



ECOLOGICAL IMPACT ASSESSMENT REPORT

PROPOSED UMOYILANGA BUFFER YARD, SITE CAMP AND
SITE CAMP ACCESS ROAD NEAR UITENHAGE, NELSON
MANDELA BAY MUNICIPALITY AND SUNDAYS RIVER VALLEY
MUNICIPALITY, EASTERN CAPE PROVINCE



ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES



PROPOSED UMOYILANGA BUFFER YARD, SITE CAMP AND SITE CAMP ACCESS ROAD NEAR UITENHAGE, NELSON MANDELA BAY MUNICIPALITY AND SUNDAYS RIVER VALLEY LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE	
<i>DEDEAT Reference Number: TBC</i>	
ECOLOGICAL IMPACT ASSESSMENT	
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CES Report Revision and Tracking Schedule

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ACRONYM LIST

ADU	Animal Demography Unit
BA	Basic Assessment
BESS	Battery Energy Storage System
BI	Biodiversity Importance
CA	Conservation Area
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CES	Coastal and Environmental Services
CESA	Critical Ecosystem Support Areas
CI	Conservation Importance
CR	Critically Endangered
CTMF	Concrete Tower Manufacturing Facility
DAFF	Department of Agriculture, Forestry and Fisheries
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
ECBCP	Eastern Cape Biodiversity Conservation Plan
EIA	Environmental Impact Assessment
EN	Endangered
EMPr	Environmental Management Programme
ESA	Ecological Support Area
EOO	Extent of Occupancy
FI	Functional Integrity
GIS	Geographical Information System
GN	Government Notice
IUCN	International Union for Conservation of Nature
LC	Least Concern
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act
NEM:BA	National Environmental Management Biodiversity Act



NFEPA	National Freshwater Ecosystem Priority Areas
NMBM	Nelson Mandela Bay Municipality
NPAES	National Protected Areas Expansion Strategy
NT	Near Threatened
ONA	Other Natural Area
PA	Protected Area
PNCO	Provincial Nature Conservation Ordinance
POSA	Plants of Southern Africa
PPP	Public Participation Process
QDS	Quarter Degree Square
RR	Receptor Resilience
SACAD	South African Conservation Areas
SANBI	South African National Biodiversity Institute
SA NLC	South African National Land Cover
SAPAD	South Africa Protected Areas Database
SCC	Species of Conservation Concern
SEI	Site Ecological Importance
SOTER	Soil and Terrain
TOPS	Threatened and Protected Species
VU	Vulnerable
WEF	Wind Energy Facility
WMA	Water Management Area



DEFINITIONS

Alien Invasive Species refers to an exotic species that can spread rapidly and displace native species causing damage to the environment

Biodiversity is the term that is used to describe the variety of life on Earth and is defined as “the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems” (Secretariat of the Convention on Biological Diversity, 2005).

Habitat Fragmentation occurs when large expanses of habitat are transformed into smaller patches of discontinuous habitat units isolated from each other by transformed habitats such as farmland.

Natural Habitat refers to habitats composed of viable assemblages of plant and/or animal species of largely native origin and/or where human activity has not essentially modified an area’s primary ecological function and species composition.

Protected Area is a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (*IUCN Definition 2008*).

Species of Conservation Concern all species that are assessed according to the IUCN Red List Criteria as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Data Deficient (DD) or Near Threatened (NT), as well as range-restricted species which are not declining and are nationally listed as Rare or Extremely Rare [also referred to in some Red Lists as Critically Rare].



SPECIALIST CHECK LIST

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).

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 iv – v, Appendix 5
3.1.2	A signed statement of independence by the specialist;	Appendix 6
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 2.1
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 2
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 1.4
3.1.6	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Chapter 4 and Chapter 6
3.1.7	Additional environmental impacts expected from the proposed development;	Chapter 5
3.1.8	Any direct, indirect and cumulative impacts of the proposed development;	Chapter 5
3.1.9	The degree to which the impacts and risks can be mitigated;	Chapter 5
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);	Chapter 5 and Section 6.2
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 6
3.1.15	Any conditions to which this statement is subjected.	Section 6.2
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.	✓



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1 INTRODUCTION AND PROJECT DESCRIPTION

1.1 PROJECT DESCRIPTION AND LOCALITY

Umoyilanga (Pty) Ltd, a subsidiary of EDF Renewables (Pty) Ltd, requires the establishment of a buffer yard, a site camp, and a site camp access road to assist with the construction of the authorised Dassiesridge Wind Energy Facility (WEF) (Ref. No. XX). The proposed buffer yard will be located on Grassridge Farm No. 187 (Nelson Mandela Bay Municipality) while the proposed site camp and associated access road will be located on Portion 11 of Blauw Baatjies Vley Farm No. 189 (Sundays River Valley Local Municipality) (Figure 1.1). Both properties fall within the project site for the authorised Dassiesridge WEF.

Coastal and Environmental Services (Pty) Ltd, trading as 'CES', has been appointed by Umoyilanga (Pty) Ltd to apply for Environmental Authorisation (EA) in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998 and subsequent amendments) Environmental Impact Assessment (EIA) Regulations (2014 and subsequent amendments) by means of conducting a Basic Assessment (BA) Process, inclusive of the relevant specialist studies. This Ecological Impact Assessment report will supplement the BA Process for the proposed Umoyilanga Buffer Yard, Site Camp and Site Camp Access Road.

A number of studies have been undertaken within the project area for the authorised Dassiesridge WEF, including the following:

- Ecological Impact Assessment for the proposed Dassiesridge Wind Energy Facility (EOH: Coastal and Environmental Services, 2014).
- Terrestrial Biodiversity Specialist Assessment for the proposed Dassiesridge Battery Energy Storage System (BESS) near Uitenhage, Nelson Mandela Bay Municipality, Eastern Cape Province (CES, 2020).
- Terrestrial Biodiversity Specialist Assessment for the proposed Dassiesridge Concrete Tower Manufacturing Facility (CTMF) near Uitenhage, Sundays River Valley Local Municipality, Eastern Cape Province (CES, 2020).
- Ecological Impact Assessment for the proposed Umoyilanga Ancillary Infrastructure near Uitenhage, Nelson Mandela Bay Municipality and Sundays River Valley Local Municipality, Eastern Cape Province (CES, 2021).
- Botanical Micro-siting Report for the proposed Dassiesridge Wind Energy Facility near Uitenhage, Nelson Mandela Bay Municipality and Sundays River Valley Local Municipality, Eastern Cape Province (CES, 2021).
- Botanical Mico-siting Report for the proposed Umoyilanga 132 kV Overhead Line (OHL) in the Sundays River Valley Local Municipality and the Nelson Mandela Bay Municipality, Eastern Cape Province.

Moreover, the proposed buffer yard is located approximately 10 m north-west of the approved BESS while the proposed site camp and site camp access road is located 19 m south of the approved road and 368 m north-east of the approved CTMF, for which Ecological Impact Assessments have already been conducted. It should also be noted that the proposed area for the Site Camp and Site Camp Access Road has been micro-sited by a botanical specialist. As such, the project area has been extensively surveyed and the information obtained is sufficient to inform the findings of this report.

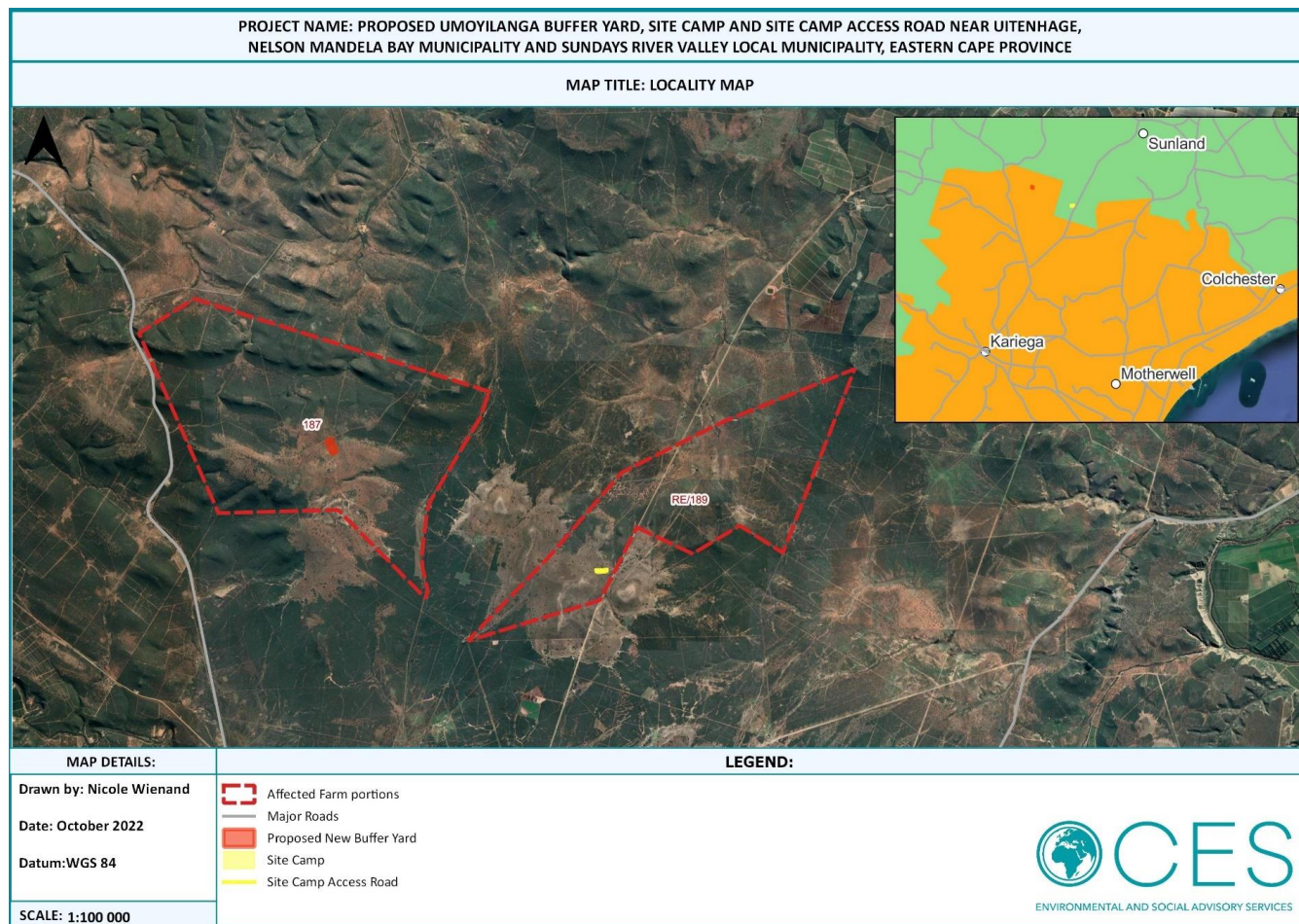


Figure 1.1: Locality Map of the proposed Umoyilanga Buffer Yard, Site Camp and Site Camp Access Road.

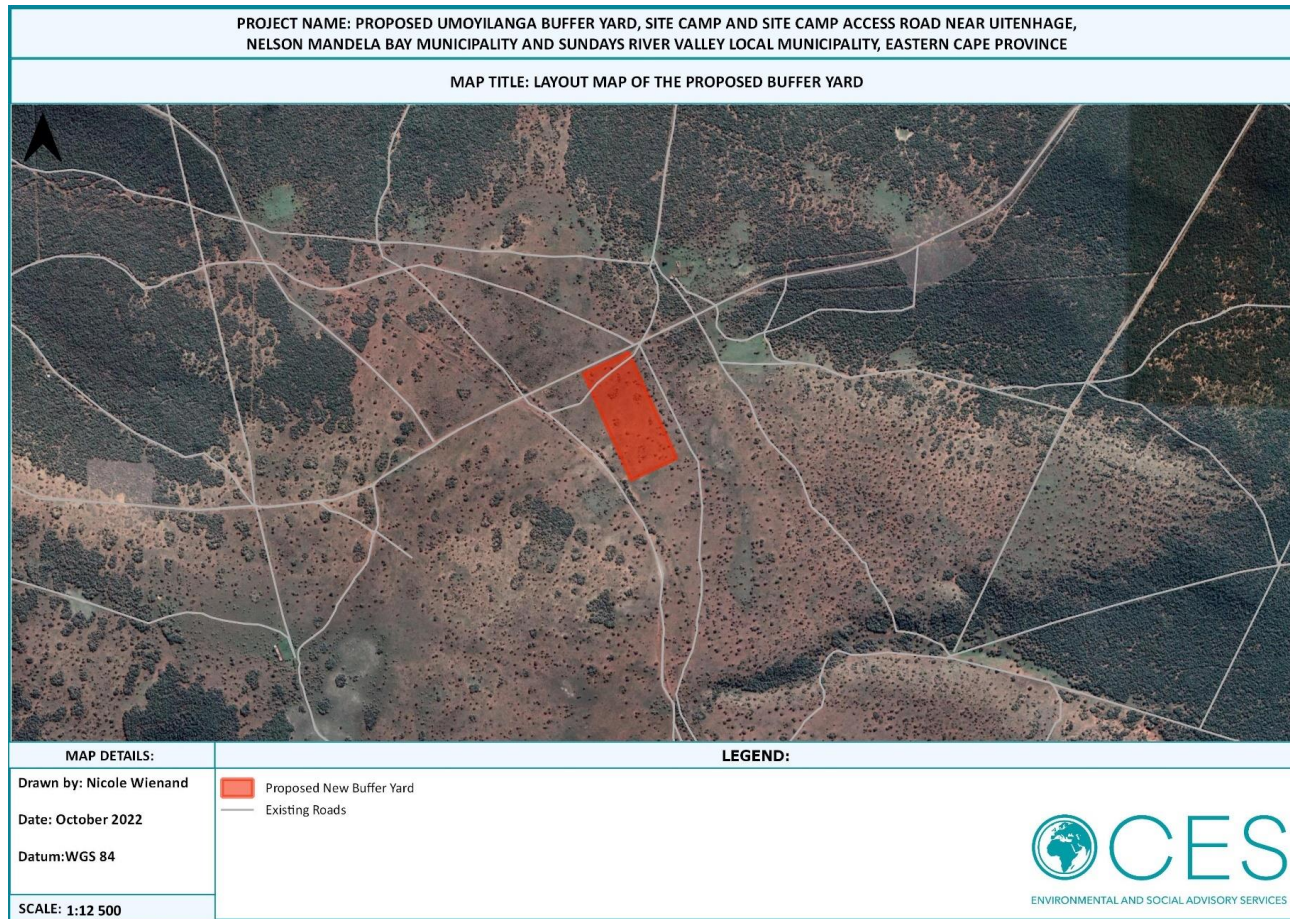


Figure 1.2: Layout Map of the proposed Buffer Yard.

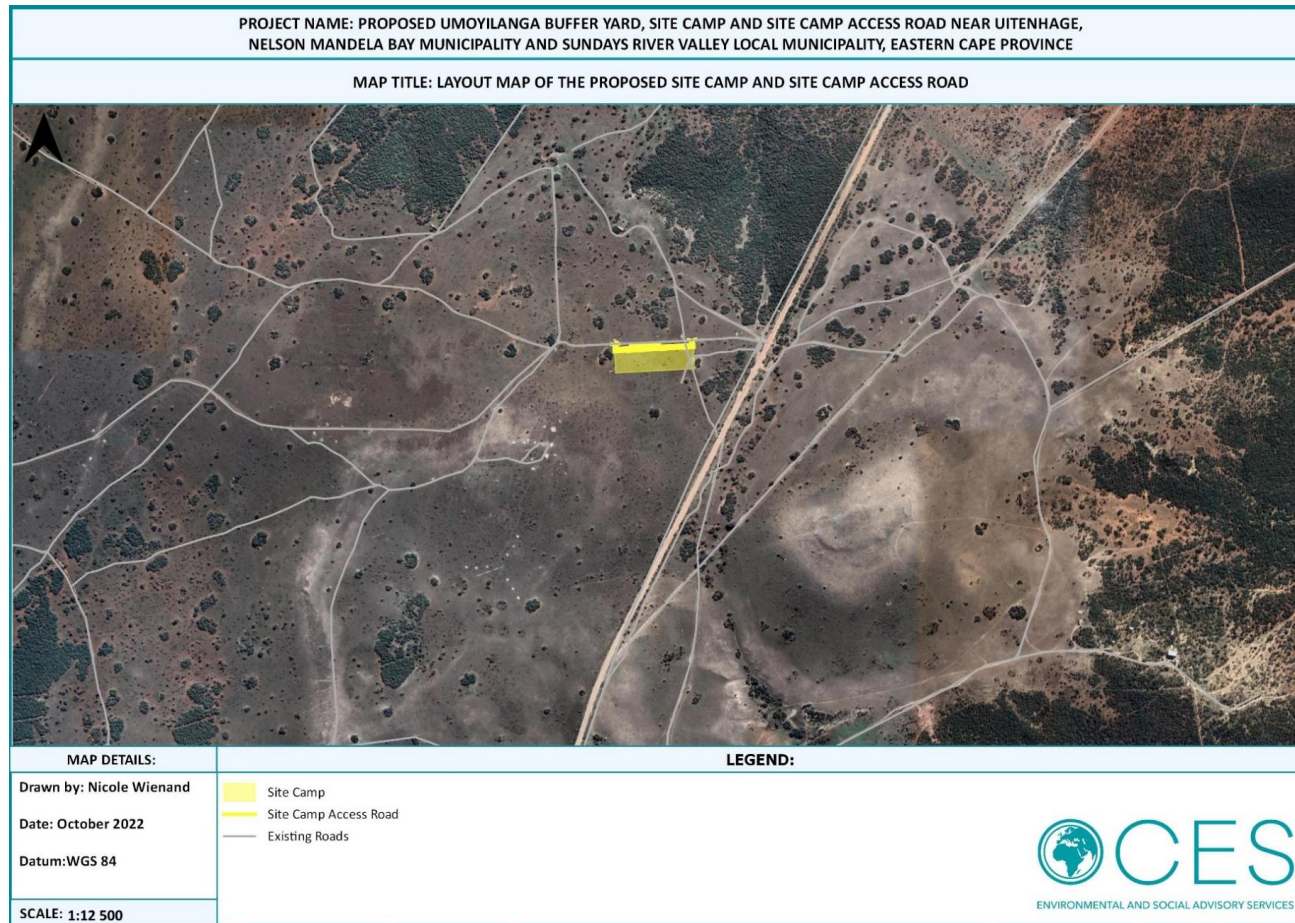


Figure 1.3: Layout Map of the proposed Site Camp and Site Camp Access Road.



1.2 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) and Terrestrial Animal and Plant Species (GN R. 1150), 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 DFFE Screening Report generated for the proposed Buffer Yard, Site Camp and Site Camp Access Road, the terrestrial biodiversity theme sensitivity is classified as low, the animal species theme sensitivity is classified as high, and the plant species theme sensitivity is classified as medium. Although the proposed terrestrial biodiversity theme sensitivity is classified as low, the site sensitivity verification confirmed that the site contains indigenous vegetation, Grassridge Bontevld, which contains a number of plant and animal SCC. As such, a full Terrestrial Biodiversity Specialist Assessment, inclusive of fauna and flora, has been prepared to supplement the BA Process for the proposed development.

1.3 OBJECTIVES AND TERMS OF REFERENCE

The objectives for the ecological assessment are as follows:

- Describe and map the vegetation types of the study site.
- Describe the biodiversity and ecological state of the vegetation unit(s) of the study site.
- Establish and map sensitive vegetation areas showing the suitability for development and no-go areas.
- Identify plant and animal species of conservation concern (Red Data List, PNCO and TOPS lists). In the case of the fauna, this was done at a desktop level.
- Identify alien plant species, assess the invasive potential, and recommend management procedures.
- Identify and assess the impacts of development on the site's natural vegetation and faunal species in terms of habitat loss, fragmentation and degradation of key ecosystems and, where feasible, provide mitigation measures to reduce these impacts.

