FINAL

Terrestrial Biodiversity Specialist Assessment

CES

ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

PROPOSED DASSIESRIDGE BATTERY ENERGY STORAGE SYSTEM NEAR UITENHAGE, NELSON MANDELA BAY MUNICIPALITY, EASTERN CAPE PROVINCE

DEFF Reference Number: 14/12/16/3/3/2/1/2244

FINAL TERRESTRIAL BIODIVERSITY SPECIALIST ASSESSMENT

PREPARED FOR:

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A subsidiary of

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REVISIONS TRACKING TABLE

CES Report Revision and Tracking Schedule

Document Title:	Final Terrestrial Biodiversity Specialist Assessment for the proposed Dassiesridge Battery Energy Storage System near Uitenhage, Nelson Mandela Bay Municipality, Eastern Cape Province.		
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	FINAL TERRESTRIAL BIODIVERSITY SPECIALIST ASSESSMENT		

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Contents of the Specialist Report

The contents of this specialist report complies with the legislated requirements as described in the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020).

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN R. 320			SECTION OF REPORT
3.1	The Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:		
	3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page ii and Chapter 1
	3.1.2	A signed statement of independence by the specialist;	Section 1.2
	3.1.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 2.4
	3.1.4	A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Chapter 3
	3.1.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 2.4
	3.1.6	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 10.1.3
	3.1.7	Additional environmental impacts expected from the proposed development;	Chapter 9
	3.1.8	Any direct, indirect and cumulative impacts of the proposed development;	Chapter 9 and Section 10.1
	3.1.9	The degree to which the impacts and risks can be mitigated;	Chapter 9
	3.1.10	The degree to which the impacts and risks can be reversed;	
	3.1.11	The degree to which the impacts and risks can cause loss of irreplaceable resources;	
	3.1.12	Proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 10.2
	3.1.13	A motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a “low” terrestrial biodiversity sensitivity and that were not considered appropriate;	N/A
	3.1.14	A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Chapter 10
	3.1.15	Any conditions to which this statement is subjected.	Section 10.2
3.2	The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.		✓
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.		Refer to Section1.2

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LIST OF ACRONYMS AND ABBREVIATIONS

ADU	Animal Demography Unit
BA	Basic Assessment
BAR	Basic Assessment Report
BESS	Battery Energy Storage System
BSP	Biodiversity Spatial Plan
CARA	Conservation of Agricultural Resource Act
CBA	Critical Biodiversity Area
CESA	Critical Ecosystem Support Area
CITES	Convention on International Trade in Endangered Species
CR	Critically Endangered
DAFF	Department of Agriculture, Forestry and Fisheries
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DEFF	Department of Environmental Affairs, Forestry and Fisheries
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner

ECBCP	Eastern Cape Biodiversity Conservation Plan
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GIS	Geographical Information System
GN	Government Notice
Ha	Hectares
IBA	Important Bird Area
IUCN	International Union for Conservation of Nature
LC	Least Concern
LM	Local Municipality
NBA	National Biodiversity Assessment
NBF	National Biodiversity Framework
NBSAP	National Biodiversity Strategy and Action Plan
NEMA	National Environmental Management Act
NEM:BA	National Environmental Management: Biodiversity Act
NEM:PAA	National Environmental Management: Protected Areas Act
NFA	National Forest Act
NFEPA	National Freshwater Ecosystem Priority Areas
NMBM	Nelson Mandela Bay Municipality
NPAES	National Protected Areas Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PA	Protected Area
PNCO	Provincial Nature Conservation Ordinance
POSA	Plants of Southern Africa
PPP	Public Participation Process
SANBI	South African National Biodiversity Institute
SANLC	South African National Land-Cover
SCC	Species of Conservation Concern
TOPS	Threatened or Protected Species
VU	Vulnerable
WEF	Wind Energy Facility
WMA	Water Management Area
WUA	Water Use Authorisation

1 PROJECT TEAM

1.1 DETAILS AND EXPERTISE OF THE SPECIALISTS

Ms Nicole Wienand (*Role: Junior Botanical Specialist and Report Writer*)

Ms Nicole Wienand is an Environmental Consultant based in the Port Elizabeth branch. Nicole obtained her BSc Honours in Botany (Environmental Management) from Nelson Mandela University (NMU) in December 2018. She also holds a BSc Degree in Environmental Management (Cum Laude) from NMU. Nicole's honours project focused on the composition of subtidal marine benthic communities on warm temperate reefs off the coast of Port Elizabeth and for her undergraduate project she investigated dune movement in Sardinia Bay. Nicole's key interests include marine ecology, botanical specialist assessments, GIS Mapping, the general EIA process, Public Participation Process (PPP) and Ecological Impact Assessments. Since her appointment with CES in January 2019, Nicole has undertaken a number of Ecological Impact Assessments under the guidance of Dr Greer Hawley and Ms Tarryn Martin.

Ms Tarryn Martin *(Role: Report Review and Signoff)*

Tarryn (**SACNASP Registration No**. 400018/14) holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C_3 and C_4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa. Tarryn specialises in conducting vegetation assessments in South Africa, Mozambique and other African countries. These assessments are often to IFC standards, specifically Performance Standard 6. Tarryn has also undertaken critical habitat assessments for areas requiring biodiversity offsets. Other botanical related work includes, developing alien management plans and biodiversity management and monitoring plans.

1.2 DECLARATION

Role on Study Team	Declaration of independence
Report production	• I, Nicole Wienand, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017; • 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 report 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.  20 October 2020 …….. ……. SIGNED DATE
Report Reviewer & Final Sign-off	• I, Tarryn Martin, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017; • 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 report 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.  20 October 2020 …….. ……. SIGNED DATE

2. INTRODUCTION

2.1 PROJECT DESCRIPTION AND LOCATION

Dassiesridge Wind Power (Pty) Ltd. is proposing the construction of a Battery Energy Storage System (BESS). The Dassiesridge BESS is proposed within the authorised Dassiesridge Wind Energy Facility (WEF) project site on the Grassridge Farm 187 near Uitenhage in the Nelson Mandela Bay Municipality (NMBM), Eastern Cape Province (Figure 2.2).

Table 2.1: 21-Digit Surveyor General (SG) Codes of the affected properties.

FARM NAME	21 DIGIT SG NUMBER	PORTION/FARM NO.	LOCAL MUNICIPALITY
Grassridge	C07600000000018700000	Farm 187	Nelson Mandela Bay Municipality

Figure 2.1: Google Earth Image of the Proposed Dassiesridge BESS (yellow polygon) and corner points (red points). The area covered by the polygon is 11-ha in extent.

Table 2.2: Corner Point Coordinates of the proposed Dassiesridge BESS Study Area.

NO. IN FIGURE 2.1	CORNER POINT COORDINATES (DEGREES, DECIMAL MINUTES)	
1.	33° 34.658'S	25° 28.119'E
2.	33° 34.778'S	25° 28.295'E
3.	33° 34.908'S	25° 28.169'E
4.	33° 34.790'S	25° 27.991'E

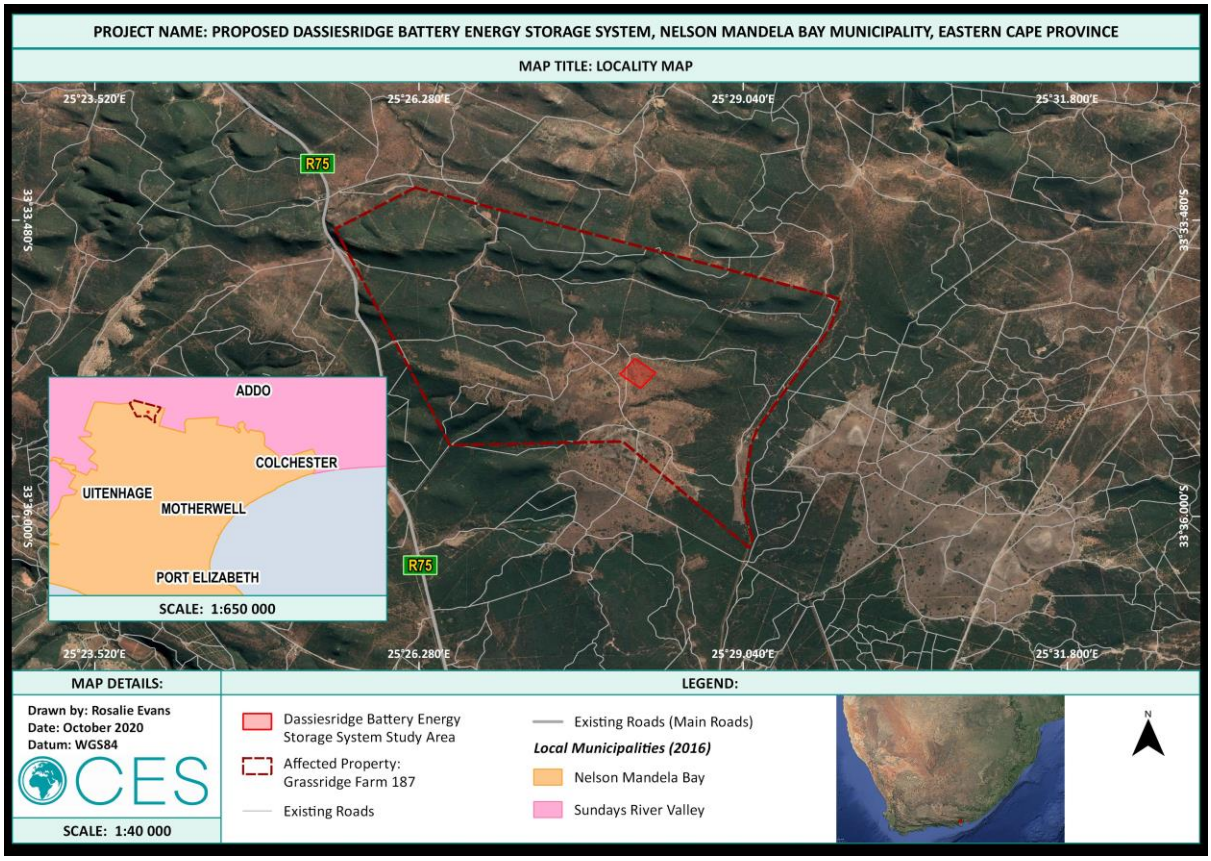

Figure 2.2: Locality Map of the Proposed Dassiesridge BESS Study Area.

The proposed Dassiesridge BESS will consist of the following (see generic design drawings in Figure 2.4 and 2.5):

- → The proposed Dassiesridge BESS will cover an area of a maximum of four **hectares** (4-ha), contained within the eleven hectares (11-ha) study area (see red shaded area in Figure 2.2 – within the maroon outlined Grassridge Farm 187). The exact location of the 4-ha Dassiesridge BESS, within the 11-ha study area, will be informed by the specialist studies.
- → The Battery Storage Facility will comprise of the following:
  - Up to 115 containers (each up to 40 m^2), each with a capacity of up to 5 megawatt hours (MWh) and on a concrete platform. These will house the batteries, management system and auxiliaries.
  - Up to 60 transformer stations (up to 35 m^2 each);
  - Up to an additional 10 m^2 per container for cooling units;
  - Internal access roads up to 8 m wide between rows of containers (Existing roads will be used as far as possible. However, where required, internal access roads will be constructed);
  - Medium voltage cabling between containers and the switching station of up to 33 kilovolts (kV); and
  - 33 kV powerlines to connect the facility to the electrical grid (approximately 1 km).
- → Temporary infrastructure including a site camp and a laydown area of approximately 0.3 ha.
- → The proposed Dassiesridge BESS will connect to the authorised Dassiesridge WEF onsite substation.

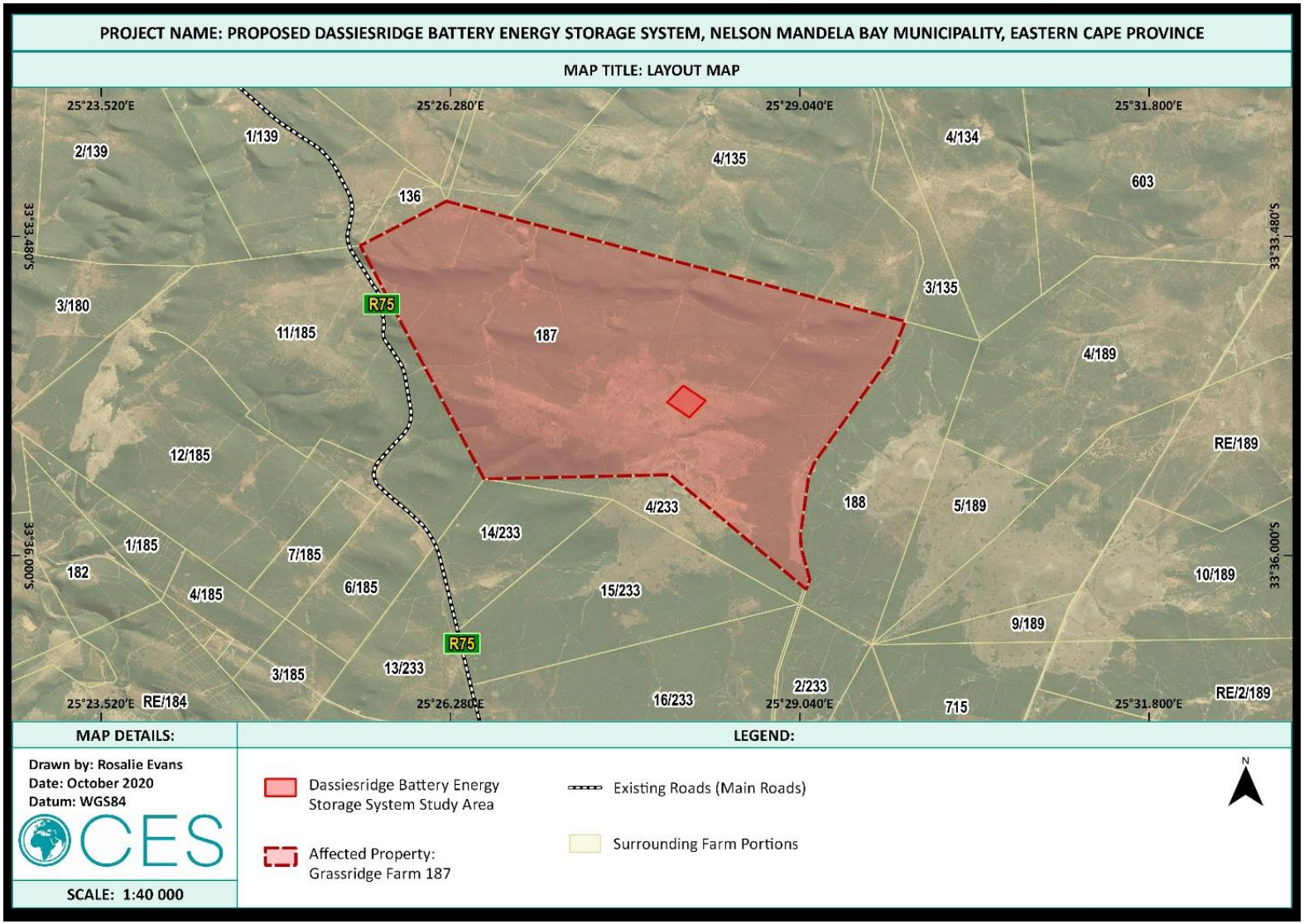

Figure 2.3: Layout Map of the proposed Dassiesridge BESS Study Area. The red polygon (box) within the farm portion is 11-ha in size. Only 4-ha within this area will be used for the BESS.

Figure 2.4: Generic Site Layout Schematic Example (1).

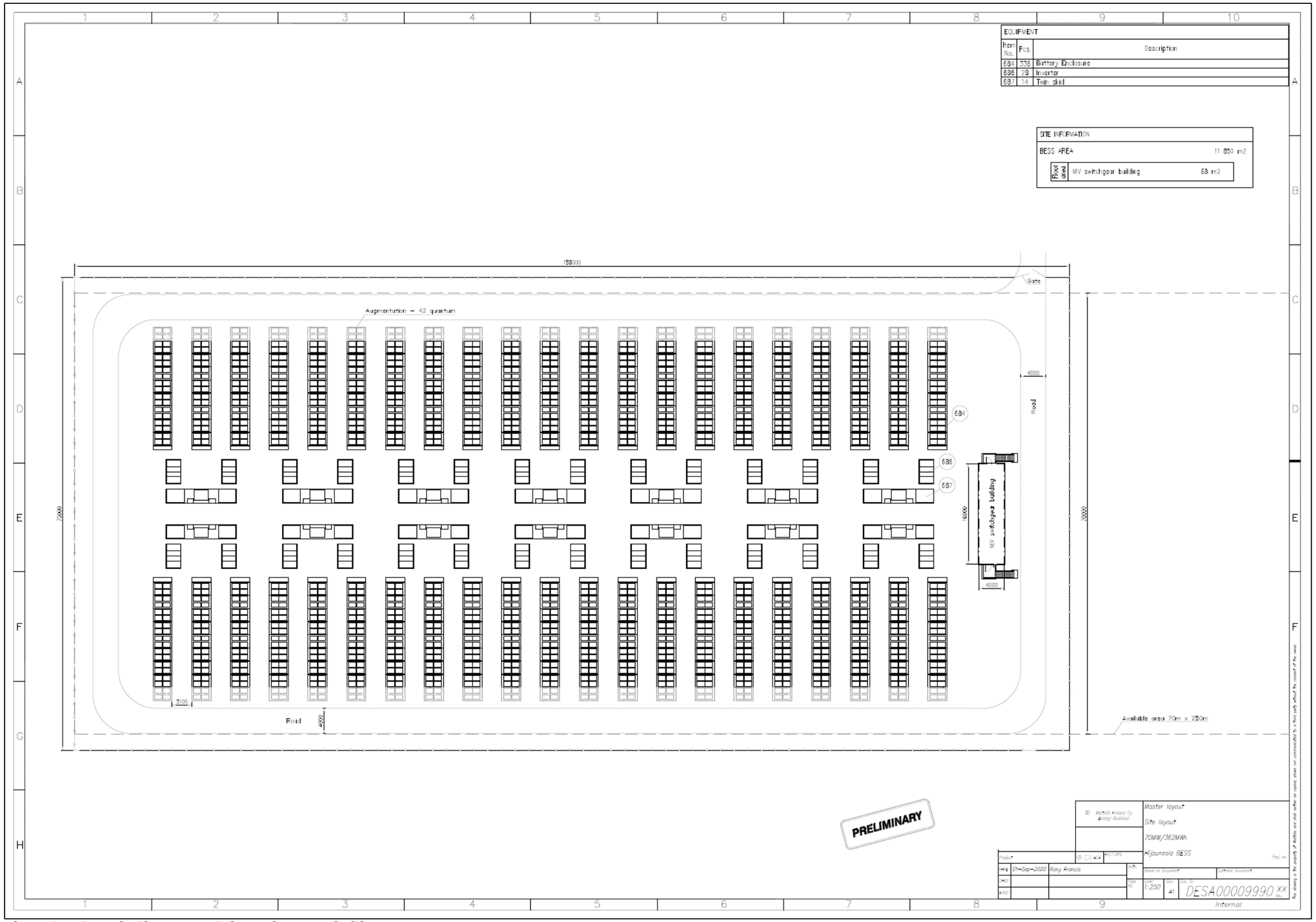

Figure 2.5: Generic Site Layout Schematic Example (2).

The proposed development triggers the need for a Basic Assessment (BA) Process as per the National Environmental Management Act (NEMA) (Act No. 107 of 1998 and subsequent amendments) Environmental Impact Assessment (EIA) Regulations (2014 and subsequent 2017 amendments). CES has been appointed by the Proponent to undertake the required application for Environmental Authorisation (EA) in terms of the above-mentioned regulations by means of conducting a BA Process, inclusive of the relevant specialist studies.

2.2 Site Sensitivity Verification and Minimum Report Content Requirements

In terms of the Protocol for the Specialist Assessment and Minimum Reporting Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020), prior to the commencement of a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool, must be confirmed by undertaking a site sensitivity verification. The results of the screening tool, together with the site sensitivity verification, ultimately determines the minimum report content requirements.

According to the results of the Screening Report generated for the proposed Dassiesridge BESS site, the relative terrestrial biodiversity theme sensitivity is classified as VERY HIGH due to the site occurring within a Critical Biodiversity Area (CBA) (ECBCP, 2007). CBAs are terrestrial and aquatic features in the landscape that are critical for the conservation of biodiversity and the maintenance of ecosystem functioning. The preliminary desktop assessment of the site, together with the site visit conducted on the 13th of October, verified the findings of the Screening Report as the site, although invaded and over grazed in areas, still boasts indigenous vegetation and supports valuable ecological process critical for the provision of ecosystem services. According to Section 3 (1) of GN R. 320, '*an applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being of "very high sensitivity" for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment'*.

Due to the high sensitivity rating of the site, a full **Terrestrial Biodiversity Specialist Assessment** (this report) has been undertaken as part of the BA Process for the proposed Dassiesridge BESS.

2.3 Objectives and Terms of Reference

The main objective of this report is to determine the baseline terrestrial ecological conditions of the study site and to assess the potential impacts the proposed development may have on the terrestrial habitat.

The following terms of reference were used for the objectives of this study:

- Describe the study site in terms of land cover and terrestrial habitat. This will include a desktop analysis of the fauna and flora.
- Review relevant legislation, policies, guidelines and standards.
- Conduct a site survey to determine the baseline ecological conditions of the study site. This will entail the identification of any Species of Conservation Concern (SCC), areas that may be susceptible to invasion by alien plant species, existing environmental degradation, and any environmentally sensitive aquatic aspects of the study site.
- Produce a sensitivity map that illustrates areas with significant development constraints.
- Describe the likely scope, scale and significance of direct and indirect positive and negative impacts resulting from the proposed development both in terms of the footprint and the immediate surrounding area during construction and operation, as well as the no-go option.
- Provide a detailed description of appropriate mitigation measures that could be adopted to reduce negative impacts for each phase of the project, where required.
- Based on the findings and outcomes of this report, make recommendations regarding the placement of the proposed 4-ha Dassiesridge BESS, within the 11-ha study area.
- Identify any need for future permitting. **[NB: It is not the purpose of the study to comply with or apply for any permitting requirements at this stage.]**

2.4 Assumptions and Limitations

This report is based on the information available at the time of compiling the report and, as a result, is subject to the following assumptions and limitations:

- The report is based on the project description and the layout provided to CES by the Proponent;
- Descriptions of the natural and social environments are based on limited fieldwork and available literature;
- The report is pre-dominantly based on a combination of desktop and on-site analysis, as well as the findings of the Ecological Impact Assessment conducted by CES (2014) for the Dassiesridge WEF;
- The site survey was conducted in Spring as this aided the identification of plant species. However, it should be noted that although dominant plant species were identified and recorded during the site survey, the plant species lists provided in this report (please see Appendix B) is based on the comprehensive floral survey conducted as part of the original Ecological Impact Assessment conducted by CES (2014) for the Dassiesridge WEF;

- Species of Conservation Concern (SCC) are difficult to find and identify, thus species described in this report do not comprise an exhaustive list. It is almost certain that additional SCC will be found during construction of the development. As such, should environmental authorisation for the proposed development be obtained, a comprehensive Floral Search and Rescue is recommended prior to vegetation clearance; and
- The information, as presented in this document, only has reference to the study site as indicated on the project maps. Therefore, this information cannot be applied to any other area without a detailed investigation being undertaken.

2.5 PUBLIC CONSULTATION

The Public Participation Process (PPP) followed to date has been described in detail in the Draft Basic Assessment Report (BAR). The Draft BAR, together with the Draft Terrestrial Biodiversity Specialist Assessment Report, were made available for a 30-day commenting and public review period. The Draft Terrestrial Biodiversity Specialist Assessment Report has been finalised subsequent to the 30-day commenting period.

3. ASSESSMENT METHODOLOGY

3.1 THE ASSESSMENT

The study site and surrounding areas were assessed using a two-phased approach. Firstly, a desktop and baseline assessment of the project area was conducted in terms of current vegetation classifications and biodiversity programmes and plans. Published literature on the ecology of the area was referenced in order to describe the study site in the context of the region and the Eastern Cape Province. The following documents/plans are referenced:

- South African Vegetation Map (SA VEGMAP) (Mucina *et al*., 2018);
- Council for Geoscience (2013);
- Soil and Terrain (SOTER) Database of South Africa (2008);
- Eastern Cape Biodiversity Conservation Plan (ECBCP, 2007 and 2019);
- Nelson Mandela Bay Municipality (NMBM) Metropolitan Open Space System (MOSS) (2009);
- The National Freshwater Ecosystem Priority Areas (NFEPA, 2011);
- The National Environmental Management: Biodiversity Act (NEMBA), 2004: List of Threatened Ecosystems (2011);
- National Biodiversity Management: Biodiversity Act (NEMBA) List of Threatened or Protected Species;
- The National Protected Areas Expansion Strategy (NPAES, 2010);
- Review of the SANBI Red Data List;
- Convention on International Trade in Endangered Species (CITES);
- The National Biodiversity Assessment (NBA) (SANBI, 2018);
- The Animal Demography Unit (ADU);
- International Union for Conservation of Nature (IUCN);
- Provincial Nature Conservation Ordinance (PNCO);
- Plants of Southern Africa (POSA) – Quarter degree square level;
- National Biodiversity Management: Biodiversity Act (NEMBA) List of Alien Invasive Vegetation; and
- Department of Agriculture, Forestry and Fisheries (DAFF) List of Protected Trees (2014).

