impact is considered to be of a low significance prior to the implementation of mitigation measures for both Alternative 1 and 2. However, with the implementation of mitigation measures and the continued control of edge effects throughout the operational phase of the development, the overall impact may be reduced from a low (negative) level prior to mitigation to an insignificant level post mitigation for both Alternative 1 and 2.

Without Mitigation	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Alternative 1	Local	Low	Long-term	Low	Probable	LOW	- ve	Medium
	1	1	3	5				
Alternative 2	Local	Low	Long-term	Low	Probable	LOW	- ve	Medium
	1	1	3	5				
Essential mitigation measures during the operational phase:								
<ul style="list-style-type: none"> ➤ Continue alien vegetation control throughout the operational phase of the development; and ➤ Restrict vehicles to travelling only on designated roadways. 								
With Mitigation	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Alternative 1	Local	Low	Short-term	Very low	Possible	INSIGNIFICANT	- ve	Medium
	1	1	1	3				
Alternative 2	Local	Low	Short-term	Very low	Possible	INSIGNIFICANT	- ve	Medium
	1	1	1	3				

7.3 No-go Option

Should the proposed development of the TISF proceed, Endangered vegetation and SCC/protected species will be removed from the construction footprint which will result in a low (negative) significance impact for Alternative 1 and Alternative 2 after mitigation. Should the proposed development of the TISF not proceed, no Endangered vegetation or SCC/protected species will be removed and the status quo of the area, in terms of vegetation is likely to remain unchanged. The overall impact of the no-go alternative is therefore considered to be neutral.

In terms of faunal species and the protection of SCC, if the proposed development does not go ahead there will be no loss of habitat within the site alternatives, however due to the fence structure acting as a barrier it is unlikely that even over time the full potential of faunal biodiversity will be realised within the site alternatives. If the proposed TISF does proceed there will be a definite loss of faunal



species and habitat that currently exists within both site alternatives, however most of these species will naturally relocate to the surrounding environment where suitable habitat is readily available and to a large extent more intact than that of the habitat within either of the site alternatives.

7.4 Cumulative Impacts

The development of the TISF will add to the cumulative loss of floral and faunal habitat as a result of previous and proposed developments by Eskom in the area. The development of both Alternative 1 and Alternative 2 will result in the loss of Endangered Cape Flats Dune Strandveld vegetation (National List of Threatened Terrestrial Ecosystems) and individuals of SCC and protected floral species. However, in the context of the larger Koeberg Nature Reserve, in which 16% of the West Coast Form of the Cape Flats Dune Strandveld is already conserved (City of Cape Town Biodiversity Fact Sheet 5: Cape Flats Dune Strandveld, 2011), the area covered by each of the alternatives is relatively small, and the loss of these small areas of vegetation is therefore considered to have a low to moderate (negative) cumulative impact on the vegetation type as a whole.



8 CONCLUSION

SAS cc was appointed to conduct a vegetation and faunal (terrestrial ecology) assessment as part of the environmental assessment and authorisation process for the proposed construction of the used nuclear fuel TISF at the KNPS within the Western Cape Province.

Two viable site alternatives for the TISF have been identified and are within the OCA. The CSB Site, (Alternative 1) is the preferred site and is located adjacent to the LLW complex, on the northern boundary of the KNPS, whilst the Ekhaya Site (Alternative 2) is located along the southern boundary of the KNPS adjacent to the Ekhaya building.

DESKTOP ASSESSMENT

The following general conclusions were drawn on completion of the desktop assessment:

- Both Alternative 1 and Alternative 2 are located within areas indicated as urban build up (National Land Cover, 2009). However, indigenous¹⁰ vegetation, although historically disturbed, is present within the areas proposed for the construction footprint of both the site alternatives;
- Both site alternatives are located within the Cape Flats Dune Strandveld vegetation type which, according to the National List of Threatened Terrestrial Ecosystems (2011), is Endangered within the region. The Cape Flats Dune Strandveld is associated with a high number of threatened plant species with up to 66 SCC known to occur (Government Gazette No 34809, 9 December 2011). It is therefore important that the unnecessary disturbance and loss of vegetation from this vegetation type is avoided where possible;
- According to the NBA (2011) neither of the site alternatives is located within a formally or informally protected area. However, according to the Koeberg Nature Reserve Management Plan (2015), the “Koeberg Private Nature Reserve” was proclaimed in 1991 in terms of the Ordinance 19 of 1974. The NEM: Protected Areas Act (2003) which came into effect after the proclamation of the nature reserve regards previously declared nature reserves as a protected area in terms of the new Act;
- According to the CoCT BioNet (2013), neither of the site alternatives is located within a CBA or an ESA; and
- According to the Koeberg Nature Reserve Management Plan (2015), both Alternative 1 and 2 are located within the developed area of the nature reserve within an Industrial Development Zone. This zone includes areas with extensive development, partially degraded or transformed land.

VEGETATION ASSESSMENT

The following general conclusions were drawn on completion of the vegetation assessment:

- Both Alternative 1 and Alternative 2 are located within the City of Cape Town Metropolitan Municipality and are located within the Fynbos biome and the Western Strandveld bioregion;
- The vegetation type indicated by Mucina and Rutherford (2009) is Cape Flats Dune Strandveld which is considered to be Endangered within the region;
- The following findings were made upon assessment of Alternative 1:
 - The vegetation associated with Alternative 1 has been disturbed as a result of historical construction related activities associated with the development of the KNPS and as a result of gravel road development through the area which has resulted in the loss of naturally occurring Cape Flats Dune Strandveld vegetation from the site. However, vegetation has subsequently begun to re-establish within the area;
 - The vegetation is characterised by the presence of clumps of shrubby vegetation with an open, shorter shrub and grassy layer;

¹⁰ Disturbance took place more than 10 years ago. Therefore the vegetation within both the site alternatives can be considered indigenous according to the NEMA definition; “Indigenous vegetation: refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years.”



- The vegetation is dominated by the pioneer shrub *Chrysanthemoides incana* which is indicative of the past disturbance which took place on the site. However, additional indigenous floral species were also encountered scattered throughout the area;
- The following findings were made upon assessment of Alternative 2:
 - Vegetation associated with Alternative 2 was historically disturbed as a result of activities associated with the construction of the KNPS and as a result of the development of a laydown area. However, over the years dune movement has resulted in the movement of sand over the disturbed area and Cape Flats Dune Strandveld vegetation has re-established in the area;
 - Floral species diversity within Alternative 2 is considered to be higher than that associated with Alternative 1 with a higher floral species richness and evenness encountered. However, species diversity is not likely to be as high as in surrounding, undisturbed Cape Flats Dune Strandveld;
- A single possible SCC¹¹, *Lampranthus cf explanatus* (Near Threatened) was encountered within the construction footprint of Alternative 1 at the time of the assessment. Individuals of this species were largely encountered within the western portion of the site, to the west of the existing gravel road;
- No SCC were encountered within the construction footprint of Alternative 2 at the time of the assessment, however, the presence of individuals of the SCC *Lessertia canescens* was confirmed during a previous assessment of the site in 2013 (Pers. comm. – Nick Helme).; and
- Three floral species which are protected under the WCNCLAA were also encountered within the construction footprint of Alternative 1 and Alternative 2 at the time of the assessment. These include *Carpobrotus acinaciformis* (encountered within both sites), *Drosanthemum* sp. (encountered within Alternative 2) and *Lampranthus cf explanatus* (encountered within Alternative 1) (all members of the Mesembryanthemaceae family)¹².

FAUNAL ASSESSMENT

The following general conclusions were drawn on completion of the faunal assessment:

- Both Alternative 1 and 2 are unlikely to support a large diversity of faunal species, however Alternative 2 is considered to have a more intact faunal habitat in comparison to Alternative 1;
- Faunal species that are expected to utilise both the site alternatives for either breeding or foraging are considered least threatened within the region (IUCN 2015);
- One mammal species *Rhabdomys pumilio* (Four striped grass mouse) was identified by on site ecologists within both the site alternatives and is considered to be very common within the area;
- All avifaunal species expected to occur at both site alternatives are listed as species of least concern (IUCN, 2015) and are common species for the region;
- In terms of faunal migratory connectivity, both of the site alternatives provide no form of connectivity for faunal species due to their location and the presence of a movement barrier to larger species in the form of a security fence. However, the site alternatives will provide foraging habitat to an extent for smaller faunal species that can pass through or over the security fence;
- Species expected to occur within the site alternatives would most likely be common to the region, and will probably move in and out of both site alternatives on a regular basis;
- From the desktop data analysis it is considered unlikely that either of the site alternatives will be inhabited by any amphibian SCC. Any amphibian species that may occur within the site alternatives are considered to be common, and will relocate naturally to the surrounding natural areas with the commencement of construction activities; and
- No endangered or protected faunal species are expected to occur within either of the site alternatives.

¹¹ Was not in flower at the time of the assessment which created a limitation to the identification of the species. The species would have to be confirmed during an additional assessment undertaken in the correct flowering season.

¹² Should protected and indigenous species to be cut, disturbed, damaged or destroyed, applications for such activities must be made to CapeNature.



SENSITIVITY MAPPING

Habitat sensitivity was determined based on the irreplaceability of the habitat, on observations of the abundance and diversity of floral species present at the time of the assessment, on the presence of floral and/or faunal SCC and protected species within the habitat, on the presence of CBAs and ESAs and on the degree of disturbance encountered as a result of historical and current activities. The sensitivity of the site alternatives is discussed below.

Alternative 1

Terrestrial habitat associated with Alternative 1 is considered to be of a low to moderate sensitivity based on the following factors:

- The vegetation type associated with the area is listed as Endangered within the region;
- The site is located within the Koeberg Nature Reserve, however it is located within an Industrial Development Zone;
- The site is not indicated to fall within an ESA or a CBA;
- The vegetation is dominated by the pioneer shrub *Chrysanthemoides incana* which is indicative of past disturbance on the site. However additional indigenous floral species which are considered to be representative of the vegetation type were also encountered scattered within the area;
- A single possible floral SCC, *Lampranthus cf explanatus*, was encountered within Alternative 1;
- Two protected floral species, *Lampranthus cf explanatus* and *Carpobrotus acinaciformis*, were encountered within Alternative 1;
- No faunal SCC are expected to occur within the site; and
- Faunal species that may be encountered within the site are likely to be common and widespread throughout the region, and as such the development poses no threat to faunal species or the habitat thereof within the region.

Alternative 2

Terrestrial habitat associated with Alternative 2 is considered to be of a moderate sensitivity based on the following factors:

- The vegetation type associated with the area is listed as Endangered within the region;
- The site is located within the Koeberg Nature Reserve, however it is located within an Industrial Development Zone;
- The site is not indicated to fall within an ESA or a CBA;
- Floral species diversity within Alternative 2 is considered to be higher than that associated with Alternative 1 with a higher floral species richness and evenness encountered, and indigenous floral species encountered within the area are considered to be representative of the natural vegetation type;
- No SCC were encountered within the construction footprint of Alternative 2 at the time of the assessment, however, the presence of individuals of the SCC *Lessertia canescens* was confirmed during a previous assessment of the site in 2013 (Pers. comm. – Nick Helme);
- Two protected floral species, *Carpobrotus acinaciformis* and *Drosanthemum* sp. were encountered within Alternative 2;
- No faunal SCC were encountered within the site; and
- All faunal species occurring within the site are considered to be common and widespread, and as such the development poses no threat to faunal species or their habitat within the region.



IMPACT ASSESSMENT

The table below serves to summarise the significance of perceived impacts on the floral and faunal biodiversity of the site alternatives before mitigation measures are implemented. Also indicated is the impact significance of each perceived impact after the implementation of mitigation measures.

Table B: Summary of terrestrial impact significance before and after mitigation.