1.4 LIMITATIONS AND ASSUMPTIONS

This report is based on current available information and, as a result, the following limitations and assumptions are implicit:

- The report is based on the project description received from the client.
- A detailed site survey was not conducted for the proposed Umoyilanga Buffer Yard, Site Camp, and Site Camp Access Road. The findings of this report is based on the numerous ecological studies that have been undertaken by CES over the past eight years for the authorised Dassiesridge WEF and the associated infrastructure. It must



be emphasized however that the study area was assessed in 2021 for the proposed BESS and CTMF, the findings of which are incorporated into this report.

- The faunal survey was mainly a desktop study, using information from previous ecological surveys conducted in the area, supplemented by recording animal species that were observed during the site survey.
- Species of Conservation Concern (SCC) are difficult to find and difficult to identify. However, the list of SCC included in Section 3.4.4 and 3.5 of this report is extensive. Furthermore, a botanical micro-siting of the site was undertaken in 2021 to identify SCC within the development footprint.
- The site visit for the BESS and CTMF, which falls within close proximity to the study site for the proposed Umoyilanga Buffer Yard, Site Camp and Site Camp Access Road, was undertaken in mid-October which falls within the optimal survey period for the Albany Thicket Biome in which the study site is located (Figure 1.4). However, it is possible that early and/or late flowering species may have been missed during this survey. However, the plant species list included in Appendix 1 is synthesized from the numerous reports compiled for the authorised Dassiesridge WEF, including the botanical micro-siting assessment,
- It should be noted that the broader project area has been affected by a number of years of drought which is likely to influence the species composition observed on site.
- Despite the abovementioned assumptions and limitations, the time available in the field and information gathered during the survey and associated reports was sufficient to provide enough information to determine the status of the affected area.

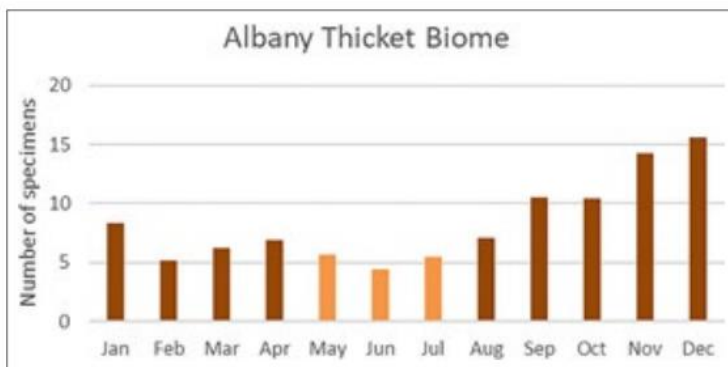


Figure 1.4: Optimal plant collection months for the Albany Thicket Biome (SANBI, 2020).



2 METHODOLOGY

2.1 THE ASSESSMENT

A number of ecological studies have been undertaken within the project area for the authorised Dassiesridge WEF (please refer to Section 1.1). As such, the project area has been extensively surveyed over the last eight (8) years and the information obtained is sufficient to inform the findings of this report. These studies assessed the site-specific ecological state, current land-use, identified potential sensitive ecosystems and identified plant species associated with the vegetation types which occur within the project area. These studies also identified the various impacts associated with the various components of the development, as well as ways to avoid and mitigate those impacts.

In addition to the information obtained from the previous assessments undertaken, key resources that were consulted when drafting this report include the following:

- 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, 2019);
- Nelson Mandela Bay Municipality (NMBM) Metropolitan Open Space System (MOSS) (2009);
- The National Freshwater Ecosystem Priority Areas (NFEPA, 2011/14);
- National Biodiversity Management: Biodiversity Act (NEMBA) List of Threatened or Protected Species (2005);
- The National Protected Areas Expansion Strategy (NPAES, 2010/18);
- Review of the SANBI Red Data List;
- Convention on International Trade in Endangered Species (CITES);
- South African National Land Cover (SA NLC, 2020);
- The National Biodiversity Assessment (NBA) (SANBI, 2018);
- The Animal Demography Unit (ADU);
- International Union for Conservation of Nature (IUCN);
- Eastern Cape Provincial Nature Conservation Ordinance (PNCO);
- South African Protected Areas Database (2022, Q1) and the South African Conservation Areas Data (2022,Q1);
- Red List of Terrestrial Ecosystems of South Africa (SANBI, 2021);
- Strategic Water Source Areas (SWSA, 2017);
- Plants of Southern Africa (POSA) database;
- iNaturalist;
- National Biodiversity Management: Biodiversity Act (NEM:BA) Alien and Invasive Species Lists (2014); and
- Department of Agriculture, Forestry and Fisheries (DAFF) List of Protected Trees (2014).



2.2 SPECIES OF CONSERVATION CONCERN

Data on the known distribution and conservation status for each potential Species of Conservation Concern (SCC) must be obtained to develop a list of SCC likely to occur within the project area. According to the Species Environmental Assessment Guideline (SANBI, 2020), the term 'SCC' refers to all species that are assessed according to the IUCN Red List Criteria as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Data Deficient (DD) or Near Threatened (NT), as well as range-restricted species which are not declining and are nationally listed as Rare or Extremely Rare [also referred to in some Red Lists as Critically Rare]. These species may be impacted significantly by the proposed activity. Species that are afforded special protection, notably those that are protected by NEM:BA (Act No. 10 of 2004), PNCO (1975), the List of Protected Tree Species under the National Forest Act (Act No. 84 of 1998) or which occur on the South African Red Data List as SCC fall within this category. The list of SCC compiled in Section 3.4.3 of this report has been compiled using the list of SCC identified within the Screening Report for the study site, the list of taxa common to Grassridge Bontveld (Grobler et al., 2018), POSA, as well as the previous assessment undertaken for the authorised Dassiesridge WEF.

2.3 SAMPLING PROTOCOL

The sampling protocol implemented during the previous assessments undertaken within the project area for the Dassiesridge WEF and associated infrastructure entailed a plotless sampling method. Prior to the site visit, Google Earth Imagery was consulted to determine variations in plant communities present on site and to identify potential habitat types in which sampling would be focused during the field assessment. During the field assessment, the vegetation types were sampled on foot and all plant species observed during the specialists' random meander were recorded. Sampling along the random meander was undertaken until no new plant species were recorded (Figure 2.1). This data was used to describe the floristic composition of the vegetation types within the project area. Photos of the species recorded were uploaded onto iNaturalist (www.inaturalist.org). This sampling protocol allowed for the rapid collection of data over a large area.

The vegetation types assessed were mapped and assigned a sensitivity score using the methodology outlined in the Species Environmental Assessment Guideline Document.

The faunal assessment was supported by on-site observations.

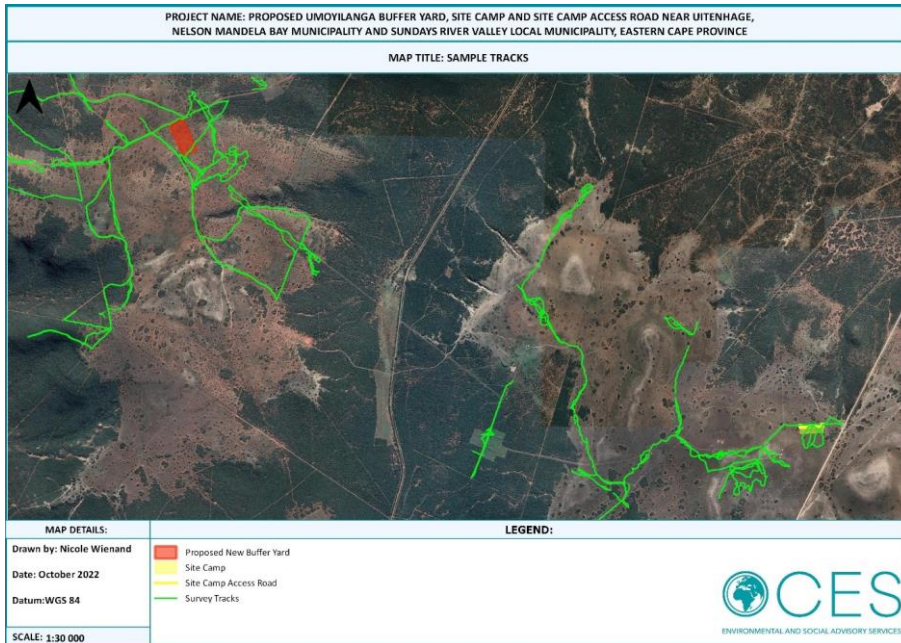


Figure 2.1: Sampling tracks of the specialists' random meander within the project area.

2.4 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 in 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 was consulted prior to the site visit to determine the vegetation types expected to occur within the project area. The SA VEGMAP was compared to actual conditions of the 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.



2.5 SENSITIVITY ASSESSMENT

The Species Environmental Assessment guideline (SANBI, 2020) was applied to assess the Site Ecological Importance (SEI) of the project area. The habitats and the species of conservation concern in the project area were assessed based on their conservation importance, functional integrity and receptor resilience (Table 2.1). The combination of these resulted in a rating of SEI and interpretation of mitigation requirements based on the ratings.

The sensitivity map was developed using available spatial planning tools as well as by applying the SEI sensitivity based on the field survey (refer to Chapter 4 for the SEI of the project area) .

Table 2.1: Criteria for establishing Site Ecological importance and description of criteria.

Criteria	Description
Conservation Importance (CI)	<i>The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of IUCN Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.</i>
Functional Integrity (FI)	<i>A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.</i>
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor.	
Receptor Resilience (RR)	<i>The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.</i>
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and Receptor Resilience (RR)	

2.6 ECOLOGICAL IMPACT ASSESSMENT

2.6.1 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 & 2021 amendments).

The details of this rating scale are included in Appendix 4.



3 DESCRIPTION OF THE ENVIRONMENT

3.1 DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT

3.1.1 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). It should be noted that the region within which the proposed project is located has been affected by an ongoing drought which started in 2015. This is likely to influence plant communities present and therefore faunal habitats within the project area.

3.1.2 Topography, Soils and Geology

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.

Topography

The topography of the broader area is characterised by low to moderately undulating hills. However, the topography of the actual study sites is relatively flat (Figure 3.1). The site camp and site camp access road is located at an altitude of approximately 286 m (with an average slope of -4.0%) whilst the proposed buffer yard is located at an altitude of approximately 313 m (with an average slope of -0.7%).

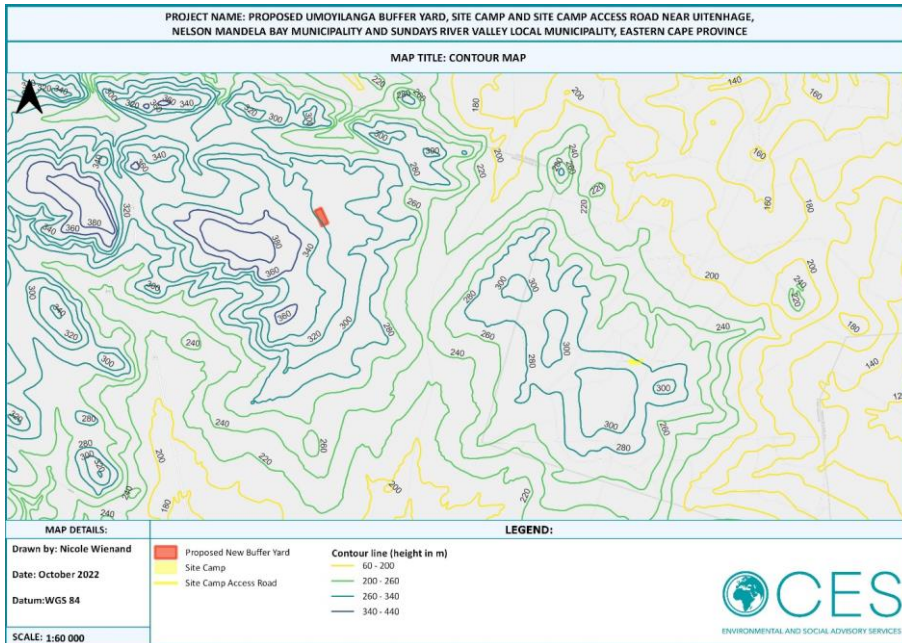


Figure 3.1: Contour Map of the study area.



Figure 3.2: Elevation profile of the Site Camp and Site Camp Access Road from east to west.



Figure 3.3: Elevation profile of the Buffer Yard from northwest to southeast.

Geology

The structure of the vegetation of the project area, Grassridge Bontveld (see Section 3.4 below), 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 bush clumps 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.

The geology underlying the buffer yard consists of shale and arenite of the Ceres Subgroup (Bokkeveld Group, Cape Supergroup) while the geology underlying the proposed Site Camp and Site Camp Access Road consists of limestone, clay and conglomerate of the Alexandria Formation (Algoa Group) (Figure 3.4).

Soils

According to SOTER (1995), the soils within the study area are classified as Eutric Regosols (Figure 3.5). 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.

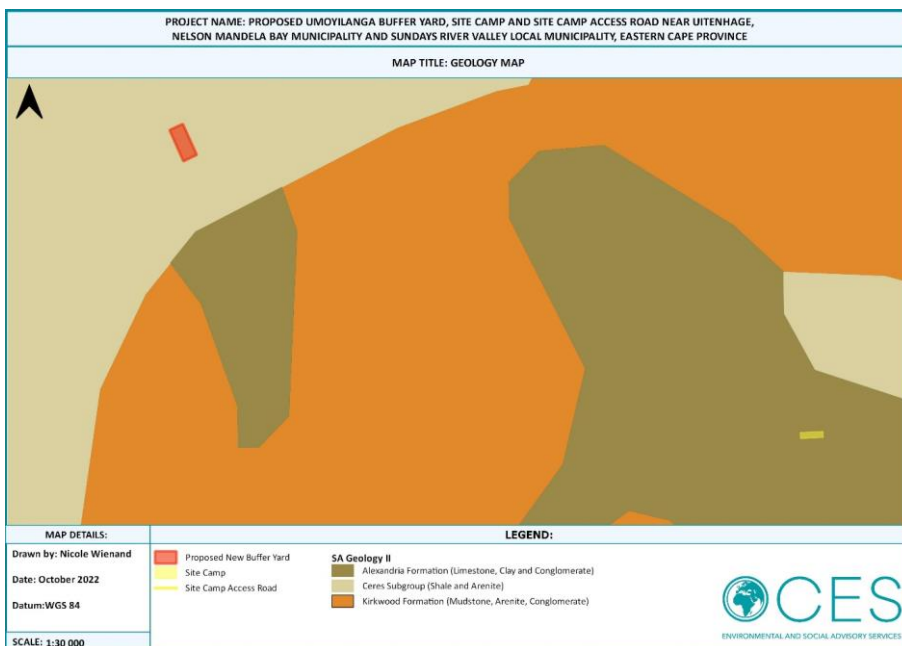


Figure 3.4: Geology Map of the study site.

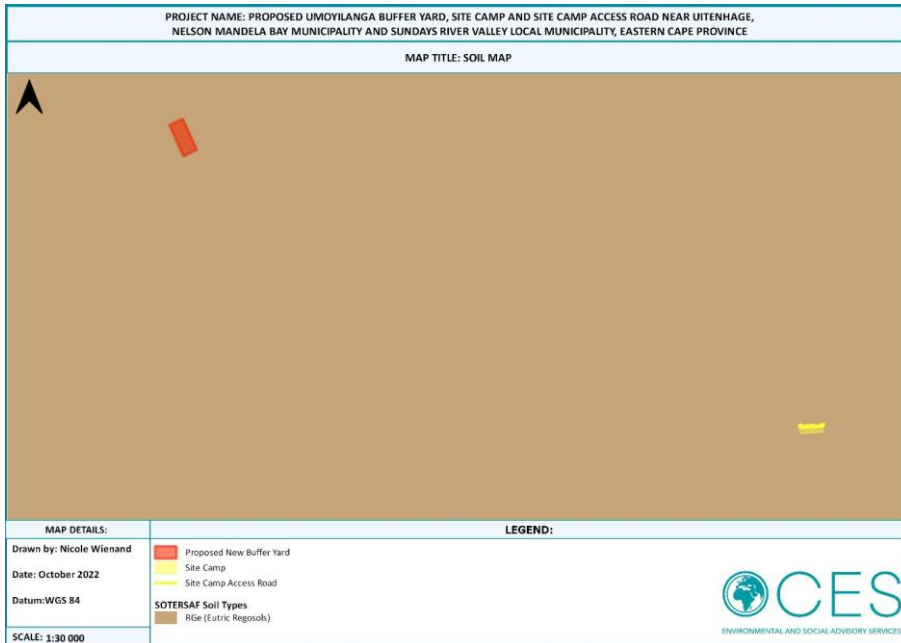


Figure 3.5: SOTER SAF Soil Map of the project area.

3.1.3 Surface water Features

The proposed Buffer Yard, Site Camp and Site Camp Access Road all fall within the N40E Quaternary Catchment of the Mzimvubu to the Tsitsikama Water Management Area (WMA 7). The site does not fall within the 500 m regulatory buffer of any wetlands recognised by the NBA (2018) or NEPFA (2011/14), or the 100 m regulatory buffer of a river (NBA, 2018) or drainage line (Figure 3.6).

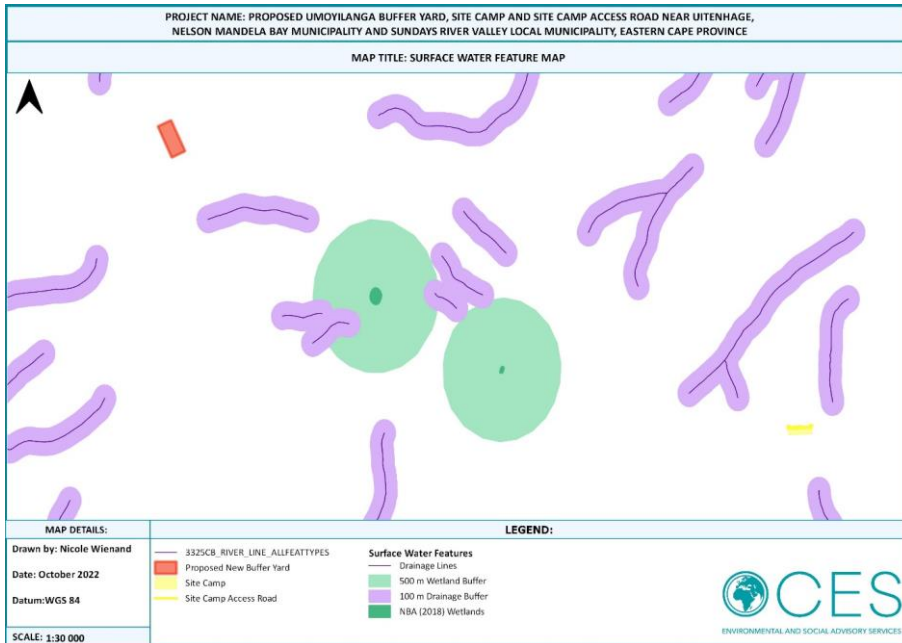


Figure 3.6: Surface water features affected by the proposed development.

3.2 LAND COVER

3.2.1 NMBM Landcover Types (2009)

Only the proposed Buffer Yard falls within the NMBM. The NMBM Land-Cover (2009) spatial dataset 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).

3.2.2 South African National Land-Cover Map (2020)

According to the SA NLC (2020), both the proposed Buffer Yard as well as the Site Camp and Access Road are located within ‘Natural Grassland’. This corresponds to the Grassridge Bontveld Vegetation which consists of a scattered bush clumps within a grassland matrix. The thicket bush clumps are recognised as patches of ‘*Dense Forest & Woodland*’ and ‘*Open Woodland*’ by the SA NLC (2020) (Figure 3.7).