In addition to the above, a site visit was conducted on the 13th of October 2020. The aim of the assessment was to assess the site-specific ecological conditions, identify areas of ecological importance and to evaluate these in terms of their conservation importance. In order to do so, the ecological sensitivity of the area was assessed and potential plant and animal Species of Conservation Concern (SCC) that may occur in habitats present in the area were identified. Ultimately, the ecological sensitivity of the site determined the minimum report content requirements for environmental impacts on the terrestrial biodiversity of the site.

Information on the general area and plant species was also generated using previous reports, including the original Ecological Impact Assessment undertaken by CES (2014), and historical records for the area. This information has been used to supplement the findings of this report.

3.2 Species of Conservation Concern (SCC)

Data on the known distribution and conservation status for each potential plant SCC was obtained in order to develop a list of SCC. In general, these will be species that are already known to be threatened or at risk and which will be most affected by the proposed activity. SCC have been selected for conservation/protection by means of a combination of applicable legislation, guidelines and conservation status lists. The following publications were utilised to cross reference conservation and protection statuses of various species:

- National Environmental Management: Biodiversity Act (No. 10 of 2004) - Chapter 4, Part 2 - Threatened and Protected Species (TOPS list);
- Endangered and Protected Flora in the 1974 Provincial Nature Conservation Ordinance (PNCO);
- 1976 List of Protected Trees (Government Gazette No. 9542 Schedule A) in the 1998 National Forest Act (NFA) as amended in November 2014; and
- SA Red Data List (http://redlist.sanbi.org).

The South African Red Data List of plants use the internationally recognised IUCN Red List Categories and Criteria to measure a species risk of extinction. The Red List of South African plants is used widely for conservation management and planning throughout South Africa.

Species that are afforded special protection and are protected by CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna) are also regarded as SCC (see http://www.cites.org/).

3.3 Sampling Protocol

The study area was visually surveyed to evaluate vegetation composition and to provide detailed information on the plant communities present. The aim of the site visit was to characterise and describe each vegetation community within the study site as well as identify areas of high sensitivity and SCC. Visible species within the study site were identified using plant identification guides and other published literature. Vegetation types within the study area were assessed and surveyed and vegetation communities were then described according to the dominant set of species recorded from each type. These were mapped and assigned a sensitivity score.

3.4 Vegetation Mapping

The revised SA VEGMAP (2018) was established in order to “provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before.” The map was developed using a wealth of data provided by a network of ecologists, biologists and conservation planners that make periodic contributions to the project. These contributions have allowed for the best national vegetation map to date, the last being that of Acocks developed over 50 years ago. The SANBI Vegetation map informs finer scale bioregional plans and includes an additional 47 new vegetation units since its refinement in 2012.

The SA VEGMAP project has two main aims:

1. To determine the variation in and units of Southern African vegetation based on the analysis and synthesis of data from vegetation studies throughout the region, and
2. To compile a vegetation map. The aim of the map was to accurately reflect the distribution and variation on the vegetation and indicate the relationship of the vegetation with the environment. For this reason, the collective expertise of vegetation scientists from various universities and state departments were harnessed to make this project as comprehensive as possible.

The map and accompanying book describes each vegetation type in detail, along with the most important species, including endemic species and those that are biogeographically important.

The SA VEGMAP is compared to actual conditions of vegetation observed onsite during the site assessment through mapping from aerial photographs, satellite images, literature descriptions (e.g. SANBI and ECBCP) and related data gathered on the ground.

3.5 SENSITIVITY ASSESSMENT

The approach used to determine the vegetation sensitivity of the study area is described below. Zones of low, moderate and highly sensitive areas were delineated according to a system developed by CES and used in numerous ecological studies. Ultimately sensitivity was determined based on the presence or lack of the following:

- Degree of disturbance and transformation;
- Presence of floral Species of Conservation Concern (SCC);
- Vegetation types (which also constitute faunal habitats) of conservation concern;
- Areas of high biodiversity as determined by species composition and community structure; and
- The presence of important process areas such as:
  - Ecological corridors
  - Topographical features (especially steep and rocky slopes that provide niche habitats for both plants and animals).

It must be noted that the sensitivity zonings in this study are based solely on ecological characteristics and social and economic factors have not been taken into consideration. The sensitivity analysis described here is based on twelve (12) criteria which are considered to be of importance in determining ecosystem and landscape sensitivity. The method predominantly involves identifying sensitive vegetation or habitat types, topography and land transformation, biodiversity patterns (hotspots) and biodiversity process areas (ecological infrastructure and corridors) (Table 3.1).

Although very simple, this method of analysis provides a good, yet conservative and precautionary assessment of the ecological sensitivity.

Table 3.1: Criteria used for the analysis of the sensitivity of the area.

CRITERIA		LOW SENSITIVITY	MODERATE SENSITIVITY	HIGH SENSITIVITY
1	**Topography**	Level or even	Undulating; fairly steep slopes	Complex and uneven with steep slopes
2	**Vegetation** - Extent or habitat type in the region	Extensive	Restricted to a particular region / zone	Restricted to a specific locality / site
3	**Conservation status** of fauna / flora or habitats	Well conserved independent of conservation value	Not well conserved, moderate conservation value	Not conserved - has a high conservation value
4	**Species of special concern** - Presence and number	None, although occasional regional endemics	No endangered or vulnerable species, some indeterminate or rare endemics	One or more endangered and vulnerable species, or more than 2 endemics or rare species
5	**Habitat fragmentation** leading to loss of viable populations	Extensive areas of preferred habitat present elsewhere in region not susceptible to fragmentation	Reasonably extensive areas of preferred habitat elsewhere and habitat susceptible to fragmentation	Limited areas of this habitat, susceptible to fragmentation
6	**Biodiversity** contribution	Low diversity or species richness	Moderate diversity, and moderately high species richness	High species diversity, complex plant and animal communities
7	**Erosion potential** or instability of the region	Very stable and an area not subjected to erosion	Some possibility of erosion or change due to episodic events	Large possibility of erosion, change to the site or destruction due to climatic or other factors
8	**Rehabilitation** potential of the area or region	Site is easily rehabilitated	There is some degree of difficulty in rehabilitation of the site	Site is difficult to rehabilitate due to the terrain, type of habitat or species required to reintroduce
9	**Disturbance** due to human habitation or other influences (alien invasive species)	Site is very disturbed or degraded	There is some degree of disturbance of the site	The site is hardly or very slightly impacted upon by human disturbance
10	**Ecological function** in the landscape (corridor, niche habitats)	Low ecological function. No corridors or niche habitats	N/A (There are NO moderate ecological functions. It is considered either high or low)	High ecological function. Portions of entire sections of the site contains corridors or niche habitats
11	**Ecological services** (food, water filter, grazing, etc.)	Low to no ecological services on site	Some sections of the site contains ecological services	Most of the site contains ecological services

CRITERIA		LOW SENSITIVITY	MODERATE SENSITIVITY	HIGH SENSITIVITY
12	**Aquatic environments** (Rivers, wetlands, drainage line etc)	Outside of the 32m watercourse buffer. Outside of the 500m wetland buffer	Within 32m of the watercourse. Within 500m of a natural wetland, but outside of 50m wetland buffer	Development within the watercourse.

A sensitivity map was developed with the aid of a satellite image so that the sensitive regions and vegetation types could be plotted (see Chapter 7).

3.6 Ecological Impact Assessment

3.6.1 Impact rating methodology

To ensure a balanced and objective approach to assessing the significance of potential impacts, a standardized rating scale was adopted which allows for the direct comparison of specialist studies. This rating scale has been developed in accordance with the requirements outlined in Appendix 1 of the NEMA EIA Regulations (2014 and subsequent 2017 amendments).

The details of this rating scale are included in Appendix D.

4. RELEVANT LEGISLATION

Environmental legislation relevant to the proposed development is summarised in Table 4.1 below. Biodiversity Plans and Programmes are discussed in Chapter 5 where they are used to describe the desktop ecological conditions of the study area.

Table 4.1: Environmental legislation considered in the preparation of the Terrestrial Biodiversity Specialist Assessment for the proposed Dassiesridge BESS.

LEGISLATION/POLICY	DESCRIPTION
The Constitution (Act 108 of 1996)	The Constitution of the Republic of South Africa is the supreme law of the land. As a result, all laws must conform to the Constitution. The Bill of Rights - Chapter 2 of the Constitution, includes an environmental right (Section 24) according to which, everyone has the right: *a) To an environment that is not harmful to their health or well-being; and* *b) To have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that:* *i. Prevent pollution and ecological degradation;* *ii. Promote conservation; and* iii. *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*
National Environmental Management Act (NEMA) (Act 108 of 1998), and its subsequent amendments. NEMA Amended EIA Regulations (GNR. 326) (2017)	Relevant Sections of the Act: Section 2, 23, 24, 24-1, 28-33 • Application of the NEMA principles (e.g. need to avoid or minimise impacts, use of the precautionary principle, polluter pays principle, etc.) • Application of fair decision-making and conflict management procedures are provided for in NEMA. • Application of the principles of Integrated Environmental Management and the consideration, investigation and assessment of the potential impact of existing and planned activities on the environment; socio-economic conditions; and the cultural heritage. NEMA introduces the duty of care concept, which is based on the policy of strict liability. This duty of care extends to the prevention, control and rehabilitation of significant pollution and environmental degradation. It also dictates a duty of care to address emergency incidents of pollution. A failure to perform this duty of care may lead to criminal prosecution and may lead to the prosecution of managers or directors of companies for the conduct of the legal persons. In addition, NEMA introduced a framework for environmental impact assessments, the Amended EIA Regulations (2017). The NEMA EIA Regulations aim to avoid detrimental environmental impacts through the regulation of specific activities that cannot commence without prior environmental authorisation. Authorisation either requires a Basic Assessment or a Full Scoping and Environmental Impact Assessment, depending on the type of activity. These assessments specify mitigation and management guidelines to minimise negative environmental impacts and optimise positive impacts.
National Environmental Management: Biodiversity Act (Act 10 of 2004), and its subsequent amendments.	The National Environmental Management: Biodiversity Act (NEMBA), No. 10 of 2004, aims to assist with the management and conservation of South Africa's biological diversity through the use of legislated planning tools. These planning tools include the declaration of bioregions and the associated bioregional plans as well as other mechanisms for managing and conserving biodiversity.

LEGISLATION/POLICY	DESCRIPTION
Threatened Ecosystems Threatened and Protected Species Alien Invasive Species Regulations, 2014.	The objectives of the Act include inter alia: To provide for: • The management and conservation of biological diversity within the Republic and of the components of such biological diversity; • The use of indigenous biological resources in a suitable manner; • The fair and equitable sharing of benefits arising from bioprospecting of genetic material derived from indigenous biological resources; and • To give effect to ratified international agreements relating to biodiversity which are binding on the Republic. • To provide for co-operative governance in biodiversity management and conservation; and • To provide for a South African National Biodiversity Institute to assist in achieving the objectives of the Act. In addition to this, Sections 50-62 of the Act provide details relating to the protection of threatened or protected ecosystems and species, while Sections 63-77 of the Act provide details relating to alien and invasive species with the purpose of preventing their introduction and spread, managing, controlling and eradicating of alien and invasive species. The NEMBA Alien and Invasive Species List (Government Notice 599 of 2014) lists Alien and Invasive species that are regulated by the NEMBA Alien and Invasive Species Regulations (Government Notice 98 of 2014).
Conservation of Agricultural Resources Act, (Act 43 of 1983).	The Conservation of Agricultural Resources Act, No. 43 of 1983 aims to control over-utilisation of the natural agricultural resources to promote the conservation of soil, water sources and vegetation through the combat of weeds and invader plants. Regulations 15 and 16 under this Act, which relate problem plants were amended in March 2001. *It should be noted that the CARA regulations for the legal obligations regarding alien invasive plants in South Africa have been superseded by the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations which was promulgated on 1 October 2014. However, CARA has not been repealed and is still included as a reference point to use in terms of the management of AIS where certain species may not be included in the NEM:BA AIS list.*
National Forest Act (Act 84 of 1998) and its subsequent amendments.	The NFA provides the legal framework for the protection and sustainable use of South Africa's indigenous forests. Any area that has vegetation which is characterised by a closed and contiguous canopy and under storey plant establishment is defined as a 'forest' and as a result falls under the authority of the Department of Environmental Affairs, Forestry and Fisheries (DEFF): Forestry sector.
National Water Act (Act 36 of 1998)	The purpose of this Act (Section 2) is to ensure that the Nation's water resources are protected, used, developed, conserved and controlled in ways that take into account, including: (a) Promoting sustainable use of water (b) Protection of aquatic and associated ecosystems and their biological diversity (c) Reducing and preventing pollution and degradation of water resources Protection of Water Resources (Sections 12-20) Provides details of measures intended to ensure the comprehensive protection of all water resources, including the water reserve and water quality.

LEGISLATION/POLICY	DESCRIPTION
	With respect to the establishment of water quality objectives, objectives may relate to (Section 13): • the presence and concentration of particular substances in the water • the characteristics and quality of the water resource and the in-stream and riparian habitat • the characteristics and distribution of aquatic biota • the regulation and prohibition of in-stream and land-based activities which may affect the quantity and quality of the water resources <u>Section 19 deals with Pollution Prevention (Part 4)</u> The person (including a municipality) who owns, controls occupies or uses the land in question, is responsible for taking reasonable measures to prevent pollution of water resources. If such measures are not taken, the catchment management agency concerned, may itself do whatever is necessary to prevent the pollution or remedy its effects and recover all reasonable costs from the persons responsible for the pollution. The 'reasonable measures' which have to be taken may include measures to: • Cease, modify or control any act or process causing the pollution; • Comply with any prescribed waste standard or management practice; • Contain or prevent the movement of pollutants; • Eliminate any source of the pollution; • Remedy the effects of the pollution; and • Remedy the effect of any disturbance to the bed and banks of a watercourse. With respect to pollution of rivers, the following definition is relevant when considering the potential impacts of development on water resources. Pollution may be deemed to occur when the following are affected: • the quality, pattern, timing, water level and assurance of instream flow; • the water quality, including the physical, chemical and biological characteristics of the water; • the character and condition of the in-stream and riparian habitat; • the characteristics, condition and distribution of the aquatic biota. The Act defines 'instream habitat' as including the physical structure of a watercourse and the associated vegetation in relation to the bed of the watercourse. <u>Riparian Ecosystems</u> 'Riparian habitat' includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species and physical structure distinct from those of adjacent land areas. <u>Section 21 deals with the Use of Water</u> Section 21 (a-k) describes activities defined as a water use under the Act. These activities may only be undertaken subject to the application for, and issue of, a water use licence.
National Environmental Management: Protected	The purpose of this Act is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological

LEGISLATION/POLICY	DESCRIPTION
Areas Amendment Act (No. 31 of 2004)	diversity and its natural landscapes and seascapes. The objectives of this Act are- • To provide, within the framework of national legislation, including the National Environmental Management Act, for the declaration and management of protected areas; • To provide for co-operative governance in the declaration and management of protected areas; • To effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity; • To provide for a representative network of protected areas on state land, private land and communal land; • To promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas; • To promote participation of local communities in the management of protected areas, where appropriate; and • To provide for the continued existence of South African National Parks.

5. DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT

5.1 CLIMATE

The information provided herewith is based on the climate data for Uitenhage – the nearest urban area in proximity to the project area. The climate of Uitenhage is classified as BSh (hot semi-arid) by Köppen and Geiger. The average annual temperature is 18.2°C, reaching an average maximum temperature in February (22.5°C), and an average minimum temperature in July (13.8°C). Uitenhage receives an average of around 427 mm of rainfall per annum, with most of the rainfall occurring in October (48 mm) (Climate-Data.org).

5.2 TOPOGRAPHY

The topography of the broader area is characterised by low to moderately undulating hills. The study site is situated at an altitude of approximately 300 m to 320 m above sea level, gently decreasing in elevation from the west to the east of the site. The average slope of the study site ranges from 0.1% to 2.4% (Figure 5.1 and Figure 5.2).

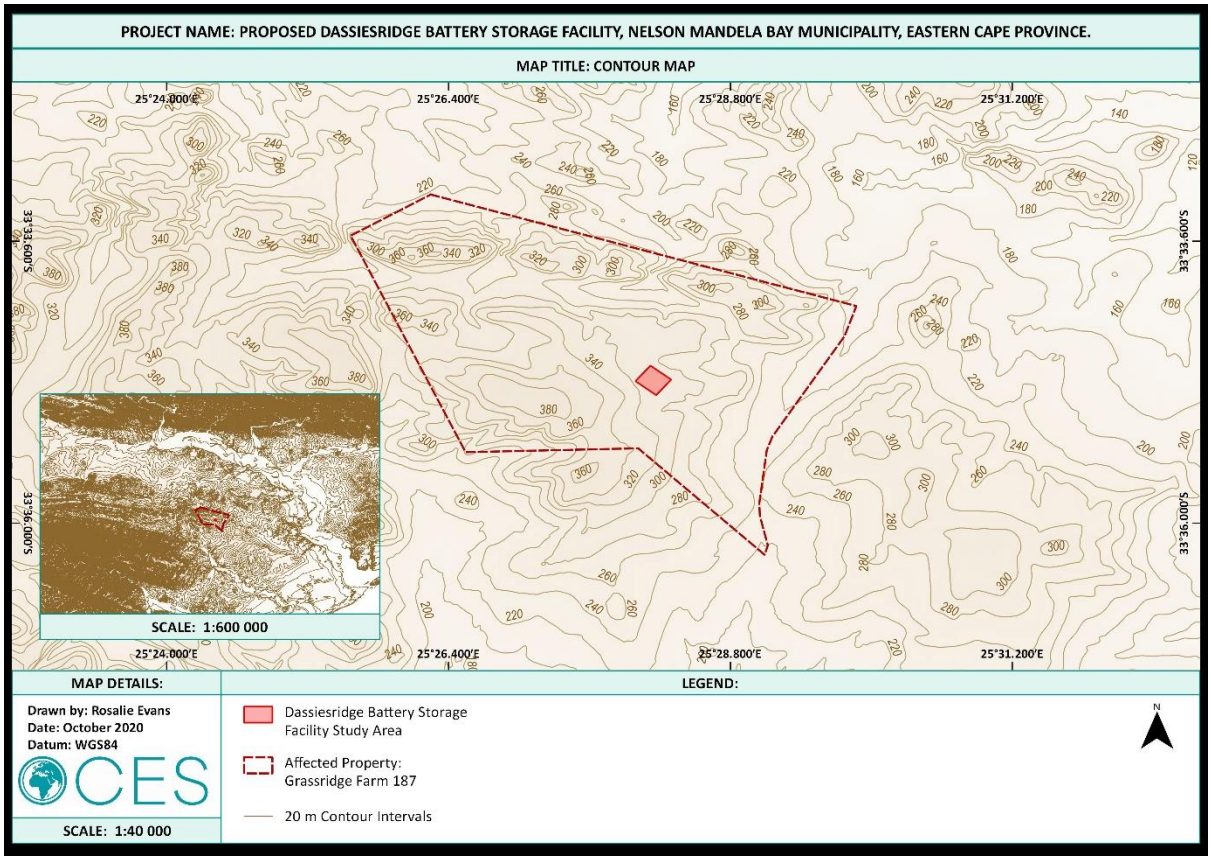

Figure 5.1 Contour Map of the study area.

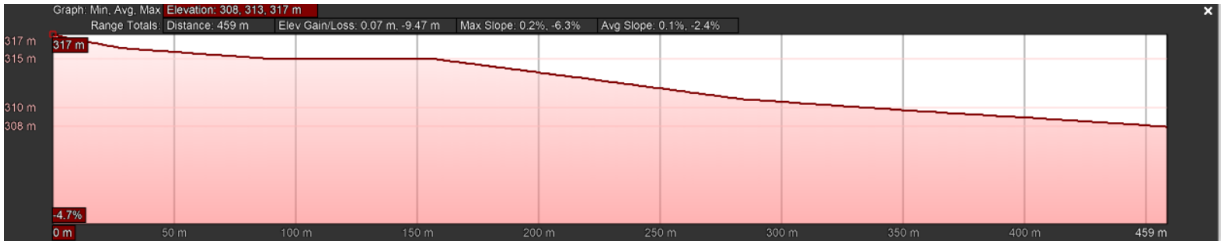

Figure 5.2: Elevation profile of the study site from west to east.

5.3 GEOLOGY AND SOILS

Vegetation types are influenced by a range of biotic and/or abiotic factors at different spatial and temporal scales, which together influence the distribution, composition, structure and diversity of plant communities (Rodrigues et al., 2016). Among the abiotic factors influencing vegetation types, topography (landform), geology, and soils are considered three of the major factors determining habitat heterogeneity and species diversity. The structure of the vegetation of the project area, Grassridge Bontveld (see Section 5.6.1), is greatly influenced by the underlying soils and geology. Grassridge Bontveld typically occurs on shallow clay, often lime-rich soil on the Bluewater Bay, Alexandria and Nanaga Formations. The characteristic thicket bushclumps form as a consequence of the weathering of the underlying geology, where the infiltration of surface and groundwater causes the dissolution of the underlying limestone, forming circular depressions known as dolines. These dolines trap windblown sediments resulting in a deeper soil depth in which thicket tree and shrub species thrive.

According to SOTER (1995), the soils within the study area are classified as Eutric Regosols (Figure 5.3). Regosols are typically 'young' soils with poorly developed horizons, except for an ochric (surface) horizon which is generally thin and low in organic matter. These soils are highly permeable and have a low water holding capacity making them unfavourable for agricultural purposes and sensitive to drought. Regosols are prone to erosion, particularly on sloping surfaces, and often form a hard surface crust during dry periods that prevents the infiltration of water and the emergence of seedlings. These soils are typically used for extensive grazing. The term 'eutric' refers to soils with a base saturation (in 1 M NH4OAc at pH 7.0) of 50% or more within 20-100 cm from the soil surface.

The geology underlying the study site consists of sedimentary deposits, including shallow marine siliciclastics such as shale and arenite, of the Ceres Subgroup (Bokkeveld Group) (Figure 5.4).

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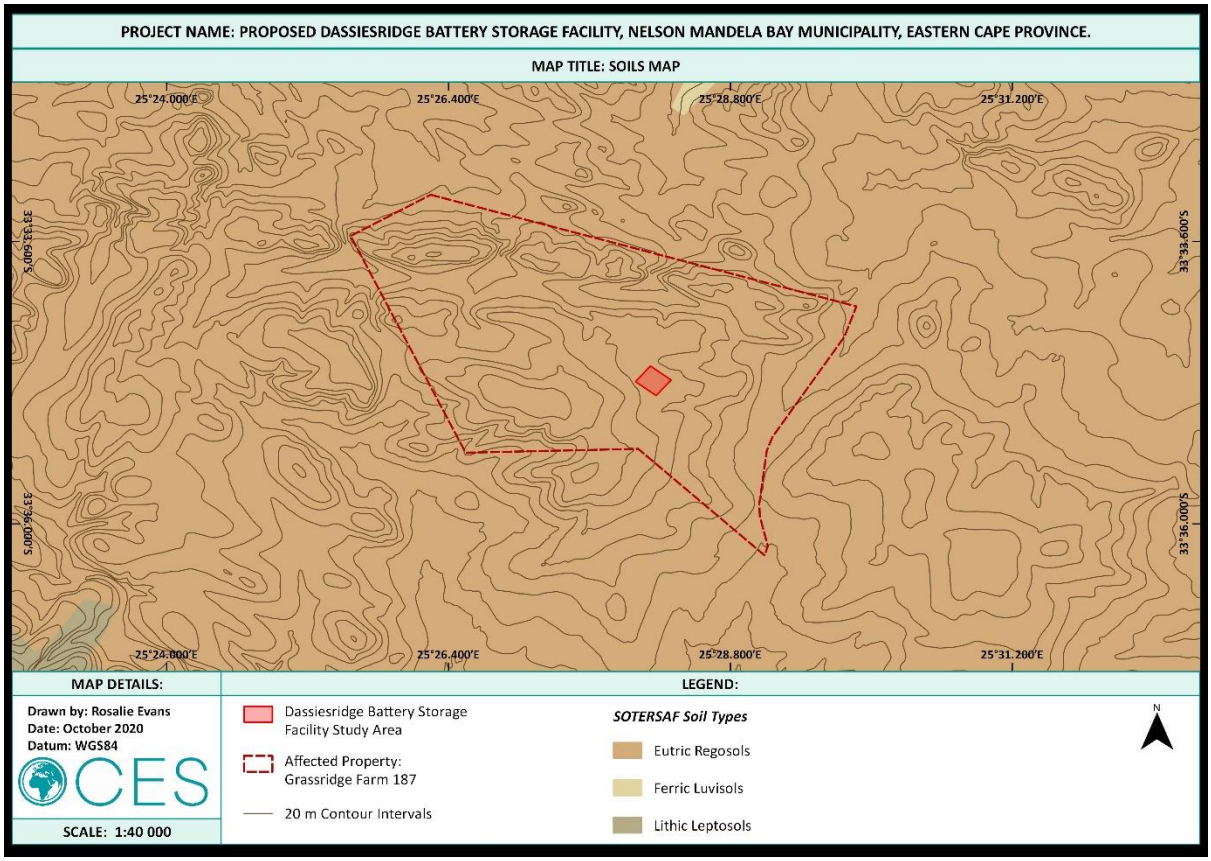

Figure 5.3: Soil Map of the study area.