<i>Habitat Unit</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
IMPACT 1: LOSS OF VEGETATION AND ASSOCIATED FLORAL BIODIVERSITY AS WELL AS SCC AND PROTECTED FLORAL SPECIES					
Construction					
Alternative 1					
Without Mitigation	Medium	Definite	MEDIUM	-ve	Medium ¹³
With Mitigation	Low	Definite	LOW	-ve	Medium
Alternative 2					
Without Mitigation	Medium	Definite	MEDIUM	-ve	Medium
With Mitigation	Low	Definite	LOW	-ve	Medium
IMPACT 2: LOSS OF FAUNAL HABITAT AND ASSOCIATED FAUNAL BIODIVERSITY AND PROTECTED SPECIES					
Construction					
Alternative 1					
Without Mitigation	Medium	Definite	MEDIUM	-ve	Medium
With Mitigation	Very low	Definite	VERY LOW	-ve	Medium
Alternative 2					
Without Mitigation	Medium	Definite	MEDIUM	-ve	Medium
With Mitigation	Very low	Definite	VERY LOW	-ve	Medium
Operational					
Alternative 1					
Without Mitigation	Low	Probable	LOW	-ve	Medium
With Mitigation	Very Low	Possible	INSIGNIFICANT	-ve	Medium
Alternative 2					
Without Mitigation	Low	Probable	LOW	-ve	Medium
With Mitigation	Very Low	Possible	INSIGNIFICANT	-ve	Medium

Vegetation

The overall impact for the construction phase was determined utilising the impact assessment methodology supplied by the EAP and was calculated to be of medium (negative) overall significance for Alternative 1 and for Alternative 2 prior to the implementation of mitigation measures. However, it is the opinion of the specialist that the overall impact should be considered to be of a low to medium (negative) significance for Alternative 1.

The implementation of mitigation measures such as the rehabilitation of the developed site during the decommissioning phase of the development is likely to reduce the intensity of the impact for both site alternatives. The overall impact after the implementation of mitigation measures was therefore calculated to be of a low (negative) significance for both Alternative 1 and 2.

¹³ The confidence levels of the assessment were reduced slightly as a result of the seasonal constraints of the assessment. However, the level of detail undertaken in the study is considered sufficient to ensure that the results of the assessment accurately define the impact of the proposed development in order to provide the relevant planners and decision makers with sufficient information to formulate an opinion on the viability of the proposed development from a conservation view point.



Although the impact associated with both the site alternatives is considered to be of a low (negative) significance after the implementation of mitigation measures, vegetation associated with Alternative 1 is considered to be slightly less sensitive than that associated with Alternative 2 and the development of Alternative 1 will therefore result in a slightly lower relative impact when compared to the development of Alternative 2.

Fauna

From the above impact assessment it is clear that the proposed development will have a medium (negative) impact in terms of the loss of faunal habitat from both of the site alternatives prior to the implementation of mitigation measures, whilst post mitigation measures these impacts will be reduced to very low (negative) levels on faunal species and their habitat. Regardless of mitigation measures there will be a definite loss of faunal habitat within the site alternatives due to development, however if mitigated properly, surrounding faunal habitat will be adequately protected from impacts and continue to support any displaced faunal species.

From the results of the impact assessment for the operational phase it is evident that the proposed development of both site alternatives will have a low (negative) impact on faunal habitat, biodiversity and SCC/protected species prior to the implementation of mitigation measures. However, with the implementation of mitigation measures the impact may be reduced to an insignificant level.

Conclusion

After conclusion of the terrestrial assessment, it is the opinion of the ecologists that, from an ecological point of view, the proposed development of either Alternative 1 or Alternative 2 will not lead to an unacceptable loss of biodiversity or important ecological aspects and can be considered favourably, provided that the mitigation measures as presented in the impact assessment of this report are strictly adhered to. However, terrestrial habitat associated with Alternative 1 is considered to be slightly less sensitive than that associated with Alternative 2 and the development of Alternative 1 will therefore result in a slightly lower relative impact when compared to the development of Alternative 2. It is therefore the opinion of the specialists that Alternative 1 be selected as the more favourable site for development.