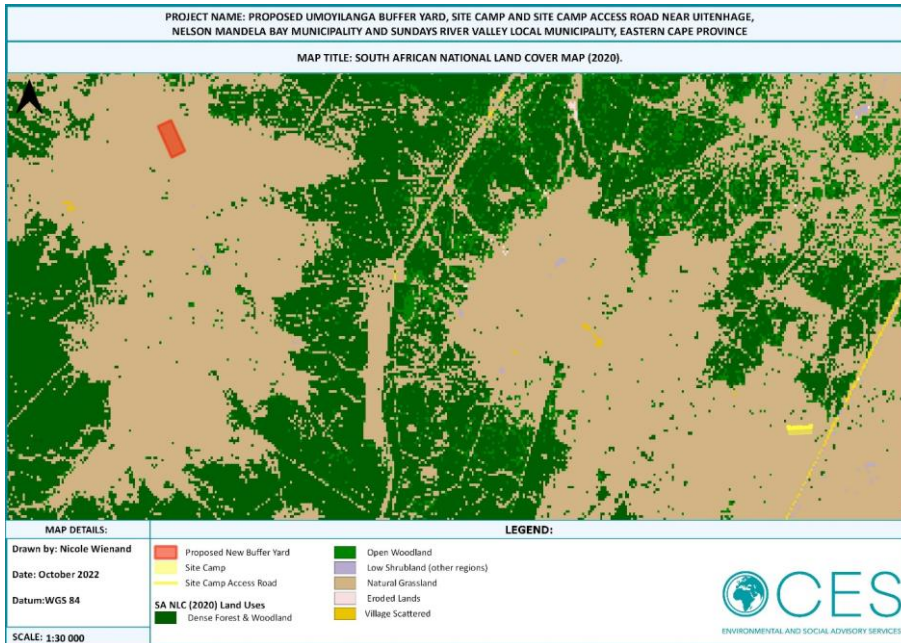


Figure 3.7: South African National Land-Cover (SANLC, 2020) Map of the project area.

3.3 THE CURRENT LAND USE

The site is currently used for livestock and game farming and the vegetation of the project area is therefore impacted, to some extent, by grazing. The sites also fall within the authorised Dassiesridge WEF area. Construction of the WEF is currently underway.

3.4 DESCRIPTION OF THE VEGETATION AND FLORISTICS

3.4.1 National Vegetation Map (SA VEGMAP2018): Expected Vegetation Types

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.

According to SANBI's National Vegetation Map (2018), the proposed development occurs within Grassridge Bontveld which forms part of the Albany Thicket Biome of South Africa.



The Albany Thicket Biome represents a species-rich, evergreen, scrubland that 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 Albany Thicket Biome has the highest number of endemic species of all biomes in the Eastern Cape and forms the core of the Albany Centre of Endemism (CEN, 2019). Unfortunately, this biome has become highly fragmented due to clearing for cultivation and its poor ability to regenerate once disturbed (SANBI, 2021).

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 bush clumps of various sizes (Grobler *et al.*, 2018). The thicket bush clumps 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 the ideal environment for the establishment of thicket species (Carvalho, 2018).

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

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

Grassridge Bontveld is classified as Least Concern in terms of the Red List of South African Ecosystems (SANBI, 2021). It is moderately protected and has experienced low rates of natural habitat loss and biotic disruption, placing this ecosystem at low risk of collapse. The historical extent of Grassridge Bontveld amounted to 245.83 km² of which 90% currently remains. It should be noted, however, that while the assessment of this ecosystem has been based on the best available data, according to SANBI (2021), the risk of collapse for this ecosystem type may be under-estimated due to a lack of comprehensive data on ecosystem



condition/integrity (including biotic disruptions due to invasive species, overutilization, altered fire regimes and other environmental degradation).

3.4.2 Key Ecological Drivers of Grassridge Bontveld

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;
- 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).

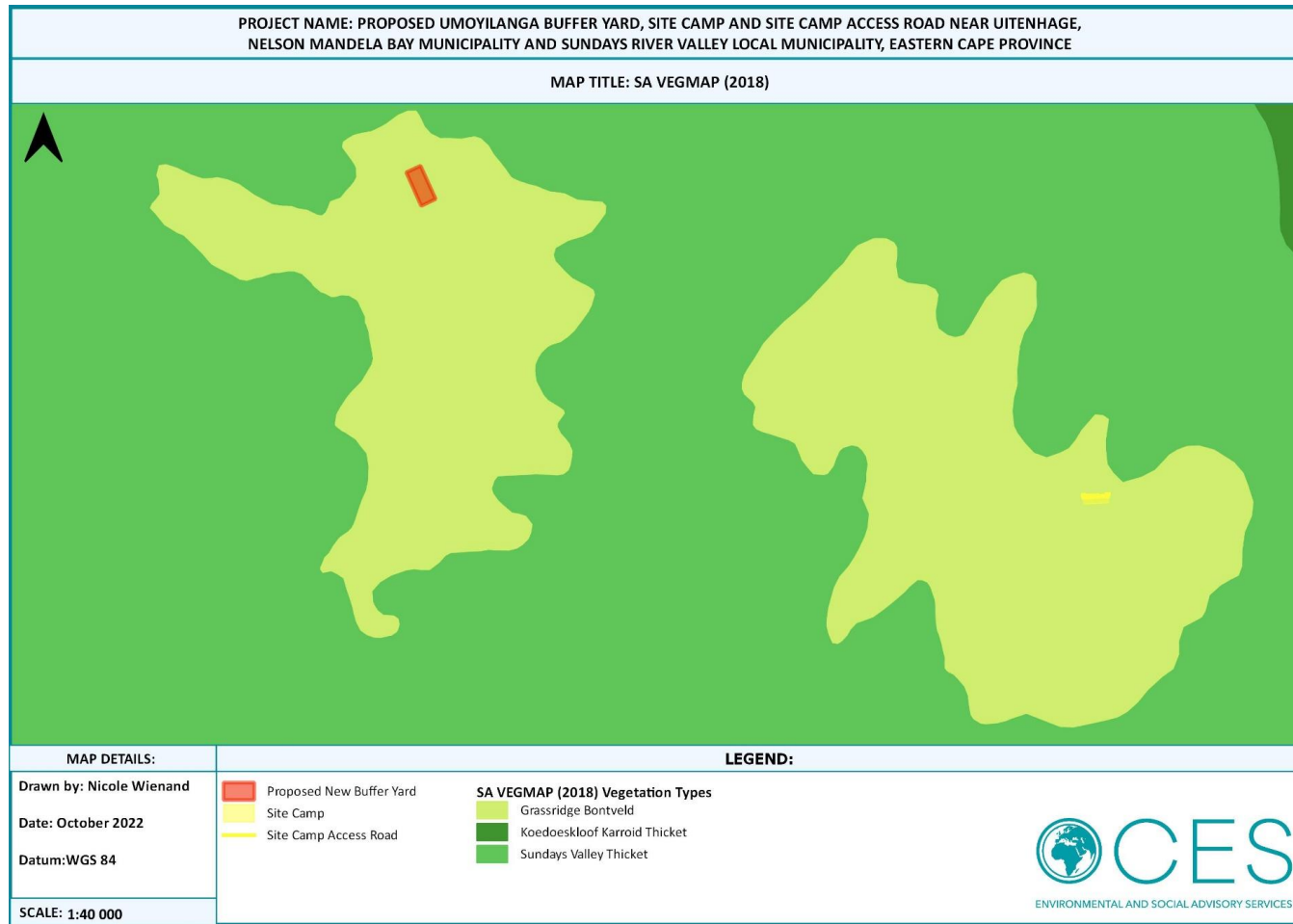


Figure 3.8: National Vegetation Map for the project site.



3.4.3 Vegetation types recorded on site

The numerous site visits undertaken for the Dassiesridge WEF, and associated infrastructure, confirmed that the vegetation of the study area consists of Grassridge Bontveld which occurs as 'islands' within a matrix of Sundays Valley Thicket when considering the broader landscape. The distribution of the two vegetation types within the landscape is largely influenced by the underlying geology. Grassridge Bontveld is restricted to limestone, clay and conglomerate of the Alexandria Formation (Algoa Group) while Sundays Valley Thicket is restricted to thicker soils and mudstone, arenite and shale of the Sundays River Formation and Kirkwood Formation (Uitenhage Group).

A degree of disturbance and degradation of the bontveld vegetation was evident, most likely due to grazing by livestock and other larger game observed on site. Bush clumps were relatively small, scattered widely throughout the succulent grassland, and dominated by a few species such as *Uclea undulata*, *Searsia pallens*, *S. incisa*, *Gymnosporia capitata*, *Schotia afra*, *Asparagus* spp. and *Sideroxylon inerme* (SCC) (Plate 3.1). The small size of the bush clumps, 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 bush clumps to small, dense, low growing clumps comprising of one or two species. Grassland cover was sparse with scattered geophytes present.

The grassy dwarf-shrubland matrix of the study area was dried and sparse. However, dominant species recorded within this component of the vegetation type include *Themeda triandra*, *Tenaxia disticha*, *Pentachistus pallida*, *Pentachistus pallida*, *Sansevieria hyacinthoides*, *Euryops ericifolius*, *Asparagus striatus*, *Eriocephalus ericoides*, *Felicia muricata*, and *Helichrysum* spp (Plate 3.2). Scattered *Aloe ferox* were also common (Plate 3.3).



Plate 3.1: 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 3.4). Large burrows,



particularly under bush clumps, 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), were observed throughout the site.

Although some degree of disturbance and degradation of the bontveld vegetation was apparent, the site still supports a number of indigenous plant species, including SCC, and provides habitat for a range of faunal species. The vegetation of the project area plays an important ecological function which ensures the continued provision of ecosystem services such as erosion prevention, carbon sequestration, and pollination, amongst others.



Plate 3.2: The grassy dwarf-shrubland matrix of the study area.



Plate 3.3: Scattered *Aloe ferox* within the grassy dwarf-shrubland matrix.



Plate 3.4: Faunal tracks observed within the study area.



3.4.4 Species of Conservation Concern

Table 3.2 below lists the **threatened** SCC likely to occur within the project area based on those recorded within the Screening Report generated for the site, previous site assessments undertaken for the Dassiesridge WEF and associated infrastructure, POSA, as well as list of taxa common to Grassridge Bontveld (Grobler *et al.*, 2018).

Eighteen (18) threatened SCC have been recorded for the study area. Although none of the threatened SCC were recorded within the study area during the most recent survey, three (3) species have been recorded within the Grassridge Bontveld of the broader project area during previous assessments undertaken for the Dassiesridge WEF including *Rhombophyllum rhomboideum* (EN), *Euryops ericifolius* (EN) and *Strelitzia juncea* (VU). Additionally, the likelihood of occurrence of three additional species has been classified as high, including Sensitive species 381 (EN), *Syncarpha recurvata* (EN), and *Justicia orchioides* (VU) (Table 3.2).



Table 3.1: List of plant SCC likely to occur within the project area.

Family	Species	SA Red List	PNCO	Protected Tree	NEMBA	Habitat, distribution and population trend (SANBI Red List)	Map of Distribution	Probability of occurrence on site based on habitat requirements	Confirmed on site (Yes/No)
-	Sensitive species 381	EN B1ab(ii,iii,v)	Schedule 4 (Protected)	-	-	This species is endemic to the Eastern Cape, with an EOO of 1200 km ² , occurring from Gqeberha to Kariega. It occurs on low, stony hills in full sun not further than 20 km from the coast. Its major habitats include Sundays Valley Thicket, and it has been recorded within Grassridge Bontveld.		HIGH This species has been recorded within Grassridge Bontveld within close proximity to the project area.	NO
Acanthaceae	<i>Justicia orchoides</i>	VU B1ab(i,ii,iii,iv,v)	-	-	-	A range restricted species occurring from St Francis Bay to Addo (EOO 2008 km ²), within the Eastern Cape Province. It is known from only seven locations which are declining due to habitat loss and degradation and invasion by alien plant species. Its habitat includes open, sandy areas with lime-rich soils, in Grassridge Bontveld and Sundays Valley Thicket (amongst other vegetation types) (von Staden, 2018).		HIGH Based on the known distribution and habitat requirements of this species, its likelihood of occurrence on site is classified as high.	NO



Family	Species	SA Red List	PNCO	Protected Tree	NEMBA	Habitat, distribution and population trend (SANBI Red List)	Map of Distribution	Probability of occurrence on site based on habitat requirements	Confirmed on site (Yes/No)
Aizoaceae	<i>Rhombophyllum rhomboideum</i>	EN B1ab(i,ii,iii,iv,v) + 2ab(i,ii,iii,iv,v)	Schedule 4 (Protected)	-	-	This is a range restricted species with an EOO of 102 km ² , occurring only from Gqeberha to Kariega within the Eastern Cape Province. It is associated with calcrete soils within Sundays Valley Thicket and Grassridge Bontveld (Raimondo and Dold, 2008).		HIGH This species occurs within the broader project area on calcrete soils in full sun.	NO (However, observed within this vegetation type by CES, 2021).
Aizoaceae	<i>Corpuscularia lehmannii</i>	CR B1ab(i,ii,iii,iv,v) + 2ab(i,ii,iii,iv,v)	Schedule 4 (Protected)	-	-	This is a very range restricted species (EOO 70 km ² , AOO < km ²). It occurs on quartzite outcrops from Coega to Gqeberha, within the Eastern Cape Province. Its major habitat types include Algoa Sandstone Fynbos, Sundays Valley Thicket, Motherwell Karroid Thicket, Bethelsdorp Bontveld. Only 2 out of 6 known recorded populations are extant (Raimondo and Helme, 2006).		LOW Grassridge Bontveld, the vegetation of the study site, is not recorded as a major habitat type for this species. Moreover, No quartzite outcrops occur within the study site.	NO



Family	Species	SA Red List	PNCO	Protected Tree	NEMBA	Habitat, distribution and population trend (SANBI Red List)	Map of Distribution	Probability of occurrence on site based on habitat requirements	Confirmed on site (Yes/No)
Apocynaceae	<i>Duvalia pillansii</i>	Rare	Schedule 4 (Protected)	-	-	This is an Eastern Cape Endemic which occurs on stony ground in thicket vegetation. It is known from only five sites between Hankey and Kirkwood. The population trend is stable and no significant threats are recorded (Victor and Dold, 2005).		LOW Although thicket bush clumps occur within the study site, based on the rarity of this species, its likelihood of occurrence on site has been classified as low.	NO
Amaryllidaceae	<i>Apodolirion macowanii</i>	VU B1ab(i,ii,iii,iv,v)	Schedule 4 (Protected)	-	-	This species is known from only 6 locations. Its distribution includes the area between the Fish River Valley and Jeffreys Bay within the Eastern Cape Province. It prefers heavy clay soils in renosterveld or valley bushveld. Sundays Valley Thicket is recognised as one of the major habitat type for this species (Dold et al., 2007).		LOW Although Sundays Valley Thicket occurs within the broader project area, the site itself does not contain the preferred habitat of this species. Based on its habitat requirements and rarity the likelihood of occurrence on site is classified as low.	NO



Family	Species	SA Red List	PNCO	Protected Tree	NEMBA	Habitat, distribution and population trend (SANBI Red List)	Map of Distribution	Probability of occurrence on site based on habitat requirements	Confirmed on site (Yes/No)
-	Sensitive species 1101	EN B1ab(iii) + 2ab(iii)	Schedule 4 (Protected)	-	-	This species occurs on valley bottoms and lower slopes of hills in rocky, loamy soils within Albany Alluvial Vegetation and Sundays Valley Thicket. Its known range includes the Sundays and Gamtoos River Valleys, within the Eastern Cape Province (EOO 3500 km ² , AOO 600 km ²) (Vlok and Raimondo, 2007).		LOW The study site does not occur within a valley bottom and does not contain the preferred habitat type of this species. As such, the likelihood of occurrence of this species on site is classified as low.	NO
-	Sensitive Species 19	VU A2cd+4cd	Schedule 4 (Protected)	-	-	This is a slow growing, long lived range restricted species which has been recorded from Patensie to Mbashe River (EOO 19 322 km ²), within the Eastern Cape Province. Its preferred habitat includes karroid scrub, clearings in valley bushveld and steep cliffs within Eastern Valley Bushveld, Sundays Valley Thicket, Motherwell Karroid Thicket, Fish Valley Thicket, Doubledrift Karroid Thicket, Buffels Mesic Thicket, Albany Valley Thicket (Williams et al., 2014).		MODERATE Grassridge Bontveld, the vegetation of the study site, is not recorded as a major habitat type for this species. However, the study site is surrounded by Sundays Valley Thicket which is recorded as a major habitat type for this species.	NO



Family	Species	SA Red List	PNCO	Protected Tree	NEMBA	Habitat, distribution and population trend (SANBI Red List)	Map of Distribution	Probability of occurrence on site based on habitat requirements	Confirmed on site (Yes/No)
Asteraceae	<i>Euryops ericifolius</i>	EN B1ab(iii)	-	-	-	This species is known from a highly restricted area between Motherwell and Coega (EOO 119 km ²) within the Eastern Cape Province. It occurs on low altitude flats and slopes within Grassridge Bontveld, Sundays Valley Thicket, and Motherwell Karroid Thicket (Raimondo and Turner, 2006).		HIGH This species has been recorded by CES (2014) within the broader project area of the Dassiesridge WEF.	NO (However, observed within this vegetation type by CES, 2016).
Asteraceae	<i>Syncarpha recurvata</i>	EN B1ab(ii,iii,iv,v)	-	-	-	Another range restricted species, <i>S. recurvata</i> occurs from Kariega to Addo (EOO of 2700 km ²) within the Eastern Cape Province. Its habitat includes calcrete pavements within the Grassridge Bontveld and Sundays Valley Thicket (amongst others). Only eight severely fragmented populations are recorded by the Red List of South African Plants which continue to decline due to cement mining, urban expansion and alien plant invasion (Berrington and Victor, 2007).		HIGH The study site contains the preferred habitat of this species.	NO



Family	Species	SA Red List	PNCO	Protected Tree	NEMBA	Habitat, distribution and population trend (SANBI Red List)	Map of Distribution	Probability of occurrence on site based on habitat requirements	Confirmed on site (Yes/No)
Fabaceae	<i>Asparagus spinescens</i>	Rare	-	-	-	This species occurs on mountain slopes and valleys within Albany Thicket and Grassland between Kariega and Queenstown within the Eastern Cape Province (EOO 9400 km ²). It is known from only four widely disjunct populations. Its population trend is stable (Raimondo <i>et al.</i> , 2007).		LOW The study site is not located on a mountain slope or valley. Based on the lack of preferred habitat and the rarity of this species, the likelihood of occurrence on site is classified as low.	NO
Hyacinthaceae	<i>Ledebouria coriacea</i>	CR B1ab(i,ii,iii,iv,v) + 2ab(i,ii,iii,iv,v)	-	-	-	This is a range restricted species, endemic to Gqeberha, within the Eastern Cape Province. Its habitat includes alluvial sand and fine gravel underlain by calcrete within Grassridge Bontveld. Plant typically occur in shaded places under <i>Pteronia</i> shrubs. Only one population is recorded on the Red List of South African Plants which is threatened by ongoing habitat loss due to urban expansion and industrial development (Von Staden and Hankey, 2016).		MODERATE The study site is located approximately 30 km northwest of one of the two known populations of this species and contains this species preferred habitat type.	NO



Family	Species	SA Red List	PNCO	Protected Tree	NEMBA	Habitat, distribution and population trend (SANBI Red List)	Map of Distribution	Probability of occurrence on site based on habitat requirements	Confirmed on site (Yes/No)
-	Sensitive species 1248	VU A2ad	-	-	-	This species is not endemic to South Africa. It occurs within a wide range of habitats but usually along mountain ranges and in thickly vegetated river valleys, under bush clumps and in boulder screes, sometimes found scrambling at the margins of karroid, succulent bush in the Eastern Cape. Its major recorded habitat types include Sundays Valley Thicket (amongst other vegetation types). However, Grassridge Bontveld is not listed as a major habitat type for this species (Raimondo <i>et al.</i> , 2007).		LOW Grassridge Bontveld, the vegetation of the study site, is not recorded as a major habitat type for this species. As such, the likelihood of occurrence is classified as low.	NO
Zygophyllaceae	<i>Zygophyllum divaricatum</i>	EN B1ab(ii,iii,iv,v)	-	-	-	This species has only been recorded between Sundays River to Coega and Addo within Grassridge Bontveld. Historically, six populations have been recorded. However, only one to three of these are thought to be extant. The remainder of the populations have been lost due to livestock grazing, urban expansion and industrial development (Dold and Raimondo, 2008).		MODERATE Although the study site contains the preferred habitat type of this species, based on the limited number of known populations (1-3 extant) of this species, its likelihood of occurrence on site is classified as moderate.	NO