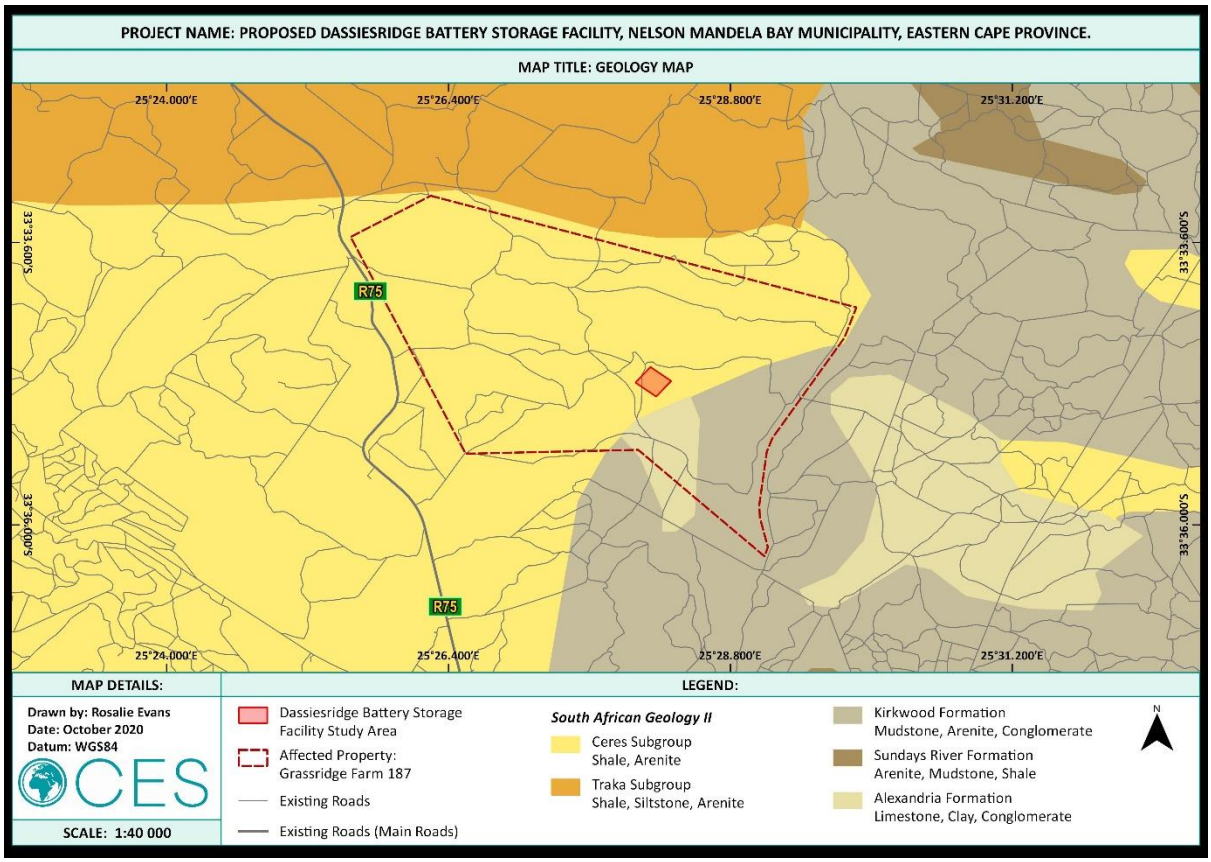

Figure 5.4: Geology Map of the study site.

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5.4 SURFACE WATER FEATURES

Figure 5.5 below illustrates the general hydrology of the area surrounding the study site. No NFEPA Rivers, NFEPA Wetlands, NBA (2018) wetlands or rivers, or tributaries (Figure 5.5 and Figure 5.6), traverse the study site. However, according to the DEFF Screening Report, the relative Aquatic Biodiversity Sensitivity of the study site is classified as VERY HIGH as the site falls within a strategic water source area.

The proposed development of the Dassiesridge BESS will directly impact the terrestrial habitat of Strategic Water Source Areas which could result in increased run-off, possible erosion and the loss of topsoil. However, it should be noted that the footprint of this site is small (only 4-ha) and located more than 100 m from surrounding drainage lines. Therefore, it is unlikely that the proposed development could impact on the water quality entering the nearby rivers or drainage lines.

The proposed Dassiesridge BESS falls within the N40E Quaternary Catchment of the Mzimvubu to the Tsitsikama Water Management Area (WMA 7).

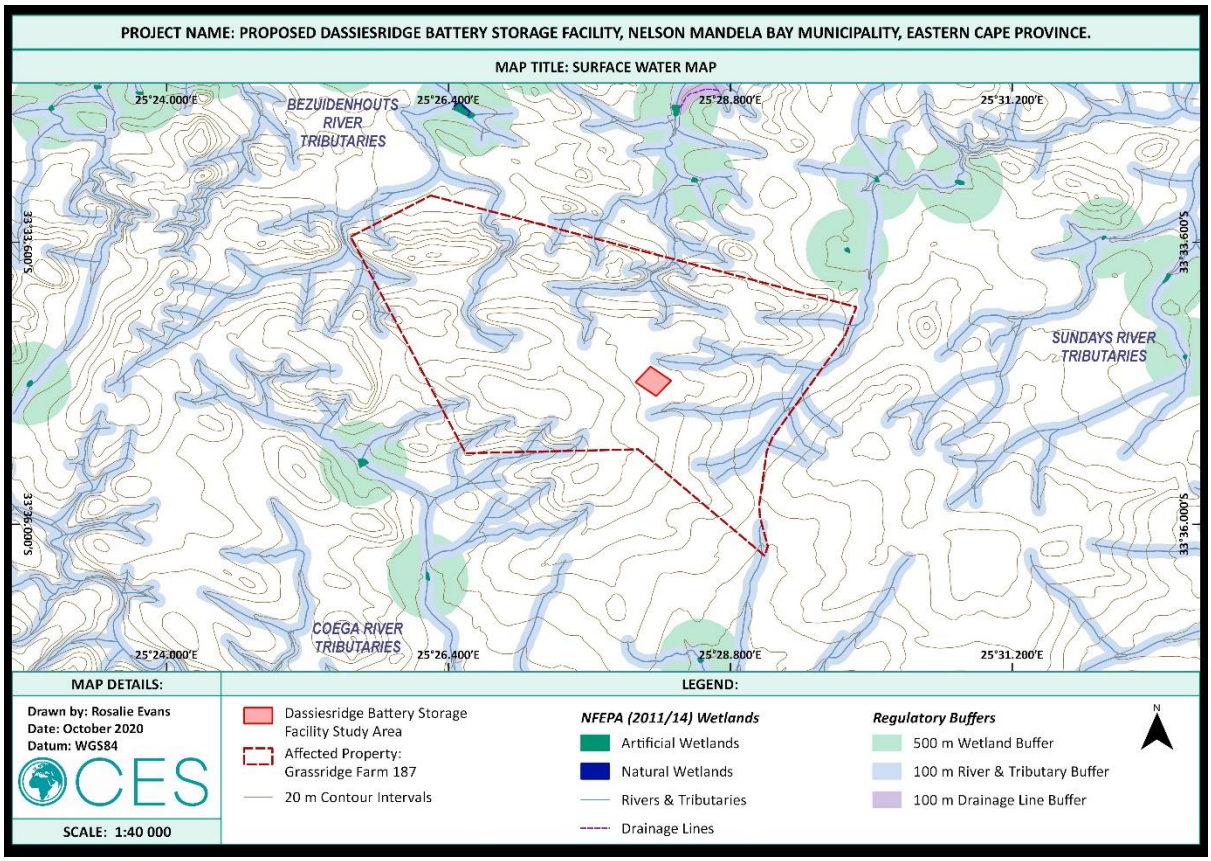

Figure 5.5: Surface water features within and surrounding the proposed study site.

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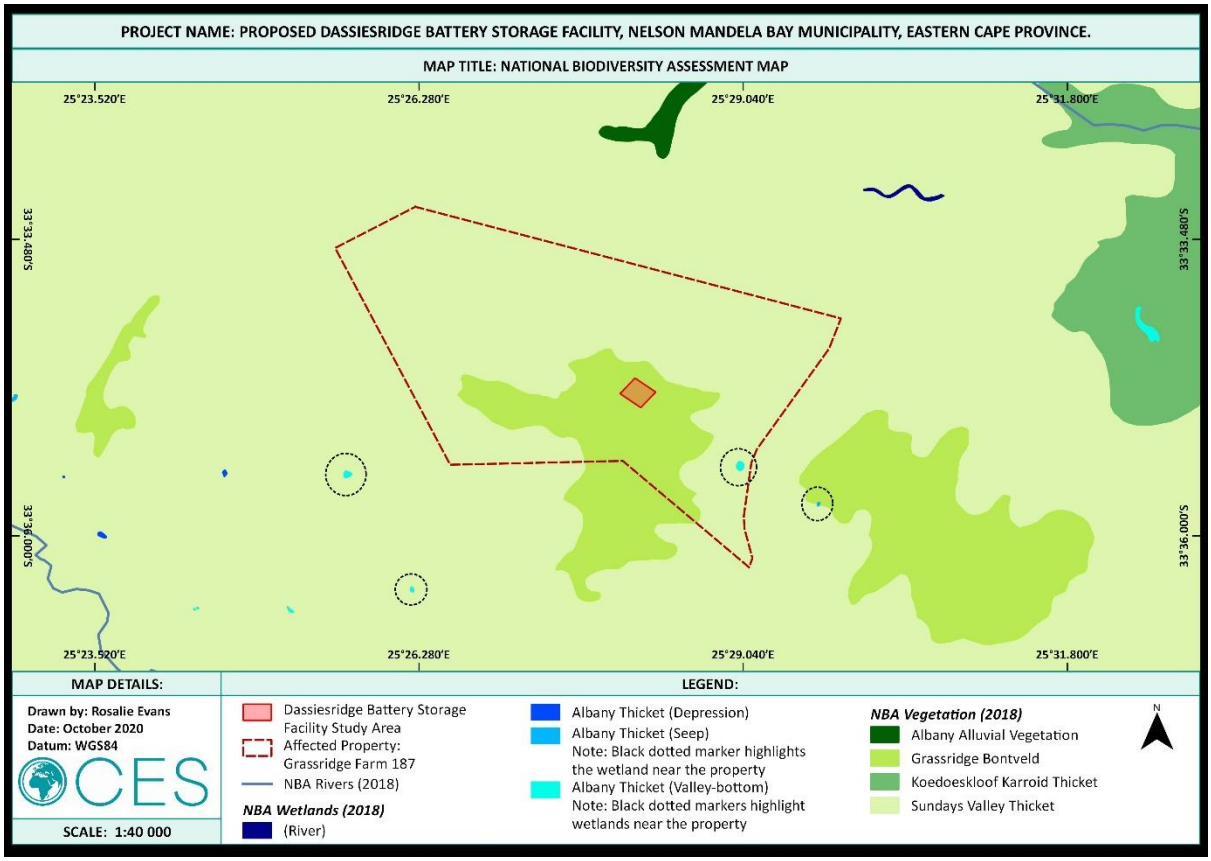

Figure 5.6: National Biodiversity Assessment (NBA, 2018) Map of the study site.

5.5 LAND COVER

Local

The NMBM (2009) Land-Cover (Figure 5.7) classifies the project area as *Donut*. Donut land uses are known as “natural areas/vacant land” or “no-man’s land” which has not yet been developed (CES, 2017).

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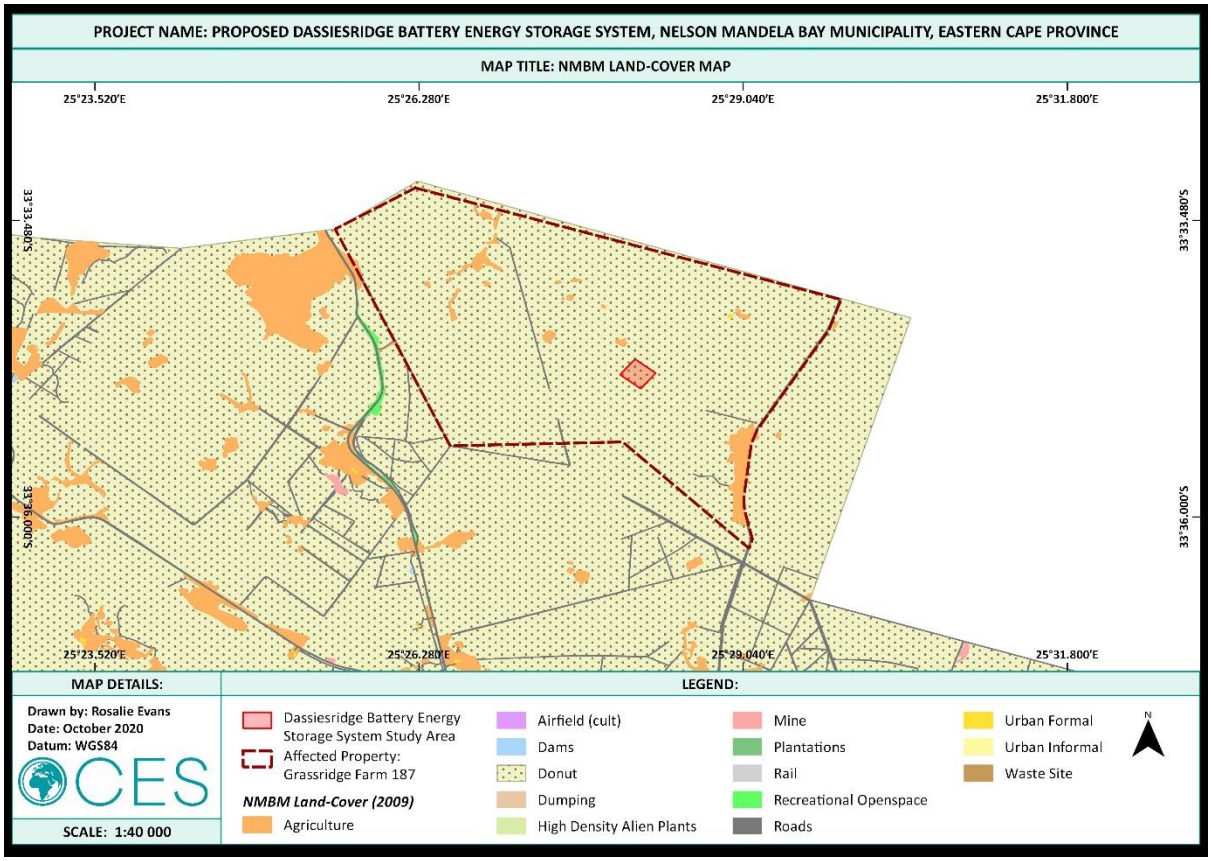

Figure 5.7: NMBM (2009) Land Cover Map of the project area.

National

According to the SA National Land-Cover Map (SANLC, 2018) the broader area surrounding the study site comprises mostly of *Dense Forest and Woodland* and *Natural Grassland* (Figure 5.8). This corresponds with the natural thicket and bontveld vegetation of the area (please refer to 5.6.1). The entire study site falls within the *Natural Grassland* land-cover class (Figure 5.8).

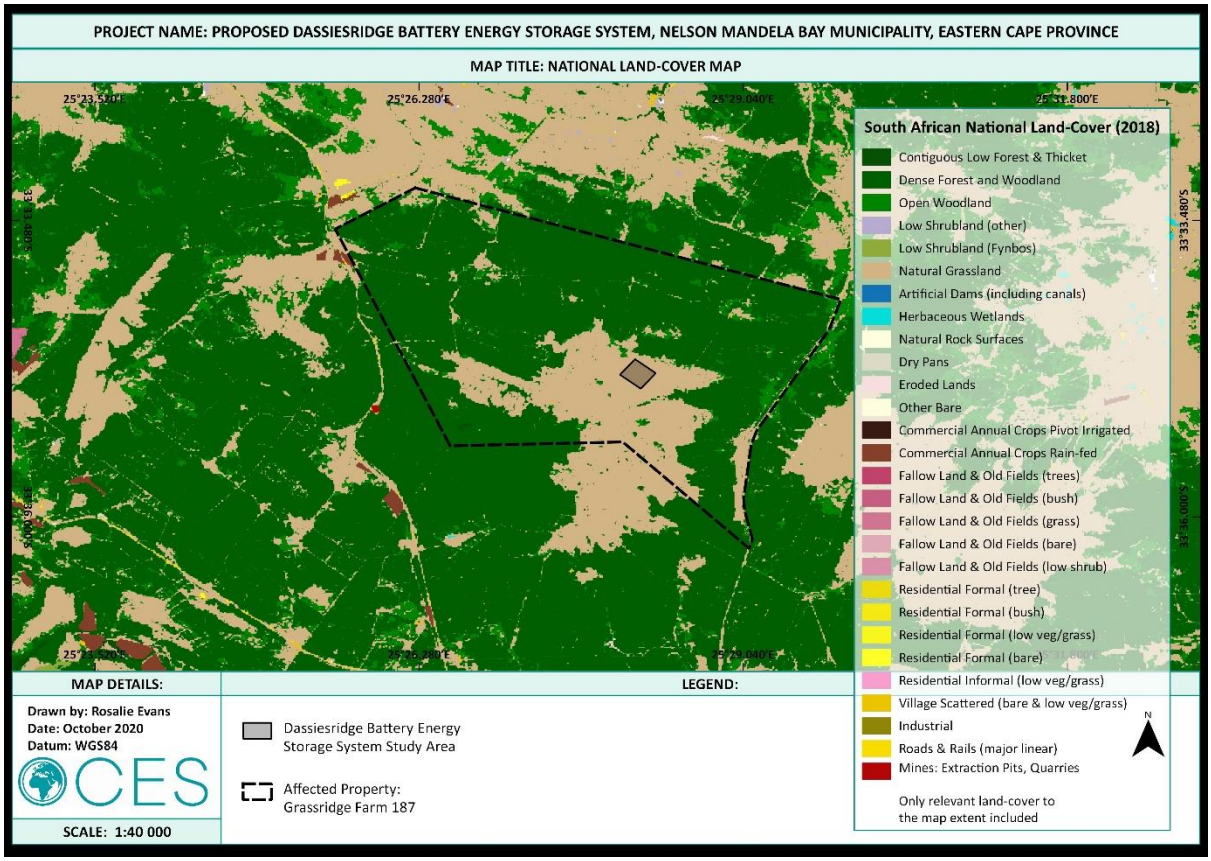

Figure 5.8: South African National Land-Cover (SANLC, 2018) Map of the project area.

5.6 VEGETATION AND FLORISTICS

5.6.1 SANBI Classification (Mucina *et al*., 2018)

The South African Vegetation Map (SA VEGMAP) of 2018 is an important resource for biodiversity monitoring and conservation management in South Africa. Under the custodianship of the South African National Biodiversity Institute (SANBI) the SA VEGMAP, (2018) was updated in order to 'provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before'. The map provides a detailed description of each of South Africa's unique vegetation types along with a comprehensive list of the important species associated with each, including endemic and biologically important species.

The Albany Thicket Biome

As per SANBI's National Vegetation Map (2018), the proposed study site falls within the Albany Thicket Biome (Mucina *et al.,* 2018). This species-rich, evergreen, scrubland covers an estimated 2.2% of South Africa's total land surface area, making it the smallest of South Africa's nine biomes. It occurs throughout most of the Eastern Cape Province, particularly in incised river valleys. The distribution and structure of this biome is influenced by a range of abiotic and biotic factors, including topography, aspect, geology, geomorphology, temperature rainfall and herbivory (CEN, 2019).

Despite its small surface area, this biome is of significant conservation importance due to its high species richness (Carvalho, 2018). The biome has the highest number of endemic species of all biomes in the Eastern Cape and forms the core of the Albany Centre of

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Endemism (CEN, 2019). Unfortunately, this biome has become highly fragmented due to clearing for cultivation and its poor ability to regenerate once disturbed (Mucina and Rutherford, 2012).

Grassridge Bontveld

According to the SA VEGMAP (2018), the vegetation type of the study site is Grassridge Bontveld (Figure 5.9). Grassridge Bontveld is a unique vegetation type that occurs exclusively in the Eastern Cape Province (Grobler *et al*., 2018) on flat topped ridges underlain by shallow soils and calcareous deposits (Meyer-Milne, 2013 in Carvalho, 2018). In fire prone ecosystems, thicket forms mosaics with grassland and/or savanna (CEN, 2019). Grassridge Bontveld is characterised by a matrix of low (0.2-0.8 m) grassy dwarf shrubland dominated by Fynbos, Grassland and Karroid elements, interspersed by thicket bushclumps of various sizes (Grobler *et al.,* 2018). The thicket bushclumps form as a consequence of the dissolution of the underlying calcrete which forms circular depressions known as dolines. Dolines accumulate windblown sediments and leaf litter, providing nutrient rich soils that retain moisture, providing ideal environments for the establishment of thicket species (Carvalho 2018).

Bontveld is typically associated with intact solid Sundays Valley Thicket or Kowie Thicket, with which busclumps share a number of common species. The sharing of thicket species between bushclumps and neighbouring intact, solid thicket is often described using the island biogeography theory. Carvalho (2018) found that the closer a bushclump is to neighbouring intact, solid thicket, the more similar the species composition will be. Species are transferred from intact solid thicket to bushclumps, or from bushclump to bushclump, via various dispersal methods, including zoochory (dispersal by birds and mammals) and autochory (self-dispersal). As such, the larger the bushclump, the greater the similarity of species composition to surrounding thicket, as larger bushclumps offer more resources, attracting foraging seed dispersers, thereby increasing the potential of seed dispersal between bushclumps (Carvalho 2018).

Bushclumps provide a microclimate ideal for the nursing of germinating seedlings, serving as species reservoirs for nearby thicket patches, thereby aiding the restoration of degraded bushclumps. It should be noted that most thicket species are long lived and reproduce via ramets, therefore restoration via germination is limited (Carvalho, 2018).

Key Ecological Drivers

Solid thicket usually occurs on valley bottoms and slopes protected from fire, while mosaic thickets (such as Grassridge Bontveld) typically occur on flat topped ridges and gentle slopes as thicket gives way to grassland or thornveld-type savanna. The distinction between Grassridge Bontveld and surrounding solid thicket types is driven mainly by substrate type but maintained by fire dynamics. Intense grazing by livestock and game can significantly reduce fuel loads, resulting in less intense, more slow-moving fires that allow the establishment and spread of thicket clumps. The probability and intensity of fire within mosaic thickets is also greatly influenced by alien invasive species and vegetation structure and composition (CEN, 2019).

In addition to fire, other ecological drivers maintaining ecosystem function and biodiversity patterns include (CEN, 2019):

- → Soil nutrient dynamics;
- → Seed dispersal;

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- → Topography, geology and soil type (also influence community composition and species distribution);
- → Spatial linkages to other vegetation types;
- → Herbivory; and
- → Climatic variability (thickets are resilient to droughts, floods and heat waves and therefore provide an important buffer for other vegetation types with which they are associated).

Conservation status and Ecosystem Protection Level

Grassridge Bontveld is classified as **Least Concern** (Skowno *et al*., 2019), with a Conservation Target of 19%. It is considered **Moderately Protected**, however, large areas have been degraded. According to Skowno *et al* (2019), the percentage decline of Grassridge Bontveld between 1990 to 2014 was 0.06%. The predicted percentage decline for the year 2040 is 3.06%. As of 2014, the dominant land cover types comprising Grassridge Bontveld included natural (90.4%), Croplands (3.3%), secondary (2.9%) and built areas (2.8%). As such, 9.53% of the area covered by this vegetation type has been transformed.

Portions of this vegetation type is conserved in the Addo Elephant National Park and the Kaapse Grysbok Private Nature Reserve (Grobler *et al.,* 2018). The rehabilitation potential of the surrounding grassland matrix is surprising achievable. However, rehabilitation and restoration of thicket bushclumps has proved less successful (Watson 2002 and De Kock, 2011 in Carvalho, 2018).

According to the Screening Report generated for the proposed site, the plant species sensitivity of the site is classified as low. Grobler *et al* (2018) lists the important taxa of Grassridge Bontveld vegetation that may be affected by the proposed development (Table 5.1).