9 REFERENCES

- Alexander, G and Marais, J.** 2008. Second Edition. *A guide to the reptiles of Southern Africa*. Struik Publishers, Cape Town.
- Barnes, K.N. (Ed).** 2000. *The Eskom Red Data Book of Avifauna of South Africa, Lesotho and Swaziland*. Avifauna life South Africa, Johannesburg, RSA
- BirdLife International.** 2014. *www.birdlife.org*. In conjunction with the International Union for Conservation of Nature (IUCN).
- Branch, B.** 1998. Third Edition. *Field Guide to Snakes and other Reptiles in Southern Africa*. Struik Publishers (Pty) Ltd, Cape Town, RSA
- Bromilow, C.** 2001. Revised Edition, First Impression. *Problem Plants of South Africa*. Briza Publications, Pretoria, RSA.
- City of Cape Town** 2011. *Biodiversity Fact Sheet 5: Cape Flats Dune Strandveld*
- De Villiers, C., Driver, A., Clark, B., Euston-Brown, D., Day, L., Job, N., Helme, N., Holmes, P., Brownlie, S., Robelo, T.** 2005. *Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape*. Fynbos Forum and Botanical Society of South Africa, Kirstenbosch, Cape Town, RSA.
- Driver A., Sink, K.J., Nel, J.N., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K.** 2012. *National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report*. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.
- Du Preez, L and Carruthers, V.** 2009. *A complete guide to the frogs of southern Africa*. Struik Publishers (Pty) Ltd, Cape Town, RSA
- EWT, Endangered Wildlife Trust (Conservation Breeding Specialist Group).** 2004. *Red Data Book of the Mammals of South Africa: A conservation Assessment*
- Government Gazette No 34809**, 9 December 2011. Department of Environmental Affairs, No. 1002 of 2011. Threatened Terrestrial Ecosystems in South Africa
- Harrison, J.A.** 2008. *PBMR DPP Environmental Impact Assessment: Specialist study: vertebrate fauna*. J.A.H Environmental Consultancy, Plumstead.
- Henning, G.A and Henning, S.F.** 1989. *South African Red Data Book of Butterflies*. South African National Scientific Programmes Report No. 158
- Holmes, P.M, Stipinovich, A. and Purves, A.** 2012b. *City of Cape Town Biodiversity Network: Methods and Results Technical Report*. Environmental Resource Management Department (ERMD), City of Cape Town.
- IUCN.** 2014. International Union for Conservation of Nature <http://www.iucnredlist.org/>.
- Koeberg Nature Reserve Management Plan.** Revision 0, (April 2015) Koeberg Management Authority
- Leeming, J.** 2003. *Scorpions of Southern Africa*. Struik Publishers (Pty) Ltd, Cape Town, RSA
- Leroy, A. and Leroy, J. Second Edition.** 2003. *Spiders of Southern Africa*. Struik Publishers (Pty) Ltd, Cape Town, RSA



- Low, B.** 2008. *Impact assessment phase for the proposed pebble bed modular reactor demonstration demonstration power plant at Koeberg*. Coastec, Rondebosch.
- Manning, J.** 2007. *Field Guide to Fynbos*. Struik Publishers, Cape Town, RSA.
- Manning, J.** 2009. *Field Guide to Wild Flowers of South Africa*. Struik Publishers, Cape Town, RSA.
- Minter, L.R., Burger, M., Harrison, J.A., Braack, H.H., Bishop, P.J., & Kloepfer, D. (Eds).** 2004. *Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland*. SI/MAB Series #9. Smithsonian Institute, Washington, DC, USA.
- Mintsa Mi Nzui, A.P.** 2009. *Use and Conservation Status of Medicinal Plants in the Cape Peninsula, Western Cape Province of South Africa*. Masters Thesis, Faculty of AgriSciences, University of Stellenbosch.
- Mucina, L. & Rutherford, M.C. (eds)** 2010. (CD set). *The vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- NEMBA.** *National Environmental Management: Biodiversity Act (No. 10 of 2004)*
- Picker, M., Griffiths, C. & Weaving, A.** 2004. New Edition. *Field Guide to Insects of South Africa*. Struik Publishers (Pty) Ltd, Cape Town, RSA
- Raimondo, D., von Staden, L., Foden., W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A., Manyama, P.A. (eds)** 2009. *Red List of South African Plants* Strelitzia 25. South African National Biodiversity Institute, Pretoria.
- SABAP2,** 2013. *The South Africa Bird Atlas Project 2 database*.
- Sinclair, I., Hockey, P. and Tarboton, W.** 2002. Third Edition. *Sasol Birds of Southern Africa*. Struik Publishers, Cape Town, RSA
- Smithers, R. H. N.** 2000. Third Edition. Edited by Peter Apps. *The Mammals of the Southern African. A Field Guide*. Struik Publishers, Cape Town, RSA.
- Todd, S.** 2013. *Proposed Weskusfleur substation in the vicinity of Koeberg substation. Fauna and flora specialist scoping report for impact assessment*. Simon Todd Consulting
- The South African National Biodiversity Institute is thanked for the use of data from the National Herbarium, Pretoria (PRE) Computerised Information System (PRECIS) as well as from the Biodiversity GIS website.**
- Van Wyk, B., van Oudtshoorn, B. and Gericke, N.** 2009. *Medicinal Plants of South Africa*. Briza Publishers, Pretoria.
- Woodhall, S.** 2005. *Field Guide to Butterflies of South Africa*. Struik Publishers (Pty) Ltd, Cape Town, RSA.