Family	Species	SA Red List	PNCO	Protected Tree	NEMBA	Habitat, distribution and population trend (SANBI Red List)	Map of Distribution	Probability of occurrence on site based on habitat requirements	Confirmed on site (Yes/No)
Zamiaceae	Sensitive species 1268	EN A2cd	Schedule 3 (Endangered)	-	Endangered Species	This range restricted species occurs in xeric thicket, often on rocky quartzite, within Sundays Valley Thicket and Bethelsdorp Bontveld from Gqeberha to Kariega within the Eastern Cape Province. It is extinct within several parts of its former range (Donaldson, 2009).		LOW This species was recorded within the Sundays Valley Thicket of the broader project area during the micro-siting of the Dassiesridge WEF. However, this species has not been recorded within the Grassridge Bontveld of the project area.	NO
Asphodelaceae	Sensitive Species 779	CR 1ab(i,ii,iii,iv,v) + 2ab(i,ii,iii,iv,v)	Schedule 4 (Protected)	-	-	This is a very range restricted species (EOO 23-548 km ² , AOO 20-24 km ²) and is extant within 4 of the 5 known locations. It occurs in rocky soils on level to southwest-facing slopes within Motherwell Karroid Thicket, Sundays Valley Thicket and Baviaans Valley Thicket from Kariega to Coega and also near Kirkwood, within the Eastern Cape Province (von Staden et al., 2019).		LOW Grassridge Bontveld, the vegetation of the study site, is not recorded as a major habitat type for this species. As such, the likelihood of occurrence is classified as low.	NO



Family	Species	SA Red List	PNCO	Protected Tree	NEMBA	Habitat, distribution and population trend (SANBI Red List)	Map of Distribution	Probability of occurrence on site based on habitat requirements	Confirmed on site (Yes/No)
Strelitziaceae	<i>Strelitzia juncea</i>	VU B1ab(ii,iii,v)	Schedule 4 (Protected)	-	-	This species is known from only six locations. It occurs within Sundays Valley Thicket from Gqeberha, Kariega and Patensie within the Eastern Cape Province (Schutte-Vlok et al., 2008).		HIGH This species was recorded within the broader project area during the micro-siting of the Dassiesridge WEF. However, this species was not recorded within the study site.	NO (However, observed within the broader project area by CES, 2021).
Scrophulariaceae	<i>Selago zeyheri</i>	VU B1ab(i,ii,iii,iv,v) + 2ab(i,ii,iii,iv,v)	-	-	-	This is a rare, range restricted species (EOO 601 km ²) that occurs from Gqeberha to the Suurberge within the Eastern Cape Province. Its habitat includes dry stone flats and lower slopes in grassy vegetation, within Albany Alluvial Vegetation, Koedoeskloof Karroid Thicket, Grass Ridge Bontveld. It is known from less than 10 locations which are declining due to habitat loss (von Staden, 2016).		MODERATE Although the study site contains the preferred habitat of this species, based on the rarity of this species, the likelihood of occurrence has been classified as moderate.	NO



3.4.5 Alien Invasive Species Present on site

An Alien Plant Species is “(a) a species that is not an indigenous species; or (b) an indigenous species translocated or intended to be translocated to a place outside of its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention” (SANBI, 2020).

It should be noted that not all introduced alien species are invasive and not all invasive species are necessarily alien.

South Africa’s National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) has defined ‘Invasive Alien Plant Species’ to mean any species whose establishment and spread outside of its natural distribution range:

- (a) Threatens ecosystems, habitats or other species or has a demonstrable potential to threaten ecosystems, habitats or other species; and
- (b) May result in economic or environmental harm or harm to human health. Invasive alien plant species are globally considered as one of the greatest threats to the environment, biodiversity, ecosystem integrity and the economy.

According to the Conservation of Agricultural Resources Act (No. 43 of 1983 - Regulation 15, 30 March 2001) (CARA), for agricultural land, and the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA), for natural areas, invasive alien plant species should be controlled and eradicated with an emphasis on urgent action in biodiversity priority areas. NEM:BA published a list of Alien and Invasive Species (No 599) in 2014/1 which regulates the management of alien and invasive plants in natural environments.

Five (5) Alien Invasive Plant Species have been recorded for the project area (Table 3.2). The management requirements for the various categories under CARA and NEM:BA are outlined below.

Table 3.2: Alien Invasive species recorded within the project area.

FAMILY	SPECIES	COMMON NAME	CARA (Act No. 43 of 1983)	NEMBA NATIONAL LIST OF INVASIVE SPECIES IN TERMS SECTIONS 70(1), 71(3) and 71A
Cactaceae	<i>Opuntia ficus-indica</i>	Prickly Pear	Category 1	Category 1b
Cactaceae	<i>Opuntia aurantiaca</i>	Jointed Cactus	Category 1	Category 1b
Fabaceae	<i>Acacia mearnsii</i>	Black wattle	Category 2	Category 2
Fabaceae	<i>Acacia cyclops</i>	Coastal Wattle / Rooikrans	Category 2	Category 1b
Asparagaceae	<i>Agave sp.</i>	Sisal hemp	Category 2	Category 2

NEM:BA Category 1b: Invasive Species

Opuntia ficus-indica, *O. aurantiaca*, and *Acacia cyclops* are listed under Category 1b of the NEMBA: National List of Invasive Species in Terms Sections 70(1), 71(3) and 71A. Plants classified as Category 1b alien invasive species are prohibited from:

- Being imported into the Republic;
- Growing or in any other way propagating any specimen;
- Conveying, moving, or otherwise translocating any specimen;
- Spreading or allowing the spread of any specimen; and



- Releasing any specimen.

NEM:BA Category 2: Invasive Species

Acacia mearnsii and *Agave sp.* are listed under Category 2 of the Plants listed under Category 2 of the NEMBA: National List of Invasive Species. Category 2 invasive species are regulated by area. A permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any species listed under Category 2.

CARA Category 1: Declared weeds

Plants classified as Category 1 in CARA are Declared Weeds. These are prohibited plants, which must be controlled or eradicated where possible (except in biocontrol reserves, which are areas designated for the breeding of biocontrol agents). *Opuntia ficus-indica* and *O. aurantiaca* are classified as Category 1 in terms of the CARA.

CARA Category 2: Invader Plants

Plants classified as Category 2 are declared Invader Plants and may only be grown under controlled conditions if a permit is acquired. No trade in these plants is permitted. *Acacia mearnsii*, *Acacia cyclops* and *Agave sp.* are classified as Category 2 in terms of the NEM:BA.

- * All alien and invasive plant species must be controlled during all phases of development according to the recommendations outlined in the Environmental Management Programme (EMPr).

3.5 DESCRIPTION OF FAUNA

The sections that follow are supplemented with the information contained within the original Ecological Impact Assessment conducted by CES (2017) for the entire Dassiesridge WEF site as well as the additional Ecological Impact Assessment undertaken within the broader project area.

It should be noted that although the study site occurs within the authorised Dassiesridge WEF, the project area is also utilised for game farming. As such, a number of large game species have been observed within the broader project area including springbok (*Antidorcas marsupialis*), 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*). Small rodents and a variety of insects and reptiles are also expected to occur on 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 include three (3) bird species, two sensitive species (Sensitive Species 5 and 8) and the invertebrate, *Aneuryphymus montanus*.

A. montanus, commonly known as the Yellow-winged Agile Grasshopper, is endemic to the Cape Region of South Africa. It has an Area of Occupancy of between 100 – 1000 km² and an estimated extent of occurrence (EOO) of 170,000 km². It is known from only six (6) localities. It is associated with fynbos vegetation, where it has been collected "amongst partly burnt stands of evergreen Sclerophyll in rocky foothills" (Brown 1960 on SANBI). It prefers south-facing cool slopes (Kinvig 2005 on SANBI). Based on the lack of preferred habitat, it is unlikely to occur within the study site.



3.5.1 Mammals

The Eastern Cape is home to 166 mammal species, 100 of which have a distribution which includes the Project Area (IUCN, 2021; Stuart & Stuart, 2015; Child *et al.*, 2016). Approximately 42 mammal species have been recorded within the project area QDS (3325CB, 3325DA) (FitzPatrick, 2021) (Appendix 2).

Twelve (12) threatened mammal SCC have a distribution which includes the project area, of which only one species (White-tailed Rat) is highly likely to occur within the project area (Table 3.3).

Table 3.3: Threatened Mammal SCC which may occur within the study area.

Name	Red list category (2016)	Habitat	Possibility of occurrence (Possible, Probable, Unlikely)
Mountain Reedbuck <i>Redunca fulvorufula</i>	EN	Inhabit high-altitude grasslands (1,500-5,000 m asl) on ridges and hillsides. Water is an important habitat requirement for this species (IUCN SSC Antelope Specialist Group, 2017).	LOW Unlikely unless purposefully stocked within the project site.
Southern Tree Hyrax <i>Dendrohyrax arboreus</i>	EN	This arboreal species is restricted to well-developed and intact Afromontane, scarp and coastal forests dominated by Milkwood trees within the Eastern Cape and KwaZulu-Natal provinces of South Africa. The estimated extent of occurrence (EOO) is 49,232 km ² and the area of occupancy (AOO), using all suitable forest patches within the EOO, is estimated to be a maximum of 1,482 km ² . This species requires specific den-tree species (<i>Mimosops caffra</i> and <i>Sideroxylon inerme</i>) (Gaylard <i>et al.</i> , 2016).	LOW Based on the lack of preferred habitat (well developed and intact Afromontane, scarp and coastal forests) the likelihood of occurrence of this species on site has been classified as low.
Duthis's Golden Mole <i>Chlorotalpa duthieae</i>	VU	This species is known from only nine locations in southern Cape Afrotropical Forests, clustered in two subpopulations: Port Elizabeth (three locations) and the indigenous coastal forest belt from Wilderness to Tsikitsikama (six locations). This species is restricted to alluvial sands and sandy loams on coastal platforms and scarp forest patches in the Southern Cape Afromontane forests, as well as the Fynbos and moist Savanna biomes. They are predominantly nocturnal. Given that this species tolerates mild habitat alteration, they do occur within suburban gardens and cultivated areas adjoining natural forests where they dig shallow subsurface tunnels whilst foraging (Bronner and Benet, 2016).	LOW Based on the lack of preferred habitat (forests/ fynbos / Moist Savanna), soils and distance from the coast, the likelihood of occurrence of this species on site has been classified as low.



Name	Red list category (2016)	Habitat	Possibility of occurrence (Possible, Probable, Unlikely)
Sensitive Species 5	VU	This is a rare species. It is a habitat generalist and occurs within the following biomes in protected areas: Savanna, Thicket, Grassland, Nama Karoo, Fynbos, and Succulent Karoo. Only one free-roaming population of this species is known which occurs along the northern borders of the country and the western boundary of the Kruger National Park (van der Merwe <i>et al.</i> , 2016).	VERY LOW This species rarely occurs in wild and is therefore very unlikely to occur on site.
Sensitive Species 8	VU	This species occurs in a wide range of forested and wooded habitats, however they mainly occur within scarp and coastal forests, thickets or dense coastal bush. Although they require dense underbrush to rest or take cover, this species can also occupy modified habitats (Venter <i>et al.</i> , 2016).	MODERATE This species possibly occurs within the Sundays Valley Thicket surrounding the project area.
Black Footed Cat <i>Felis nigripes</i>	VU	This species is strictly nocturnal making use of dens during the day. They use abandoned termite mounds or dens dug by other animals such as Aardvark, Ground Squirrels and Springhares. It is a habitat specialist that occurs in open, short grass areas with an abundance of rodents and ground roosting birds. It inhabits ry, open savannah, grasslands and Karoo semi-desert with sparse shrub and tree cover and a mean annual rainfall of between 100 and 500 mm at altitudes up to 2,000 m asl. It is not found in the driest and sandiest parts of the Namib and Kalahari Deserts (Wilson <i>et al.</i> , 2016).	MODERATE This species may occur within the grassland matrix of the Grassridge Bontveld Vegetation and has been recorded in the nearby Addo Elephant National Park.
Leopard <i>Panthera pardus</i>	VU	Wide habitat tolerance and highly varied diet. Habitats include woodland, grassland savannah and mountain habitats but also occur widely in coastal scrub, shrubland and semidesert (Swanepoel, <i>et al.</i> 2016).	MODERATE (observed on neighbouring properties)
White-tailed Rat <i>Mystromys albicaudatus</i>	VU	Shrubland and Grassland. Often associated with calcrete soils within grasslands. They are never found on soft, sandy substrate, rocks, wetlands or river banks. In the Maclear district of the Eastern Cape Province, it was found in habitats with crests and ridges and trapped on bare patches with sparse vegetation. (Avenant, <i>et al.</i> , 2019)	HIGH The proposed site does contain suitable habitat for this species.
African Marsh Rat <i>Dasymys incomtus</i>	VU	Wide variety of habitats, including forest and savanna habitats, swampland and grasslands but they	VERY LOW



Name	Red list category (2016)	Habitat	Possibility of occurrence (Possible, Probable, Unlikely)
		rely on intact wetlands. they occur specifically in reed beds among semi-aquatic grasses in wetlands or swampy areas or along rivers and streams (Pillay <i>et al.</i> , 2016).	Based on the lack of preferred habitat (wetlands/streams) it is very unlikely that this species occurs within the project area.
Grey Rhebok <i>Pelea capreolus</i>	NT	Rocky hills of mountain fynbos. Predominantly browsers, often feeding on ground-hugging forbs, and largely water independent. Western Cape, they are often observed on agricultural lands (Taylor <i>et al.</i> , 2016)	LOW Based on the lack of preferred habitat for this species, it is unlikely to occur within the project area.
Brown Hyena <i>Parahyaena brunnea</i>	NT	Found in open woodland savanna with a maximum rainfall up to about 700 mm and favours rocky, mountainous areas with bush cover in the bushveld. It shows an ability to survive close to urban areas. Is independent of drinking water but requires some type of cover in which to lie up during the day. Populations of Brown Hyaenas in non-protected areas comprise a significant proportion of the global population, suggesting that such areas are likely to be important for their sustained conservation (Yarnell <i>et al.</i> , 2006).	LOW Based on the lack of preferred habitat, it is unlikely that this species occurs within the study area.
Cape Clawless Otter <i>Aonyx capensis capensis</i>	NT	African Clawless Otters are predominantly aquatic and seldom found far from water. They are also found in many seasonal or episodic rivers in the Karoo (South Africa). (Okes, <i>et al.</i> , 2016).	VERY LOW The nearest river is located approximately 6 km from the proposed site. Based on the lack of preferred aquatic habitat, it is unlikely that this species occurs within the study area.



3.5.2 Herpetofauna (Reptiles and Amphibians)

Amphibians

The Eastern Cape hosts 54 amphibian species, 21 of these species have a distribution which coincides with the project area (Appendix 3) (IUCN, 2021; Du Preez & Carruthers, 2017). Consultation of the ADU historical records confirms that 18 amphibian species have been recorded within the QDS (3325CB, 3325DA) and are likely to occur within the project area, all of which are considered Least Concern (Appendix 3).

Three endemic species have a distribution which includes the project area, two are endemic to South African, Cape River Frog (*Amietia fuscigula*) and Delalande's Sand Frog (*Tomopterna delalandii*), and one is endemic to the Eastern Cape, Eastern Leopard Toad (*Sclerophrys pardalis*). This species inhabits open grassy bushveld areas, thickets and agricultural areas and breeds in large, permanent, usually deep pools (IUCN SSC ASG, 2016).

Reptiles

The Eastern Cape is home to 133 reptile species, 69 species have a distribution that coincides with the project area (Appendix 3) (IUCN, 2021; Branch, 1998; Bates et al. 2014). Consultation of the ADU historical records for QDS (3325CB, 3325DA) and iNaturalist indicates that 57 species have been confirmed to occur within the study area. Four reptile species are endemic to the EC and have a distribution which includes the project area (Table 3.4) and two chameleon (*Bradypodion*) species have yet to be described.

Although not recorded within the Screening Report generated for this site, in previous Screening Reports Sensitive Species 18 has been recorded. This species is listed as Endangered and is poorly protected (Tolley, *et. al.*, 2018). It is endemic to South Africa and very restricted to inland areas of Algoa Bay in the Eastern Cape Province (Figure 3.9). The only known population is found in bontveld vegetation on limestone (Nanaga formation) and calcareous paleodunes (Cenozoic Algoa Group) (Maritz, *et. al.*, 2018). Currently, a total of only 30 confirmed observation records exists for this species, all of which occur within Grassridge Bontveld.



Figure 3.9: Distribution of Sensitive Species 18 (SARCA, 2014).



Table 3.4: List of reptile SCC which may occur within the study area.

Name	Red list Category (SARCA 2014)	Habitat	Distribution Map
Sensitive Species18	EN	Bontveld vegetation on limestone (Nanaga formation) and calcareous paleodunes (Cenozoic Algoa Group) (Maritz, et. al., 2018).	
Essex's Pygmy Gecko <i>(Goggia essexi)</i>	LC	Shale and sandstone rock outcrops with low vegetation cover in karroid thicket and grassy fynbos (Bates & Branch, 2018).	
Albany Sandveld Lizard <i>(Nucras taeniolata)</i>	LC	Very little is known about the ecology of this seemingly rare lizard. Observed on soft and hard soils and shale in mesic environments, where it may burrow in at the base of bushes or shelter under rock slabs (Burger & Tolley, 2018).	
Algoa Bay Legless Skink <i>(Acontias lineicauda)</i>	LC	Endemic to the Algoa Bay region of the Eastern Cape, South Africa. Fossorial, found in alluvial soils in inland valleys (Bauer & Conradie, 2018).	
Algoa Dwarf Burrowing Skink <i>(Scelotes anguineus)</i>	LC	Fynbos Biome thicket (Bauer, et. al., 2018).	



3.6 BIODIVERSITY INDICATORS

3.6.1 Critical Biodiversity Areas

Provincial

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:

- 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). Only the proposed buffer yard falls within the NMBM.

According to the ECBCP (2019), the site camp and site camp access road does not fall within a CBA, an ESA or Protected Area. Only the north-western half of the proposed buffer yard falls within an Aquatic ESA 1. The remainder of the Buffer Yard, Site Camp and Site Camp Access Road does not occur within a CBA, ESA or protected area.

Local – NMBM Biodiversity Plan (2009/14)

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 CBA or an ESA.



Table 3.5: Biodiversity priority areas affected by the proposed Umpyilanga Buffer Yard, Site Camp and Site Camp Access Road.

Category	Sensitivity Features	Desired Management Objective	Recommendation
ECBCP (2019) Terrestrial CBAs/ESAs			
Aquatic ESA 1	<p>ESAs are not essential for meeting biodiversity targets, but are essential in terms of:</p> <ul style="list-style-type: none"> • <u>Aquatic landscape:</u> ESAs extend into catchments that are essential for the maintenance of CBA rivers and wetlands. 	<p>Maintain ecological function within the localised and broader landscape. A functional state in this context means that the area must be maintained in a semi-natural state such that ecological function and ecosystem services are maintained.</p> <p>For areas classified as ESA1, the following objectives apply:</p> <ul style="list-style-type: none"> • These areas are not required to meet biodiversity targets, but they still perform essential roles in terms of connectivity, ecosystem service delivery and climate change resilience. • These systems may vary in condition and maintaining function is the main objective, therefore: <ul style="list-style-type: none"> ○ Ecosystems still in natural, near natural state should be maintained. <p>Ecosystems that are moderately disturbed/degraded should be restored.</p>	<p>Based on the distance to the nearest drainage lines/surface water feature, as well as the small footprint of the proposed buffer yard, it is unlikely that development within the small portion of the Aquatic ESA 1 will affect surrounding rivers or wetlands. It should also be noted that the buffer yard (and site camp) is temporary and will only be required during the construction phase of the approved Dassiesridge WEF. However, erosion control measures and mitigation measures related to spills specified in the EMPr should be adhered to.</p>

3.6.2 Ecosystem Threat Status

The vegetation of the study site, Grassridge Bontveld, is classified as Least Concern (SANBI, 2021).