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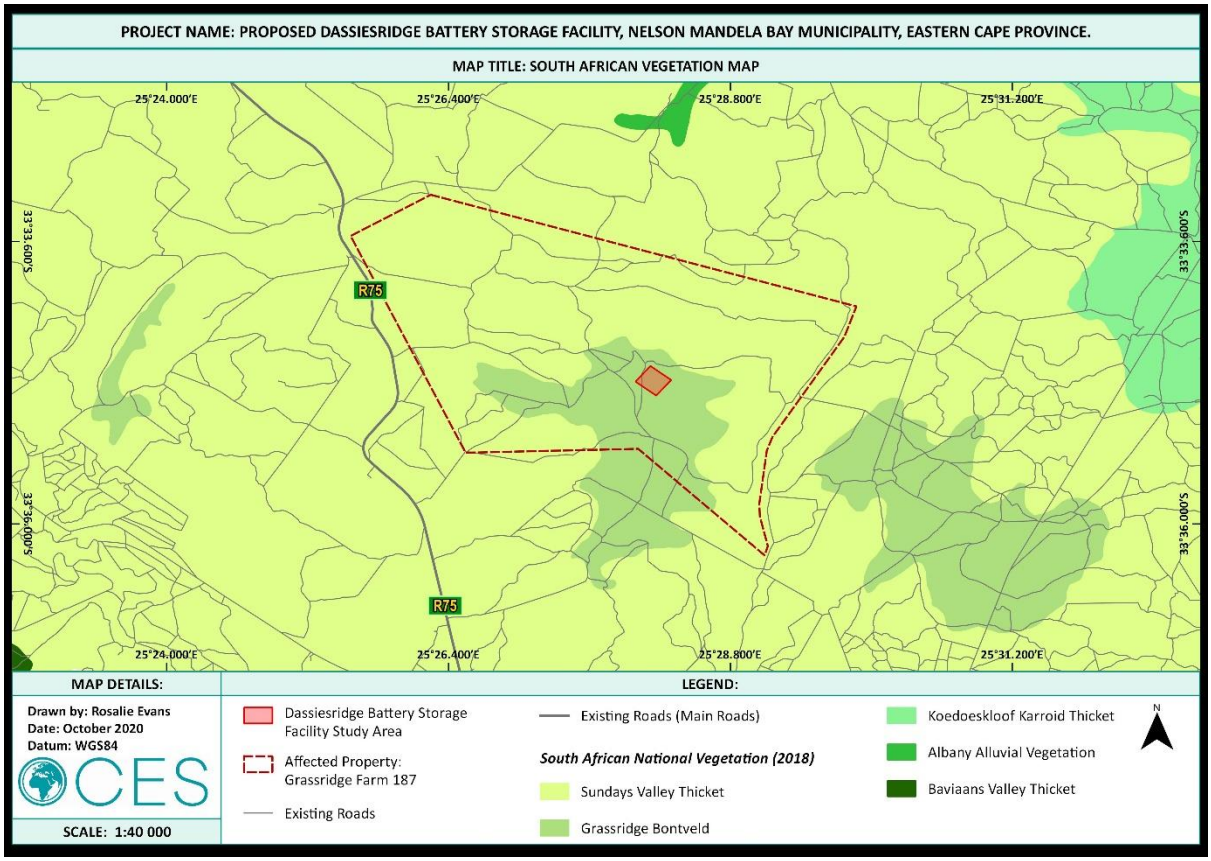

Figure 5.9: South African (2018) Vegetation Map of the project area.

Table 5.1: List of important taxa common to Grassridge Bontveld (Globler *et al*., 2018) (d=dominant, e=South African endemic, et=possibly endemic to a vegetation type).

Category	Dominant species
Small Tree	*Schotia afra* (d), *Sideroxylon inerme* (d)
Succulent Tree	*Aloe africana* (e), *Aloe ferox* (d)
Succulent Shrub	*Crassula expansa* (d), *Ruschia uncinata* (d), *Carpobrotus edulis, Crassula capitella, Crassula ericoides* (e), *Crassula perfoliata, Crassula perforata, Crassula tetragona* (e), *Euphorbia globosa* (e), *Rhombophyllum rhomboideum* (e)
Geophytic Herb	*Sansevieria hyacinthoides* (d), *Bulbine favosa, Bulbine inamarxiae, Moraea pallida, Oxalis smithiana, Ledebouria coriacea* (e)
Herb	*Aizoon rigidum* (d, e), *Chaenostoma campanulata* (d), *Gazania krebsiana* (d), *Hypoestes aristata* (d), *Indigastrum costatum subsp. macrum* (d), *Senecio burchellii* (d, e), *Arctotheca calendula, Berkheya heterophylla* (e), *Hibiscus pusillus, Lotononis glabra, Monsonia emarginata* (e), *Scabiosa albanensis* (e)
Low Shrub	*Helichrysum anomalum* (d), *Jamesbrittenia microphylla* (d, e), *Tephrosia capensis* (d), *Acmadenia obtusata* (e), *Agathosma capensis* (e), *Asparagus falcatus, Asparagus multiflorus* (e), *Asparagus striatus* (e), *Blepharis capensis* (e), *Chascanum cuneifolium* (e), *Clutia daphnoides* (e), *Dischoriste setigera, Disparago tortilis* (e), *Felicia muricata, Hermannia althaeoides* (e), *Hermannia flammea* (e), *Hermannia holosericea* (e), *Lantana rugosa, Limeum aethiopicum, Lobostemon trigonus* (e), *Muraltia squarrosa* (e), *Osteospermum polygaloides, Passerina rubra* (e), *Wahlenbergia tenella* (e), *Euryops ericifolius* (e), *Syncarpha recurvata* (d)
Leaf-succulent Dwarf Shrub	*Zygophyllum divaricatum* (e)
Semi-parasitic Shrub	*Colpoon compressum* (d)
Graminoid	*Aristida diffusa* (d), *Cynodon dactylon* (d), *Cynodon incompletus* (d), *Eustachys paspaloides* (d), *Heteropogon contortus* (d), *Panicum maximum* (d), *Setaria sphacelata* (d), *Stipa dregeana* (d), *Tenaxia disticha* (d), *Themeda triandra* (d), *Cymbopogon marginatus, Cymbopogon pospischilii, Digitaria argyrograpta, Digitaria natalensis, Ehrharta calycina, Ehrharta erecta, Eragrostis capensis, Eragrostis curvula, Eragrostis*

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	obtusa, Ficinia truncata (e), *Helictotrichon capense* (e), *Melica racemosa, Panicum deustum, Pentameris pallida, Sporobolus ioclados*
Tall Shrub	*Euclea undulata* (d), *Euclea racemosa* (d), *Carissa bispinosa subsp. bispinosa* (d), *Dovyalis caffra, Ehretia rigida, Euclea crispa, Gymnosporia capitata* (e), *Hippobromus pauciflorus, Maerua cafra, Mystroxylon aethiopicum subsp. aethiopicum* (d), *Pterocelastrus tricuspidatus* (d), *Putterlickia pyracantha* (d), *Scutia myrtina, Searsia lucida, Searsia pyroides, Searsia pterota* (d)
Herbaceous Climber	*Kedrostis nana, Pelargonium peltatum* (e)
Woody Climber	*Asparagus aethiopicus, Jasminum angulare, Rhoiacarpos capensis* (e), *Rhoicissus digitata*
Woody Succulent Climber	*Cynanchum viminale*

5.6.2 Plant Species of Conservation Concern

Plant species of conservation concern comprise those species that are either threatened (Critically Endangered, Endangered, Vulnerable), rare or declining. The South African National Biodiversity Institute (SANBI) Plants of Southern Africa (POSA) plant database (http://posa.sanbi.org) and the list of important taxa common to Grassridge Bontveld (Globler *et al*., 2018) was consulted, along with the categories indicated in the SANBI Threatened Species Programme website (http://redlist.sanbi.org/species.php?species) to identify potential species of conservation concern within the proposed development footprint (Table 5.2).

The following list of plant SCC that may ***potentially*** be found within the development footprint has been derived from current literature for possible vegetation found in the area as well as the South African Red Data List, DAFF protected trees, the Provincial Nature Conservation Ordinance (PNCO), NEM:BA List of Critically Endangered, Endangered, Vulnerable and Protected Species, and Mucina *et al.*, List of Endemic Taxa. A full list of plant species that were identified during the site survey can be found in Appendix B while the full list of the potential species that could occur within the project area are listed in Appendix A.

Table 5.2: Species of Conservation Concern that may occur within the proposed development footprint.

FAMILY	SPECIES	ECOLOGY	Conservation status	Presence confirmed
Fabaceae	*Aspalathus angustifolia*	Indigenous; Endemic	VU	NO
Zamiaceae	*Encephalartos horridus*	Indigenous; Endemic	EN	**YES**
Asphodelaceae	*Aloe bowiea*	Indigenous; Endemic	CR	NO
Aizoaceae	*Bergeranthus addoensis*	Indigenous; Endemic	VU	NO
Aizoaceae	*Orthopterum coegana*	Indigenous; Endemic	CR	NO
Aizoaceae	*Ruschia aristata*	Indigenous; Endemic	RARE	NO
Aizoaceae	*Mestoklema albanicum*	Indigenous; Endemic	NT	NO
Apocynaceae	*Huernia longii*	Indigenous; Endemic	RARE	NO
Apocynaceae	*Brachystelma cummingii*	Indigenous; Endemic	EN	NO
Apocynaceae	*Brachystelma schoenlandianum*	Indigenous; Endemic	EX	NO
Strelitziaceae	*Strelitzia juncea*	Indigenous; Endemic	VU	**YES**
Scrophulariaceae	*Selago zeyheri*	Indigenous; Endemic	VU	NO

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Iridaceae	*Tritonia dubia*	Indigenous; Endemic	NT	NO
Fabaceae	*Argyrolobium crassifolium*	Indigenous; Endemic	EN	NO
Fabaceae	*Lotononis monophylla*	Indigenous; Endemic	CR	NO
Fabaceae	*Indigofera tomentosa*	Indigenous; Endemic	NT	NO
Asteraceae	*Senecio scaposus var. addoensis*	Indigenous; Endemic	EN	NO
Asteraceae	*Euryops ericifolius*	Indigenous; Endemic	EN	**YES**
Rutaceae	*Agathosma stenopetala*	Indigenous; Endemic	VU	NO
Restionaceae	*Hypodiscus procurrens*	Indigenous	NT	NO
Plumbaginaceae	*Limonium linifolium*	Indigenous; Endemic	NT	NO

5.6.3 Forest Classification (NFA)

No natural forest, or forest patches, will be impacted by the proposed development.

5.7 BIODIVERSITY INDICATORS

South Africa's policy and legislative framework for biodiversity is well developed, providing a strong basis for the conservation and sustainable use of biodiversity. South Africa is one of the few countries in the world to have a Biodiversity Act and a National Biodiversity Institute.

Key components of the national policy and legislative framework for biodiversity include:

- The White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1997);
- The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA);
- NEMBA List of Ecosystems in need of Protection;
- NEMBA List of Threatened or Protected Species;
- NEMBA List of Alien Invasive Species;
- The National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEMPAA);
- The National Biodiversity Strategy and Action Plan (NBSAP) (2015);
- The National Biodiversity Assessment (NBA) (2018);
- The National Biodiversity Framework (2008) (NBF);
- The National Protected Area Expansion Strategy (2008) (NPAES); and
- Important Bird Areas (2015) (IBA).

In addition to national legislation, some of South Africa's nine provinces have their own provincial biodiversity legislation, as nature conservation is a concurrent function of national and provincial government in terms of the Constitution (Act 108 of 1996). The Eastern Cape Biodiversity Conservation Plan (ECBCP) covers the entire Eastern Cape Province.

5.7.1 Eastern Cape Biodiversity Conservation Plan (ECBCP, 2019) and the Nelson Mandela Bay Metropolitan Bioregional Plan (2009/14)

The ECBCP (2019) replaces the ECBCP (2007) in its entirety and provides a map of important biodiversity areas, outside of the Protected Areas network, which must be used to inform land use and resource-use planning and decision making. The objectives of the ECBCP (2019) are to:

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1) Identify the minimum spatial requirements needed to maintain a living landscape that continues to support all aspects of biodiversity and retain/maintain essential ecological infrastructure. This is achieved through the selection of areas, based on achieving targets, which represent important biodiversity pattern AND ecological processes;
2) Serve as the primary source of biodiversity information for land use planning and decision-making; and
3) Inform conservation and restoration action in important biodiversity areas.

The aim of the ECBCP (2019) was to map biodiversity priority areas through a systematic conservation planning process. The main outputs of the ECBCP include Protected Areas (PA), Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA), Other Natural Areas (ONA) and No Natural Habitat Remaining (NNR) for both terrestrial and aquatic ecosystems.

The ECBCP (2019), covers the NMBM in the Aquatic CBA layer but does not include the NMBM in the Terrestrial layer because the current NMBM Biodiversity Plan (2009/14) involved a fine scale biodiversity assessment, detailed expert input and stakeholder engagement, and is legally enforced and implemented by the responsible agencies (ECBCP, 2019).

The NMBM Biodiversity Plan (2009/14) assessed the extent of the loss of natural features (including vegetation types, ecological processes and SCC) within the NMBM due to various land uses. This assessment also included an assessment of the habitat integrity of riverine systems within the NMBM. Based on the remaining natural features, options for the conservation of a representative proportion of all biodiversity within the NMBM was determined, including CBAs and Critical Ecosystem Support Areas (CESA) which are the minimum areas required to meet conservation objectives in the NMBM. This Biodiversity Plan assists with land use planning and decision making within the NMBM, with the purpose of facilitating the long-term persistence of a representative proportion of all biodiversity patterns, ecological processes and SCC within the municipality.

According to the NMBM Biodiversity Plan (2009) spatial dataset, the study site does not occur within a terrestrial CBA or a CESA (Figure 5.10). However, the study site does occur within a portion of an aquatic ESA 1 (Figure 5.11). According to the ECBCP 2019 Handbook, ESAs are not essential for meeting biodiversity targets, however, ESAs extend into catchments that are essential for the maintenance of CBA rivers and wetlands.

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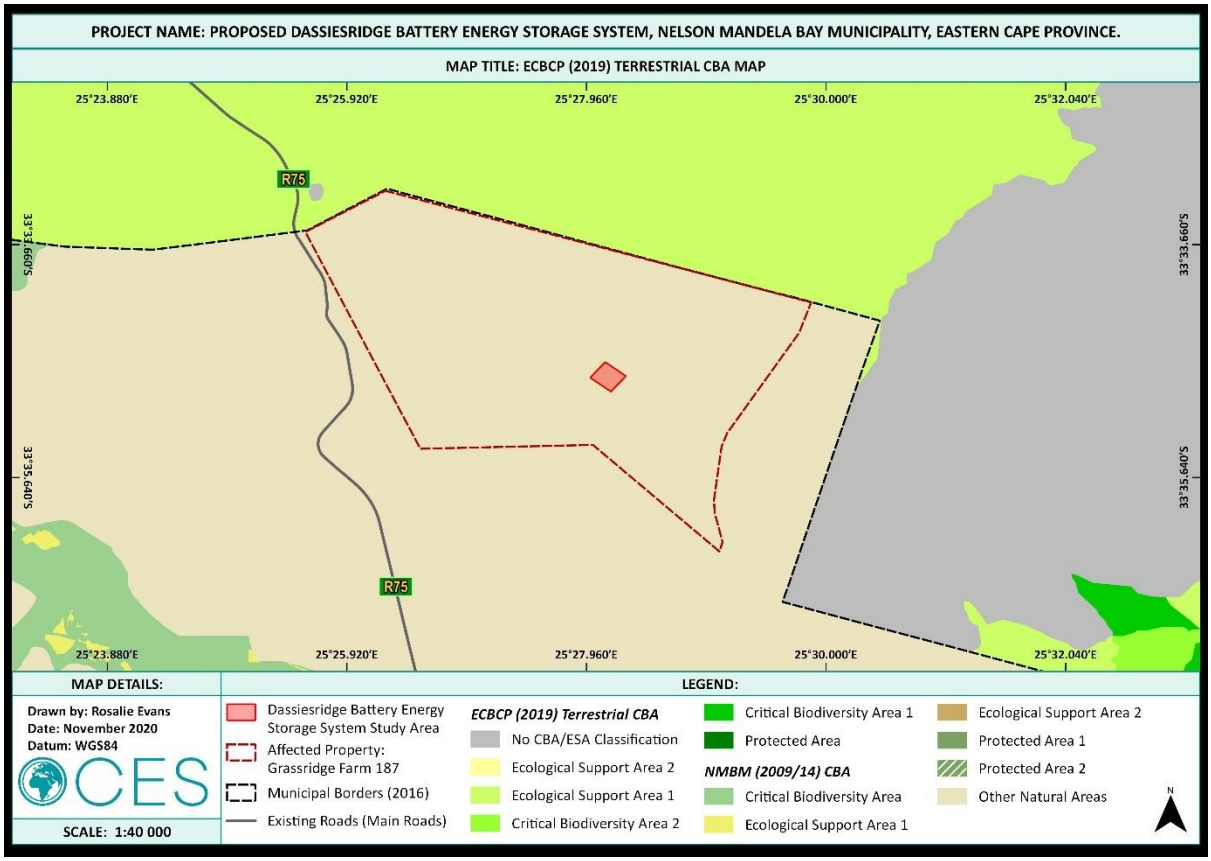

Figure 5.10: ECBCP (2019) Terrestrial Critical Biodiversity Areas (CBAs) located within the project area.

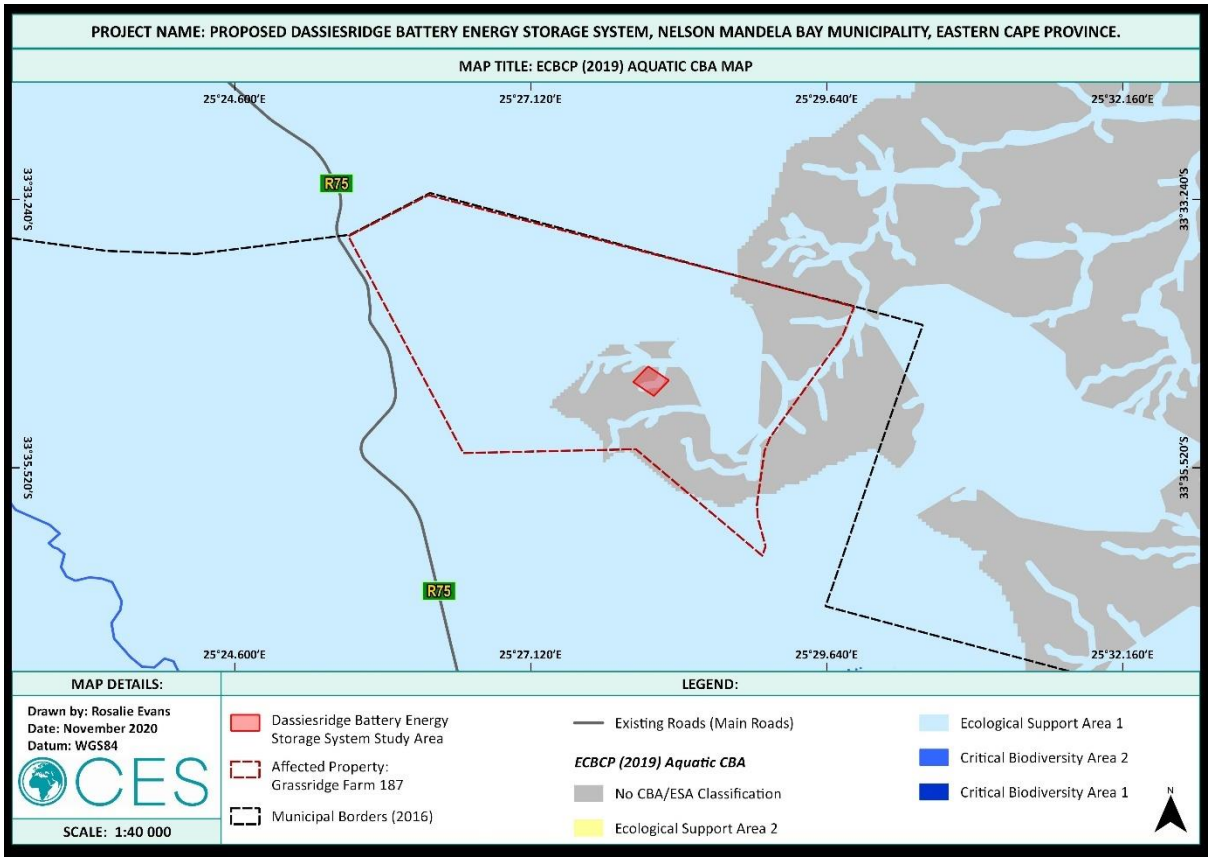

Figure 5.11: ECBCP (2019) Aquatic Critical Biodiversity Areas (CBAs) located within the project area.

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5.7.2 Threatened Ecosystems

The National Environmental Management: Biodiversity Act, (Act No. 10 OF 2004) (NEM:BA) provides a National List of Ecosystems that are threatened and in need of protection – GN 1002 of 2011. Although the study site is not located within a threatened ecosystem, it is situated within 3.8 kilometres from an Endangered Ecosystem (Albany Alluvial Vegetation) (Figure 5.12), with which it may share some transitional elements and species. These results are supported by the findings of the NBA (2018), which classified the vegetation/ecosystem of the project site (Grassridge Bontveld) as Least Concern (Skowno *et al*., 2019).

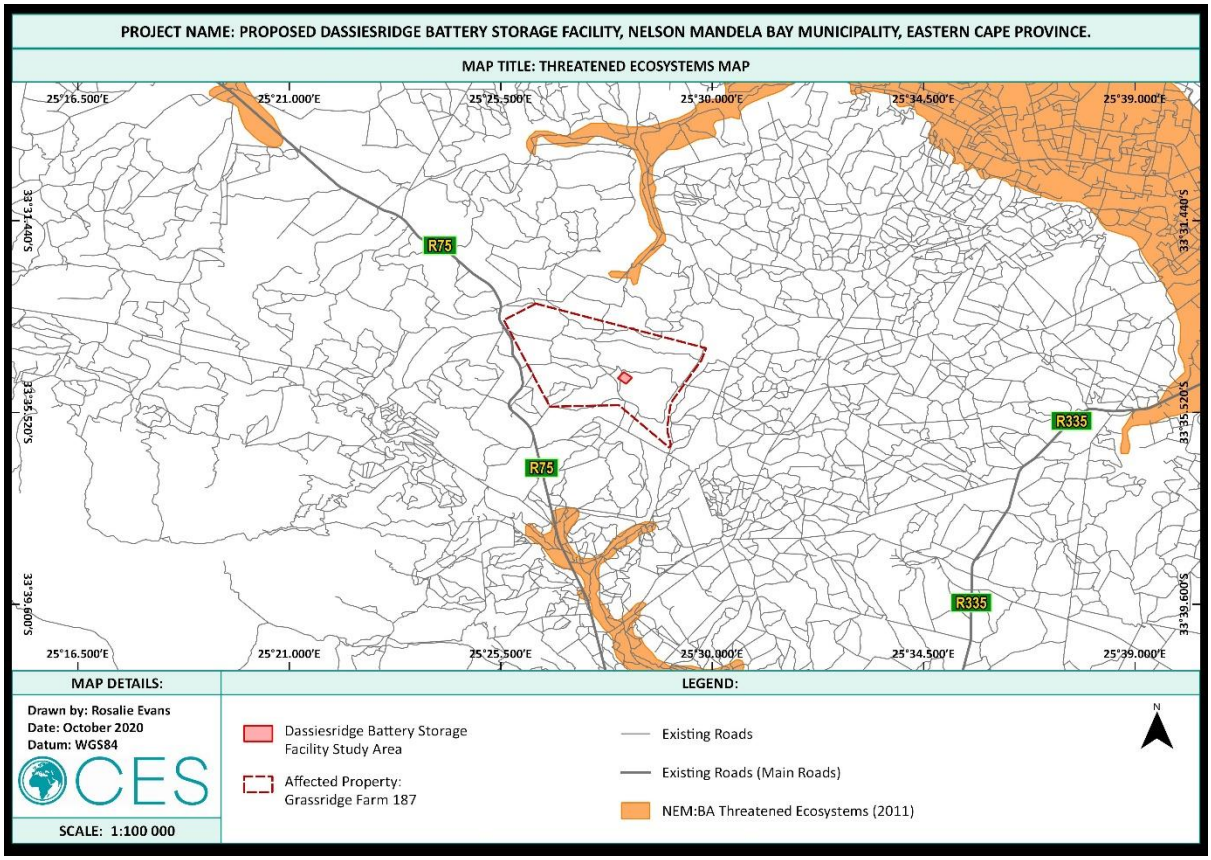

Figure 5.12: NEM:BA (2011) Threatened Ecosystems within the project area.

5.7.3 Protected areas

The National Protected Areas Expansion Strategy (NPAES, 2008) was developed to "achieve cost-effective protected area expansion for ecological sustainability and increased resilience to climate change." The NPAES originated as Government recognised the importance of protected areas in maintaining biodiversity and critical ecological process. The NPAES sets targets for expanding South Africa's protected area network, placing emphasis on those ecosystems that are least protected.

The study site is not located within any informal- or formal protected area(s). The Baviaans-Addo NPAES Focus Area is located approximately 5.1 km west of the study site (Figure 5.13).

There are no Important Bird Areas (IBAs) located within the project area.

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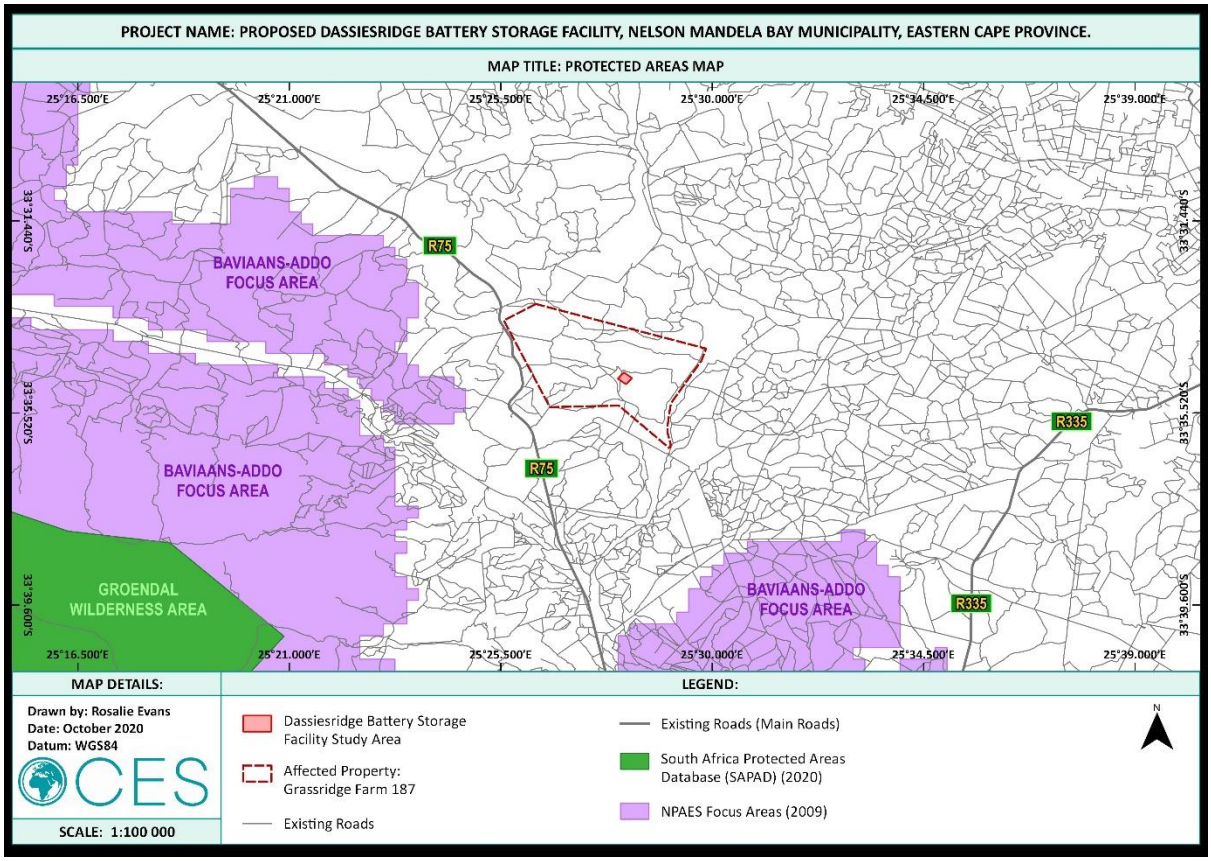

Figure 5.13 NPAES Focus Areas and SAPAD (2020) Protected Areas.

5.8 FAUNA

The sections that follow are supplemented with the information contained within the original Ecological Impact Assessment conducted by CES (2014) for the entire Dassiesridge WEF site.

According to the Screening Report generated for the proposed site, the animal species sensitivity of the site is classified as HIGH. The sensitivity features contributing to the sensitivity classification is listed in Table 5.3 below.

Table 5.3: Sensitivity features contributing to the Animal Species Sensitivity of the Site.

Sensitivity	Species	Common Name	SANBI Red List	IUCN	PNCO	NEM:BA
High	*Neotis denhami*	Denhams Bustard	Near Threatened	Near Threatened	Schedule 2	-
Medium	*Aneuryphymus montanus*	Yellow-winged Agile Grasshopper	-	Vulnerable	-	-
Medium	*Sensitive species 18*[1]	-	Critically Endangered	-	-	-
Medium	*Circus maurus*	Black Harrier	Vulnerable	Endangered	Schedule 2	-

[1] Some SCC are sensitive to illegal harvesting. As such, their names are obscured and listed as "Sensitive species #". As per the best practice guideline that accompanies the protocol and screening tool, the name of the sensitive species may not appear in any BAR or EIA report, nor any specialist reports released into the public domain.

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During the site visit conducted for this study (October 2020), the only fauna observed were springbok (*Antidorcas marsupialis).* However, a variety of faunal species such as zebra (*Equus* sp.), Wildebeest (*Connochaetes* sp.). ostriches (*Struthio camelus*), impala (*Aepyceros melampus*), bush bucks (*Tragelaphus scriptus*), dassies (*Procavia capensis*), termite mounds and vervet monkeys (*Chlorocebus pygerythrus*) were observed within the greater project area and surrounding farm portions. Small rodents and a variety of insects and reptiles are also expected to occur on site.

5.8.1 Birds

Birds are excellent early-warning signs for environmental change as they typically occupy high trophic levels in food webs. Bird species diversity in South Africa is high, with approximately 856 bird species recorded in the region (including the Prince Edward Islands). Of the 856 recorded species, 68 are endemic or near-endemic species while 132 are classified as threatened or near threatened (Taylor and Peacock, 2018). Of South Africa's nine (9) biomes, the majority of threatened bird species occur in the Savannah and Indian Ocean Coastal Belt Biomes. The Albany Thicket Biome (in which the study site occurs), is fourth on the list with 37 threatened species. while no bird species are restricted to Albany Thicket, the biome still supports a number of South African endemics, including the Knysna Warbler and Knysna Woodpecker (Taylor and Peacock, 2018).

The Eastern Cape Province, the second largest province of South Africa, contains all nine (9) of the country's biomes and therefore, unsurprisingly, contains a rich assemblage of bird species. According to BirdLife Eastern Cape, over 500 bird species have been recorded in the province. According to the original Final Pre-Construction Bird Monitoring Report and Avifaunal Impact Assessment conducted by Smallie (2014) for the Dassiesridge WEF, 67 bird species were recorded within the project area. According to this report, within a national context, this site is of relatively low sensitivity for avifauna

5.8.2 Mammals

According to The Red List of Mammals of South Africa, Swaziland and Lesotho (Child *et al*., 2016), of the 331 taxa within the region, 57 are classified as Threatened (six Critically Endangered, 20 Endangered and 31 Vulnerable) and 35 are classified as Near Threatened. Large game makes up less than 15% of the mammal species in South Africa and a much smaller percentage in numbers and biomass. According to IUCN, 133 mammal species have a distribution that includes the project site. The Animal Demography Unit (ADU) historical records for QDS 3325CB confirms that 19 mammal species have been recorded within 30 km^2 of the project area, all of which are classified as Least Concern except for *Philantomba monticola* (Blue Duiker) and *Panthera pardus* (Leopard), both classified as Vulnerable.

Blue Duiker are very small herbivorous mammals who's distribution ranges across central, western and southern Africa. In South Africa, this species is restricted to the coastal provinces, from Umfolozi River System in Kwazulu-Natal to George in the Western Cape. Their habitat includes a wide range of coastal forested and wooded habitats, including primary and secondary forests, gallery forests, dry forest patches, coastal scrub and farmlands, but thrives is more dense coastal forest, coastal bush and thicket which provides refuge from predators. Blue Duiker are exclusively browsers and feed on leaves, fruit, berries, flowers, fresh forest litter, tubers and roots. They do not require freshwater as their water needs are met through

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the food they consume (SANBI, 2019). This species is very shy and while it is possible that this species occurs within the project area, it is likely that they will move away from the study site during construction. However, the project will result in the further loss of 4-ha of habitat for this species but is unlikely to significantly impact on its breeding.

Leopard, although widespread in South Africa, are secretive animals and under severe threat due to hunting, snaring, and demand for their skins. This species has been assigned a threat status as Vulnerable due to the 10% population decline recorded over the last three generations (18 to 27 years). The habitat tolerance of Leopard is wide and includes woodland, grassland, savannah, mountain habitats coastal scrub, shrubland, and semi-desert, although densely wooded and rocky areas appear to be the preferred choice. Unfortunately, the habitat available for this species is becoming increasingly scarce with recent habitat suitability models indicating that only around 20% of South Africa constitutes as suitable habitat (Swanepoel e*t al.*, 2016). Although it is possible that this species could occur in the project area, it is unlikely that it's breeding or feeding grounds will be significantly affected by the proposed development.

5.8.3 Amphibians and Reptiles

Amphibians and reptiles are well represented in sub-Saharan Africa. However, distribution patterns in southern Africa are uneven both in terms of species distribution and in population numbers (du Preez and Carruthers, 2009). Climate, centres of origin and range restrictions are the three main factors that determine species distribution. The eastern coast of South Africa has the highest amphibian diversity and endemicity while reptile diversity is generally highest in the north eastern extremes of South Africa and declines to the south and west (Alexander and Marais, 2010).

Reptiles

South Africa has 350 species of reptiles, comprising 213 lizards, 9 worm lizards, 105 snakes, 13 terrestrial tortoises, 5 freshwater terrapins, 2 breeding species of sea turtle and 1 crocodile (Branch, 1998). Of those 350 reptile species, the Eastern Cape is home to 133 which includes 21 snakes, 27 lizards and eight chelonians (tortoises and turtles). The majority of these are found in Mesic Succulent Thicket and riverine habitats. According to IUCN, approximately 42 reptile species are likely to occur within the project area. Consultation of the ADU historical records for QDS 3325CB indicates that 30 species have been confirmed to occur within at least 30 km^2 of the project area, all of which are classified as Least Concern except *Nucras taeniolata* (Albany Strandveld Lizard) which is classified as Near Threatened.

Amphibians

Amphibians are important in wetland systems, particularly where fish are excluded or of minor importance. In these habitats' frogs are dominant predators of invertebrates. Frog abundance and diversity is a poignant reflection of the general health and well-being of aquatic ecosystems. According to IUCN, 19 amphibian species have a distribution which includes the project area. Consultation of the ADU historical records confirms that 11 species of amphibian are likely to occur within the project area, all of which are considered **Least Concern**.

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5.8.4 Insects

Aloeides clarki, commonly referred to as the Coega Copper, is a rare species of butterfly of the Family Lycaenidae. *A. clarki* is listed as Endangered and is endemic to the lower Coega and Sundays River valleys and is associated with dry, sandy and limestone ridges at an altitude of 30 to 150 m in Coega Bontveld. It is possible that it may occur within the project area however, it has only been recorded within the Coega Special Economic Zone (SEZ) and at an isolated location at the Sundays River Mouth, both of which are not near the study area.

This species has an obligate relationship with host ants, reported to be a species of *Monomorium*. It is possible that the construction activities associated with project could cause changes to the ant communities on the site by introducing invasive species. If this species is present at the site, impact on this species is likely to be an indirect impact as a result of changes to the host species it is dependent on. There is of course the possibility that the host ants will be among the species that increase in number as a result of development and this could benefit the butterflies.

*** Please refer to Appendix C for the comprehensive list of faunal species that are likely to occur in the project area.**

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6. SITE INVESTIGATION

6.1 GENERAL SITE CHARACTERISTICS

The site visit conducted on the 13th of October 2020 confirmed that the vegetation of the study site is Grassridge Bontveld. A degree of disturbance and degradation of the bontveld was evident, most likely due to grazing by livestock and other larger game observed on site. Bushclumps were relatively small, scattered widely throughout the succulent grassland, and dominated by a few species such as *Uclea undulata*, *Searsia* spp., *Gymnosporia capitata*, *Schotia afra* and *Sideroxylon inerme* (SCC) (Plate 6.2). The small size of the bushclumps, as well as the structure and composition of the bontveld on site is most likely attributed to the characteristics of the underlying substrate coupled with the intensity of grazing. Apparent over grazing has resulted in the reduction of a number of the bushclumps to small, dense, low growing clumps comprising of one or two species. Grassland cover was sparse with scattered geophytes present.

Plate 6.1: Grassridge Bontveld of the study site.

A number of tracks as well as evidence of foraging and digging for bulbs and tubers was observed on site which suggests the site is frequented by faunal species (Plate 6.2). Large burrows, particularly under bushclumps, were also observed. The only fauna observed on site, however, were springbok *(Antidorcas marsupialis*).

Scattered alien invasive species, including *Opuntia aurantiaca* and *Opuntia ficus-indica* (both classified as Category 1b invasive species in terms of NEM:BA), was observed throughout the site.

Although no wetland species were observed on site, large depressions are apparent on aerial imagery. The soil in these areas and in other patches throughout the site was damp. However, it is unclear whether this is due to the recent rain received in the area or a shallow water table.

Plate 6.2: Faunal tracks observed within the study site.

It should be noted that although the site has been degraded and disturbed due to overgrazing, the site still supports a number of indigenous plant species, including SCC, and provides important habitat for faunal species. As such, the site still maintains ecological function thereby contributing to the provision of valuable ecosystem services including nutrient cycling, primary production, carbon sequestration, soil formation, amongst many others.

6.2 VEGETATION SURVEY

While dominant species observed during the site visit were noted, a comprehensive vegetation survey was undertaken as part of the Ecological Impact Assessment conducted by CES (2014) for the entire Dassiesridge WEF project site. A list of all plant species identified during the survey is included in Appendix B of this report.

7. SENSITIVITY ASSESSMENT

7.1 CONSERVATION AND SPATIAL PLANNING TOOLS

In order to identify any potential site sensitivities or ecologically important areas during the early stages of a development, the conservation planning tools available for a particular area should be consulted. This could potentially assist with the fine-tuning of plans and infrastructure layouts.

The following relevant conservation planning tools were consulted for this assessment:

- SANBI Vegetation Threat Status;
- NEMBA Protected Ecosystems;
- ECBCP Critical Biodiversity Areas (Terrestrial and Aquatic);
- NMBM MOSS CBAs; and
- Nature and Environmental Conservation Ordinance No. 19 of 1974.

The conservation status of the Grassridge Bontveld vegetation of the study site is considered **Least Concern**, while the Ecosystem Protection Level is considered **Moderately Protected** (Skowno *et al*., 2019). The study site is located within an ECBCP (2007) Terrestrial and Aquatic CBA 2. However, the study site is not situated within a Terrestrial or an Aquatic CBA (neither CBA 1 nor CBA 2) according to the updated ECBCP (2019). The study site does not occur within a threatened ecosystem, as listed by the NBA (2018) or the National Environmental Management: Biodiversity Act (NEM:BA*) National list of ecosystems that are threatened and in need of protection* (2011) or a Protected Area.

7.2 SENSITIVITY ALLOCATION

The project area of the proposed Dassiesridge BESS has been mapped in terms of the ecological sensitivity (Figure 7.1). The sensitivity ratings and reasons therefore have been provided below. The recommended mitigations measures that need to be implemented in order to minimise the ecological impacts of the development are described in Chapter 9.

Areas of **high sensitivity** include:

- Process areas such as rivers, wetlands and streams that are important for ecosystem functioning, including surface and ground water as well as animal and plant dispersal;
- Areas that have a high species richness;
- Areas that are not significantly impacted, transformed or degraded by current land use; and
- Areas that contain the majority of species of special concern found in the area and may contain high numbers of globally important species or comprise part of a globally important vegetation type.

Areas of **moderate sensitivity** include:

- Areas that still provide a valuable contribution to biodiversity and ecosystem functioning despite being degraded;
- Degraded areas that still have a relatively high species richness; and

→ Degraded areas that still contain species of special concern.

Areas of **low sensitivity** include:

→ Areas that are highly impacted by current land use and provide little value to the ecosystem; and

→ Highly degraded areas that are unlikely to harbour any species of special concern.

Moderate Sensitivity

In line with the findings of the original Ecological Impact Assessment conducted by CES (2014) for the Dassiesridge WEF, the grassland areas of the Grassridge Bontveld has been assigned a moderate sensitivity as they did not contain many SCC and cover was sparse. However, despite this, the grassland areas still provide valuable ecosystem functions and plays an important role in maintaining the structure of the bontveld vegetation.

Any SCC within the grassland areas are considered highly sensitive and will require permits for their removal. All relevant mitigation measures specified in this report are applicable in these areas.

High Sensitivity

High sensitivity has been allocated to bushclumps, due to the presence of SCC, their poor ability to regenerate once disturbed, species richness and important ecological function within the landscape. This is in line with the findings of the original Ecological Impact Assessment conducted by CES (2014) for the proposed Dassiesridge WEF. The damp depressions apparent on satellite imagery, and observed on site, have also been allocated high sensitivity despite the lack of common wetland species. It is recommended that the project area is groundtruthed prior to construction and a Search and Rescue undertake for all SCC identified.

Infrastructure should preferably be placed in areas of moderate sensitivity. However, due to the location of the authorised substation, infrastructure, including roads and cabling, will traverse a portion of an area classified as high sensitivity. This is deemed acceptable, provided the areas of high sensitivity are micro-sited prior to construction or vegetation clearance in order to minimise the loss and impact on areas of high sensitivity.

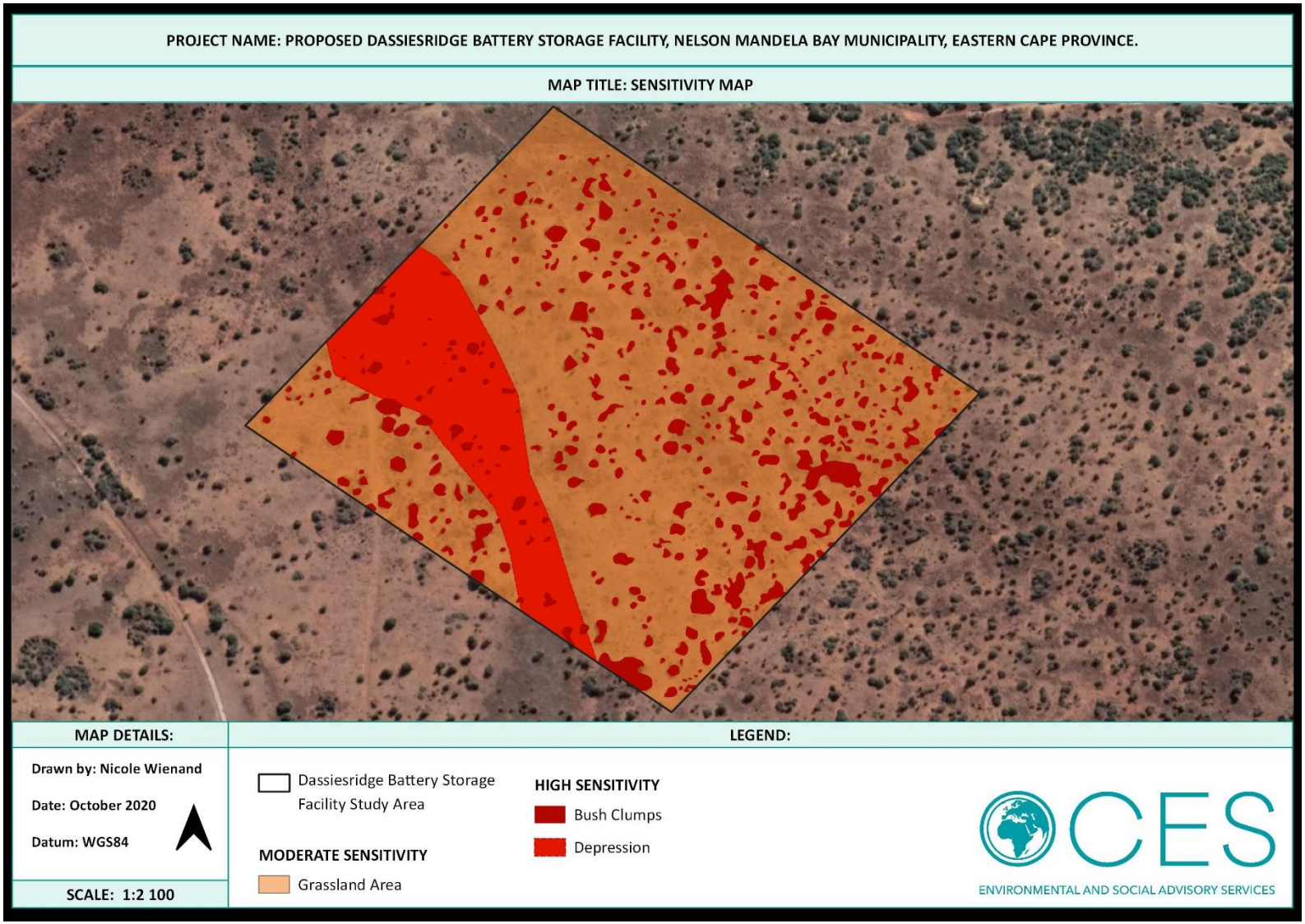

Figure 7.1: Sensitivity Map of the proposed site for the Dassiesridge BESS.

8. IMPACT IDENTIFICATION AND ASSESSMENT

The study that has been undertaken provides the necessary information in order to assess the impacts of the proposed Dassiesridge BESS on the ecology of the area at the appropriate spatial and temporal scales. The impacts identified and described in Section 9.1 below have been assessed in terms of the criteria described in Appendix D of this report.

8.1 IMPACT ASSESSMENT

PLANNING AND DESIGN PHASE

Impact 1: Legal and Policy Compliance

Cause and Comment
Preferred Alternative: Failure to obtain and adhere to the necessary permits and/or authorisations, as well as failure to adhere to existing policies and legal obligations relating to the ecological environment, could lead to the project conflicting with local, provincial and national policies, legislation, etc. This could result in a lack of institutional support for the project, overall project failure and undue disturbance to the natural environment.

No-Go Alternative: The no-go alternative will not result in any conflict with local, provincial, and/or national policies, legislation, etc.

Mitigation Measures
- All necessary permitting and authorisations must be obtained prior to the commencement of any construction activities;
- A suitably qualified Environmental Control Officer (ECO) must be appointed prior to the commencement of the construction phase;
- Ensure that all relevant legislation and policy is consulted and further ensure that the project is compliant with such legislation and policy; and
- Planning for the construction and operation of the proposed development should consider available best practice guidelines.

Significance Assessment

IMPACT 1: LEGAL AND POLICY COMPLIANCE										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Indirect	Long-Term	Regional/ National	Severe	Possible	**HIGH (-)**	Reversible	Resource will be lost	Achievable	**LOW (-)**
No-Go Alternative	***Not Applicable***									

CONSTRUCTION PHASE

Impact 2: Impacts on the Terrestrial Habitat of Strategic Water Source Areas

Cause and Comment

Preferred Alternative: During the construction phase, the clearance of vegetation and associated construction activities will directly impact the terrestrial habitat of Strategic Water Source Areas which could result in increased run-off, possible erosion and the loss of topsoil. However, it should be noted that the footprint of this site is small (only 4-ha) and located more than 100 m from surrounding drainage lines and/or rivers. Therefore, it is unlikely that the proposed development will impact on the water quality entering the nearby rivers or drainage lines. Additionally, this impact is easily mitigated. Provided that the mitigation measures are implemented, it is likely this impact will be of low significance.

No-Go Alternative: The no-go alternative will not impact the terrestrial habitat nor strategic water source areas.

Mitigation Measures

- An Erosion Management Plan / Method Statement should be compiled and implemented during the Construction Phase;
- Vegetation clearance must be kept to a minimum and retained where possible to avoid soil erosion;
- Disturbed areas must be rehabilitated as soon as possible after construction; and
- The site should be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion.

Significance Assessment

IMPACT 2: IMPACTS ON THE TERRESTRIAL HABITAT OF STRATEGIC WATER SOURCE AREAS										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct	Long-Term	Study-Area	Moderate	May Occur	**MODERATE (-)**	Reversible	Resource will be lost	Achievable	**LOW (-)**
No-Go Alternative	***Not Applicable***									

Impact 3: Loss of Indigenous Vegetation (Grassridge Bontveld)

Cause and Comment

Preferred Alternative: Vegetation clearance for the construction of the proposed Dassiesridge BESS will result in the direct loss of approximately 4-ha of Grassridge Bontveld vegetation.

No-Go Alternative: The no-go alternative will not require vegetation clearance.

Mitigation Measures

- A comprehensive Plant Search and Rescue must be conducted prior to vegetation clearance;
- A qualified botanical specialist must conduct the translocation of any SCC;
- SCC should be translocated to the nearest appropriate habitat, preferably a protected portion of the property;
- The clearance of vegetation at any given time should be kept to a minimum and vegetation clearance must be strictly limited to the development footprint;
- Employees must be prohibited from making fires and harvesting plants;
- Any alien vegetation which establishes during the construction phase should be removed from site and disposed of at a registered waste disposal site. Continuous monitoring for seedlings should take place throughout the construction phase;
- Only indigenous species should be used for rehabilitation purposes;
- As far as practically possible, existing access roads should be utilised; and
- An Alien Vegetation Management Plan should be compiled (for implementation during the phases that follow).

Significance Assessment

IMPACT 3: LOSS OF INDIGENOUS VEGETATION (GRASSRIDGE BONTVELD)										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Cumulative	Permanent	Study-Area	Moderate	Definite	**MODERATE (-)**	Irreversible	Resource will be lost	Achievable	**MODERATE (-)**
No-Go Alternative	***Not Applicable***									

Impact 4: Loss of Biodiversity

Cause and Comment

Preferred Alternative: During the construction phase, the loss of Grassridge Bontveld due to vegetation clearance coincides with the loss of ecological infrastructure[2], faunal habitats, SCC, and plant species, and consequently overall biodiversity within the affected ecosystem (Grassridge Bontveld). This could negatively affect ecological processes and functioning within the area, thereby influencing the provision of valuable ecosystems services.

No-Go Alternative: The no-go alternative will not require vegetation clearance and will not result in the direct loss of biodiversity.

Mitigation Measures

- A comprehensive Plant and Faunal Search and Rescue must be conducted prior to vegetation clearance;
- A qualified botanical specialist must conduct the translocation of any SCC;
- SCC should be translocated to the nearest appropriate habitat, preferably a protected portion of the property;
- The clearance of vegetation at any given time should be kept to a minimum and vegetation clearance must be strictly limited to the development footprint;
- Employees must be prohibited from making fires and harvesting plants;
- Only indigenous species should be used for rehabilitation purposes which must aim to re-vegetate exposed soil; and
- As far as practically possible, existing roads should be utilised.

[2] **Ecological infrastructure** refers to the naturally functioning ecosystems that generate or deliver valuable ecosystem services – they are nature's equivalent of built infrastructure. Examples include mountain catchment areas, wetlands and soils. Intact ecological infrastructure provides long-term, cost-effective natural solutions to the maintenance and ongoing delivery of vital services to communities (CEN, 2019).

Significance Assessment

IMPACT 4: LOSS OF BIODIVERSITY										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Cumulative	Permanent	Study Area	Moderate	Definite	**MODERATE (-)**	Irreversible	Resource will be lost	Achievable	**MODERATE (-)**
No-Go Alternative	***Not Applicable***									

Impact 5: Loss of Plant Species of Conservation Concern (SCC)

Cause and Comment

Preferred Alternative: During the construction phase, construction activities, including the clearance of vegetation, could permanently damage or destroy plant SCC which are present on site, contributing to the cumulative loss of plant SCC in the region.

No-Go Alternative: The no-go alternative will not require vegetation clearance.

Mitigation Measures

- Refer to mitigation measures listed under Impact 4 above.

Significance Assessment

IMPACT 5: LOSS OF SPECIES OF CONSERVATION CONCERN (SCC)										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Cumulative	Permanent	Study Area	Severe	Probable	**HIGH (-)**	Irreversible	Resource will be lost	Achievable	**MODERATE (-)**
No-Go Alternative	***Not Applicable***									

Impact 6: Establishment of Alien Plant Species

Cause and Comment

Preferred Alternative: The removal of existing natural vegetation creates 'open' habitats which favours the establishment of undesirable vegetation in areas that are typically very difficult to eradicate which could pose a threat to surrounding ecosystems.

No-Go Alternative: The no-go alternative has the risk of alien plant species establishment in the absence of the Dassiesridge BESS development.

Mitigation Measures

- An Alien Vegetation Management Plan must be developed and implemented to prevent the establishment and spread of undesirable alien plant species during all phases of development; and
- Any alien vegetation which establishes during the construction phase should be removed from site and disposed of at a registered waste disposal site. Continuous monitoring for seedlings should take place throughout the construction phase.

Significance Assessment

IMPACT 6: ESTABLISHMENT OF ALIEN PLANT SPECIES										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Indirect	Long-Term	Localised	Moderate	Probable	**MODERATE (-)**	Reversible	Resource will be lost	Achievable	**LOW (-)**
No-Go Alternative	Existing	Long-Term	Localised	Moderate	Definite	**MODERATE (-)**	N/A	N/A	N/A	**N/A**

Impact 7: Habitat Loss/Fragmentation

Cause and Comment

Preferred Alternative: During the construction phase, the loss of vegetation coincides with the loss of faunal habitat, reducing feeding, breeding and rearing locales. Faunal populations could become locally extinct or diminish in size.

No-Go Alternative: The no-go alternative will not require vegetation clearance which could result in the loss of habitat or habitat fragmentation.

Mitigation Measures

- A comprehensive Faunal Search and Rescue should be conducted directly prior to vegetation clearance;
- The clearance of vegetation at any given time should be kept to a minimum;
- Employees must not trap, hunt, handle or remove any faunal species from the site; and
- As far as practically possible, existing access roads must be utilized.

Significance Assessment

IMPACT 7: HABITAT LOSS/FRAGMENTATION										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Indirect	Permanent	Localised	Moderate	Definite	**MODERATE (-)**	Irreversible	Resource will be lost	Achievable	**LOW (-)**
No-Go Alternative	***Not Applicable***									

Impact 8: Wildlife Mortalities

Cause and Comment

Preferred Alternative: During the construction phase, vegetation clearance, vehicles, crew and materials may increase animal fatalities through opportunistic hunting, collisions, accidents or baiting and trapping.

No-Go Alternative: The no-go alternative is not likely to result in an increase in wildlife mortalities.

Mitigation Measures

- A comprehensive Faunal Search and Rescue should be conducted directly prior to vegetation clearance;
- Vehicle speed must be limited to 40km/hr to reduce faunal collision mortality;
- All staff on site must receive training with regards to the proper management and response should animals be encountered;
- No animal shall be killed or injured as a result of the Dassiesridge BESS construction and presence of construction staff; and
- No hunting, baiting or trapping shall be allowed within the affected property or surrounding property by construction staff.

Significance Assessment

IMPACT 8: WILDLIFE MORTALITIES										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Indirect	Permanent	Localised	Moderate	May Occur	**MODERATE (-)**	Irreversible	Resource will be lost	Achievable	**LOW (-)**
No-Go Alternative	***Not Applicable***									

Impact 9: Impacts of Noise and Lighting on surrounding Faunal Populations

Cause and Comment

Preferred Alternative: During the construction phase, construction activities will lead to the increase in ambient noise levels in the project area. This could disturb surrounding faunal populations.

No-Go Alternative: The no-go alternative will not result in an increase in noise and lighting.

Mitigation Measures

- Ensure machinery and plant is in good working order. The appropriate silencers should be fitted on equipment if required;
- Where possible, external lighting should be avoided; and
- Minimise the number of machinery/ plant and construction vehicles accessing the site.

Significance Assessment

IMPACT 9: IMPACTS OF NOISE AND LIGHTING ON SURROUNDING FAUNAL POPULATIONS										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Indirect	Short-Term	Localised	Moderate	Probable	**MODERATE (-)**	Reversible	Resource will not be lost	Achievable	**LOW (-)**
No-Go Alternative	***Not Applicable***									

Impact 10: Loss of *Sensitive Species 18*

Cause and Comment

Preferred Alternative: Sensitive Species 18 is listed as Critically Endangered and the only currently known population occurs in the Grassridge Bontveld. It is therefore possible that this species occurs in the project area. This species is typically a cryptic species and difficult to find. This species is likely to be impacted by the loss of habitat and direct mortality such as road kills.

No-Go Alternative: The no-go alternative will not result in an increased risk Sensitive Species 18.

Mitigation Measures

- Implement a faunal search and rescue plan prior to construction. If any individuals of this species are found, they should be relocated to areas that will not be affected during the construction phase;
- It is imperative to have a comprehensive road mitigation plan to prevent roadkill on the access roads, and during the construction phase; and
- A long-term monitoring and anti-poaching plan must be developed and implemented.

Significance Assessment

IMPACT 10: LOSS OF SENSITIVE SPECIES 18										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Indirect	Permanent	Localised	Moderate	May Occur	**MODERATE (-)**	Irreversible	Resource will be lost	Achievable	**LOW (-)**
No-Go alternative	***Not Applicable.***									

Impact 11: Loss of habitat for *Aloeides clarki* (Coega Copper Butterfly)

Cause and Comment

Preferred Alternative: Although it is possible that the butterfly species, *Aloeides clarki* (listed as Endangered) may occur within the project area based on habitat availability, it has only been recorded within the Coega SEZ and at an isolated patch at the Sundays River Mouth, both of which are not near the study area. Additionally, the species has an obligate relationship with host ants, reported to be a species of *Monomorium.* For the butterfly to be present, the host ant would also need to be present.

No-Go Alternative: The no-go alternative will not result in an increased risk to the Coega Copper butterfly.

Mitigation Measures

- It is recommended that an entomological ground truthing survey is conducted prior to construction to identify areas that are sensitive. The entomologist should have the skills to be able to positively identify the host ant species as well as the butterfly;
- Protect abiotic habitats, such as termite mounds which play an important ecological role such as providing shelter;
- All limestone outcrops within the area of the proposed development must be checked as part of the proposed micro siting exercise prior to construction, to ascertain whether this species occurs there. Because of their specialised behavior they are restricted to very small areas, which are relatively easy to conserve; and
- If the entomologist finds a population of this species close to project infrastructure, they should provide suggested mitigation measures to reduce the impact.

Significance Assessment

IMPACT 11: LOSS OF HABITAT FOR *ALOEIDES CLARKI* (COEGA COPPER BUTTERFLY)										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct	Permanent	Localised	Moderately Severe	May Occur	**MODERATE (-)**	Irreversible	Resource will be lost	Achievable	**LOW (-)**
No-Go Alternative	***Not Applicable***									

Impact 12: Inadequate Rehabilitation and Maintenance of Disturbed Areas

Cause and Comment

Preferred Alternative: During the construction phase, failure to implement rehabilitation measures could lead to the erosion of- and permanent loss of valuable soil, the unnecessary loss of indigenous vegetation and the establishment of alien invasive vegetation.

No-Go Alternative: The no-go alternative will not result in disturbed areas, which require rehabilitation.

Mitigation Measures

- The Rehabilitation Plan must be implemented during and post-construction;
- All temporary disturbed areas that do not form part of development, must be rehabilitated using only indigenous vegetation; and

- All impacted areas must be restored as per the EMPr requirements.

Significance Assessment

IMPACT 11: INADEQUATE REHABILITATION AND MAINTENANCE OF DISTURB AREAS										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct	Permanent	Localised	Moderate	Definite	**MODERATE (-)**	Irreversible	Resource will be partially lost	Achievable	**LOW (-)**
No-Go Alternative	***Not Applicable***									

OPERATIONAL PHASE

Impact 13: Establishment of Alien Plant Species

Cause and Comment

Preferred Alternative: During the operational phase, failure to remove and manage alien vegetation during construction could result in the permanent establishment of alien vegetation in the study area. The poor rehabilitation of disturbed areas could lead to the permanent degradation of ecosystems as well as allow invasion by alien plant species.

No-Go Alternative: The no-go alternative has the risk of alien plant species establishment in the absence of the Dassiesridge BESS development.

Mitigation Measures

- The Alien Vegetation Management Plan must be implemented to prevent the establishment and the spread of undesirable alien plant species during the Operational Phase; and
- Monitoring of the establishment of alien seedlings should continue throughout the operational phase. Any alien seedlings should be removed and disposed of at a registered landfill.

Significance Assessment:

IMPACT 13: ESTABLISHMENT OF ALIEN PLANT SPECIES										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Indirect	Long-Term	Localized	Moderate	May Occur	**MODERATE (-)**	Reversible	Resource will not be lost	Achievable	**LOW (-)**
No-Go Alternative	Existing	Long-Term	Localised	Moderate	Definite	**MODERATE (-)**	N/A	N/A	N/A	**N/A**

Impact 14: Impacts of Noise and Lighting on Faunal Populations

Cause and Comment

Preferred Alternative: During the operational phase, noise and lighting associated with the proposed Dassiesridge BESS (including maintenance activities) could cause a disturbance to surrounding faunal populations within the project area.

No-Go Alternative: The no-go alternative will not result in an increase in noise and lighting.

Mitigation Measures

- Regular maintenance and checks of the BESS must be undertaken;
- Minimise access to the site; and
- Where possible, external lighting should be avoided.

Significance Assessment:

IMPACT 14: IMPACTS OF NOISE AND LIGHTING ON FAUNAL POPULATIONS										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct	Long-Term	Localised	Moderate	Probable	**MODERATE (-)**	Reversible	Resource will not be lost	Achievable	**LOW (-)**
No-Go Alternative	***Not Applicable.***									

Impact 15: Obstruction of Ecological Corridors / Processes

Cause and Comment

Preferred Alternative: The proposed Dassiesridge BESS is located within an ecological corridor identified by the ECBCP using an integrated corridor design for the whole Province. The significance of this impact is considered low due to the presence of extensive area of similar habitat surrounding the proposed Dassiesridge BESS which would allow for the continued migration and dispersal or faunal and floral species.

No-Go Alternative: The no-go alternative will not obstruct ecological corridors or processes.

Mitigation Measures

- None identified.

Significance Assessment:

IMPACT 15: OBSTRUCTION OF ECOLOGICAL CORRIDORS / PROCESSES										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Indirect	Long-Term	Localized	Slight	May Occur	**LOW (-)**	Irreversible	Resource will be lost	Achievable	**LOW (-)**
No-Go Alternative	**Not Applicable.**									

Impact 16: Effect of the development on Ecological Drivers

Cause and Comment

Preferred Alternative: The composition, species diversity and structure of Grassridge Bontveld is driven mainly by substrate type but maintained by ecological drivers, specifically fire dynamics and herbivory. Intense grazing by livestock and game can significantly reduce fuel loads, resulting in less intense, more slow-moving fires that allow the establishment and spread of thicket clumps. The probability and intensity of fire within mosaic thickets is also greatly influenced by alien invasive species and vegetation structure and composition. Ecological drivers such as fire and herbivory are likely to be reduced in the immediate area surrounding the facility as faunal species will likely move away from the noise and fires will be prevented due to health and safety concerns. However, this impact will be localised to the immediate area surrounding the facility and will therefore be of a low significance.

No-Go Alternative: The no-go alternative will not result in development which could impact ecological drivers.

Mitigation Measures

- Given that the impact will be low and localised to the immediate area around the facility, no further mitigation measures are recommended.

Significance Assessment:

IMPACT 16: EFFECT OF THE DEVELOPMENT ON ECOLOGICAL DRIVERS										
IMPACT	***NATURE***	***DURATION***	***EXTENT***	***SEVERITY***	***LIKELIHOOD***	***SIGNIFICANCE BEFORE MITIGATION***	***REVERSIBILITY***	***IRREPLACEABLE LOSS***	***MITIGATION POTENTIAL***	***SIGNIFICANCE AFTER MITIGATION***
All Alternatives	Direct & Indirect	Long-Term	Localised	Slight	May Occur	**LOW (-)**	Irreversible	Resource will be lost	Achievable	**LOW (-)**
No-Go Alternative	**Not Applicable.**									

DECOMISSIONING PHASE

Should the infrastructure be decommissioned in the long-term, the impacts associated with the decommissioning phase could be similar to those for the construction phase and most of the mitigation measures stipulated for the construction phase will, therefore, be relevant. The decommissioning phase EMPr must include additional decommissioning phase recommendations and mitigation measures relating to the ecological environment based on case studies of BESS decommissioning and it must consider the relevant legislation, policies and guidelines at the time of decommissioning."

9. IMPACT STATEMENT, RECOMMENDATIONS AND CONCLUSION

9.1 CONCLUSIONS AND RECOMMENDATIONS

This study assessed the ecological impacts associated with the proposed Dassiesridge BESS. Although the development footprint of the proposed Dassiesridge BESS amounts to only four (4) ha, a total area of 11-ha was investigated for this study. This aided the identification of the least sensitive location for the siting of the proposed BESS.

The site visit confirmed that that the proposed development is located within one (1) vegetation type – Grassridge Bontveld. Grassridge Bontveld occurs exclusively in the Eastern Cape Province and covers a small area. While its conservation status is classified as Least Concern and it is considered Moderately Protected, approximately 9.53% of this vegetation type has been lost due to land transformation. Although a degree degradation and disturbance to the thicket clumps within the site was noted (most likely due to overgrazing by livestock and game), the site still supports a number of indigenous plant species, including SCC, and provides important habitat for faunal species. As such, the site still maintains ecological function thereby contributing to biodiversity and the provision of valuable ecosystem services including nutrient cycling, primary production, carbon sequestration, and soil formation, amongst many others.

Table 9.1 below summarises the change in impact significance between pre- to post-mitigation during all phases of the proposed development. The majority of the impacts were identified for the construction phase and were classified as moderate negative. These will be reduced to a low negative significance if the mitigation measures as proposed in this report, are implemented and adhered to. In line with the Ecological Impact Assessment conducted by CES (2014) for the greater Dassiesridge WEF, the associated impacts identified were not deemed insurmountable provided the recommendation and mitigation measures identified in this report are implemented.

Table 9.1: Summary of all sixteen (16) impacts identified for the proposed Dassiesridge BESS.

IMPACT	PRIOR TO MITIGATION	POST-MITIGATION	NO-GO ALTERNATIVE
PLANNING AND DESIGN PHASE			
Impact 1: Legal and Policy Compliance	**HIGH (-)**	**LOW (-)**	**N/A**
CONSTRUCTION PHASE			
Impact 2: Impacts on the Terrestrial Habitat of Strategic Water Source Areas	**MODERATE (-)**	**LOW (-)**	**N/A**
Impact 3: Loss of Indigenous Vegetation (Grassridge Bontveld)	**MODERATE (-)**	**MODERATE (-)**	**N/A**
Impact 4: Loss of Biodiversity	**MODERATE (-)**	**MODERATE (-)**	**N/A**
Impact 5: Loss of Plant SCC	**HIGH (-)**	**MODERATE (-)**	**N/A**

Impact 6: Establishment of Alien Plant Species	**MODERATE (-)**	**LOW (-)**	**MODERATE (-)**
Impact 7: Habitat Loss/Fragmentation	**MODERATE (-)**	**LOW (-)**	**N/A**
Impact 8: Wildlife Mortalities	**MODERATE (-)**	**LOW (-)**	**N/A**
Impact 9: Impacts of Noise and Lighting on surrounding Faunal Populations	**MODERATE (-)**	**LOW (-)**	**N/A**
Impact 10: Loss of Sensitive Species 18	**MODERATE (-)**	**LOW (-)**	**N/A**
Impact 11: Loss of habitat for *Aloeides clarki* (Coega Copper Butterfly)	**MODERATE (-)**	**LOW (-)**	**N/A**
Impact 12: Inadequate Rehabilitation and Maintenance of Disturbed Areas	**MODERATE (-)**	**LOW (-)**	**N/A**
OPERATIONAL PHASE			
Impact 13: Establishment of Alien Plant Species	**MODERATE (-)**	**LOW (-)**	**MODERATE (-)**
Impact 14: Impacts of Noise and Lighting on Faunal Populations	**MODERATE (-)**	**LOW (-)**	**N/A**
Impact 15: Obstruction of Ecological Corridors / Processes	**LOW (-)**	**LOW (-)**	**N/A**
Impact 16: Effect of the development on Ecological Drivers	**LOW (-)**	**LOW (-)**	**N/A**

The grassland areas of the site were allocated moderate sensitivity, while bushclumps and depression areas were allocated high sensitivity. Due to the scattered nature of the thicket clumps, should the proposed development proceed, the loss of a portion of the thicket clumps in unavoidable. However, it is recommended that the footprint of the proposed development be situated within a portion of the site that will result in the minimum loss of species diversity and plant SCC.

9.1.1 Existing Impacts

A baseline analysis of the present condition of the study site indicated that some degree of disturbance/degradation of the Grassridge Bontveld vegetation (particularly the thicket clumps) has occurred, due to grazing by livestock and game. Additionally, scattered alien invasive plants of the genus *Opuntia* were also identified (NEMBA Category 1b; CARA Category 1). As such, it is recommended that an Alien Management Plan or Method Statement be compiled and implemented during both the construction and operational phase of the proposed development.

9.1.2 Cumulative Impacts

The following cumulative impacts were identified as a result of the proposed Dassiesridge BESS:

Aspect	Description of Impact
Loss of Indigenous Vegetation (Grassridge Bontveld)	Vegetation clearance for the construction of the proposed Dassiesridge BESS will result in the cumulative loss of Grassridge Bontveld – a unique vegetation type found exclusively within the Eastern Cape Province. The loss of vegetation coincides with the loss of biodiversity associated with the ecosystems and niche habitats, and therefore cumulative habitat fragmentation.
Loss of SCC	The proposed Dassiesridge BESS will require the removal and translocation of SCC from the study site to the nearest appropriate habitat. It is possible that the translocation of some of these individuals is unsuccessful. As such, the proposed development will likely contribute to the cumulative loss of SCC in the region.

9.1.3 No-go Areas

Although no 'no-go' areas have been identified for the proposed Dassiesridge BESS, areas of high sensitivity have been delineated. It is recommended that the proposed Dassiesridge BESS is located within the southern half of the 11-ha surveyed site and that the depression in the north-western quarter of site is avoided, as far as practically possible. However, it is recognised that due to the location of the authorised substation, infrastructure including roads and cabling will traverse a portion of an area classified as highly sensitive. This is deemed acceptable provided these areas are micro-sited prior to vegetation clearance and/or construction. Additionally, it is imperative that vegetation clearance and activities associated with the construction of the proposed development be restricted to the boundaries of the development footprint (limited to 4-ha). It is recommended that the boundaries of the development footprint be clearly demarcated prior to the commencement of construction in order to prevent encroachment into the surrounding Grassridge Bontveld.

9.2 Conditions of Authorisation

The following additional recommendations must be included in the Final EMPr and as well as the conditions of the Environmental Authorisation (EA), if granted:

- All necessary permitting and authorisations must be obtained prior to the commencement of any construction activities;
- A suitably qualified ECO must be appointed prior to the commencement of the construction phase;
- A ground truthing survey of all SCC must be undertaken in order to inform the placement of the proposed Dassiesridge BESS within the proposed 11-ha site;
- A comprehensive Search and Rescue for fauna and flora should be conducted prior to vegetation clearance;
- It is recommended that an entomological ground truthing survey is conducted prior to construction to identify areas that are sensitive. The entomologist should have the skills to be able to positively identify the host ant species as well as the butterfly;
- All SCC must be relocated to nearest appropriate habitat;

- An Erosion Management Plan must be developed prior to the commencement of construction activities in order to mitigate the unnecessary loss of topsoil and runoff; and
- An Alien Vegetation Management Plan should be compiled (for implementation during the phases that follow the Planning and Design Phase).

9.2.1 Mitigation Measures

All mitigation measures identified for the impacts associated with the proposed development must be implemented during the relevant phases of the proposed Dassiesridge BESS (please refer to Section 9.1 above for the recommended mitigation measures associated with each impact).

9.3 Ecological Statement and Opinion of the Specialist

The ecological impacts of all aspects of the proposed Dassiesridge BESS were assessed. The majority of the impacts were rated as moderately negative and can be adequately mitigated to reduce the significance thereof to low negative.

Due to the scattered nature of the thicket clumps, should the proposed development proceed, the loss of a portion of the thicket clumps is unavoidable. However, it is recommended that the footprint of the proposed development is situated within a portion of the site that will result in the minimum loss of species diversity and plant SCC. As such, prior to the commencement of construction it is recommended that a ground truthing survey is undertaken to establish the number of SCC which will ultimately inform the placement of the proposed Dassiesridge BESS. The implementation of the recommended mitigation measures and monitoring protocols as described in this report and the EMPr are critical to ensure a development that is as environmentally sustainable as possible. Regardless of the placement of the proposed development, specific mitigation measures, including the undertaking of a comprehensive Plant and Faunal Search and Rescue Operation and the relocation of the SCC to the nearest appropriate habitat, must be implemented and adhered to. Furthermore, the development footprint of the proposed development must be demarcated to prevent any encroachment of construction or operational activities into surrounding natural areas and vegetation clearance must be kept to the absolute minimum footprint required for construction of the Dassiesridge BESS. Minor location deviations from the proposed works is deemed acceptable but the footprint may not be made larger.

The proposed Dassiesridge BESS is <u>NOT considered to be fatally flawed.</u>

The **no-go option** refers to the proposed development not taking place. This option will have a moderately positive outcome for the indigenous vegetation and surrounding natural environment relative to the proposed development, but the benefits associated with the construction of the proposed Dassiesridge BESS will be lost.

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APPENDIX A – LIST OF POSSIBLE PLANT SPECIES

The following list of plant species may occur within the project area of the proposed Dassiesridge BESS (source: http://posa.sanbi.org/sanbi/Explore).

FAMILY	SPECIES	SANBI RED LIST	IUCN	ECOLOGY
Poaceae	*Stipa dregeana*	Least Concern	Least Concern	Indigenous
Poaceae	*Sporobolus ludwigii*	Least Concern	Least Concern	Indigenous
Poaceae	*Themeda triandra*	Least Concern	Least Concern	Indigenous
Poaceae	*Tenaxia disticha*	Least Concern	-	Indigenous
Asteraceae	*Ursinia nana*	Least Concern	Least Concern	Indigenous
Asphodelaceae	*Haworthiopsis glauca*	Not Evaluated	-	Indigenous; Endemic
Iridaceae	*Aristea schizolaena*	Least Concern	Least Concern	Indigenous; Endemic
Amaryllidaceae	*Haemanthus coccineus*	Least Concern	Least Concern	Indigenous
Celastraceae	*Mystroxylon aethiopicum*	Least Concern	Least Concern	Indigenous; Endemic
Ericaceae	*Erica simulans*	Least Concern	Least Concern	Indigenous; Endemic
Scrophulariaceae	*Selago luxurians*	Least Concern	Least Concern	Indigenous; Endemic
Asteraceae	*Ursinia discolor*	Least Concern	Least Concern	Indigenous; Endemic
Neckeraceae	*Porotrichum madagassum*	Not Available	-	Indigenous
Fabaceae	*Chamaecrista capensis*	Least Concern	Least Concern	Indigenous
Iridaceae	*Dierama pendulum*	Least Concern	Least Concern	Indigenous; Endemic
Asphodelaceae	*Gasteria acinacifolia*	Least Concern	Least Concern	Indigenous; Endemic
Poaceae	*Arundinella nepalensis*	Least Concern	Least Concern	Indigenous
Polygalaceae	*Polygala virgata*	Least Concern	Least Concern	Indigenous
Apocynaceae	*Ceropegia carnosa*	Least Concern	Least Concern	Indigenous
Poaceae	*Hyparrhenia hirta*	Least Concern	Least Concern	Indigenous
Begoniaceae	*Begonia geranioides*	Least Concern	Least Concern	Indigenous; Endemic

Fabaceae	*Aspalathus angustifolia*	**Vulnerable**	Vulnerable	Indigenous; Endemic
Achariaceae	*Acharia tragodes*	Least Concern	Least Concern	Indigenous; Endemic
Solanaceae	*Nicandra physalodes*	Not Available	-	Not indigenous; Naturalised; Invasive
Asphodelaceae	*Aloe lineata*	Least Concern	Least Concern	Indigenous; Endemic
Iridaceae	*Tritonia gladiolaris*	Least Concern	Least Concern	Indigenous
Poaceae	*Cymbopogon marginatus*	Least Concern	Least Concern	Indigenous
Poaceae	*Digitaria sanguinalis*	Not Available	NE	Not indigenous; Naturalised
Penaeaceae	*Penaea cneorum*	Least Concern	Least Concern	Indigenous; Endemic
Fabaceae	*Senegalia caffra*	Least Concern	Least Concern	Indigenous
Poaceae	*Avena fatua*	Not Available	NE	Not indigenous; Naturalised; Invasive
Anacardiaceae	*Searsia dentata*	Least Concern	Least Concern	Indigenous
Poaceae	*Tribolium curvum*	Least Concern	Least Concern	Indigenous
Poaceae	*Pentameris airoides*	Least Concern	Least Concern	Indigenous
Euphorbiaceae	*Acalypha ecklonii*	Least Concern	Least Concern	Indigenous; Endemic
Scrophulariaceae	*Jamesbrittenia microphylla*	Least Concern	Least Concern	Indigenous; Endemic
Poaceae	*Stipa dregeana*	Least Concern	Least Concern	Indigenous; Endemic
Poaceae	*Phragmites australis*	Least Concern	Least Concern	Indigenous
Ericaceae	*Erica copiosa*	Least Concern	Least Concern	Indigenous; Endemic
Scrophulariaceae	*Jamesbrittenia foliolosa*	Least Concern	Least Concern	Indigenous; Endemic
Iridaceae	*Gladiolus ochroleucus*	Least Concern	Least Concern	Indigenous
Poaceae	*Digitaria eriantha*	Least Concern	Least Concern	Indigenous
Orchidaceae	*Holothrix sp.*		-	
Scrophulariaceae	*Buddleja saligna*	Least Concern	Least Concern	Indigenous
Iridaceae	*Gladiolus permeabilis*	Least Concern	Least Concern	Indigenous; Endemic
Achariaceae	*Ceratiosicyos laevis*	Least Concern	Least Concern	Indigenous
Poaceae	*Vulpia bromoides*	Least Concern	NE	Not indigenous; Naturalised; Invasive

Polygalaceae	*Polygala illepida*	Least Concern	Least Concern	Indigenous; Endemic
Poaceae	*Aira cupaniana*	Not Available	NE	Not indigenous; Naturalised
Orthotrichaceae	*Zygodon erosus*	Not Available	-	Indigenous
Malvaceae	*Sida ternata*	Least Concern	Least Concern	Indigenous
Poaceae	*Pentameris pallida*	Least Concern	Least Concern	Indigenous
Iridaceae	*Ixia orientalis*	Least Concern	Least Concern	Indigenous; Endemic
Poaceae	*Ehrharta erecta*	Least Concern	Least Concern	Indigenous
Poaceae	*Panicum deustum*	Least Concern	Least Concern	Indigenous
Myrtaceae	*Eugenia zeyheri*	Least Concern	Least Concern	Indigenous; Endemic
Neckeraceae	*Porotrichum elongatum*	Not Available	-	Indigenous

APPENDIX B – LIST OF PLANT SPECIES IDENTIFIED WITHIN THE PROJECT AREA.

FAMILY	SPECIES	IUCN	SA RED DATA LIST	PNCO	PROTECTED TREES	NEMBA	CITES
RUTACEAE	*Acmadenia obtusata*	-	LC	-	-	-	-
ASPARAGACEAE	*Agave spp.*	-	-	-	-	-	
ASPHODELACEAE	*Aloe africana*	-	LC	-	-	-	Appendix II
ASPHODELACEAE	*Aloe ferox*	-	LC	-	-	-	Appendix II
ASPARAGACEAE	*Asparagus striatus*	-	LC	-	-	-	-
ASPARAGACEAE	*Asparagus suaveolens*	-	LC	-	-	-	-
APOCYNACEAE	*cf Hoodia pilifera*	-	VU	Schedule 4	-	-	Appendix II
GENTIANACEAE	*Chironia baccifera*	-	LC	-	-	-	-
ASTERACEAE	*Osteospermum moniliferum*	-	LC	-	-	-	-
CRASSULACEAE	*Cotyledon orbiculata*	-	LC	-	-	-	-
CRASSULACEAE	*Cotyledon velutina*	-	LC	-	-	-	-
CRASSULACEAE	*Crassula arborescens*	-	LC	-	-	-	-
CRASSULACEAE	*Crassula mesembryanthemoides*	-	LC	-	-	-	-
CRASSULACEAE	*Crassula muscosa*	-	LC	-	-	-	-
CRASSULACEAE	*Crassula ovata*	-	LC	-	-	-	-
CRASSULACEAE	*Crassula pellucida*	-	LC	-	-	-	-
CRASSULACEAE	*Crassula perforata*	-	LC	-	-	-	-
CRASSULACEAE	*Crassula rupestris Thunb. subsp. rupestris*	-	LC	-	-	-	-
ARALIACEAE	*Cussonia sphaerocephala*	-	LC	-	-	-	-
POACEAE	*Cynodon dactylon*	-	LC	-	-	-	-
ASTERACEAE	*Disparago ericoides*	-	LC	-	-	-	-
SALICACEAE	*Dovyalis caffra*	-	LC	-	-	-	-

ASTERACEAE	*Elytropappus rhinocerotis*	-	LC	-	-	-	-
ZAMIACEAE	*Encephalartos cf horridus*	Endangered	EN	Schedule 3	-	*Endangered*	-
POACEAE	*Eragrostis chloromelas*	-	LC	-	-	-	-
POACEAE	*Eragrostis curvula*	-	LC	-	-	-	-
Ebenaceae	*Euclea undulata*	-	LC	-	-	-	-
EUPHORBIACEAE	*Euphorbia ledienii*	-	LC	-	-	-	Appendix I
EUPHORBIACEAE	*Euphorbia mauritanica var. mauritanica*	-	LC	-	-	-	Appendix I
ASTERACEAE	*Euryops cf ericifolius*	-	EN	-	-	-	-
ASTERACEAE	*Felicia muricata*	-	LC	-	-	-	-
ASTERACEAE	*Gazania krebsiana*	-	LC	-	-	-	-
MALVACEAE	*Grewia robusta*	-	LC	-	-	-	-
CELASTRACEAE	*Gymnosporia buxifolia*	-	LC	-	-	-	-
CELASTRACEAE	*Gymnosporia cf polyacantha*	-	LC	-	-	-	-
MALVACEAE	*Hermania sp.*	-	-	-	-	-	-
SAPINDACEAE	*Hippobromus pauciflorus*	-	LC	-	-	-	-
RESTIONACEAE	*Hypodiscus rigidus*	-	LC	-	-	-	-
SCROPHULARIACEAE	*Jamesbrittenia microphylla*	-	LC	-	-	-	-
CRASSULACEAE	*Kalanchoe rotundifolia*	-	LC	-	-	-	-
AIZOACEAE	*Lampranthus cf hollandii*	-	LC	-	-	-	-
AIZOACEAE	*Lampranthus products*	-	-	-	-	-	-
HYACINTHACEAE	*Ledebouria ensifolia*	-	LC	-	-	-	-
HYACINTHACEAE	*Ledibouria floribunda*	-	LC	-	-	-	-
BORAGINACEAE	*Lobostemon trigonus*	-	LC	-	-	-	-
SOLANACEAE	*Lycium horridum*	-	LC	-	-	-	-
CAPPARACEAE	*Maerua cafra*	-	LC	-	-	-	-
POACEAE	*Merxmuellera disticha*	-	LC	-	-	-	-
POLYGALACEAE	*Muraltia squarrosa*	-	LC	-	-	-	-

OLEACEAE	*Olea europaea subsp. Africana*	-	LC	-	-	-	-
CACTACEAE	*Opuntia aurantiaca*	-	-	-	-	-	Appendix II
CACTACEAE	*Opuntia ficus-indica*	-	-	-	-	-	Appendix II
HYACINTHACEAE	*Ornithogalum dubium*	-	LC	-	-	-	-
THYMELAEACEAE	*Passerina corymbosa*	-	LC	-	-	-	-
THYMELAEACEAE	*Passerina rigida*	-	LC	-	-	-	-
POACEAE	*Pentaschistis pallida*	-	-	-	-	-	-
PORTULACACEAE	*Portulacaria afra*	-	LC	-	-	-	-
CELASTRACEAE	*Pterocelastrus tricuspidatus*	-	LC	-	-	-	-
CELASTRACEAE	*Putterlickia pyracantha*	-	LC	-	-	-	-
AIZOACEAE	*Rhombophyllum rhomboideum*	Endangered	EN	-	-	-	-
ANACARDIACEAE	*Searsia longispina*	-	LC	-	-	-	-
ANACARDIACEAE	*Searsia lucida*	-	-	-	-	-	-
ANACARDIACEAE	*Searsia pyroides*	-	LC	-	-	-	-
ANACARDIACEAE	*Searsia rigens*	-	-	-	-	-	-
ANACARDIACEAE	*Searsia tumulicola*	-	-	-	-	-	-
APOCYNACEAE	*Sarcostemma viminale subsp. thunbergii*	-	LC	-	-	-	-
ANACARDIACEAE	*Schinus molle*	-	-	-	-	-	-
FABACEAE	*Schotia afra var afra*	-	LC	-	-	-	-
ASTERACEAE	*Senecio radicans*	-	LC	-	-	-	-
SAPOTACEAE	*Sideroxylon inerme*	-	LC	Appendix 2	Protected Tree	-	-
SOLANACEAE	*Solanum tomentosum*	-	LC	-	-	-	-
STRELITZIACEAE	*Strelitzia cf juncea*	-	VU	-	-	-	-
POACEAE	*Themeda triandra*	-	LC	-	-	-	-

APPENDIX C – LIST OF ANIMAL SPECIES

The following lists of animal species could occur within the project area of the proposed Dassiesridge BESS.

Birds

STRUTHIONIFORMES: Struthionidae		
Common Ostrich	*Struthio camelus*	
ANSERIFORMES: Anatidae		
White-faced Whistling-Duck	*Dendrocygna viduata*	
White-backed Duck	*Thalassornis leuconotus*	
Egyptian Goose	*Alopochen aegyptiaca*	
South African Shelduck	*Tadorna cana*	
Spur-winged Goose	*Plectropterus gambensis*	
Hottentot Teal	*Spatula hottentota*	
Cape Shoveler	*Spatula smithii*	
African Black Duck	*Anas sparsa*	
Yellow-billed Duck	*Anas undulata*	
Mallard	*Anas platyrhynchos*	Rare/Accidental
Cape Teal	*Anas capensis*	
Red-billed Duck	*Anas erythrorhyncha*	
Southern Pochard	*Netta erythrophthalma*	
Maccoa Duck	*Oxyura maccoa*	Vulnerable
GALLIFORMES: Numididae		
Helmeted Guineafowl	*Numida meleagris*	
GALLIFORMES: Phasianidae		
Common Quail	*Coturnix coturnix*	
Red-necked Francolin	*Pternistis afer*	
Red-winged Francolin	*Scleroptila levaillantii*	
Gray-winged Francolin	*Scleroptila afra*	Endemic (country/region)
PHOENICOPTERIFORMES: Phoenicopteridae		
Greater Flamingo	*Phoenicopterus roseus*	
Lesser Flamingo	*Phoeniconaias minor*	Near-threatened
PODICIPEDIFORMES: Podicipedidae		
Little Grebe	*Tachybaptus ruficollis*	
Great Crested Grebe	*Podiceps cristatus*	
Eared Grebe	*Podiceps nigricollis*	
COLUMBIFORMES: Columbidae		
Speckled Pigeon	*Columba guinea*	
Rameron Pigeon	*Columba arquatrix*	
Lemon Dove	*Columba larvata*	
Red-eyed Dove	*Streptopelia semitorquata*	
Ring-necked Dove	*Streptopelia capicola*	
Laughing Dove	*Streptopelia senegalensis*	
Emerald-spotted Wood-Dove	*Turtur chalcospilos*	
Tambourine Dove	*Turtur tympanistria*	
Namaqua Dove	*Oena capensis*	
OTIDIFORMES: Otididae		
Kori Bustard	*Ardeotis kori*	Near-threatened
Ludwig's Bustard	*Neotis ludwigii*	Endangered
Denham's Bustard	*Neotis denhami*	Near-threatened
White-bellied Bustard	*Eupodotis senegalensis*	

Black Bustard	*Eupodotis afra*	Endemic (country/region) Vulnerable
MUSOPHAGIFORMES: Musophagidae		
Knysna Turaco	*Tauraco corythaix*	
CUCULIFORMES: Cuculidae		
White-browed Coucal	*Centropus superciliosus*	
Green Malkoha	*Ceuthmochares australis*	
Great Spotted Cuckoo	*Clamator glandarius*	
Pied Cuckoo	*Clamator jacobinus*	
Dideric Cuckoo	*Chrysococcyx caprius*	
Klaas's Cuckoo	*Chrysococcyx klaas*	
African Emerald Cuckoo	*Chrysococcyx cupreus*	
Black Cuckoo	*Cuculus clamosus*	
Red-chested Cuckoo	*Cuculus solitarius*	
Common Cuckoo	*Cuculus canorus*	
CAPRIMULGIFORMES: Caprimulgidae		
Eurasian Nightjar	*Caprimulgus europaeus*	
Fiery-necked Nightjar	*Caprimulgus pectoralis*	
CAPRIMULGIFORMES: Apodidae		
Alpine Swift	*Apus melba*	
African Swift	*Apus barbatus*	
Little Swift	*Apus affinis*	
Horus Swift	*Apus horus*	
White-rumped Swift	*Apus caffer*	
African Palm-Swift	*Cypsiurus parvus*	
GRUIFORMES: Sarothruridae		
Buff-spotted Flufftail	*Sarothrura elegans*	
Red-chested Flufftail	*Sarothrura rufa*	
Striped Flufftail	*Sarothrura affinis*	
GRUIFORMES: Rallidae		
African Rail	*Rallus caerulescens*	
Eurasian Moorhen	*Gallinula chloropus*	
Red-knobbed Coot	*Fulica cristata*	
African Swamphen	*Porphyrio madagascariensis*	
Black Crake	*Zapornia flavirostra*	
GRUIFORMES: Heliornithidae		
African Finfoot	*Podica senegalensis*	
GRUIFORMES: Gruidae		
Blue Crane	*Anthropoides paradiseus*	Vulnerable
CHARADRIIFORMES: Burhinidae		
Water Thick-knee	*Burhinus vermiculatus*	
Spotted Thick-knee	*Burhinus capensis*	
CHARADRIIFORMES: Recurvirostridae		
Black-winged Stilt	*Himantopus himantopus*	
Pied Avocet	*Recurvirostra avosetta*	
CHARADRIIFORMES: Haematopodidae		
African Oystercatcher	*Haematopus moquini*	
CHARADRIIFORMES: Charadriidae		
Black-bellied Plover	*Pluvialis squatarola*	
Blacksmith Lapwing	*Vanellus armatus*	

Black-winged Lapwing	*Vanellus melanopterus*	
Crowned Lapwing	*Vanellus coronatus*	
Kittlitz's Plover	*Charadrius pecuarius*	
Common Ringed Plover	*Charadrius hiaticula*	
Three-banded Plover	*Charadrius tricollaris*	
White-fronted Plover	*Charadrius marginatus*	
Chestnut-banded Plover	*Charadrius pallidus*	Near-threatened
CHARADRIIFORMES: Rostratulidae		
Greater Painted-Snipe	*Rostratula benghalensis*	
CHARADRIIFORMES: Jacanidae		
African Jacana	*Actophilornis africanus*	
CHARADRIIFORMES: Scolopacidae		
Whimbrel	*Numenius phaeopus*	
Eurasian Curlew	*Numenius arquata*	Near-threatened
Bar-tailed Godwit	*Limosa lapponica*	Near-threatened
Ruddy Turnstone	*Arenaria interpres*	
Red Knot	*Calidris canutus*	Near-threatened
Ruff	*Calidris pugnax*	
Curlew Sandpiper	*Calidris ferruginea*	Near-threatened
Sanderling	*Calidris alba*	
Little Stint	*Calidris minuta*	
African Snipe	*Gallinago nigripennis*	
Terek Sandpiper	*Xenus cinereus*	
Common Sandpiper	*Actitis hypoleucos*	
Common Greenshank	*Tringa nebularia*	
Marsh Sandpiper	*Tringa stagnatilis*	
Wood Sandpiper	*Tringa glareola*	
CHARADRIIFORMES: Turnicidae		
Hottentot Buttonquail	*Turnix hottentottus*	Endemic (country/region) Endangered
CHARADRIIFORMES: Glareolidae		
Double-banded Courser	*Smutsornis africanus*	
CHARADRIIFORMES: Laridae		
Gray-hooded Gull	*Chroicocephalus cirrocephalus*	
Kelp Gull	*Larus dominicanus*	
Little Tern	*Sternula albifrons*	
Damara Tern	*Sternula balaenarum*	Vulnerable
Caspian Tern	*Hydroprogne caspia*	
White-winged Tern	*Chlidonias leucopterus*	
Whiskered Tern	*Chlidonias hybrida*	
Roseate Tern	*Sterna dougallii*	
SPHENISCIFORMES: Spheniscidae		
African Penguin	*Spheniscus demersus*	Endangered
CICONIIFORMES: Ciconiidae		
Black Stork	*Ciconia nigra*	
White Stork	*Ciconia ciconia*	
SULIFORMES: Anhingidae		
African Darter	*Anhinga rufa*	
SULIFORMES: Phalacrocoracidae		
Long-tailed Cormorant	*Microcarbo africanus*	
Great Cormorant	*Phalacrocorax carbo*	

Cape Cormorant	*Phalacrocorax capensis*	Endemic (country/region) Endangered
PELECANIFORMES: Scopidae		
Hamerkop	*Scopus umbretta*	
PELECANIFORMES: Ardeidae		
Little Bittern	*Ixobrychus minutus*	
Gray Heron	*Ardea cinerea*	
Black-headed Heron	*Ardea melanocephala*	
Goliath Heron	*Ardea goliath*	
Purple Heron	*Ardea purpurea*	
Great Egret	*Ardea alba*	
Intermediate Egret	*Ardea intermedia*	
Little Egret	*Egretta garzetta*	
Cattle Egret	*Bubulcus ibis*	
Squacco Heron	*Ardeola ralloides*	
Black-crowned Night-Heron	*Nycticorax nycticorax*	
White-backed Night-Heron	*Gorsachius leuconotus*	
PELECANIFORMES: Threskiornithidae		
Glossy Ibis	*Plegadis falcinellus*	
African Sacred Ibis	*Threskiornis aethiopicus*	
Hadada Ibis	*Bostrychia hagedash*	
African Spoonbill	*Platalea alba*	
ACCIPITRIFORMES: Sagittariidae		
Secretarybird	*Sagittarius serpentarius*	Vulnerable
ACCIPITRIFORMES: Pandionidae		
Osprey	*Pandion haliaetus*	
ACCIPITRIFORMES: Accipitridae		
Black-winged Kite	*Elanus caeruleus*	
African Harrier-Hawk	*Polyboroides typus*	
Bearded Vulture	*Gypaetus barbatus*	Near-threatened
African Cuckoo-Hawk	*Aviceda cuculoides*	
Cape Griffon	*Gyps coprotheres*	Endangered
Black-chested Snake-Eagle	*Circaetus pectoralis*	
Crowned Eagle	*Stephanoaetus coronatus*	Near-threatened
Martial Eagle	*Polemaetus bellicosus*	Vulnerable
Long-crested Eagle	*Lophaetus occipitalis*	
Booted Eagle	*Hieraaetus pennatus*	Rare/Accidental
Verreaux's Eagle	*Aquila verreauxii*	
Pale Chanting-Goshawk	*Melierax canorus*	
Gabar Goshawk	*Micronisus gabar*	
African Marsh-Harrier	*Circus ranivorus*	
Black Harrier	*Circus maurus*	Endangered
Pallid Harrier	*Circus macrourus*	Near-threatened
African Goshawk	*Accipiter tachiro*	
Little Sparrowhawk	*Accipiter minullus*	
Black Goshawk	*Accipiter melanoleucus*	
Black Kite	*Milvus migrans*	Rare/Accidental
African Fish-Eagle	*Haliaeetus vocifer*	
Common Buzzard	*Buteo buteo*	
Forest Buzzard	*Buteo trizonatus*	Endemic (country/region) Near-threatened
Jackal Buzzard	*Buteo rufofuscus*	
STRIGIFORMES: Tytonidae		
Barn Owl	*Tyto alba*	
STRIGIFORMES: Strigidae		

African Scops-Owl	*Otus senegalensis*	
Cape Eagle-Owl	*Bubo capensis*	
Spotted Eagle-Owl	*Bubo africanus*	
African Barred Owlet	*Glaucidium capense*	
African Wood-Owl	*Strix woodfordii*	
Marsh Owl	*Asio capensis*	
COLIIFORMES: Coliidae		
Speckled Mousebird	*Colius striatus*	
White-backed Mousebird	*Colius colius*	
Red-faced Mousebird	*Urocolius indicus*	
TROGONIFORMES: Trogonidae		
Narina Trogon	*Apaloderma narina*	
BUCEROTIFORMES: Upupidae		
Eurasian Hoopoe	*Upupa epops*	
BUCEROTIFORMES: Phoeniculidae		
Green Woodhoopoe	*Phoeniculus purpureus*	
BUCEROTIFORMES: Bucerotidae		
Crowned Hornbill	*Lophoceros alboterminatus*	
Trumpeter Hornbill	*Bycanistes bucinator*	
CORACIIFORMES: Alcedinidae		
Half-collared Kingfisher	*Alcedo semitorquata*	
Malachite Kingfisher	*Corythornis cristatus*	
African Pygmy-Kingfisher	*Ispidina picta*	
Brown-hooded Kingfisher	*Halcyon albiventris*	
Giant Kingfisher	*Megaceryle maxima*	
Pied Kingfisher	*Ceryle rudis*	
CORACIIFORMES: Meropidae		
White-fronted Bee-eater	*Merops bullockoides*	Rare/Accidental
European Bee-eater	*Merops apiaster*	
CORACIIFORMES: Coraciidae		
European Roller	*Coracias garrulus*	
PICIFORMES: Lybiidae		
Red-fronted Tinkerbird	*Pogoniulus pusillus*	
Pied Barbet	*Tricholaema leucomelas*	
Black-collared Barbet	*Lybius torquatus*	
PICIFORMES: Indicatoridae		
Wahlberg's Honeyguide	*Prodotiscus regulus*	
Lesser Honeyguide	*Indicator minor*	
Scaly-throated Honeyguide	*Indicator variegatus*	
Greater Honeyguide	*Indicator indicator*	
PICIFORMES: Picidae		
Rufous-necked Wryneck	*Jynx ruficollis*	
Cardinal Woodpecker	*Chloropicus fuscescens*	
Olive Woodpecker	*Chloropicus griseocephalus*	
Ground Woodpecker	*Geocolaptes olivaceus*	Endemic (country/region) Near-threatened
Knysna Woodpecker	*Campethera notata*	Endemic (country/region) Near-threatened
FALCONIFORMES: Falconidae		

Lesser Kestrel	*Falco naumanni*	
Rock Kestrel	*Falco rupicolus*	
Amur Falcon	*Falco amurensis*	
Eurasian Hobby	*Falco subbuteo*	
Lanner Falcon	*Falco biarmicus*	
Peregrine Falcon	*Falco peregrinus*	
PASSERIFORMES: Campephagidae		
Gray Cuckooshrike	*Coracina caesia*	
Black Cuckooshrike	*Campephaga flava*	
PASSERIFORMES: Oriolidae		
Eurasian Golden Oriole	*Oriolus oriolus*	
African Black-headed Oriole	*Oriolus larvatus*	
PASSERIFORMES: Platysteiridae		
Cape Batis	*Batis capensis*	
Chinspot Batis	*Batis molitor*	
Pririt Batis	*Batis pririt*	
PASSERIFORMES: Malaconotidae		
Black-backed Puffback	*Dryoscopus cubla*	
Southern Tchagra	*Tchagra tchagra*	
Southern Boubou	*Laniarius ferrugineus*	
Bokmakierie	*Telophorus zeylonus*	
Sulphur-breasted Bushshrike	*Telophorus sulfureopectus*	
Olive Bushshrike	*Telophorus olivaceus*	
Gray-headed Bushshrike	*Malaconotus blanchoti*	
PASSERIFORMES: Dicruridae		
Fork-tailed Drongo	*Dicrurus adsimilis*	
PASSERIFORMES: Monarchidae		
African Crested-Flycatcher	*Trochocercus cyanomelas*	
African Paradise-Flycatcher	*Terpsiphone viridis*	
PASSERIFORMES: Laniidae		
Red-backed Shrike	*Lanius collurio*	
Southern Fiscal	*Lanius collaris*	
PASSERIFORMES: Corvidae		
Cape Crow	*Corvus capensis*	
Pied Crow	*Corvus albus*	
White-necked Raven	*Corvus albicollis*	
PASSERIFORMES: Chaetopidae		
Cape Rockjumper	*Chaetops frenatus*	Endemic (country/region) Near-threatened
PASSERIFORMES: Stenostiridae		
Fairy Flycatcher	*Stenostira scita*	
PASSERIFORMES: Paridae		
Southern Black-Tit	*Melaniparus niger*	
Gray Tit	*Melaniparus afer*	
PASSERIFORMES: Remizidae		
Southern Penduline-Tit	*Anthoscopus minutus*	
PASSERIFORMES: Alaudidae		
Spike-heeled Lark	*Chersomanes albofasciata*	

Eastern Long-billed Lark	*Certhilauda semitorquata*	Endemic (country/region)
Gray-backed Sparrow-Lark	*Eremopterix verticalis*	
Sabota Lark	*Calendulauda sabota*	
Karoo Lark	*Calendulauda albescens*	Endemic (country/region)
Eastern Clapper Lark	*Mirafra fasciolata*	
Rufous-naped Lark	*Mirafra africana*	
Red-capped Lark	*Calandrella cinerea*	
Large-billed Lark	*Galerida magnirostris*	
PASSERIFORMES: Macrosphenidae		
Cape Crombec	*Sylvietta rufescens*	
Cape Grassbird	*Sphenoeacus afer*	
Victorin's Warbler	*Cryptillas victorini*	Endemic (country/region)
PASSERIFORMES: Cisticolidae		
Yellow-bellied Eremomela	*Eremomela icteropygialis*	
Namaqua Warbler	*Phragmacia substriata*	
Green-backed Camaroptera	*Camaroptera brachyura*	
Bar-throated Apalis	*Apalis thoracica*	
Yellow-breasted Apalis	*Apalis flavida*	
Karoo Prinia	*Prinia maculosa*	
Rufous-eared Warbler	*Malcorus pectoralis*	
Rock-loving Cisticola	*Cisticola aberrans*	
Red-headed Cisticola	*Cisticola subruficapilla*	
Wailing Cisticola	*Cisticola lais*	
Levaillant's Cisticola	*Cisticola tinniens*	
Piping Cisticola	*Cisticola fulvicapilla*	
Zitting Cisticola	*Cisticola juncidis*	
Cloud Cisticola	*Cisticola textrix*	
PASSERIFORMES: Acrocephalidae		
African Reed Warbler	*Acrocephalus baeticatus*	
Lesser Swamp Warbler	*Acrocephalus gracilirostris*	
PASSERIFORMES: Locustellidae		
Little Rush-Warbler	*Bradypterus baboecala*	
PASSERIFORMES: Hirundinidae		
Plain Martin	*Riparia paludicola*	
Banded Martin	*Riparia cincta*	
Rock Martin	*Ptyonoprogne fuligula*	
Barn Swallow	*Hirundo rustica*	
White-throated Swallow	*Hirundo albigularis*	
Pearl-breasted Swallow	*Hirundo dimidiata*	
Greater Striped Swallow	*Cecropis cucullata*	
Lesser Striped Swallow	*Cecropis abyssinica*	
Common House-Martin	*Delichon urbicum*	
Black Sawwing	*Psalidoprocne pristoptera*	
PASSERIFORMES: Pycnonotidae		
Sombre Greenbul	*Andropadus importunus*	
Terrestrial Brownbul	*Phyllastrephus terrestris*	
Cape Bulbul	*Pycnonotus capensis*	Endemic (country/region)
PASSERIFORMES: Phylloscopidae		
Willow Warbler	*Phylloscopus trochilus*	
Yellow-throated Woodland-Warbler	*Phylloscopus ruficapilla*	
PASSERIFORMES: Sylviidae		
Bush Blackcap	*Sylvia nigricapillus*	Vulnerable
Layard's Warbler	*Sylvia layardi*	

Chestnut-vented Warbler	*Sylvia subcoerulea*	
PASSERIFORMES: Zosteropidae		
Cape White-eye	*Zosterops virens*	
PASSERIFORMES: Sturnidae		
European Starling	*Sturnus vulgaris*	Introduced species
Wattled Starling	*Creatophora cinerea*	
Pale-winged Starling	*Onychognathus nabouroup*	
Red-winged Starling	*Onychognathus morio*	
Black-bellied Starling	*Notopholia corusca*	
African Pied Starling	*Lamprotornis bicolor*	Endemic (country/region)
Cape Starling	*Lamprotornis nitens*	
PASSERIFORMES: Turdidae		
Olive Thrush	*Turdus olivaceus*	
PASSERIFORMES: Muscicapidae		
African Dusky Flycatcher	*Muscicapa adusta*	
Spotted Flycatcher	*Muscicapa striata*	
Chat Flycatcher	*Agricola infuscatus*	
Fiscal Flycatcher	*Melaenornis silens*	
Karoo Scrub-Robin	*Cercotrichas coryphoeus*	
Brown Scrub-Robin	*Cercotrichas signata*	
Red-backed Scrub-Robin	*Cercotrichas leucophrys*	
Cape Robin-Chat	*Cossypha caffra*	
Chorister Robin-Chat	*Cossypha dichroa*	
White-starred Robin	*Pogonocichla stellata*	
Sentinel Rock-Thrush	*Monticola explorator*	Near-threatened
Cape Rock-Thrush	*Monticola rupestris*	Endemic (country/region)
African Stonechat	*Saxicola torquatus*	
Southern Anteater-Chat	*Myrmecocichla formicivora*	
Arnot's Chat	*Myrmecocichla arnotti*	
Ruaha Chat	*Myrmecocichla collaris*	
Capped Wheatear	*Oenanthe pileata*	
Familiar Chat	*Oenanthe familiaris*	
PASSERIFORMES: Promeropidae		
Cape Sugarbird	*Promerops cafer*	Endemic (country/region)
PASSERIFORMES: Nectariniidae		
Collared Sunbird	*Hedydipna collaris*	
Orange-breasted Sunbird	*Anthobaphes violacea*	Endemic (country/region)
Mouse-colored Sunbird	*Cyanomitra veroxii*	
Amethyst Sunbird	*Chalcomitra amethystina*	
Malachite Sunbird	*Nectarinia famosa*	
Southern Double-collared Sunbird	*Cinnyris chalybeus*	
Greater Double-collared Sunbird	*Cinnyris afer*	
Dusky Sunbird	*Cinnyris fuscus*	
PASSERIFORMES: Ploceidae		
Scaly Weaver	*Sporopipes squamifrons*	
Spectacled Weaver	*Ploceus ocularis*	
Cape Weaver	*Ploceus capensis*	Endemic (country/region)
Southern Masked-Weaver	*Ploceus velatus*	
Village Weaver	*Ploceus cucullatus*	
Forest Weaver	*Ploceus bicolor*	
Red-billed Quelea	*Quelea quelea*	
Southern Red Bishop	*Euplectes orix*	
Yellow Bishop	*Euplectes capensis*	
Red-collared Widowbird	*Euplectes ardens*	

Long-tailed Widowbird	*Euplectes progne*	
Grosbeak Weaver	*Amblyospiza albifrons*	
PASSERIFORMES: Estrildidae		
Swee Waxbill	*Coccopygia melanotis*	
Common Waxbill	*Estrilda astrild*	
Red-billed Firefinch	*Lagonosticta senegala*	
African Firefinch	*Lagonosticta rubricata*	
Red-headed Finch	*Amadina erythrocephala*	
Quailfinch	*Ortygospiza atricollis*	
Bronze Mannikin	*Spermestes cucullata*	
PASSERIFORMES: Viduidae		
Pin-tailed Whydah	*Vidua macroura*	
Variable Indigobird	*Vidua funerea*	
PASSERIFORMES: Passeridae		
House Sparrow	*Passer domesticus*	Introduced species
Cape Sparrow	*Passer melanurus*	
Southern Gray-headed Sparrow	*Passer diffusus*	
Yellow-throated Bush Sparrow	*Gymnoris superciliaris*	
PASSERIFORMES: Motacillidae		
Cape Wagtail	*Motacilla capensis*	
Mountain Wagtail	*Motacilla clara*	
African Pied Wagtail	*Motacilla aguimp*	
African Pipit	*Anthus cinnamomeus*	
Long-billed Pipit	*Anthus similis*	
Plain-backed Pipit	*Anthus leucophrys*	
Buffy Pipit	*Anthus vaalensis*	
Orange-throated Longclaw	*Macronyx capensis*	
PASSERIFORMES: Fringillidae		
Yellow-fronted Canary	*Crithagra mozambica*	
Forest Canary	*Crithagra scotops*	Endemic (country/region)
Black-throated Canary	*Crithagra atrogularis*	
Brimstone Canary	*Crithagra sulphurata*	
Yellow Canary	*Crithagra flaviventris*	
White-throated Canary	*Crithagra albogularis*	
Protea Canary	*Crithagra leucoptera*	Endemic (country/region) Near-threatened
Streaky-headed Seedeater	*Crithagra gularis*	
Cape Siskin	*Crithagra totta*	Endemic (country/region)
Cape Canary	*Serinus canicollis*	
Black-headed Canary	*Serinus alario*	
PASSERIFORMES: Emberizidae		
Golden-breasted Bunting	*Emberiza flaviventris*	
Cape Bunting	*Emberiza capensis*	
Lark-like Bunting	*Emberiza impetuani*	
Cinnamon-breasted Bunting	*Emberiza tahapisi*	

Amphibians

Family	Scientific name	Common name	Red list category
Bufonidae	*Sclerophrys capensis*	Raucous Toad	Least Concern
Hyperoliidae	*Hyperolius marmoratus*	Painted Reed Frog	Least Concern (IUCN ver 3.1, 2013)
Hyperoliidae	*Hyperolius marmoratus verrucosus*	Painted Reed Frog (subsp. verrucosus)	Least Concern (IUCN ver 3.1, 2013)
Hyperoliidae	*Kassina senegalensis*	Bubbling Kassina	Least Concern

Hyperoliidae	*Semnodactylus wealii*	Rattling Frog	Least Concern
Pyxicephalidae	*Amietia delalandii*	Delalande's River Frog	Least Concern (2017)
Pyxicephalidae	*Amietia fuscigula*	Cape River Frog	Least Concern (2017)
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern (2013)
Pyxicephalidae	*Cacosternum nanum*	Bronze Caco	Least Concern (2013)
Pyxicephalidae	*Strongylopus fasciatus*	Striped Stream Frog	Least Concern
Pyxicephalidae	*Strongylopus grayii*	Clicking Stream Frog	Least Concern

Reptiles

Family	Scientific name	Common name	Red list category
Agamidae	Agama atra	Southern Rock Agama	Least Concern (SARCA 2014)
Chamaeleonidae	Bradypodion sp. (barbatulum)	Beardless Dwarf Chameleon	Not Evaluated
Chamaeleonidae	Bradypodion sp. (Groendal)	Groendal Dwarf Chameleon	
Chamaeleonidae	Bradypodion ventrale	Eastern Cape Dwarf Chameleon	Least Concern (SARCA 2014)
Colubridae	Dispholidus typus typus	Boomslang	Least Concern (SARCA 2014)
Colubridae	Philothamnus occidentalis	Western Natal Green Snake	Least Concern (SARCA 2014)
Cordylidae	Cordylus cordylus	Cape Girdled Lizard	Least Concern (SARCA 2014)
Cordylidae	Pseudocordylus microlepidotus microlepidotus	Cape Crag Lizard	Least Concern (SARCA 2014)
Elapidae	Naja nivea	Cape Cobra	Least Concern (SARCA 2014)
Gekkonidae	Chondrodactylus bibronii	Bibron's Gecko	Least Concern (SARCA 2014)
Gekkonidae	Pachydactylus maculatus	Spotted Gecko	Least Concern (SARCA 2014)
Lacertidae	Nucras taeniolata	Albany Sandveld Lizard	Near Threatened (SARCA 2014)
Lacertidae	Pedioplanis lineoocellata pulchella	Common Sand Lizard	Least Concern (SARCA 2014)
Lamprophiidae	Boaedon capensis	Brown House Snake	Least Concern (SARCA 2014)
Lamprophiidae	Duberria lutrix lutrix	South African Slug-eater	Least Concern (SARCA 2014)
Lamprophiidae	Homoroselaps lacteus	Spotted Harlequin Snake	Least Concern (SARCA 2014)
Lamprophiidae	Lycodonomorphus rufulus	Brown Water Snake	Least Concern (SARCA 2014)
Lamprophiidae	Prosymna sundevallii	Sundevall's Shovel-snout	Least Concern (SARCA 2014)
Lamprophiidae	Psammophis crucifer	Cross-marked Grass Snake	Least Concern (SARCA 2014)
Lamprophiidae	Psammophis notostictus	Karoo Sand Snake	Least Concern (SARCA 2014)
Scincidae	Acontias meleagris	Cape Legless Skink	Least Concern (SARCA 2014)
Scincidae	Scelotes caffer	Cape Dwarf Burrowing Skink	Least Concern (SARCA 2014)
Scincidae	Trachylepis capensis	Cape Skink	Least Concern (SARCA 2014)
Scincidae	Trachylepis homalocephala	Red-sided Skink	Least Concern (SARCA 2014)
Scincidae	Trachylepis varia sensu stricto	Common Variable Skink	
Scincidae	Trachylepis variegata	Variegated Skink	Least Concern (SARCA 2014)
Testudinidae	Chersina angulata	Angulate Tortoise	Least Concern (SARCA 2014)
Testudinidae	Stigmochelys pardalis	Leopard Tortoise	Least Concern (SARCA 2014)
Viperidae	Bitis arietans arietans	Puff Adder	Least Concern (SARCA 2014)
Viperidae	Causus rhombeatus	Rhombic Night Adder	Least Concern (SARCA 2014)

Mammals

Family	Scientific name	Common name	Red list category
Bovidae	*Antidorcas marsupialis*	Springbok	Least Concern (2016)
Bovidae	*Philantomba monticola*	Blue Duiker	Vulnerable (2016)
Canidae	*Vulpes chama*	Cape Fox	Least Concern (2016)
Cercopithecidae	*Chlorocebus pygerythrus*	Vervet Monkey	Least Concern (2016)
Cercopithecidae	*Papio ursinus*	Chacma Baboon	Least Concern (2016)
Felidae	*Caracal caracal*	Caracal	Least Concern (2016)

Felidae	*Felis catus*	Domestic Cat	Introduced
Felidae	*Panthera pardus*	Leopard	Vulnerable (2016)
Muridae	*Aethomys namaquensis*	Namaqua Rock Mouse	Least Concern
Muridae	*Desmodillus auricularis*	Cape Short-tailed Gerbil	Least Concern (2016)
Muridae	*Grammomys dolichurus*	Common Grammomys	Least Concern (2016)
Muridae	*Mastomys coucha*	Southern African Mastomys	Least Concern (2016)
Muridae	*Mastomys natalensis*	Natal Mastomys	Least Concern (2016)
Muridae	*Otomys irroratus*	Southern African Vlei Rat (Fynbos type)	Least Concern (2016)
Muridae	*Otomys unisulcatus*	Karoo Bush Rat	Least Concern (2016)
Muridae	*Rattus rattus*	Roof Rat	Least Concern
Muridae	*Rhabdomys pumilio*	Xeric Four-striped Grass Rat	Least Concern (2016)
Mustelidae	*Ictonyx striatus*	Striped Polecat	Least Concern (2016)
Mustelidae	*Mellivora capensis*	Honey Badger	Least Concern (2016)

APPENDIX D – IMPACT RATING METHODOLOGY

To ensure a balanced and objective approach to assessing the significance of potential impacts, a standardised rating scale was adopted which allows for the direct comparison of specialist studies. This rating scale has been developed in accordance with the requirements outlined in Appendix 1 of the EIA Regulations (2014 and subsequent 2017 amendments).

Impact significance pre-mitigation

This rating scale adopts six key factors to determine the overall significance of the impact prior to mitigation:

1. **Nature of impact:** Defines whether the impact has a negative or positive effect on the receiving environment.
2. **Type of impact:** Defines whether the impact has a direct, indirect or cumulative effect on the environment.
3. **Duration:** defines the relationship of the impact to temporal scales. The temporal scale defines the significance of the impact at various time scales as an indication of the duration of the impact. This may extend from the short-term (less than 5 years, equivalent to the construction phase) to permanent. Generally, the longer the impact occurs the greater the significance of any given impact.
4. **Extent:** describes the relationship of the impact to spatial scales i.e. the physical extent of the impact. This may extend from the local area to an impact that crosses international boundaries. The wider the spatial scale the impact extends, the more significant the impact is considered to be.
5. **Probability:** refers to the likelihood (risk or chance) of the impact occurring. While many impacts generally do occur, there is considerable uncertainty in terms of others. The scale varies from unlikely to definite, with the overall impact significance increasing as the likelihood increases.
6. **Severity or benefits:** the severity/beneficial scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on the receiving environment. The severity of an impact can be evaluated prior and post mitigation to demonstrate the seriousness of the impact if it is not mitigated, as well as the effectiveness of the mitigation measures. The word 'mitigation' does not only refer to 'compensation', but also includes concepts of containment and remedy. For beneficial impacts, optimization refers to any measure that can enhance the benefits. Mitigation or optimisation should be practical, technically feasible and economically viable.

For each impact, the duration, extent and probability are ranked and assigned a score. These scores are combined and used to determine the overall impact significance prior to mitigation. They must then be considered against the severity rating to determine the overall significance of an activity. This is because the severity of the impact is far more important than the other three criteria. The overall significance is either negative or positive (Criterion 1) and direct, indirect or cumulative (Criterion 2).

Table D1: Evaluation Criteria.

Duration (Temporal Scale)	
Short term	*Less than 5 years*
Medium term	*Between 5-20 years*

Long term	*Between 20 and 40 years (a generation) and from a human perspective also permanent*	
Permanent	*Over 40 years and resulting in a permanent and lasting change that will always be there*	
Extent (Spatial Scale)		
Localised	*At localised scale and a few hectares in extent*	
Study Area	*The proposed site and its immediate environs*	
Regional	*District and Provincial level*	
National	*Country*	
International	*Internationally*	
Probability (Likelihood)		
Unlikely	*The likelihood of these impacts occurring is slight*	
May Occur	*The likelihood of these impacts occurring is possible*	
Probable	*The likelihood of these impacts occurring is probable*	
Definite	*The likelihood is that this impact will definitely occur*	
Severity Scale	*Severity*	*Benefit*
Very Severe/ Beneficial	An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.
Severe/ Beneficial	Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these.	A long-term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
Moderately severe/Beneficial	Medium to long term impacts on the affected system(s) or party (ies), which could be mitigated.	A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
Slight	Medium- or short-term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.
No effect/don't or can't know	The system(s) or party(ies) is not affected by the proposed development.	In certain cases, it may not be possible to determine the severity of an impact.

** In certain cases, it may not be possible to determine the severity of an impact thus it may be determined: Don't know/Can't know.*

Table D2: Description of Overall Significance Rating

Significance Rate	***Description***
Don't Know	*In certain cases, it may not be possible to determine the significance of an impact. For example, the primary or secondary impacts on the social or natural environment given the available information.*
NO SIGNIFICANCE	*There are no primary or secondary effects at all that are important to scientists or the public.*

LOW NEGATIVE	***LOW POSITIVE***	*Impacts of low significance are typically acceptable impacts for which mitigation is desirable but not essential. The impact by itself is insufficient, even in combination with other low impacts, to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural environment or on social systems.*
MODERATE NEGATIVE	**MODERATE POSITIVE**	*Impacts of moderate significance are impacts that require mitigation. The impact is insufficient by itself to prevent the implementation of the project but in conjunction with other impacts may prevent its implementation. These impacts will usually result in a negative medium to long-term effect on the natural environment or on social systems.*
HIGH NEGATIVE	***HIGH POSITIVE***	*Impacts that are rated as being high are serious impacts and may prevent the implementation of the project if no mitigation measures are implemented, or the impact is very difficult to mitigate. These impacts would be considered by society as constituting a major and usually long-term change to the environment or social systems and result in severe effects.*
VERY HIGH NEGATIVE	***VERY HIGH POSITIVE***	*Impacts that are rated as very high are very serious impact which may be sufficient by itself to prevent the implementation of the project. The impact may result in permanent change. Very often these impacts are unmitigable and usually result in very severe effects or very beneficial effects.*

Impact significance post-mitigation

Once mitigation measures are proposed, the following three factors are then considered to determine the overall significance of the impact after mitigation.

1. **Reversibility Scale**: This scale defines the degree to which an environment can be returned to its original/partially original state.
2. **Irreplaceable loss Scale:** This scale defines the degree of loss which an impact may cause.
3. **Mitigation potential Scale:** This scale defines the degree of difficulty of reversing and/or mitigating the various impacts ranges from very difficult to easily achievable. Both the practical feasibility of the measure, the potential cost and the potential effectiveness is taken into consideration when determining the appropriate degree of difficulty.

Table D3: Post-mitigation Evaluation Criteria

Reversibility	
Reversible	*The activity will lead to an impact that can be reversed provided appropriate mitigation measures are implemented.*
Irreversible	*The activity will lead to an impact that is permanent regardless of the implementation of mitigation measures.*
Irreplaceable loss	
Resource will not be lost	*The resource will not be lost/destroyed provided mitigation measures are implemented.*
Resource will be partly lost	*The resource will be partially destroyed even though mitigation measures are implemented.*
Resource will be lost	*The resource will be lost despite the implementation of mitigation measures.*
Mitigation potential	
Easily achievable	*The impact can be easily, effectively and cost effectively mitigated/reversed.*

Achievable	*The impact can be effectively mitigated/reversed without much difficulty or cost.*
Difficult	*The impact could be mitigated/reversed but there will be some difficultly in ensuring effectiveness and/or implementation, and significant costs.*
Very Difficult	*The impact could be mitigated/reversed but it would be very difficult to ensure effectiveness, technically very challenging and financially very costly.*

The following assumptions and limitations are inherent in the rating methodology:

- Value Judgements: Although this scale attempts to provide a balance and rigor to assessing the significance of impacts, the evaluation relies heavily on the values of the person making the judgment.
- Cumulative Impacts: These affect the significance ranking of an impact because it considers the impact in terms of both on-site and off-site sources. This is particularly problematic in terms of impacts beyond the scope of the proposed development. For this reason, it is important to consider impacts in terms of their cumulative nature.
- Seasonality: Certain impacts will vary in significance based on seasonal change. Thus, it is difficult to provide a static assessment. Seasonality will need to be implicit in the temporal scale, with management measures being imposed accordingly (e.g. dust suppression measures being implemented during the dry season).

APPENDIX E – CURRICULUM VITAE OF THE PROJECT TEAM