APPENDIX A
Method of Assessment
Terrestrial



A-1 Desktop Study

- Maps, aerial photographs and digital satellite images were consulted prior to the field assessment in order to determine broad habitats, vegetation types and potentially sensitive sites. An initial visual on-site assessment of the site alternatives was made in order to confirm the assumptions made during consultation of the maps;
- Literature review with respect to habitats, vegetation types and species distribution was conducted;
- Relevant data bases and reports considered during the assessment of the site alternatives included:
 - The National Land Cover Dataset (2009);
 - The National Biodiversity Assessment (NBA, 2011);
 - The National List of Threatened Terrestrial Ecosystems (2011);
 - The City of Cape Town Biodiversity Network (CoCT BioNet, 2013);
 - The South African National Biodiversity Institute (SANBI) Threatened species programme (TSP);
 - Pretoria Computer Information Systems (PRECIS);
 - MammalMAP;
 - ReptileMAP;
 - LepiMAP;
 - FrogMAP;
 - SpiderMAP;
 - Koeberg Nature Reserve Management Plan (2015);
 - PBMR DPP Environmental Impact Assessment: Specialist study: vertebrate fauna (Harrison, 2008);
 - Impact assessment phase for the proposed pebble bed modular reactor demonstration power plant at Koeberg (Low, 2008); and
 - Proposed Weskusfleur Substation in the vicinity of Koeberg Substation: fauna and flora specialist scoping report for impact assessment (Todd, 2013).

A-2 Floral Species of Conservation Concern (SCC) Assessment

SCC as listed by previous ecological assessments undertaken within and in the vicinity of the Koeberg Nuclear Power Station (Low, 2008, Todd, 2013 and Koeberg Nature Reserve Management Plan, 2015) were taken into consideration. Throughout the floral assessment special attention was paid with the identification of any of these SCC as well as identification of suitable habitat that could potentially sustain these species.

A-3 Faunal Assessment

The faunal study component for this project was undertaken purely on a desktop basis, using information gained from online resources as well as previous studies conducted within the area (Harrison 2008, Todd, 2013 and the Koeberg Nature Reserve Management Plan, 2015). This information was cross referenced with data and visual observation made during the vegetation assessment of the site alternatives, in order to determine habitat intactness and probability of species occurring in the site alternatives.

A-4 Fauna and the Species of Conservation Concern Sensitivity Index

Given the restrictions of field assessments to identify all the faunal species that possibly occur on a particular property, the Species of Conservation Concern Sensitivity Index (SCCSIS) has been developed to provide an indication of the potential faunal SCC that could reside in the area, while simultaneously providing a quantitative measure of the study areas value in terms of conserving faunal diversity. The SCCSIS is based on the principles that when the knowledge of the specie's historical distribution is combined with a field assessment that identifies the degree to which the property supports a certain species habitat and food requirements, inferences can be made about the chances of that particular species residing on the property. Repeating this procedure for all the potential faunal SCC of the area and collating this information then provides a sensitivity measure of



the study area that has been investigated. The detailed methodology to determine the SCCSIS of the study area is presented below:

Probability of Occurrence (POC): Known distribution range (D), habitat suitability of the site (H) and availability of food sources (F) on site were determined for each of the species. Each of these variables is expressed a percentage (where 100% is a perfect score). The average of these scores provided a Probability of Occurrence (POC) score for each species. The POC value was categorised as follows:

- **0-20%** = **Low;**
- **21-40%** = **Low to Medium;**
- **41-60%** = **Medium;**
- **61-80%** = **Medium to High and**
- **81-100%** = **High**
- POC** = **(D+H+F)/3**

Total Species Score (TSS): Species with a POC of more than 60% (High-medium) were considered when applying the SCCSIS. A weighting factor was assigned to the different International Union for the Conservation of Nature (IUCN) categories providing species with a higher conservation status, a higher score. This weighting factor was then multiplied with the POC to calculate the total species score (TSS) for each species. The weighting as assigned to the various categories is as follows:

- **Data Deficient** = **0.2;**
- **Rare** = **0.5;**
- **Near Threatened** = **0.7;**
- **Vulnerable** = **1.2;**
- **Endangered** = **1.7 and**
- **Critically Endangered** = **2.0.**

$$\text{TSS} = (\text{IUCN weighting} * \text{POC}) \text{ where POC} > 60\%$$

Average Total Species Score (Ave TSS) and Threatened Taxa Score (Ave TT): The average of all TSS potentially occurring on the site is calculated. The average of all the Threatened taxa (TT) (*Near threatened, Vulnerable, Endangered and Critically Endangered*) TSS scores are also calculated. The average of these two scores (Ave TSS and Ave TT) was then calculated in order to add more weight to threatened taxa with POC higher than 60%.

$$\text{Ave} = \text{Ave TSS} [\text{TSS}/\text{No of Spp}] + \text{Ave TT} [\text{TT TSS}/\text{No of Spp}]/2$$

SCCSIS: The average score obtained above and the sum of the percentage of species with a POC of 60% or higher of the total number of SCC listed for the area was then calculated. The average of these two scores, expressed as a percentage, gives the SCCSIS for the area investigated.

$$\text{SCCSIS} = \text{Ave} + [\text{Spp with POC} > 60\% / \text{Total no Of Spp} * 100] / 2$$

SCCSIS interpretation:

Table A: SCCSIS value interpretation with regards to SCC importance within the study area.

SCCSIS Score	SCC importance
0-20%	Low
21-40%	Low-Medium
41-60%	Medium
60-80%	High-Medium
81-100%	High

A-5 Impact Assessment Methodology for EIAs - Instructions to Specialists

The significance of all potential impacts that would result from the proposed project is determined in order to assist decision-makers. The significance rating of impacts is considered by decision-makers, as shown below.



- **INSIGNIFICANT**: the potential impact is negligible and **will not** have an influence on the decision regarding the proposed activity.
- **VERY LOW**: the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity.
- **LOW**: the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity.
- **MEDIUM**: the potential impact **should** influence the decision regarding the proposed activity.
- **HIGH**: the potential impact **will** affect a decision regarding the proposed activity.
- **VERY HIGH**: The proposed activity should only be approved under special circumstances.

The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The significance of each identified impact¹⁴ must be rated according to the methodology set out below:

Step 1 – Determine the **consequence** rating for the impact by determining the score for each of the three criteria (A-C) listed below and then **adding** them¹⁵. The rationale for assigning a specific rating, and comments on the degree to which the impact may cause irreplaceable loss of resources and be irreversible, must be included in the narrative accompanying the impact rating:

Rating	Definition of Rating	Score
A. Extent – the area over which the impact will be experienced		
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3
B. Intensity – the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. Duration – the timeframe over which the impact will be experienced and its reversibility		
Short-term	Up to 2 years (i.e. reversible impact)	1
Medium-term	2 to 15 years (i.e. reversible impact)	2
Long-term	More than 15 years (state whether impact is irreversible)	3

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Combined Score (A+B+C)	3 – 4	5	6	7	8 – 9
Consequence Rating	Very low	Low	Medium	High	Very high

Example 1:

Extent	Intensity	Duration	Consequence
Regional 2	Medium 2	Long-term 3	High 7

¹⁴ This does not apply to minor impacts which can be logically grouped into a single assessment.

¹⁵ Please note that specialists are welcome to discuss the rating definitions as they apply to their study with the EIA team.