3.6.3 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 processes. The NPAES sets targets for expanding South Africa's protected area network, placing emphasis on those ecosystems that are least protected. According to the NPAES (2010/18), the study site does not occur within an NPAES Focus Area. The nearest NPAES Focus Area, the Baviaans-Addo NPAES Focus Area, is located approximately 4-5 km from the site.

The South African Protected Areas Database (SAPAD) and the South African Conservation Areas Database (SACAD) is a spatial dataset that includes all the protected areas (PA) and conservation areas (CA) within South Africa. Data on privately owned PAs are also included in the dataset which is maintained and updated on a quarterly basis. This dataset therefore provides the most up to date information on protected areas and conservation areas in South Africa. According to SACAD and SAPAD (2022, Q1), the study site does not occur within a protected area or a conservation area. The nearest protected area is the Uitenhage Nature Reserve which is located approximately 12 km south of the study site.

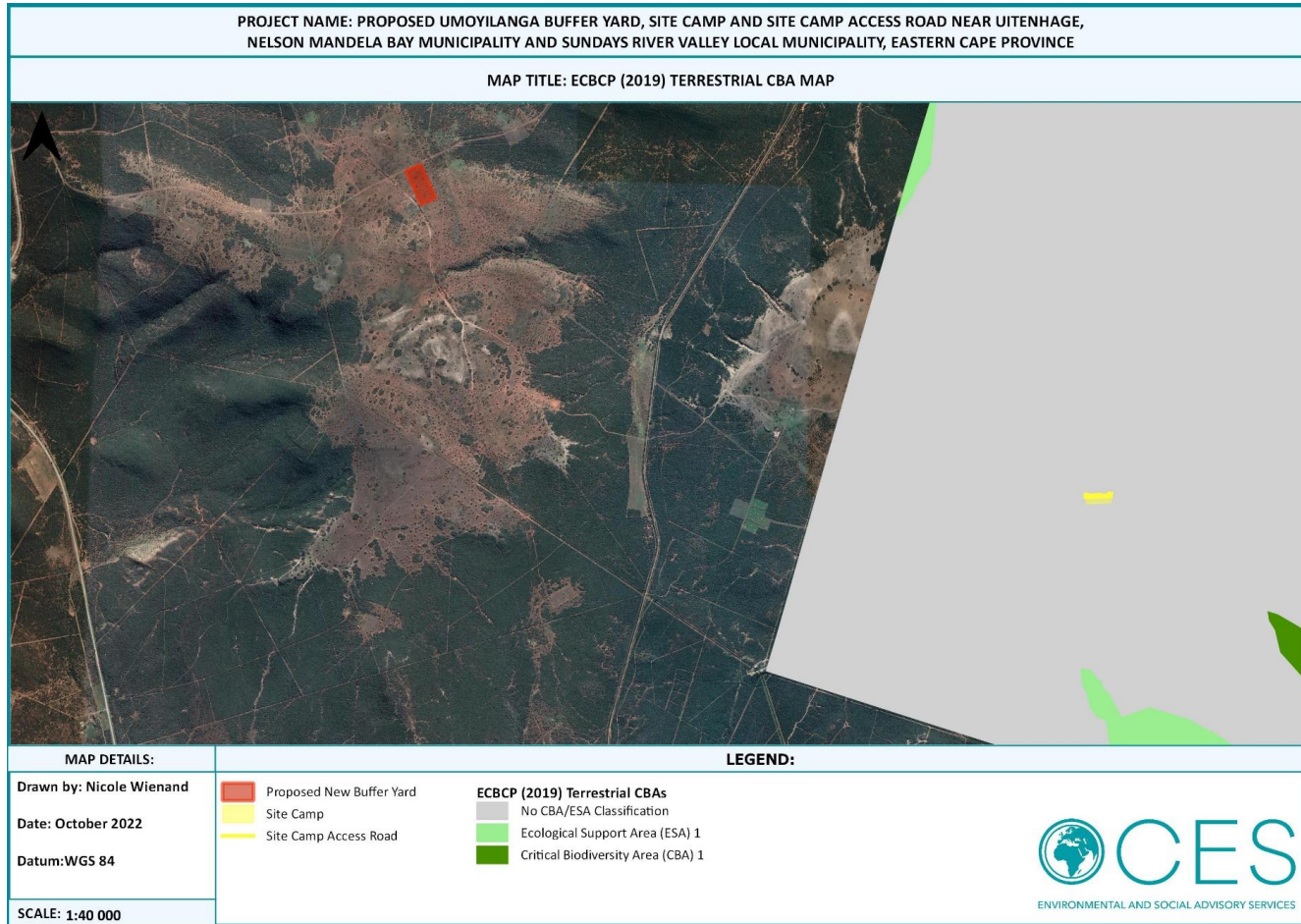


Figure 3.10: ECBCP (2019) Terrestrial CBAs within the project area.

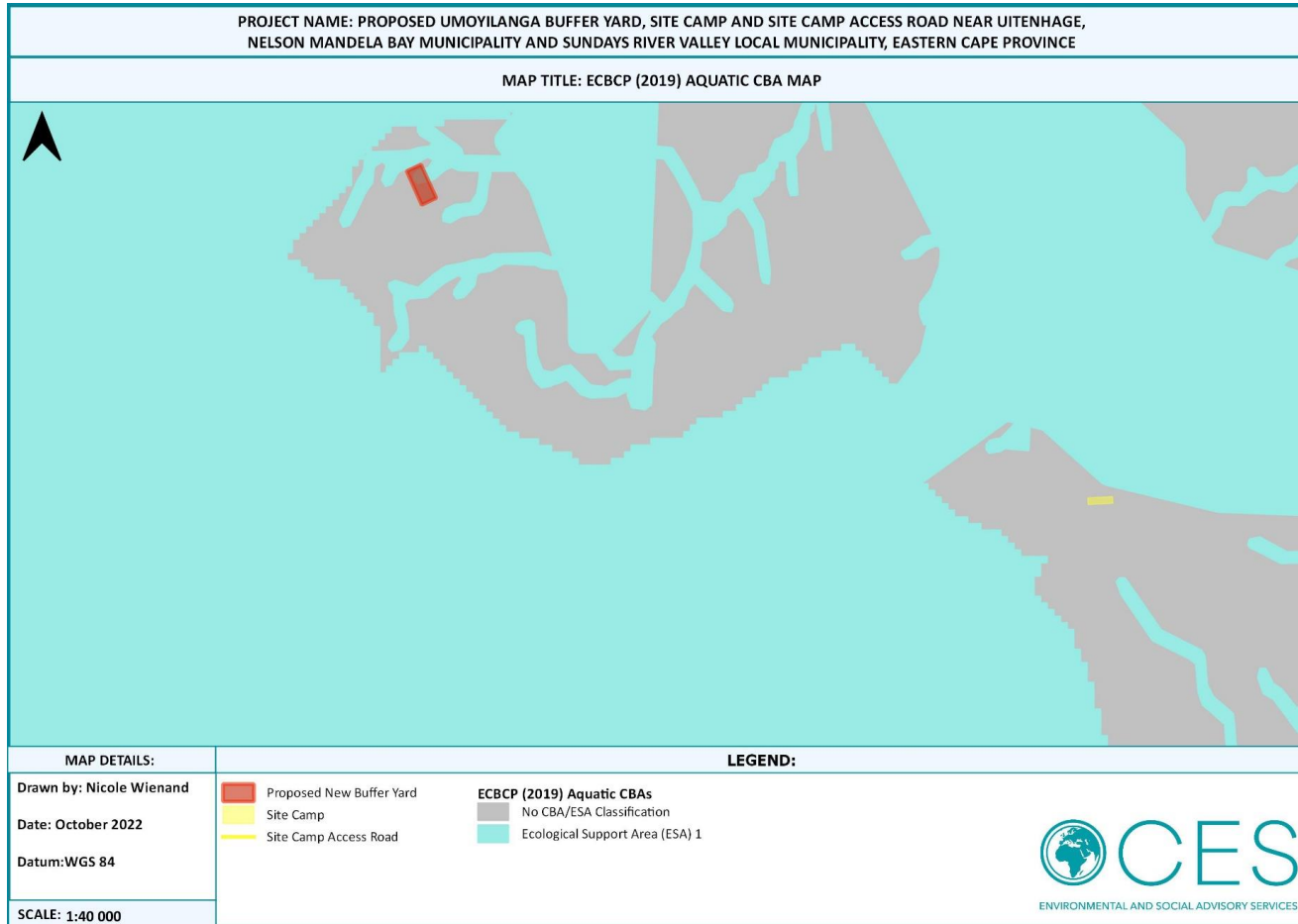


Figure 3.11: ECBCP (2019) Aquatic CBAs.

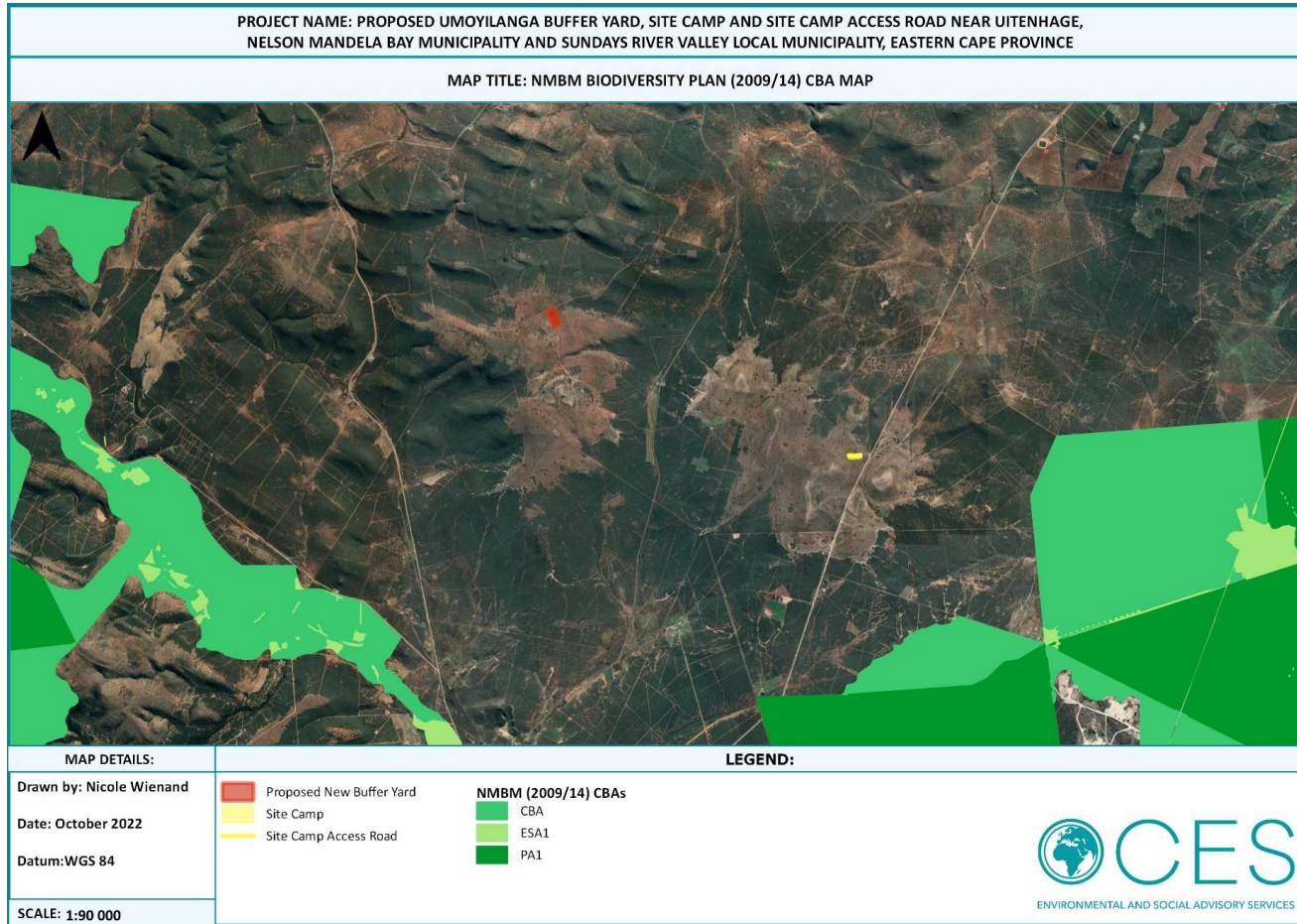


Figure 3.12: NMBM Biodiversity Plan (2009/14) CBA Map.

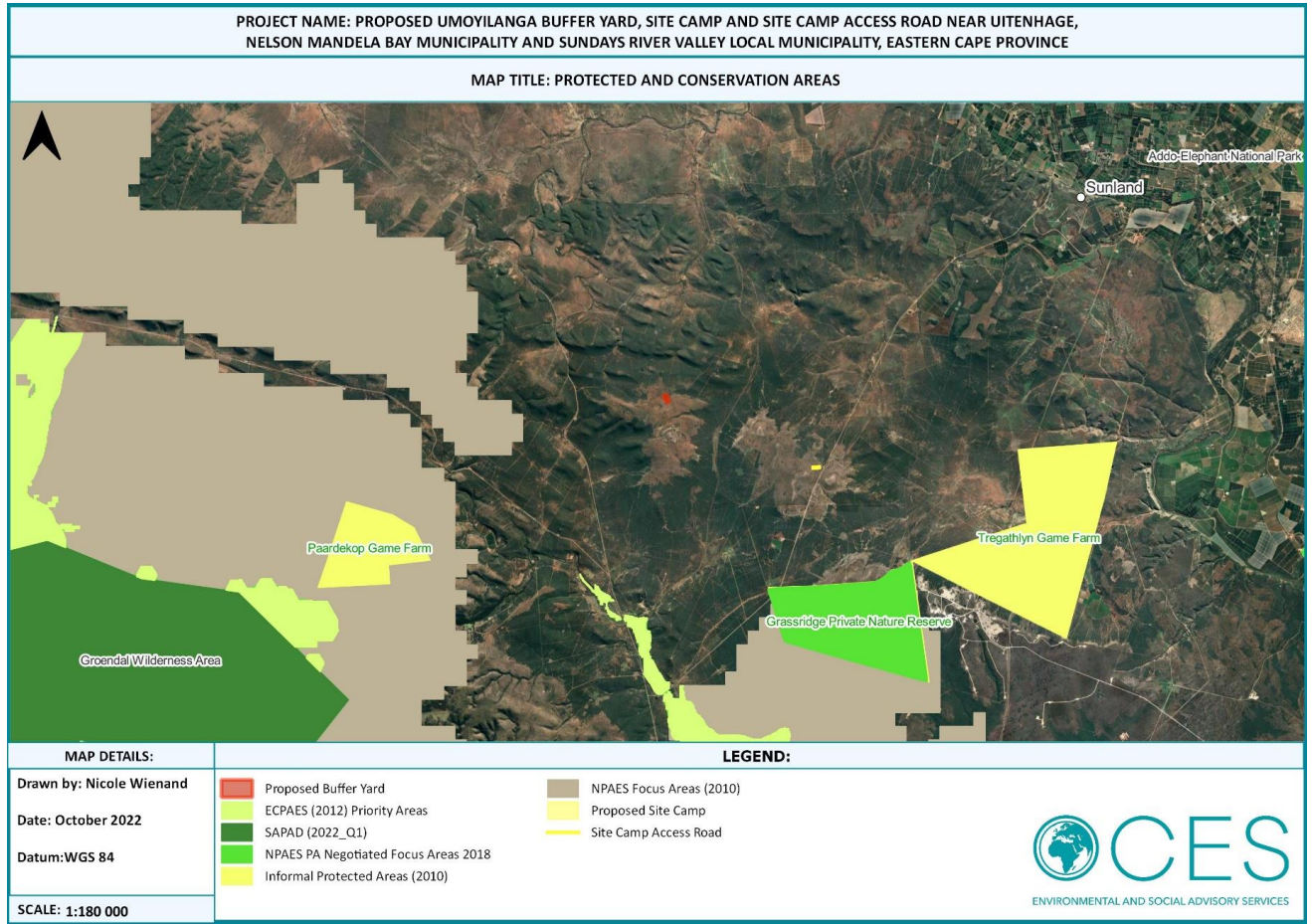


Figure 3.13: Protected areas surrounding the project area.



4 SITE SENSITIVITY

4.1 SITE SENSITIVITY

The Species Environmental Assessment Guideline (SANBI, 2020) was applied to assess the Site Ecological Importance (SEI) of the project area. The habitats and the species of conservation concern in the project area were assessed based on their conservation importance, functional integrity and receptor resilience (Table 4.1). The combination of these resulted in a rating of SEI and interpretation of mitigation requirements based on the ratings.

The sensitivity map was developed using available spatial planning tools as well as by applying the SEI sensitivity based on the field survey.

Table 4.1: Criteria for establishing Site Ecological importance and description of criteria.

Criteria	Description
Conservation Importance (CI)	<i>The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of IUCN Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.</i>
Functional Integrity (FI)	<i>A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.</i>
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor.	
Receptor Resilience (RR)	<i>The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.</i>
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and Receptor Resilience (RR)	

Table 4.2 provides a summary of how the ecosystem type was assessed.

Based on the evaluation of SEI in terms of the Species Environmental Assessment Guideline (SANBI, 2020), the SEI of the study site is classified as VERY HIGH. Interpretation of this classification in relation to proposed development activities, specifies 'Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains'.



Table 4.2: Evaluation of Site Ecological Importance (SEI) of habitat and SCC.

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	BI	Receptor Resilience	SEI
Grassridge Bontveld	HIGH	HIGH	HIGH	LOW	VERY HIGH
	<p><u>Fulfilling Criteria triggered</u></p> <p><i>Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km². IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining.</i></p> <p><u>Justification:</u></p> <p>High likely occurrence of four EN plant species, two VU plant species, one EN animal species and one VU animal species, all with an EOO > 10 km.</p> <p><i>Euphorbia globosa</i> (EN; EOO = 1200 km²), <i>Justicia orchioides</i> (VU; EOO of 2008 km²), <i>Rhombophyllum rhomboideum</i> (EN; EOO of</p>	<p><u>Fulfilling Criteria triggered</u></p> <p>Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.</p> <p>Reason</p> <p>The extent of the Grassridge Bontveld in which the study site occurs is approximately 600-800 ha, is relatively</p>		<p><u>Fulfilling Criteria triggered</u></p> <p><i>Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.</i></p> <p><u>Justification</u></p> <p>A study undertaken by Campbell (2018), found that Grassridge Bontveld cannot recover from vegetation clearance, especially if the underlying soil and geology has been disturbed as this is one of the main abiotic factors influencing the distribution, structure and composition of this vegetation type. Additionally, According to EWT and Bionerds (2021) in Vervurgt (2021), it has been found that Sensitive Species 18 does not return to rehabilitated areas of Grassridge Bontveld.</p>	



Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	BI	Receptor Resilience	SEI
	102 km ²), <i>Euryops ericifolius</i> (EN; 119 km ²), <i>Syncarpha recurvata</i> (EN; EOO 2700 km ²), <i>Strelitzia juncea</i> (VU; EOO 1300 km ²), <i>Mystromys albicaudatus</i> (VU; AOO 3,719–12,061 km ²); Sensitive Species 18 (EN; EOO 95 km ²).	intact with minor current negative ecological impacts. There is good habitat connectivity with functional ecological corridors within the landscape.			

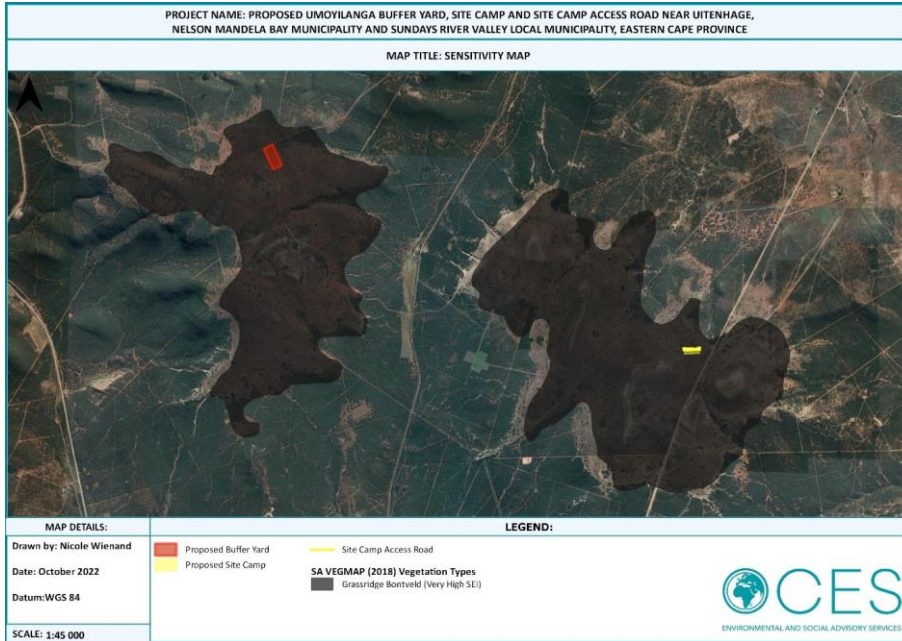


Figure 4.1: Sensitivity map indicating the SEI of the study site as per the classification in terms of the Species Environmental Assessment Guideline (SANBI, 2020).



5 IMPACT IDENTIFICATION AND ASSESSMENT

The study that has been undertaken provides the necessary information in order to assess the impacts of the proposed Umoyilanga Buffer Yard, Site Camp and Site Camp Access Road on the ecology of the area at the appropriate spatial and temporal scales. The impacts identified and described in Section 5.1 below have been assessed in terms of the criteria described in Appendix 4 of this report. It should be noted that the proposed development is only required for the duration of the construction phase of the Dassiesridge WEF whereafter facilities will be decommissioned. As such, only construction phase impacts have been identified below as the 'operational phase' is not relevant to the proposed Buffer Yard, Site Camp and Site Camp Access Roads.



5.1 IMPACT ASSESSMENT

Table 5.1: Assessment of impacts associated with the proposed Umoyilanga Buffer Yard, Site Camp and Site Camp Access Road.

CONSTRUCTION PHASE

IMPACT 1: LOSS OF GRASSRIDGE BONTVELD

Cause and Comment

Direct Impact

The clearing of land for the construction of the proposed development will result in the direct loss of 4.7 ha of Grassridge Bontveld (classified as Least Concern). The current remaining extent of this vegetation type amounts to ~ 221.3 ha. Therefore, the clearance of 4.7 ha amounts to a 2% loss of the overall extent of this vegetation type.

Cumulative Impact

According to SANBI (2021), 90% of the historical extent of Grassridge Bontveld currently remains. This indicates that only 10% of this vegetation type has been lost. It should be noted that portions of this vegetation type have already been lost within the project area the broader project area due to construction of the approved Dassiesridge WEF, roads, agriculture, and industrial development.

No-Go Alternative

If the project does not go ahead, the current impacts associated with grazing, agriculture, and the infestation of invasive alien species will continue. Furthermore, construction of the approved Dassiesridge WEF will also continue. As such, the No-go Alternative is classified as low negative.

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 must 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 must be removed from site and disposed of at a registered waste disposal site;
- Continuous monitoring for seedlings must take place throughout the construction phase;
- Only indigenous species must be used for rehabilitation purposes;
- As far as practically possible, existing access roads must be utilised; and
- The Alien Management Plan/ Method Statement for the Dassiesridge WEF must be implemented during construction (and Operation) of the Umoyilanga Buffer Yard, Site Camp and Site Camp Access Roads.



Significance Assessment:										
Alternative	Nature & Type	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Preferred Alternative	Direct (-)	Long-term	Study Area	Moderate	Definite	MODERATE (-)	Reversible	Resource will be partly lost	Achievable	Low (-)
Cumulative	Cumulative (-)	Long-term	Study Area	Moderate	Definite	MODERATE (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.			N/A
No-Go	Existing (-)	Long-term	Regional	Slight	Definite	Low (-)	N/A			

IMPACT 2: LOSS OF BIODIVERSITY

Cause and Comment

Direct Impact

During the construction phase, the loss of Grassridge Bontveld due to vegetation clearance coincides with the loss of 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 project area, thereby influencing the provision of valuable ecosystems services. However, based on the small development footprint of the proposed Umoyilanga Buffer Yard, Site Camp and Site Access Road this impact is classified as moderate negative prior to mitigation.

Cumulative Impact

Biodiversity within the broader project area has already been lost due to the clearance of vegetation for roads and other infrastructure, agriculture, industrial development, amongst other land uses. As such, the Cumulative Impact is classified as moderate.

No-Go Alternative



If the project does not go ahead, the current impacts and loss of biodiversity associated with grazing, subsistence farming, and the infestation of invasive alien species will continue. Furthermore, development of the approved Dassiesridge WEF will also continue. As such, the No-go Alternative is classified as low negative.

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 must be translocated to the nearest appropriate habitat, preferably a protected portion of the property;
- The clearance of vegetation at any given time must 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 must be used for rehabilitation purposes which must aim to re-vegetate exposed soil; and
- As far as practically possible, existing roads must be utilised.

Significance Assessment:

Alternative	Nature & Type	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Preferred Alternative	Direct (-)	Long-term	Study Area	Moderate	Definite	MODERATE (-)	Irreversible	Resource will be partially lost	Easily Achievable	Low (-)
Cumulative	Cumulative (-)	Permanent	Study Area	Moderate	Definite	MODERATE (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.			N/A
No-Go	Existing (-)	Long-term	Study Area	Slight	Definite	Low (-)				

IMPACT 3: LOSS OF PLANT SPECIES OF CONSERVATION CONCERN

Cause and Comment



Direct Impact

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.

Cumulative Impact

Plant SCC have likely already been lost within the broader project area due to clearance of vegetation for roads and other infrastructure, agriculture, industrial development, amongst other land uses. As such, the Cumulative Impact is classified as moderate.

No-Go Alternative

The No-go alternative will not require the clearance of vegetation and will therefore not result in the loss of plant SCC. The no-go alternative is therefore negligible.

Mitigation Measures:

- Species that are known to survive translocation must be translocated and used to rehabilitate impacted areas which do not form part of the development footprint;
- Permits for the removal of plant species protected in terms of the Nature and Environmental Conservation Ordinance 19 of 1974, TOPS and List of Protected Trees must be obtained prior to vegetation clearance; and
- Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.

Significance Assessment:

Alternative	Nature & Type	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
All Alternatives	Direct (-)	Permanent	Study Area	Severe	May Occur	HIGH (-)	Irreversible	Resource will be partially lost	Easily Achievable	Low (-)
Cumulative	Cumulative (-)	Permanent	Regional	Severe	May Occur	HIGH (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.			N/A
No-Go	N/A					NEGLIGIBLE	N/A			



IMPACT 4: LOSS OF A PORTION OF AN AQUATIC ESA 1

Cause and Comment

Direct Impact

The construction of the proposed development will result in the loss of a portion of an area classified as an aquatic ESA 1. ESAs extend into catchments that are essential for the maintenance of CBA rivers and wetlands. However, based on the distance to the nearest drainage lines/ surface water feature, as well as the small footprint of the proposed buffer yard, it is unlikely that development within the small portion of the Aquatic ESA 1 will affect surrounding rivers or wetlands. As such, the significance of this impact is classified as low negative.

Cumulative Impact

Portions of CBAs and ESAs have already been lost within the region due to other developments and various other activities. The construction of the proposed development will therefore contribute to the cumulative loss of areas classified as ESA 1.

No-Go Alternative

The No-go alternative will not result in the loss of areas classified as an aquatic ESA 1. As such, this impact is classified as negligible.

Mitigation Measures:

- Existing roads must be utilised as far as practically and feasibly possible;
- An Erosion Management Plan / Method Statement must 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 and remedial action must be taken at the first signs of erosion.

Significance Assessment:

Alternative	Nature & Type	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Preferred Alternative	Direct (-)	Long-term	Study Area	Slight	Definite	Low (-)	Reversible	Resource will not be lost	Easily achievable	Low (-)
Cumulative	Cumulative (-)	Permanent	Regional	Slight	Definite	Low (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area.			N/A



							However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.		
No-Go	N/A					NEGLIGIBLE	N/A		

IMPACT 5: ESTABLISHMENT OF ALIEN PLANT SPECIES

Cause and Comment

Direct Impact

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.

Cumulative Impact

Alien Plant Species, including *Opuntia ficus-indica*, *O. aurantiaca*, *Acacia mearnsii*, *A. cyclops* and *Agave* sp. have already established within the broader project area. Therefore, should the proposed Buffer yard, Site Camp and Site Camp Access Road result in the further establishment of alien invasive species in the project area, the invasion by alien species could be exacerbated. The cumulative impact associated therewith has therefore been classified as moderate.

No-Go Alternative

There is already evidence of *Opuntia ficus-indica*, *O. aurantiaca*, *Acacia mearnsii*, *A. cyclops* and *Agave* sp. within the site. Under the no-go alternative these species are likely to continue multiplying if left unchecked. The current no-go alternative is thus rated as moderate negative

Mitigation Measures:

- The clearance of vegetation must be strictly limited to that which is necessary for the establishment of the proposed Buffer Yard, Site Camp and Site Camp Access Road;
- Laydown areas must be located within previously disturbed areas wherever possible;
- Any impacted areas outside of the development footprint must be rehabilitated using indigenous plant species commonly occurring within vegetation types of the project area; and
- Existing access roads must be utilised wherever possible.

Significance Assessment:

Alternative	Nature & Type	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
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Preferred Alternative	Direct (-)	Long-Term	Study-Area	Moderate	May Occur	MODERATE (-)	Reversible	Resource will be partly lost	Easily achievable	Low (-)
Cumulative	Cumulative (-)	Long-Term	Study-Area	Slight	May Occur	Low (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area.		N/A	
No-Go	Existing (-)	Long-Term	Study-Area	Moderate	Probable	MODERATE (-)	N/A			

IMPACT 6: DISTURBANCE AND/OR DEATH OF HERPETOFAUNA AND/OR LOSS OF HABITATS

Cause and Comment

Direct Impact

During the construction phase, construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil, and the movement of construction vehicles) could result in wildlife mortalities through road kills or accidental killing, and/or cause the displacement of herpetofauna via increased noise, lighting or air pollution. Additionally, the loss of vegetation/soil due to clearance will result in the direct loss of faunal habitat, which will directly, and indirectly, impact on amphibians and reptiles adapted to their ground dwelling habitats. Reptiles also face a high risk of being poached in the wild, and the increase in individuals associated with the construction of the proposed development could create reptile poaching opportunities. As such, this impact is rated moderate negative.

Cumulative Impact

The addition of the proposed development likely will exacerbate current impacts on amphibians and reptiles within the study area due to existing developments (e.g., roads, mining, and livestock farming), and may exacerbate the loss of protected reptile species through increased poaching opportunities. Moreover, amphibians and reptiles are relatively poor dispersers and are slower to move away from construction areas, increasing their risk to impacts. Therefore, the cumulative impact is rated moderate negative.

No-Go Alternative

The No-go alternative will not require construction activities associated with the proposed development to take place and therefore will not result in any additional disturbance and/or death to amphibian or reptile species. If the proposed development is not approved, herpetofauna are likely to be disturbed and/or killed due to other activities taking place in the study area. The no-go alternative therefore is rated moderate negative.



Mitigation Measures:

- It is illegal to remove or kill amphibians and reptiles within the study area listed as either Schedule I or II on the PNCO. The relevant permits must be obtained prior to the translocation of protected amphibians and reptiles;
- All construction staff must be educated with regards to wildlife conservation, and all staff employed by the developer must ensure that any amphibians or reptiles encountered during construction of the proposed development are not harmed or killed;
- Amphibians and reptiles encountered must be allowed to move away from the construction area. In the event they need to be translocated, amphibians must be released in the same catchment areas while reptiles must be relocated to directly adjacent areas of the proposed development. No amphibian or reptile species may be removed off site without proper authorisation from the relevant authority;
- A rescue plan must be developed to protect reptiles which could fall into construction pits;
- The appointed ECO must be trained in snake handling and removal techniques;
- Any amphibian or reptile species that may die due to construction activities associated with the proposed development must be recorded (e.g., photographed and GPS coordinates taken) and reported to the appointed ECO and relevant authorities (i.e., EWT). Where needed, the carcass should be donated to SANBI.
- All individuals, including construction workers must sign a register prior to accessing the construction site;
- Speed restrictions (40 km per hour is recommended) must be implemented to reduce the chance of road kills, as well as to reduce the amount of dust caused by vehicle movement along the roads;
- All reasonable and feasible measures should be implemented to reduce noise in ecologically sensitive areas.

Significance Assessment:

Impact	Nature	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Preferred Alternative	Direct (-)	Short-term	Study Area	Moderate	Probable	MODERATE (-)	Irreversible	Resource will be partially lost	Achievable	Low (-)
Cumulative	Cumulative (-)	Short-term	Study Area	Moderate	Probable	MODERATE (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.			N/A
No-Go	Existing (-)	Long-Term	Study Area	Moderate	Definite	MODERATE (-)	N/A			

IMPACT 7: DISTURBANCE AND/OR DEATH OF MAMMALS AND/OR LOSS OF HABITATS



Cause and Comment

Direct Impact

During the construction phase, construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil and the movement of construction vehicles) could result in wildlife mortalities through road kills or accidental killing, and/or cause the displacement of mammals via increased noise, lighting or air pollution. Additionally, the loss of vegetation/soil due to clearance will result in the direct loss of faunal habitat, which will directly, and indirectly, impact on small sedentary species adapted to their ground dwelling habitats. Larger more agile species such as antelope are likely to disperse to more suitable habitats away from construction areas. As such, this impact is rated low negative.

Cumulative Impact

The addition of the proposed development may exacerbate current impacts on mammals within the study area due to existing developments (e.g., roads, mining, and farming), and could exacerbate the loss of protected mammal species through increased poaching opportunities. However, mammals are relatively agile and can move away from construction areas to more suitable habitat. Therefore, the cumulative impact is rated low negative.

No-Go Alternative

The no-go alternative will not require construction activities associated with the proposed development to take place and therefore will not result in any additional disturbance and/or death to mammal species. If the proposed development is not approved, mammal species are likely to be disturbed and/or killed due to other activities taking place in the study area. The no-go alternative therefore is rated slight negative.

Mitigation Measures:

- It is illegal to remove or kill mammals within the study area listed as either Schedule I or II on the PNCO. The relevant permits must be obtained prior to the translocation of protected mammal spec;
- All construction staff must be educated with regards to wildlife conservation, and all staff employed by the developer must ensure that any mammals encountered during construction of the proposed development are not harmed or killed;
- Any mammals encountered must be allowed to move away from the construction area. No mammal may be removed off site without proper authorisation from the relevant authority;
- Any mammal species that may die due to construction activities associated with the proposed development must be recorded (e.g., photographed and GPS coordinates taken) and reported to the appointed ECO and relevant authorities (i.e., EWT). Where needed, the carcass should be donated to SANBI; and
- Speed restrictions (40 km per hour is recommended) must be implemented to reduce the chance of road kills, as well as to reduce the amount of dust caused by vehicle movement along the roads.
- All reasonable and feasible measures should be implemented to reduce noise and lighting in ecologically sensitive areas.

Significance Assessment:

Impact	Nature	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Preferred Alternative	Direct (-)	Short-term	Study Area	Slight	May occur	Low (-)	Irreversible	Resource will be partly lost	Achievable	Low (-)



Cumulative	Cumulative (-)	Short-term	Study Area	Slight	May occur	Low (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.	N/A
No-Go	Existing (-)	Long-Term	Study Area	Slight	Definite	Low (-)	N/A	

IMPACT 8: DISTURBANCE AND/OR LOSS OF HERPETOFAUNA SPECIES OF CONSERVATION CONCERN

Cause and Comment

Direct Impact

During the construction phase, construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil and the movement of construction vehicles) could result in the loss of herpetofauna SCC through increased road kills or accidental killing, and/or the displacement of Sensitive Species 18. 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.

Cumulative Impact

Herpetofauna SCC have likely been disturbed and/or lost due to existing developments and activities within the study area, and the potential loss of herpetofauna SCC associated with the construction of the proposed development may contribute to the overall cumulative loss of SCC within the broader study area. As such, this impact is rated as high negative.

No-Go Alternative

The no-go alternative will not require the clearance of vegetation/soil and therefore will not result in the potential loss of herpetofauna SCC. If the proposed development is not approved, SCC are still likely to be disturbed and/or killed due to other activities taking place in the study area such as farming and the construction of the Dassiesridge WEF. The no-go alternative, therefore, is rated high negative.

Mitigation Measures:

- The mitigation measures relating to Sensitive Species 18 specified in the Final EMP for the approved Dassiesridge WEF must be implemented and adhered to. These include the following:



- • An ECO, with an ecological background, must be appointed for the Dassiesridge project and must have undertaken a snake wrangling course so that they can safely relocate any snakes found on site.
 - The ECO must walk the site immediately prior to construction i.e. in front of earth moving equipment. All snakes and other slow-moving species must be recorded (photographs and GPS location) and relocated elsewhere within the same property, out of harms way. The location where the fauna is relocated to must be recorded (GPS and photograph) and placed on iNaturalist.
 - Road signs must be placed along access roads warning people to drive slowly to avoid hitting Sensitive Species 18.
 - Signage can be similar to that used for the Western Leopard Toad in Cape Town.
 - Traffic calming measures, such as speed restrictions, must be implemented.
 - Staff induction must include information on speed limits and that vehicles must stop when they encounter snakes crossing the road. If encountered, vehicles must wait until the snake has moved off the road before continuing on.
 - Any mortalities must be collected and donated to SANBI with GPS co-ordinates.
 - The ECO must check trenches daily for faunal species (including snakes) that may have fallen inside. If faunal species are found, these must be recorded and removed to suitable habitat out of harms way.
- It is illegal to remove or kill any of the amphibians and reptiles within the study area that are listed as either Schedule I or II on the PNCO. Not all areas can be avoided, but it is recommended that construction staff should be educated with regards to wildlife conservation and that all staff employed by the developer ensure that any amphibians or reptiles encountered are not harmed or killed;
- Amphibians or reptiles encountered must be allowed to move away from the construction area. In the event they need to be translocated, amphibians must be released in the same catchment area while reptiles must be relocated to directly adjacent areas of the proposed development. No amphibians or reptiles may be removed off site without proper authorisation from the relevant authority; and
- Where possible, amphibian or reptile SCC observed on site must be recorded (photographed, GPS coordinates taken) and loaded onto iNaturalist by the appointed ECO.

Significance Assessment:

Impact	Nature	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Preferred Alternative	Direct (-)	Permanent	Localised	Severe	May Occur	High (-)	Irreversible	Resource will be partly lost	Achievable	MODERATE (-)
Cumulative	Cumulative (-)	Permanent	Study Area	Severe	May Occur	High (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area.			N/A



						HIGH (-)	However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.
No-Go	Existing (-)	Long-Term	Study Area	Severe	Definite	HIGH (-)	N/A

IMPACT 9: DISTURBANCE AND/OR LOSS OF MAMMAL SPECIES OF CONSERVATION CONCERN

Cause and Comment

Direct Impact

During the construction phase, construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil and the movement of construction vehicles) could result in the disturbance and/or loss of mammal SCC through increased road kills or accidental killing, and/or cause the displacement of mammal SCC via increased noise or air pollution. Only one threatened mammal SCC is highly likely to occur within the project area, including the White-tailed Rat (*Myiastromys albicaudatus*) which is classified as VU. This species is often associated with calcrete soils within grasslands. Additionally, some mammal SCC may face the risk of being hunted, baited, or trapped by construction staff. However, mammals are likely to move away from the project area during construction. As such, this impact is classified as low negative.

Cumulative Impact

Mammal SCC have likely already been lost due to existing developments and activities within the broader area and the potential loss of mammal SCC associated with construction of the proposed development may contribute to the overall cumulative loss of SCC within the broader study area. As such, this impact is rated as low negative.

No-Go Alternative

The no-go alternative will not require the clearance of vegetation/soil and therefore will not result in the potential loss of mammal SCC. If the proposed development is not approved, mammal SCC are still likely to be disturbed and/or killed due to other activities taking place in the study area such as farming and the construction of the Dassiesridge Wind Farm. The no-go alternative is therefore rated low negative.

Mitigation Measures:

- Mammal SCC encountered must be allowed to move away from the construction area. No mammal SCC may be removed off site without proper authorisation from the relevant authority;
- All individuals, including construction workers must sign a register prior to accessing the construction area;
- Construction workers must not be housed on site;
- It is illegal to remove or kill any of the mammals within the study area that are listed as either Schedule I or II on the PNCO. Not all areas can be avoided, but it is recommended that construction staff should be educated with regards to wildlife conservation and that all staff employed by the developer ensure that any mammals encountered are not harmed or killed;
- Hunting, baiting, or trapping of mammals must not be allowed within the affected properties or surrounding properties by construction staff;



- The appointed ECO must undertake an overview inspection of the site for the evidence of snares during the construction phase; and
- Where possible, mammal SCC observed on site must be recorded (photographed, GPS coordinates taken) and loaded onto iNaturalist by the appointed ECO.

Significance Assessment:

Impact	Nature	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Preferred Alternative	Direct (-)	Permanent	Study Area	Slight	May Occur	Low (-)	Irreversible	Resource will be partly lost	Easily achievable	Low (-)
Cumulative	Cumulative (-)	Permanent	Study Area	Slight	May Occur	Low (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.			N/A
No-Go	Existing (-)	Long-Term	Study Area	Slight	Definite	Low (-)	N/A			

DECOMMISSIONING PHASE

The proposed Buffer Yard, Site Camp and Site Camp Access Road should be decommissioned and rehabilitated once the construction of the Dassiesridge WEF is completed. Impacts associated within inadequate rehabilitation of impacted areas is included below.

IMPACT 10: FAILURE TO REHABILITATE IMPACT AREAS AND THE INFESTATION OF ALIEN PLANT SPECIES

Cause and Comment

Direct Impact

Failure to control alien plant species during construction and/or rehabilitate impacted areas could result in the establishment and spread of alien plant species within the project area.



Cumulative Impact

Scattered alien invasive species have already established in the surrounding area. Therefore, should the decommissioning of the proposed development lead to the further establishment of alien invasive species in the project area, the invasion by alien species could be exacerbated. Considering the small footprint of the proposed development, the cumulative impact associated therewith has been classified as low.

No-Go Alternative

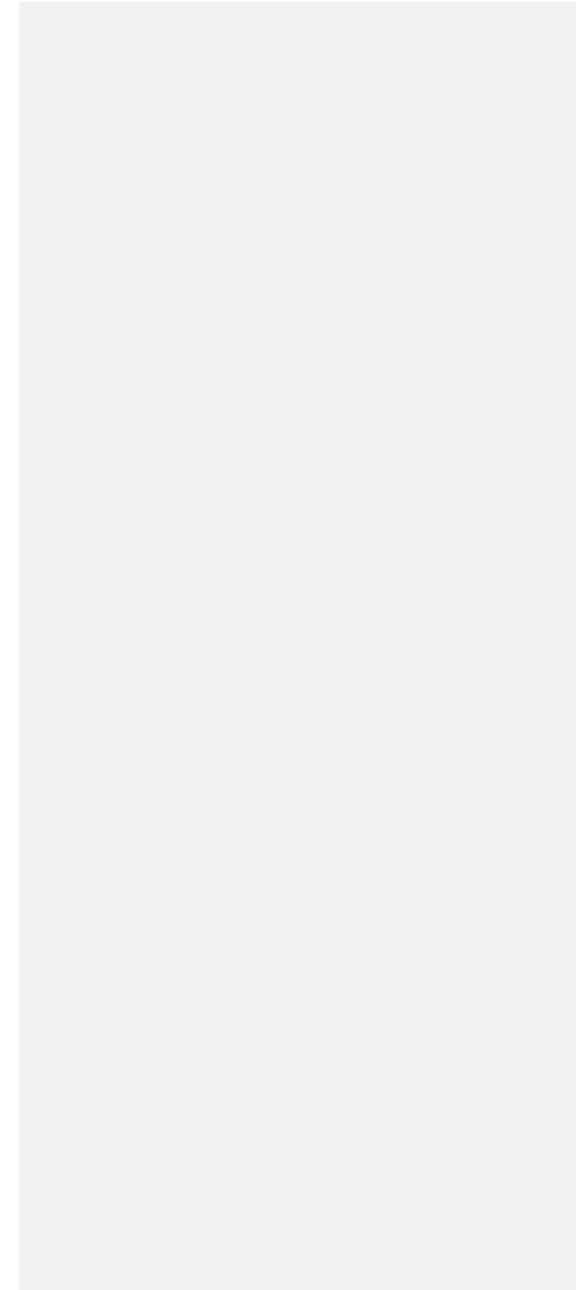
There is already evidence of *Opuntia ficus-indica*, *O.aurantiaca*, *Acacia mearnsii* and *A. cyclops* within the site. Under the no-go alternative these species are likely to continue multiplying if left unchecked. The current no-go alternative is thus low.

Mitigation Measures:

- The site must be checked regularly for the presence of alien invasive species. When alien invasive species are found, immediate action must be taken to remove them;
- The Alien Management Plan/ Method Statement for the Dassiesridge WEF must be implemented and adhered to; and
- The site must be rehabilitated using indigenous plant species commonly occurring within Grassridge Bontveld.

Significance Assessment:

Impact	Nature	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Preferred Alternative	Direct	Permanent	Study-Area	Moderate	May Occur	Moderate (-)	Reversible	Resource will be partly lost	Easily Achievable	Low (-)
Cumulative	Cumulative	Long-Term	Study-Area	Slight	May Occur	Low (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or farming activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above.			N/A
No-Go	Direct	Long-Term	Localised	Moderate	Probable	Low (-)	N/A			





6 IMPACT STATEMENT, CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

The SEI of the proposed development sites has been classified as VERY HIGH due to the combination of its high conservation important, high functional integrity and low receptor resilience. A major contributing factor is the potential occurrence of Sensitive Species 18. As such, the implementation of the mitigation measures relating to this species which are specified in the Final EMPr for the Dassiesridge WEF (as well as this report) is of critical importance.

Despite the VERY HIGH classification of SEI the majority of the impacts identified for the development can be reduce to low if the migration measures specified in this report are implemented. The Ecological Impact Assessment undertaken for the proposed Umoyilanga Buffer Yard, Site Camp and Site Camp Access Road identified ten (10) impacts associated within the proposed development, two (2) of which were classified as high, five (5) of which were classified as moderate and three (3) of which were classified as low prior to the implementation of mitigation measures. If the mitigation measures specified in this report are implemented, the significance of these impacts can be reduced to low for nine (9) of these impacts and moderate (1) for one of the impacts.

It is also important to consider the context of the development. The proposed site is relatively small and occurs within the project area for the approved Dassiesridge WEF.

6.2 CONDITIONS OF EMPR, EA AND MONITORING

All management / mitigation measures identified for the impacts associated with the proposed development must be incorporated into the EMPr and implemented during all the relevant phases of the proposed development (please refer to Section 5.1 above for the recommended mitigation measures associated with each impact identified). Specific mitigation measures and recommendations that should be incorporated into the EA (if granted) include:

- All necessary permitting and authorisations must be obtained prior to the commencement of any construction activities;
- A search and rescue must be undertaken by a qualified botanical specialist. Botanical SCC which are known to survive translocation must be relocated to nearest appropriate habitat;
- A Search and Rescue Operation must be undertaken by a qualified herpetologist for protected amphibian and reptile species, particularly for Sensitive Species 18;
- An Erosion Method Statement must be developed prior to the commencement of construction activities in order to mitigate the unnecessary loss of topsoil and runoff;



- The Alien Management Plan / Method Statement compiled for the Dassiesridge WEF must be implemented and adhered to during the construction, operation and decommissioning of the proposed Buffer Yard, Site Camp and Site Camp Access Road;
- Activities within 500 m of a wetland and 100 m of a watercourse must obtain the necessary Water Use Authorisation prior to the commencement of such activities;
- Lay down areas must be located within previously disturbed areas where possible (e.g. the parking lot at the tented camp or within the footprint of existing gravel roads);
- A member of staff should be appointed to walk the perimeter of the fence, directly prior to construction/vegetation clearance at the start of each day to ensure no faunal species are in harm's way. In the event that faunal species are encountered, these should be allowed to move away from the area safely. Slow moving species e.g. tortoises and cryptic species should be moved out of harm's way and into suitable neighbouring habitat.

6.3 ECOLOGICAL STATEMENT AND OPINION OF THE SPECIALIST

The specialist is of the opinion that the development can proceed provided the recommended mitigation measures, specifically the undertaking of a search and rescue by a qualified botanical specialist and herpetologist, are implemented.



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APPENDIX 1: LIST OF PLANT SPECIES OCCURRING WITHIN THE PROJECT AREA.

Table A.1 Plant species occurring within the project area.

FAMILY	SPECIES	SA RED DATA LIST	PNCO	PROTECTED TREES	NEMBA	SAMPLING SITE
AIZOACEAE	<i>Aizoon glinoides</i>	LC	Schedule 4	-	-	Both Sites
AIZOACEAE	<i>Lampranthus cf hollandii</i>	LC	-	-	-	Buffer Yard
AIZOACEAE	<i>Lampranthus products</i>	-	-	-	-	Both Sites
AMARYLLIDACEAE	<i>Ammocharis coranica</i>	LC	Schedule 4	-	-	Buffer Yard
AMARYLLIDACEAE	<i>Boophone disticha</i>	LC	Schedule 4	-	-	Both Sites
ANACARDIACEAE	<i>Searsia longispina</i>	LC	-	-	-	Both Sites
ANACARDIACEAE	<i>Searsia lucida</i>	-	-	-	-	Both Sites
ANACARDIACEAE	<i>Searsia pyroides</i>	LC	-	-	-	Both Sites
ANACARDIACEAE	<i>Searsia rigens</i>	-	-	-	-	Both Sites
ANACARDIACEAE	<i>Searsia tumulicola</i>	-	-	-	-	Both Sites
ANACARDIACEAE	<i>Searsia pallens</i>	LC	-	-	-	Both Sites
APOCYNACEAE	<i>Carissa bispinosa</i>	LC	Schedule 4	-	-	Both Sites



APOCYNACEAE	<i>Sarcostemma viminale</i> <i>subsp. thunbergii</i>	LC	-	-	-	Both Sites
ARALIACEAE	<i>Cussonia Spicata</i>	LC	-	-	-	Both Sites
ASPARAGACEAE	<i>Asparagus striatus</i>	LC	-	-	-	Both Sites
ASPARAGACEAE	<i>Asparagus africanus</i>	LC	-	-	-	Both Sites
ASPARAGACEAE	<i>Asparagus capensis</i>	LC	-	-	-	Both Sites
ASPARAGACEAE	<i>Asparagus suaveolens</i>	LC	-	-	-	Both Sites
ASPHODELACEAE	<i>Aloe africana</i>	LC	Schedule 4	-	-	Both Sites
ASPHODELACEAE	<i>Aloe ferox</i>	LC	-	-	-	Both Sites
ASPHODELACEAE	<i>Bulbine abyssinica</i>	LC	-	-	-	Buffer Yard
ASTERACEAE	<i>Osteospermum moniliferum</i>	LC	-	-	-	Both Sites
ASTERACEAE	<i>Eriocephalus ericoides</i>	LC	-	-	-	Both Sites
ASTERACEAE	<i>Disparago ericoides</i>	LC	-	-	-	Both Sites
ASTERACEAE	<i>Elytropappus rhinocerotis</i>	LC	-	-	-	Both Sites
ASTERACEAE	<i>Felicia muricata</i>	LC	-	-	-	Both Sites
ASTERACEAE	<i>Gazania krebsiana</i>	LC	-	-	-	Both Sites
ASTERACEAE	<i>Helichrysum cf cymosum</i>	LC	-	-	-	Both Sites
ASTERACEAE	<i>Metalasia muricata</i>	LC	-	-	-	Both Sites
ASTERACEAE	<i>Senecio radicans</i>	LC	-	-	-	Both Sites
ASTERACEAE	<i>Pteronia incana</i>	LC	-	-	-	Both Sites



BORAGINACEAE	<i>Lobostemon trigonus</i>	LC	-	-	-	Both Sites
CELASTRACEAE	<i>Gymnosporia buxifolia</i>	LC	-	-	-	Both Sites
CELASTRACEAE	<i>Gymnosporia capitata</i>	LC	-	-	-	Both Sites
CELASTRACEAE	<i>Gymnosporia heterophylla</i>	LC	-	-	-	Both Sites
CELASTRACEAE	<i>Putterlickia pyracantha</i>	LC	-	-	-	Both Sites
CRASSULACEAE	<i>Cotyledon orbiculata</i>	LC	-	-	-	Both Sites
CRASSULACEAE	<i>Crassula perforata</i>	LC	-	-	-	Both Sites
CRASSULACEAE	<i>Crassula rupestris</i> Thunb. <i>subsp. rupestris</i>	LC	-	-	-	Both Sites
CRASSULACEAE	<i>Crassula mesembryanthoides</i>	LC	-	-	-	Both Sites
CRASSULACEAE	<i>Crassula tetragona</i>	LC				Both Sites
Ebenaceae	<i>Euclea undulata</i>	LC	-	-	-	Both Sites
EUPHORBIACEAE	<i>Euphorbia ledienii</i>	LC	-	-	-	Both Sites
EUPHORBIACEAE	<i>Euphorbia tetragona</i>	LC	-	-	-	Both Sites
EUPHORBIACEAE	<i>Euphorbia mauritanica</i> var. <i>mauritanica</i>	LC	-	-	-	Both Sites
FABACEAE	<i>Schotia afra</i> var <i>afra</i>	LC	-	-	-	Both Sites
GENTIANACEAE	<i>Chironia baccifera</i>	LC	-	-	-	Both Sites
GERANIACEAE	<i>Pelargonium pulverulentum</i>	LC	-	-	-	Both Sites
HYACINTHACEAE	<i>Ledebouria ensifolia</i>	LC	-	-	-	Both Sites



HYACINTHACEAE	<i>Ledebouria revoluta</i>	LC	-	-	-	Both Sites
HYACINTHACEAE	<i>Ledibouria floribunda</i>	LC	-	-	-	Both Sites
HYACINTHACEAE	<i>Albuca setosa</i>	LC	-	-	-	Both Sites
MALVACEAE	<i>Hermania sp.</i>	-	-	-	-	Both Sites
MALVACEAE	<i>Hermannia flammea</i>	LC	-	-	-	Both Sites
MALVACEAE	<i>Hermannia cf althenoides</i>	LC	-	-	-	Both Sites
MALVACEAE	<i>Hibiscus pusillus</i>	LC	-	-	-	Both Sites
OLEACEAE	<i>Olea europaea subsp. Africana</i>	LC	-	-	-	Both Sites
POACEAE	<i>Aristida congesta</i>	LC	-	-	-	Both Sites
POACEAE	<i>Cynodon dactylon</i>	LC	-	-	-	Both Sites
POACEAE	<i>Cymbopogon sp.</i>	LC	-	-	-	Both Sites
POACEAE	<i>Eragrostis spp.</i>	LC	-	-	-	Both Sites
POACEAE	<i>Eragrostis curvula</i>	LC	-	-	-	Both Sites
POACEAE	<i>Merxmullera disticha</i>	LC	-	-	-	Both Sites
POACEAE	<i>Pentaschistis pallida</i>	-	-	-	-	Both Sites
POACEAE	<i>Themeda triandra</i>	LC	-	-	-	Both Sites
POLYGALACEAE	<i>Muraltia squarrosa</i>	LC	-	-	-	Both Sites
PORTULACACEAE	<i>Portulacaria afra</i>	LC	-	-	-	Both Sites
RHAMNACEAE	<i>Scutia myrtina</i>	LC	-	-	-	Both Sites
RUTACEAE	<i>Acmadenia obtusata</i>	LC	-	-	-	Both Sites



RUSCACEAE	<i>Eriospermum capense</i>	LC	-	-	-	Both Sites
SAPOTACEAE	<i>Sideroxylon inerme</i>	LC	Appendix 2	Protected Tree	-	Both Sites
SCROPHULARIACEAE	<i>Jamesbrittenia microphylla</i>	LC	-	-	-	Both Sites
SCROPHULARIACEAE	<i>Selago corymbosa</i>	LC	-	-	-	Both Sites
SOLANACEAE	<i>Lycium horridum</i>	LC	-	-	-	Both Sites
SOLANACEAE	<i>Solanum tomentosum</i>	LC	-	-	-	Both Sites
THYMELAEACEAE	<i>Passerina corymbosa</i>	LC	-	-	-	Both Sites
THYMELAEACEAE	<i>Passerina rigida</i>	LC	-	-	-	Both Sites



APPENDIX 2: LIST OF MAMMAL SPECIES.

Table A2: List of mammal species likely to occur on site.

Family	Scientific name	Common name	Red list category (2016)	ReptileMAP 3325CB, 3325DA
Afrosoricida				
Chrysochloridae	<i>Amblysomus hottentotus</i>	Hottentot Golden Mole	Least Concern	x
Chrysochloridae	<i>Chlorotalpa duthieae</i>	Duthis's Golden Mole	Vulnerable	
Artiodactyla				
Bovidae	<i>Alcelaphus buselaphus</i>	Hartebeest	Least Concern	x
Bovidae	<i>Antidorcas marsupialis</i>	Springbok	Least Concern	x
Bovidae	<i>Damaliscus pygargus phillipsi</i>	Blesbok	Least Concern	x
Bovidae	<i>Oreotragus oreotragus</i>	Klipspringer	Least Concern	x
Bovidae	<i>Pelea capreolus</i>	Grey Rhebok	Near Threatened	x
Bovidae	<i>Sensitive Species 5</i>	Sensitive Species 5	Vulnerable	x
Bovidae	<i>Raphicerus campestris</i>	Steenbok	Least Concern	x
Bovidae	<i>Raphicerus melanotis</i>	Cape Grysbok	Least Concern	
Bovidae	<i>Redunca fulvorufula</i>	Mountain Reedbuck	Endangered	x
Bovidae	<i>Sylvicapra grimmia</i>	Common Duiker	Least Concern	x
Bovidae	<i>Tragelaphus sylvaticus</i>	Bushbuck	Least Concern	x
Bovidae	<i>Tragelaphus strepsiceros</i>	Greater Kudu	Least Concern	x
Suidae	<i>Phacochoerus africanus</i>	Common Warthog	Least Concern	x
Suidae	<i>Potamochoerus larvatus</i>	Bushpig	Least Concern	
Carnivora				
Canidae	<i>Canis mesomelas</i>	Black-backed Jackal	Least Concern	x
Canidae	<i>Otocyon megalotis</i>	Bat-eared Fox	Least Concern	x
Canidae	<i>Vulpes chama</i>	Cape Fox	Least Concern	x
Felidae	<i>Caracal caracal</i>	Caracal	Least Concern	x
Felidae	<i>Felis nigripes</i>	Black Footed Cat	Vulnerable	
Felidae	<i>Felis silvestris</i>	Wild Cat	Least Concern	
Felidae	<i>Panthera pardus</i>	Leopard	Vulnerable	x
Herpestidae	<i>Atilax paludinosus</i>	Southern Marsh Mongoose	Least Concern	



Herpestidae	<i>Herpotes ichneumon</i>	Egyptian Mongoose	Least Concern	
Herpestidae	<i>Cynictis penicillata</i>	Yellow Mongoose	Least Concern	x
Herpestidae	<i>Herpestes pulverulentus</i>	Cape Grey Mongoose	Least Concern	x
Herpestidae	<i>Suricata suricatta</i>	Meerkat	Least Concern	x
Hyaenidae	<i>Crocuta crocuta</i>	Spotted Hyena	Near- Threatened	
Hyaenidae	<i>Parahyaena brunnea</i>	Brown Hyena	Near- Threatened	
Hyaenidae	<i>Proteles cristata</i>	Aardwolf	Least Concern	
Mustelidae	<i>Ictonyx striatus</i>	Striped Polecat	Least Concern	x
Mustelidae	<i>Mellivora capensis</i>	Honey Badger	Least Concern	x
Mustelidae	<i>Aonyx capensis capensis</i>	Cape Clawless Otter	Near- Threatened	
Mustelidae	<i>Poecilogale albinucha</i>	African Striped Weasel	Least Concern	
Viverridae	<i>Genetta genetta</i>	Common Genet	Least Concern	
Viverridae	<i>Genetta tigrina</i>	Cape Genet	Least Concern	x
Chiroptera				
Miniopteridae	<i>Miniopterus natelesensis</i>	Natal Long-fingered Bat	Least Concern	
Miniopteridae	<i>Miniopterus fraterculus</i>	Lessor Long-fingered Bat	Least Concern	
Molossidae	<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	Least Concern	
Nycteridae	<i>Nycteris thebaica</i>	Cape Long-eared Bat	Least Concern	
Pteropodidae	<i>Epomophorus wahlbergi</i>	Wahlberg's Epauletted Fruit Bat	Least Concern	
Pteropodidae	<i>Rousettus aegyptiacus</i>	Egyptian Fruit Bat	Least Concern	
Rhinolophidae	<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	Least Concern	x
Rhinolophidae	<i>Rhinolophus capensis</i>	Cape Horseshoe Bat	Least Concern	
Vespertilionidae	<i>Myotis tricolor</i>	Temminck's Myotis (Hairy Bat)	Least Concern	
Vespertilionidae	<i>Neoromicia capensis</i>	Cape Bat	Least Concern	
Vespertilionidae	<i>Kerivoula lanosa</i>	Lesser Woolly Bat	Least Concern	
Vespertilionidae	<i>Neoromicia zuluensis</i>	Zulu Pipistrelle Bat	Least Concern	
Eulipotyphla				
Soricidae	<i>Crocidura cynea</i>	Reddish-grey Musk Shrew	Least Concern	
Soricidae	<i>Crocidura flavescens</i>	Greater Musk Shrew	Least Concern	
Soricidae	<i>Myosorex varius</i>	Forest Shrew	Least Concern	x
Soricidae	<i>Suncus infinitesimus</i>	Least Dwarf Shrew	Least Concern	
Soricidae	<i>Suncus varilla</i>	Lesser Drawf Shrew	Least Concern	
Hyracoidea				



Procaviidae	<i>Procavia capensis</i>	Cape Dassie	Least Concern	
Procaviidae	<i>Dendrohyrax arboreus</i>	Southern Tree Hyrax	Endangered	x
Lagomorpha				
Leporidae	<i>Lepus saxatilis</i>	Scrub Hare	Least Concern	
Leporidae	<i>Pronolagus saundersiae</i>	Hewitt's Red Rock Hare	Least Concern	
Macroscelididae				
Macroscelididae	<i>Elephantulus edwardii</i>	Cape Elephant Shrew	Least Concern	x
Macroscelididae	<i>Elephantulus rupestris</i>	Western Rock Sengi	Least Concern	
Primate				
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey	Least Concern	x
Cercopithecidae	<i>Papio ursinus</i>	Chacma Baboon	Least Concern	x
Rodentia				
Bathyergidae	<i>Georychus capensis</i>	Cape Mole Rat	Least Concern	
Bathyergidae	<i>Cryptomys hottentotus</i>	African Mole Rat	Least Concern	
Gliridae	<i>Graphiurus murinus</i>	Woodland Dormouse	Least Concern	
Gliridae	<i>Graphiurus ocellatus</i>	Spectacled Dormouse	Least Concern	
Hystricidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern	x
Muridae	<i>Dasymys incomtus</i>	African Marsh Rat	Vulnerable	
Muridae	<i>Dendromus melanotis</i>	Grey Climbing Mouse	Least Concern	
Muridae	<i>Dendromus mesomelas</i>	Brants's Climbing Mouse	Least Concern	
Muridae	<i>Desmodillus auricularis</i>	Cape Short-tailed Gerbil	Least Concern	x
Muridae	<i>Grammomys dolichurus</i>	Woodland Thicket Rat	Least Concern	x
Muridae	<i>Grammomys cometes</i>	Mozambique Thicket Rat	Least Concern	
Muridae	<i>Gerbillurus paebe</i>	Pygmy Hairy-footed Gerbil	Least Concern	
Muridae	<i>Mastomys coucha</i>	Southern African Mastomys	Least Concern	x
Muridae	<i>Mastomys natalensis</i>	Natal Mastomys	Least Concern	x
Muridae	<i>Micaelamys namaquensis</i>	Namaqua Rock Rat	Least Concern	x
Muridae	<i>Mus minutoides</i>	Tiny Pygmy Mouse	Least Concern	
Muridae	<i>Mus musculus</i>	House Mouse	Least Concern	
Muridae	<i>Otomys karoensis</i>	Robert's Vlei Rat	Least Concern	
Muridae	<i>Otomys irroratus</i>	Southern African Vlei Rat (Fynbos type)	Least Concern	x
Muridae	<i>Otomys unisulcatus</i>	Karoo Bush Rat	Least Concern	x
Muridae	<i>Rattus rattus</i>	Roof Rat	Least Concern	x



Muridae	<i>Rhabdomys pumilio</i>	Xeric Four-striped Grass Rat	Least Concern	x
Nesomyidae	<i>Dendromus mesomelas</i>	Brants's Climbing Mouse	Least Concern	
Nesomyidae	<i>Saccostomus campestris</i>	Southern African Pouched Mouse	Least Concern	x
Nesomyidae	<i>Myodomys albicaudatus</i>	White-tailed Rat	Vulnerable	
Pedetidae	<i>Pedetes capensis</i>	South African Spring Hare	Least Concern	x
Thryonomys	<i>Thryonomys swinderianus</i>	Greater Cane Rat	Least Concern	
Tubulidentata				
Orycteropodidae	<i>Orycteropus afer</i>	Aardvark	Least Concern	



APPENDIX 3: LIST OF HERPETOFAUNA.

Table A3: List of amphibians likely to occur on site.

Family	Scientific Name	Common Name	Red list Category	FrogMAP	iNaturalist
				3325CB, 3325DA	
Brevicipitidae	<i>Breviceps adspersus</i>	Bushveld Rain Frog	Least Concern		
Brevicipitidae	<i>Breviceps pentheri</i>	Thicket Rain Frog		x	x
Bufoidea	<i>Sclerophrys capensis</i>	Raucous Toad	Least Concern	x	x
Bufoidea	<i>Sclerophrys pardalis</i>	Eastern Leopard Toad	Least Concern	x	x
Hyperoliidae	<i>Hyperolius marmoratus</i>	Painted Reed Frog	Least Concern	x	x
Hyperoliidae	<i>Hyperolius marmoratus verrucosus</i>	Painted Reed Frog (subsp. verrucosus)	Least Concern	x	x
Hyperoliidae	<i>Hyperolius semidiscus</i>	Yellowstriped Reed Frog	Least Concern		
Hyperoliidae	<i>Kassina senegalensis</i>	Bubbling Kassina	Least Concern		
Hyperoliidae	<i>Semnodactylus wealii</i>	Rattling Frog	Least Concern		
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	Natal Puddle Frog	Least Concern		x
Pipidae	<i>Xenopus laevis</i>	Common Platanna	Least Concern	x	
Pyxicephalidae	<i>Amietia delalandii</i>	Delalande's River Frog	Least Concern	x	x
Pyxicephalidae	<i>Amietia fuscigula</i>	Cape River Frog	Least Concern	x	x
Pyxicephalidae	<i>Amietia poyntoni</i>	Poynton's River Frog	Least Concern		
Pyxicephalidae	<i>Cacosternum boettgeri</i>	Common Caco	Least Concern	x	x
Pyxicephalidae	<i>Cacosternum nanum</i>	Bronze Caco	Least Concern	x	x
Pyxicephalidae	<i>Strongylopus fasciatus</i>	Striped Stream Frog	Least Concern		
Pyxicephalidae	<i>Strongylopus grayii</i>	Clicking Stream Frog	Least Concern	x	x
Pyxicephalidae	<i>Tomopterna delalandii</i>	Delalande's Sand Frog		x	x
Pyxicephalidae	<i>Tomopterna tandyi</i>	Tandy's Sand Frog	Least Concern		
Pyxicephalidae	<i>Pyxicephalus adspersus</i>	Giant African Bullfrog		x	x



Table A4: List of reptiles likely to occur on site.

	Scientific Name	Common Name	Red list Category (SARCA 2014)	iNaturalist	ReptileMAP
				Gqeberha (Port Elizabeth)	3325CB, 3325DA
Lizards					
Agamidae	<i>Agama atra</i>	Southern Rock Agama	Least Concern	Confirmed	Confirmed
Chamaeleonidae	<i>Bradypodion sp. (barbatulum)</i>	Beardless Dwarf Chameleon	Not Evaluated		Confirmed
Chamaeleonidae	<i>Bradypodion sp. (Groendal)</i>	Groendal Dwarf Chameleon	Not Evaluated		Confirmed
Chamaeleonidae	<i>Bradypodion ventrale</i>	Eastern Cape Dwarf Chameleon	Least Concern	Confirmed	Confirmed
Cordylidae	<i>Chamaesaura anguina</i>	Cape Snake Lizard	Least Concern	Confirmed	
Cordylidae	<i>Cordylus cordylus</i>	Cape Girdled Lizard	Least Concern	Confirmed	Confirmed
Cordylidae	<i>Karusasaurus polyzonus</i>	Karoo Girdled Lizard	Least Concern	Confirmed	
Cordylidae	<i>Pseudocordylus microlepidotus</i>	Cape Crag Lizard	Least Concern	Confirmed	Confirmed
Gekkonidae	<i>Chondrodactylus bibronii</i>	Bibron's Gecko	Least Concern		Confirmed
Gekkonidae	<i>Goggia essexi</i>	Essex's Pygmy Gecko	Least Concern		
Gekkonidae	<i>Hemidactylus mabouia</i>	Tropical House Gecko	Least Concern	Confirmed	
Gekkonidae	<i>Lygodactylus capensis</i>	Common Dwarf Gecko	Least Concern	Confirmed	
Gekkonidae	<i>Pachydactylus maculatus</i>	Spotted Thick-toed Gecko	Least Concern	Confirmed	Confirmed
Gekkonidae	<i>Pachydactylus mariquensis</i>	Common Banded Gecko	Least Concern		Confirmed
Gerrhosauridae	<i>Tetradactylus seps</i>	Short-legged Seps	Least Concern		
Lacertidae	<i>Nucras lalandii</i>	Delalande's Sandveld Lizard	Least Concern		
Lacertidae	<i>Nucras livida</i>	Karoo Sandveld Lizard	Least Concern		
Lacertidae	<i>Nucras taeniolata</i>	Albany Sandveld Lizard	Least Concern	Confirmed	Confirmed
Lacertidae	<i>Pedioplanis burchelli</i>	Burchell's Sand Lizard	Least Concern		
Lacertidae	<i>Pedioplanis lineoocellata pulchella</i>	Common Sand Lizard	Least Concern		Confirmed
Lacertidae	<i>Tropidosaura montana rangeri</i>	Ranger's Mountain Lizard	Least Concern		Confirmed
Scincidae	<i>Acontias gracilicauda</i>	Thin-tailed Legless Skink	Least Concern		Confirmed
Scincidae	<i>Acontias lineicauda</i>	Algoa Bay Legless Skink	Least Concern	Confirmed	Confirmed
Scincidae	<i>Acontias orientalis</i>	Eastern Cape Legless Skink	Least Concern	Confirmed	Confirmed



Scincidae	<i>Scelotes anguineus</i>	Algoa Dwarf Burrowing Skink	Least Concern	Confirmed	Confirmed
Scincidae	<i>Scelotes caffer</i>	Cape Dwarf Burrowing Skink	Least Concern		Confirmed
Scincidae	<i>Trachylepis capensis</i>	Cape Skink	Least Concern	Confirmed	Confirmed
Scincidae	<i>Trachylepis homalocephala</i>	Red-sided Skink	Least Concern	Confirmed	Confirmed
Scincidae	<i>Trachylepis varia</i>	Common Variable Skink	Least Concern	Confirmed	Confirmed
Scincidae	<i>Trachylepis variegata</i>	Variiegated Skink	Least Concern	Confirmed	Confirmed
Varanidae	<i>Varanus albigularis</i>	Rock Monitor	Least Concern	Confirmed	
Varanidae	<i>Varanus niloticus</i>	Water Monitor	Least Concern	Confirmed	Confirmed
Snakes					
Colubridae	<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	Least Concern	Confirmed	
Colubridae	<i>Dasypeltis scabra scabra</i>	Rhombic Eggeater	Least Concern	Confirmed	
Colubridae	<i>Dispholidus typus typus</i>	Boomslang	Least Concern	Confirmed	Confirmed
Colubridae	<i>Philothamnus hoplogaster</i>	Green Water Snake	Least Concern	Confirmed	
Colubridae	<i>Philothamnus occidentalis</i>	Western Natal Green Snake	Least Concern	Confirmed	Confirmed
Colubridae	<i>Philothamnus semivariiegatus</i>	Spotted Bush Snake	Least Concern	Confirmed	
Elapidae	<i>Aspidelaps lubricus lubricus</i>	Coral Shield Cobra	Least Concern		
Elapidae	<i>Hemachatus haemachatus</i>	Rinkhals	Least Concern		Confirmed
Elapidae	<i>Naja nivea</i>	Cape Cobra	Least Concern	Confirmed	Confirmed
Lamprophiidae	<i>Aparallactes capensis</i>	Black-headed Centipede-eater	Least Concern		
Lamprophiidae	<i>Boaedon capensis</i>	Brown House Snake	Least Concern	Confirmed	Confirmed
Lamprophiidae	<i>Duberria lutrix lutrix</i>	South African Slug-eater	Least Concern	Confirmed	Confirmed
Lamprophiidae	<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	Least Concern	Confirmed	Confirmed
Lamprophiidae	<i>Lamprophis aurora</i>	Aurora House Snake	Least Concern		Confirmed
Lamprophiidae	<i>Lamprophis fuscus</i>	Yellow-bellied Snake	Least Concern		
Lamprophiidae	<i>Lamprophis guttatus</i>	Spotted Rock Snake	Least Concern		
Lamprophiidae	<i>Lycodonomorphus inornatus</i>	Olive Ground Snake	Least Concern	Confirmed	
Lamprophiidae	<i>Lycodonomorphus laevisissimus</i>	Dusky-bellied Water Snake	Least Concern		
Lamprophiidae	<i>Lycodonomorphus rufulus</i>	Brown Water Snake	Least Concern	Confirmed	Confirmed
Lamprophiidae	<i>Lycophidion capense capense</i>	Cape Wolf Snake	Least Concern	Confirmed	Confirmed



Lamprophiidae	<i>Prosymna sundevallii</i>	Sundevall's Shovel-snout	Least Concern		Confirmed
Lamprophiidae	<i>Psammophis crucifer</i>	Cross-marked Grass Snake	Least Concern	Confirmed	Confirmed
Lamprophiidae	<i>Psammophis notostictus</i>	Karoo Sand Snake	Least Concern		Confirmed
Lamprophiidae	<i>Psammophylax rhombeatus</i>	Spotted Grass Snake (Rhombic Skaapstecker)	Least Concern	Confirmed	Confirmed
Lamprophiidae	<i>Pseudaspis cana</i>	Mole Snake	Least Concern	Confirmed	
Leptotyphlopidae	<i>Leptotyphlops nigricans</i>	Black Thread Snake	Least Concern	Confirmed	Confirmed
Typhlopidae	<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	Least Concern	Confirmed	
Typhlopidae	<i>Afrottyphlops bibronii</i>	Bibron's Blind Snake	Least Concern		
-	Sensitive Species 18	-	Critically Endangered		
Viperidae	<i>Bitis arietans arietans</i>	Puff Adder	Least Concern	Confirmed	Confirmed
Viperidae	<i>Bitis atropos</i>	Berg Adder	Least Concern	Confirmed	
Viperidae	<i>Causus rhombeatus</i>	Rhombic Night Adder	Least Concern	Confirmed	Confirmed
Tortoises and Terrapins (Chelonians)					
Testudinidae	<i>Chersina angulata</i>	Angulate Tortoise	Least Concern	Confirmed	Confirmed
Testudinidae	<i>Homopus areolatus</i>	Parrot-beaked Tortoise	Least Concern	Confirmed	Confirmed
Testudinidae	<i>Stigmochelys pardalis</i>	Leopard Tortoise	Least Concern	Confirmed	Confirmed
Pelomedusidae	<i>Pelomedusa galeata</i>	South African Marsh Terrapin	Not evaluated	Confirmed	Confirmed



APPENDIX 4: CES ASSESSMENT METHODOLOGY

Pre-Mitigation Evaluation Criteria

This rating scale adopts four (4) key factors to determine the overall significance of the impact prior to mitigation:

- 1. Temporal Scale:** This scale defines the duration of any given impact over time. 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.
- 2. Spatial Scale:** This scale defines the spatial extent of any given impact. This may extend from the local area to an impact that crosses international boundaries. The wider the impact extends, the more significant it is likely to be.
- 3. Severity/Benefits Scale:** This scale defines how severe negative impacts would be, or how beneficial positive impacts would be. This negative/positive scale is critical in determining the overall significance of any impacts.
- 4. Likelihood Scale:** This scale defines the risk or chance of any given 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.

Table A5: Pre-Mitigation Evaluation Criteria.

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	
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	
SEVERITY SCALE	SEVERITY	BENEFIT
Slight	Slight impacts on the affected system(s) or party(ies)	Slightly beneficial to the affected system(s) and party(ies)
Moderate	Moderate impacts on the affected system(s) or party(ies)	Moderately beneficial to the affected system(s) and party(ies)
Severe/ Beneficial	Severe impacts on the affected system(s) or party(ies)	A substantial benefit to the affected system(s) and party(ies)



Very Severe/ Beneficial	Very severe change to the affected system(s) or party(ies)	A very substantial benefit to the affected system(s) and party(ies)
LIKELIHOOD SCALE		
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	

Table A6: Significance Descriptions.

SIGNIFICANCE RATE		DESCRIPTION
LOW NEGATIVE	LOW POSITIVE	<i>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.</i>
MODERATE NEGATIVE	MODERATE POSITIVE	<i>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.</i>
HIGH NEGATIVE	HIGH POSITIVE	<i>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.</i>
VERY HIGH NEGATIVE	VERY HIGH POSITIVE	<i>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.</i>

Post-Mitigation Criteria

Once mitigation measures are proposed, the following three (3) 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 8.3: Post-Mitigation Criteria.

REVERSIBILITY	
Reversible	<i>The activity will lead to an impact that can be reversed provided appropriate mitigation measures are implemented.</i>
Irreversible	<i>The activity will lead to an impact that is permanent regardless of the implementation of mitigation measures.</i>
IRREPLACEABLE LOSS	
Resource will not be lost	<i>The resource will not be lost/destroyed provided mitigation measures are implemented.</i>
Resource will be partly lost	<i>The resource will be partially destroyed even though mitigation measures are implemented.</i>
Resource will be lost	<i>The resource will be lost despite the implementation of mitigation measures.</i>
MITIGATION POTENTIAL	
Easily achievable	<i>The impact can be easily, effectively and cost effectively mitigated/reversed.</i>
Achievable	<i>The impact can be effectively mitigated/reversed without much difficulty or cost.</i>
Difficult	<i>The impact could be mitigated/reversed but there will be some difficulty in ensuring effectiveness and/or implementation, and significant costs.</i>
Very Difficult	<i>The impact could be mitigated/reversed but it would be very difficult to ensure effectiveness, technically very challenging and financially very costly.</i>

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. For this reason, impacts of especially a social nature need to reflect the values of the affected society.
- **Cumulative Impacts:** These affect the significance rating 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 and the BA. 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 and, with management measures being imposed accordingly (e.g. dust suppression measures being implemented during the dry season).



APPENDIX 5: CURRICULUM VITAE OF PROJECT

TEAM

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APPENDIX 6: SPECIALIST DECLARATIONS

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