Step 2 – Assess the **probability** of the impact occurring according to the following definitions:

Probability – the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

Example 2:

Extent	Intensity	Duration	Consequence	Probability
Regional 2	Medium 2	Long-term 3	High 7	Probable

Step 3 – Determine the overall **significance** of the impact as a combination of the **consequence** and **probability** ratings, as set out below:

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	INSIGNIFICANT	INSIGNIFICANT	VERY LOW	VERY LOW
	Low	VERY LOW	VERY LOW	LOW	LOW
	Medium	LOW	LOW	MEDIUM	MEDIUM
	High	MEDIUM	MEDIUM	HIGH	HIGH
	Very High	HIGH	HIGH	VERY HIGH	VERY HIGH

Example 3:

Extent	Intensity	Duration	Consequence	Probability	Significance
Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH

Step 4 – Note the **status** of the impact (i.e. will the effect of the impact be negative or positive?)

Example 4:

Extent	Intensity	Duration	Consequence	Probability	Significance	Status
Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH	- ve

Step 5 – State your level of **confidence** in the assessment of the impact (high, medium or low).

Depending on the data available, you may feel more confident in the assessment of some impact than others. For example, if you are basing your assessment on extrapolated data, you may reduce the confidence level to low, noting that further groundtruthing is required to improve this.

Example 5:

Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH	- ve	High



Step 6 – Identify and describe practical **mitigation** and **optimisation** measures that can be implemented effectively to reduce or enhance the significance of the impact. Mitigation and optimisation measures must be described as either:

- **Essential:** best practice measures which must be implemented and are non-negotiable; and.
- **Best Practice:** recommended to comply with best practice, with adoption dependent on the proponent’s risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented.

Essential mitigation and optimisation measures must be inserted into the completed impact assessment table. The impact should be re-assessed with mitigation, by following Steps 1-5 again to demonstrate how the extent, intensity, duration and/or probability change after implementation of the proposed mitigation measures. *Best practice* measures must also be inserted into the impact assessment table, but not considered in the “with mitigation” impact significance rating.

Example 6: A completed impact assessment table

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH	- ve	High
Essential mitigation measures:								
<ul style="list-style-type: none"> • Xxx1 • Xxx2 • Xxx3 								
Best practice mitigation measures:								
<ul style="list-style-type: none"> • Yyy1 • Yyy2 								
With mitigation	Local 1	Low 1	Long-term 3	Low 5	Improbable	VERY LOW	- ve	High

Step 7 – Summarise all impact significance ratings as follows in your executive summary:

Impact	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Impact 1: XXXX	Medium	Improbable	LOW	-ve	High
With Mitigation	Low	Improbable	VERY LOW		High
Impact 2: XXXX	Very Low	Definite	VERY LOW	-ve	Medium
With Mitigation:	<i>Not applicable</i>				





environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

File Reference Number:	(For official use only) 12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

- (1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014; and
- (2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 921, 2013

PROJECT TITLE

EIA for the Proposed Used Nuclear Fuel Transient Interim Storage Facility at Koeberg Nuclear Power Station

Specialist:	SCIENTIFIS AGROLOGIC SERVICES	
Contact person:	Stellen van Staden	
Postal address:	P.O. BOX 751779 Gardenview	
Postal code:	2047	Cell: 083 415 2356
Telephone:	011 616 7893	Fax:
E-mail:	skp@sas.environmental.co.za	
Professional affiliation(s) (if any)	Pri Sci. Nat Reg no 400134/05	
Project Consultant:	SRK Consulting (South Africa) (Pty) Ltd	
Contact person:	Sharon Jones	
Postal address:	Postnet Suite #206, Private Bag X18, Rondebosch	
Postal code:	7701	Cell: 082 876 0638
Telephone:	021 659 3060	Fax: 021 685 7105
E-mail:	sjones@srk.co.za	

4.2 The specialist appointed in terms of the Regulations_

I, Stephan von Steden, declare that --

General declaration:

I act as the independent specialist in this application;

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 Act, Regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, Regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

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; and

I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Steden

Signature of the specialist:

Scientific Aquatic Services

Name of company (if applicable):

08/11/2016

Date: