

BIODIVERSITY IMPACT ASSESSMENT REPORT:

Proposed Residential Development On Bezweni Farm 18223 within uMzimkhulu Town, uMzimkhulu Local Municipality, KwaZulu-Natal

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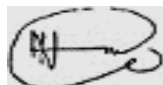
Accra Group (PTY) Ltd

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Declaration of Independence by Specialist

- I, **Ntando Kumalo**, hereby declare that I acted as the independent specialist in this application.
- I do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of NEMA and the Environmental Impact Assessment Regulations, 2017.
- I have and will not have a vested interest in the proposed activity proceeding.



Signed:

Date:17 October 2023

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Details of Author

The relevant experience/s of specialist team members involved in the compilation of this report are briefly summarized in the table below. Detailed CVs of the specialist team can be made available on request.

Specialist	Role	Details
Ntando Kumalo Senior Environmental Specialist	Co-author & project management	Ntando has more than 10 years' experience and is competent in data collection, analysis and report writing related to biodiversity assessments. Also has experience in conducting biodiversity rehabilitation plans, wetland assessment and rehabilitation plans. Ntando has a BSc (Hon) in Forest Resources and Wildlife Management and is a registered Professional Natural Scientist in the field of Environmental Science. He oversaw successful implementation of the project.

Executive Summary

AIM360 Environmental Solutions (PTY) Ltd (AIM360) was appointed by Accra Group on the behalf the uMzimkhulu Local Municipality to undertake a specialist biodiversity impact assessment study (inclusive of faunal, avifauna and floral) to inform the environmental processes for the proposed residential development on Bezweni Farm 18223 situated in the Town of uMzimkhulu.

The assessment initially commenced with a desktop study during which data related for the study area such as existing literature, maps, aerial photography and Geographical Information Systems (GIS) were collected and reviewed. Field investigation was conducted during the month of September 2023 to verify the desktop information.

The terms of reference for this study were as follows:

- i. Determine the biodiversity in terms of plants, animals, birds and reptiles.
- ii. Identify and consider all sensitive terrestrial ecological habitats or features.
- iii. Determine the present ecological condition and sensitivity of identified habitats.
- iv. Assess conservation status of plant, bird and animal species.
- v. Compile a species inventory for species on site and to recommend necessary actions in case of occurrence of endangered, vulnerable or rare species or any species of conservation importance.
- vi. Identify and undertake an impact significance assessment of anticipated project-related impacts on the taxa and/or habitats.
- vii. Recommend feasible mitigation measures for implementation, including but not limited to the recommendation of minimum buffers.

Floral Assessment

According to the National South African Vegetation Map (Mucina & Rutherford, 2006) the study site is characterised by 2 terrestrial vegetation types, the Dry Coast Hinterland Grasslands and the Moist Coast Hinterland Grassland. The Dry Coast Hinterland Grassland has a national and provincial threat status of **Vulnerable** (Skowno et al., 2018, Jewitt, 2018). The Moist Coast Hinterland Grassland has a national threat status of **Vulnerable** (Skowno et al., 2018) and provincial threat status of **Endangered** (Jewitt, 2018).

Following a site visit undertaken on 30 September 2023, three distinct vegetation communities were identified within and around the proposed development site.

- a) Open Primary Grassland (belonging to the Dry Coast Hinterland Grassland - **Vulnerable**)
- b) *Vachellia* Thicket
- c) *Eucalyptus* Plantation

The ecological condition of the 'Open Grassland' community was found to be good whilst that of the other vegetation communities was poor. The poor ecological condition was attributed to the vegetation communities being of secondary nature. The sensitivity of the 'Open Grassland' community was found to be high whilst that of the *Vachellia* Thicket was low and that of the *Eucalyptus* Plantation was very low. Summarised assessment results are presented in Table A.

Table A: Summary of the ecological condition assessment results for the tree vegetation communities.

Vegetation Community	Species Composition	Structural Intactness	Ecological Condition	Threat Status	Sensitivity
Open Primary Grassland	Good	Contiguous	Good	Vulnerable	High
<i>Vachellia</i> Thicket	Poor	Contiguous	Poor	Vulnerable	Low
<i>Eucalyptus</i> Plantation	Poor	Contiguous	Poor	N/A	Very Low

At least 5 species of conservation concern were identified on site. These include *Aloe ferox*, *A. maculata*, *Hypoxis hemerocallidea*, *Hypoxis* spp. and *Scadoxus puniceus*.

Faunal Assessment

Mammals

According to the Animal Demography Unit (2022), about 11 mammal species occur within grid square 3029BB within which the development site is situated and all of them are of **Least Concern**. The study area does not harbour any mammal species of conservation concern (SCC).

Avifauna

According to data from the Southern African Bird Atlas Project (SABAP2, 2023) a total of 136 bird species have been recorded within pentads 3010_2950 and 3010_2955. Of these species, eight (8) are considered threatened species as per the 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. These are the Denham's Bustard, Grey Crowned Crane, Lanner Falcon, African Marsh Harrier, Southern Ground Hornbill, Secretarybird, Woolly Necked Stork and Cape Vulture. At least 5 are moderately likely to utilise the development site whilst there is a low probability that the other 3 will utilise the site.

Herpetofauna

Review of available Red Data Books highlighted that at least 1 species of conservation concern (i.e., KwaZulu-Natal Dwarf Chameleon) and 7 near-endemic or endemic species potentially occur within and around the study area. All 8 species have a low likelihood of being present on site.

Impact Assessment & Mitigation

Without mitigation, the proposed development will likely have **medium** to **high** impacts on the ecological habitats and biodiversity. However, should the prescribed mitigation measures be implemented for the project, the associated risks are all expected to have **low** to **medium** impact significance.

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Disclaimer

The accuracy of this Report is subject to the information provided to the specialist (Aim360 Pty Ltd) by its Client and site conditions existing during the time of assessment. Whilst Aim360 has undertaken due diligence as practically possible in establishing the accuracy of the available information, we do not accept any material liability arising from commercial decisions or actions arising from the findings. Aim360 reserves the right to update findings based on the availability of new information.

1 Introduction and Project Overview

1.1 Introduction

AIM360 Environmental Solutions (PTY) Ltd (AIM360) was appointed by Accra Group on the behalf the uMzimkhulu Local Municipality to undertake a specialist biodiversity impact assessment study (inclusive of faunal, avifauna and floral) to inform the environmental processes for the proposed residential development on Bezweni Farm 18223 situated in the Town of uMzimkhulu. The town is situated in Ward 19 of the uMzimkhulu Local Municipality, of the Harry Gwala District Municipality, KwaZulu-Natal.

In terms of direction to the study site, the study site can be easily accessed via the P749 Road. The central coordinates of the site are provided as follows: 30°14'26.36"S; 29°55'7.83"E. A locality map showing the study site in relation to surrounding areas is provided as **Figure 1-1**, while an orthophoto aerial map showing the current site conditions is provided as **Figure 1-2** on the next page.

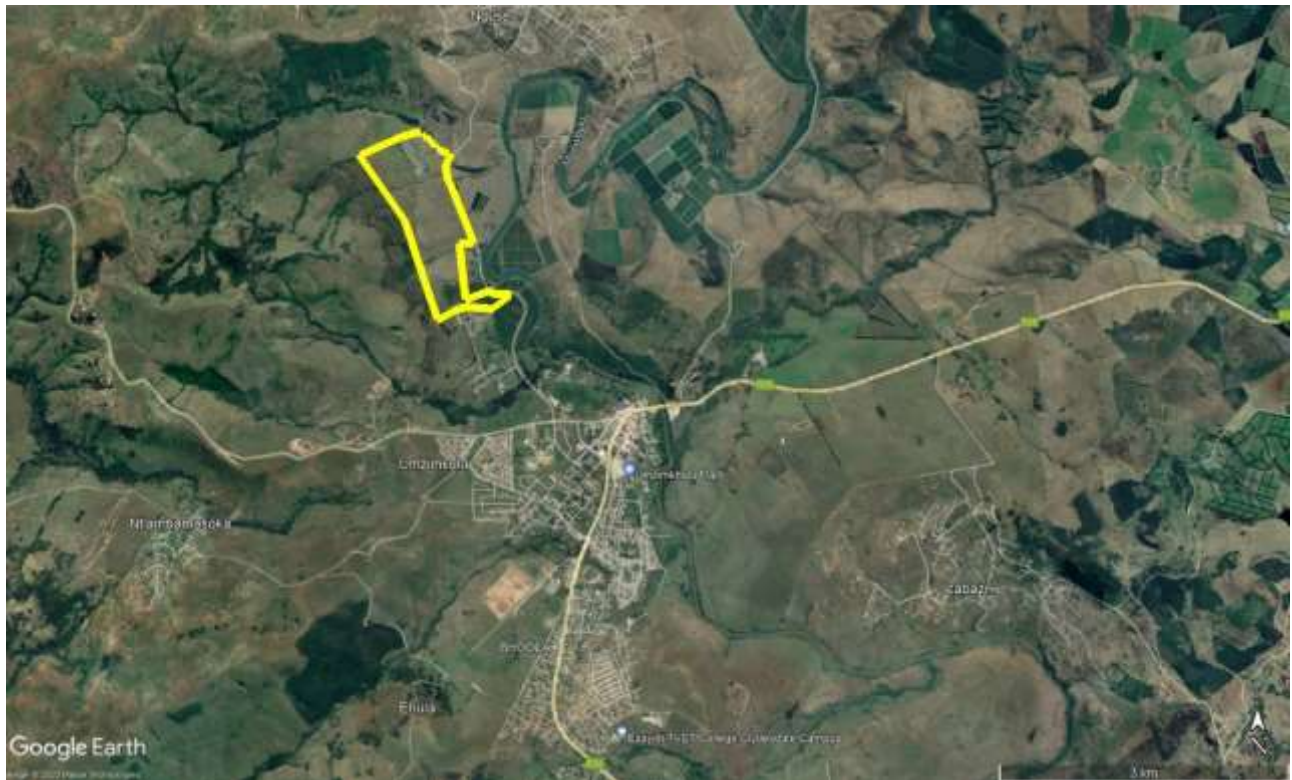


Figure 1-1: Site location of the study site in relation to the project area (Source: Google Earth™, October 2023).



Figure 1-2: Orthophoto aerial map of the development site.

1.2 Project description

The proposed project entails the following:

- Construction of residential houses.
- Construction of potable water pipeline.
- Construction of sewage reticulation pipeline.
- Construction of internal roads.

Figure 1-3 below is the proposed layout plan.

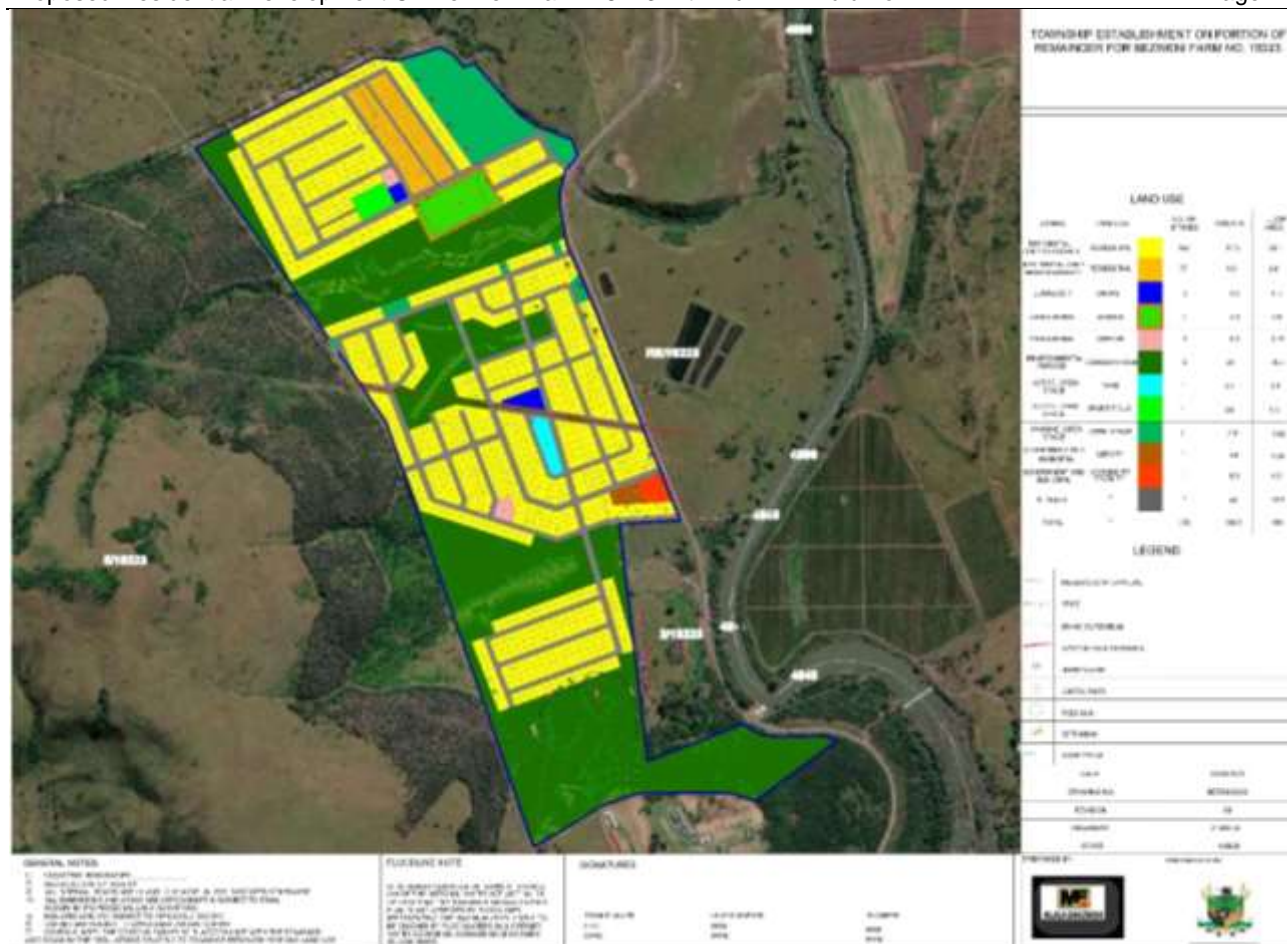


Figure 1-3: Proposed development layout.

1.3 Terms of Reference of the study

The following Terms of Reference (ToR) for the biodiversity study have been outlined:

- Determine the biodiversity in terms of plants, animals, birds and reptiles.
- Identify and consider all sensitive terrestrial ecological habitats or features.
- Determine the present ecological condition and sensitivity of identified habitats.
- Assess conservation status of plant, bird and animal species.
- Compile a species inventory for species on site and to recommend necessary actions in case of occurrence of endangered, vulnerable or rare species or any species of conservation importance.
- Identify and undertake an impact significance assessment of anticipated project-related impacts on the taxa and/or habitats.
- Recommend feasible mitigation measures for implementation, including but not limited to the recommendation of minimum buffers.

2 Project Scope and Methodology

2.1 Scope of the project

The overarching objective of this study is to compile a Biodiversity Impact Assessment Report that includes a description of the biodiversity (flora, faunal and avifauna) within the project site. The report also provides for the identification of impacts on the above biodiversity that are anticipated from project-related activities and recommend appropriate mitigation measures as applicable. Specific intended outcomes of the study are outlined below:

- i. Terrestrial Ecological Assessment:
 - Determine the ecological diversity in terms of plants, animals, birds and reptiles.
 - Identify and consider all sensitive ecological habitats or features.
 - Determine the present ecological condition and sensitivity of identified habitats.
 - Assess conservation status of plant, bird and animal species.
 - Compile a species inventory for species on site and to recommend necessary actions in case of occurrence of endangered, vulnerable or rare species or any species of conservation importance.
- ii. Impact Assessment and Mitigation:
 - Identify and undertake an impact significance assessment of anticipated project-related impacts on the taxa and/or habitats.
 - Recommend feasible mitigation measures for implementation, including but not limited to the recommendation of minimum buffers.

2.2 Methodology

The methodology carried out for this study is presented in **Appendix A** of this report.

2.3 Study limitations

Please note that the following assumptions and limitations are applicable to this assessment:

- i. The GPS device used is only accurate up to 3m. Therefore, the boundary of delineated features (which were subsequently plotted digitally) may be offset by at least 3 meters on either side.
- ii. Vegetation descriptions provided are not comprehensive but an indication of dominant species of interest.
- iii. Some plants species flower during specific seasons and are difficult to identify without inflorescence, therefore inconspicuous plant species may have been missed.
- iv. The assessment was based on a 1-day site visit late in spring survey and does not cover the summer season. Site visits should ideally be conducted over differing seasons in order to better understand the surrounding ecological habitat and faunal species.
- v. Ecology is dynamic and complex, certain aspect may have been overlooked. However, it is expected that the proposed development site has been accurately assessed and considered, based on consideration of existing studies and monitoring data.
- vi. Conclusions of this report were based on experience of these and similar species in different parts of South Africa. Faunal behaviour cannot be entirely reduced to formulas that will hold true under all circumstances.
- vii. Many faunal species of conservation importance (Red Data Species) are secretive and difficult to observe even during intensive field surveys.

3 Relevant legislation

3.1 National legislation

3.1.1 National Environmental Management Act (Act 107 of 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations (No R. 324, No R. 325 and No R. 326) as amended (April 2017), states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the type and location of the proposed activity.

3.1.2 National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (10 of 2004), (NEMBA) provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. Certain activities, known as Restricted Activities, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling of listed species.

3.1.3 Conservation of Agricultural Resources Act (Act 43 of 1983)

The Act regulates the utilisation and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.

3.1.4 National Water Act (Act 36 of 1998)

The National Water Act (NWA) recognises that the protection of water resources, including not only the water itself but the entire aquatic ecosystem is necessary to achieve sustainable use of water for the benefit of all water users. In section 1 of the NWA a water resource is defined as being all water found in the various phases of the hydrological cycle, including that portion of water that is found underground. This definition ensures that the entire water resource is treated in an integrated fashion and as a resource that is common to all. The DWS has regulated that no activity may take place within a watercourse without authorisation from DWS. Therefore, no development activities may occur within any wetland or riparian zone unless authorisation is granted by DWS in terms of section 21 of the NWA.

A General Authorisation (GA) in terms of Section 39 of the NWA, which is an authorisation for water uses as defined in Section 21(c) and (i) without a license provided that the water use is within certain limits and complies with conditions as set out in the GA, was issued by DWS for prescribed water uses as contained in General Notice 509 of 2016 as published in the Government Gazette No. 40229 of 26 August 2016.

However, according to section 3 of the Notice, it must be noted that the GA does not apply:

- i. To the use of water in terms of section 21(c) or (i) of the Act for the rehabilitation of a wetland as contemplated in General Authorisation 1198 published in Government Gazette 32805 dated 18 December 2009.
- ii. To the use of water in terms of section 21(c) or (i) of the Act within the regulated area of a watercourse where the Risk Class is Medium or High as determined by the Risk Matrix.
- iii. In instances where an application must be made for a water use license for the authorisation of any other water use as defined in section 21 of the Act that may be associated with a new activity.
- iv. Where storage of water results from the impeding or diverting of flow or altering the bed, banks, course or characteristics of a watercourse.

- v. To any water use in terms of section 21(c) or (i) of the Act associated with construction, installation or maintenance of any sewerage pipelines, pipelines carrying hazardous materials and to raw water and wastewater treatment works.

3.2 National and Provincial Conservation Guidelines

3.2.1 South African Inventory of Inland Aquatic Ecosystems (SAIIAE)

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (2018) is a collection of spatial data relating to the extent of river and wetland ecosystems types, as well as information on pressures, confidence and extent of protection. SAIIAE aims to provide comprehensive desktop data of both inland wetlands and rivers at a national level. These data layers were developed and used for the 2018 National Biodiversity Assessment (NBA 2018).

3.2.2 The White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1997)

The policy comprises part of the broader context wherein national environmental policy has been formulated. It further sets the agenda for defining the strategy for conservation of South Africa's biodiversity.

3.2.3 Natal Nature Conservation Ordinance 15 of 1974

The ordinance was established to provide institutional structures for nature conservation and to consolidate the laws relating to nature conservation in KwaZulu-Natal. Schedule 12 of the Ordinance lists plants that are specially protected subject to obtaining a permit for their disturbance.

3.2.4 The National Biodiversity Assessment

The purpose of the National Biodiversity Assessment (NBA) is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA is central to fulfilling SANBI's mandate to monitor and report regularly on the status of the country's biodiversity, in terms of the National Environmental Management: Biodiversity Act (NEMBA, Act 10 of 2004). The NBA endeavours to capture the challenges and opportunities embedded in South Africa's rich natural heritage by looking at biodiversity in the context of social and economic change and recognising the relationship between people and their environment.

The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are Ecosystem Threat Status (ETS) and Ecosystem Protection Level (EPL) (Driver et al., 2012).

Ecosystem Threat Status (ETS)

Ecosystem threat status (ETS) outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Driver et al., 2011).

Ecosystem Protection Level (EPL)

Ecosystem protection level (EPL) tells us whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected or well protected,

based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Driver et al., 2012).

4 Results of Desktop Investigation

This section contains dataset accessed as part of the desktop assessment and are presented below. It is important to note that although all datasets used provide useful and often verifiable high-quality data, the various databases used not always provide an entirely accurate indication of the proposed project and related activities, actual site characteristics at the scale required to inform the environmental authorisation process. However, this information is considered to be useful as background information to the study. Thus, this data was used as guideline to inform the assessment and to focus on areas and aspects of increased conservation importance.

4.1 Biophysical Setting

The results of the desktop investigation, carried out at a broader spatial scale of the study area, indicated that the study area is characterised by the biophysical conditions presented in the **Table 4-1** below.

Table 4-1: Desktop results of the biophysical attributes of the study area.

Biophysical Attributes	
Terrain	Closed hills, mountains; moderate and high relief.
Elevation	760 – 820 m
MAP (Schulze, 1997)	700 – 800 mm
Rainfall intensity	66.8 mm
Mean Annual Temperature	16 – 18 °C
Geology (Council of Geoscience, 2008)	Underlain by Shale of the Pietermaritzburg Formation of the Ecca Group.
Soil Erodibility Score (K-factor) (Schulze, 2007)	0.40
Soil (National Soils Layer)	Loam

4.2 Desktop Sensitivity Screening Assessment Results

According to the screening report¹ for an environmental authorization as required by the 2014 EIA Regulations, the sensitivity of the 'Animal Species Theme' was evaluated as high whilst that of the 'Plant Species Theme' was evaluated as medium and that of the 'Aquatic Biodiversity Theme' and 'Terrestrial Biodiversity Theme' were evaluated as low. Summarised results are provided in **Table 4.2** below and in Figure 4.1 – 4.3.

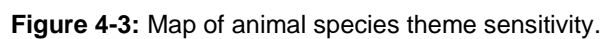
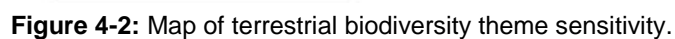
Table 4-2: Summarised desktop sensitivity screening results.

Theme	Sensitivity	Sensitive Features & their Sensitivity
Plant Species Theme	Medium	<ul style="list-style-type: none"> i. Sensitive species 712 - Medium ii. Sensitive species 551 - Medium iii. <i>Geranium sparsiflorum</i> - Medium iv. <i>Asclepias disparilis</i> - Medium v. <i>Afrologisticum wilmsianum</i> - Medium vi. Sensitive species 1076 - Medium vii. Sensitive species 609 - Medium viii. Sensitive species 1251 - Medium ix. Sensitive species 535 - Medium

		x. <i>Sisyranthus fanniniae</i> - Medium xi. <i>Disperis woodii</i> - Medium xii. <i>Senecio dregeanus</i> - Medium
Terrestrial Biodiversity Theme	Very High	i. CBA: Optimal – Very High ii. Dry Coast Hinterland Grassland (Vulnerable) - Very High iii. Moist Coast Hinterland Grassland (Vulnerable) - Very High
Animal Species Theme	High	i. Aves - <i>Balearica regulorum</i> - High ii. Aves - <i>Hirundo atrocaerulea</i> - Medium iii. Aves - <i>Stephanoaetus coronatus</i> - Medium iv. Mammalia - <i>Dendrohyrax arboreus</i> - Medium v. Mammalia - <i>Ourebia ourebi ourebi</i> - Medium vi. Sensitive species 8 - Medium



Figure 4-1: Map of relative plant species theme sensitivity.



4.3 Benchmark Vegetation

According to the National South African Vegetation Map (Mucina & Rutherford, 2006) the study site is characterised by 2 terrestrial vegetation types, the Dry Coast Hinterland Grasslands and the Moist Coast Hinterland Grassland (**Figure 4-4**). Both vegetation types belong to the Grassland Biome. The characteristics of abovementioned vegetation types are discussed below.

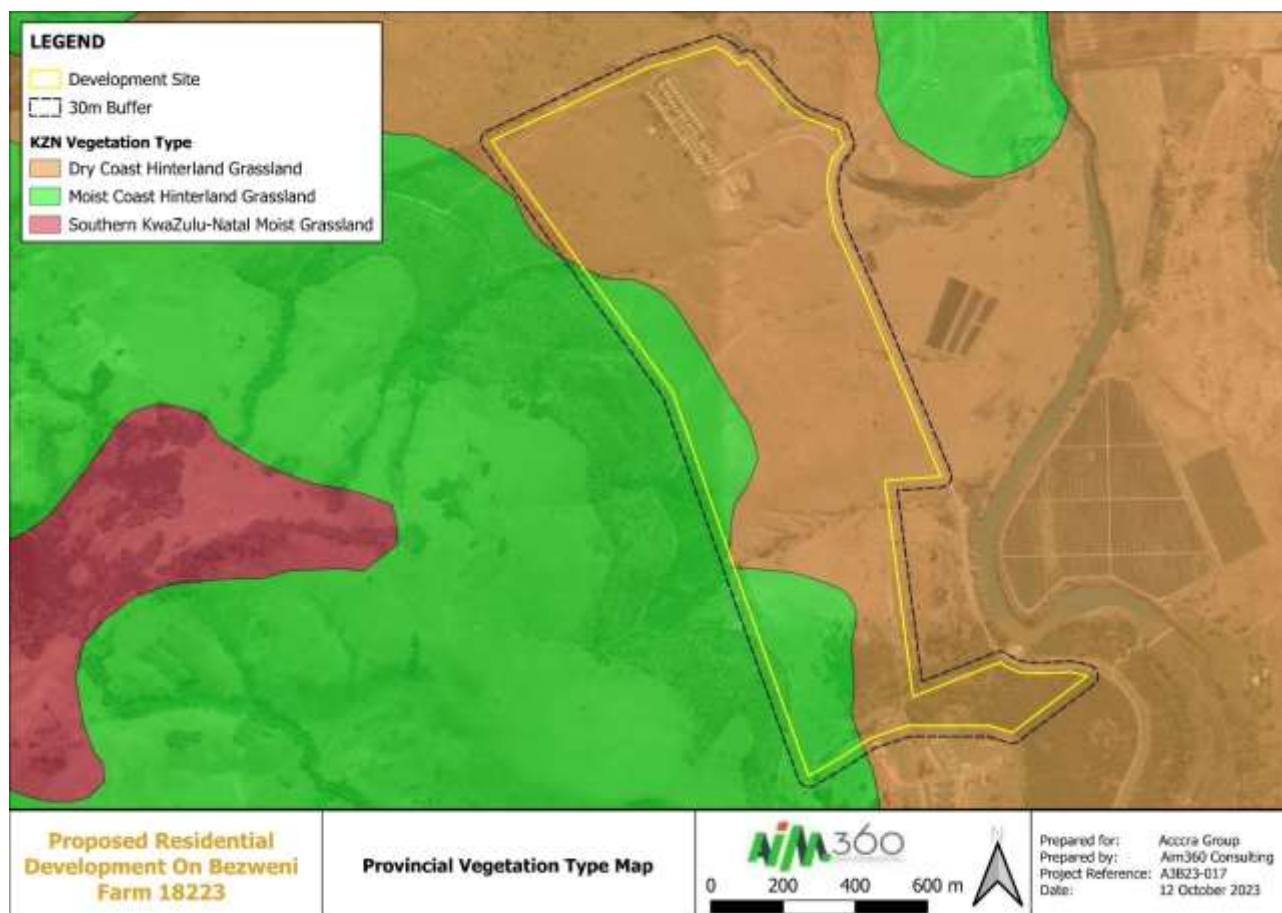


Figure 4-4: Map showing the spatial distribution of the provincial vegetation types.

4.3.1 Dry Coast Hinterland Grassland (Gs19)

Undulating plains and hilly landscape mainly associated with drier coast hinterland valleys in the rain-shadow of the rain-bearing frontal weather systems from the east coast. Sour sparse wiry grassland dominated by unpalatable Ngongoni grass (*Aristida junciformis*) with this monodominance associated with low species diversity. In good condition dominated by *Themeda triandra* and *Tristachya leucothrix*. Wooded areas are found in valleys at lower altitudes, where this vegetation unit grades into SVs 3 KwaZulu-Natal Hinterland Thornveld and SVs 7 Bisho Thornveld. Termitaria support bush clumps with *Acacia* species, *Cussonia spicata*, *Ehretia rigida*, *Grewia occidentalis* and *Coddia rudis* (Scott-Shaw & Escott, 2011).

Conservation Status

The Dry Coast Hinterland Grassland has a national and provincial threat status of **Vulnerable** (Skowno et al., 2018, Jewitt, 2018). The vegetation community is nominally protected.

4.3.2 Moist Coast Hinterland Grassland (Gs20)

Rolling and hilly landscape. Dense tall sour grassland dominated by unpalatable Ngongoni grass (*Aristida junciformis*) with this mono-dominance associated with low species diversity, when in good condition dominated by *Themeda triandra* and *Tristachya leucothrix*.

Conservation Status

The Moist Coast Hinterland Grassland has a national threat status of **Vulnerable** (Skowno et al., 2018) and provincial threat status of **Endangered** (Jewitt, 2018). The vegetation community is nominally protected.

4.4 Biodiversity Conservation Context.

4.4.1 KwaZulu-Natal Biodiversity Spatial Planning

According to the KZN BSP dataset the about 40% of the proposed development site is classified as a Critical Biodiversity Area: Optimal Area (CBA: Optimal). CBA: Optimal is an area which represent the best localities out of a potentially larger selection of available planning units' that are optimally located to meet both the conservation target but also the criteria defined by either the Decision Support Layers or the Cost Layer (Ezemvelo KZN Wildlife, 2016). The classification is driven by the potential occurrence of the following conservation important biodiversity resources; *Odontomelus eshowe* (Grasshopper); *Dorotogonus infragilis* (Millipede) and *Euonyma lymneaeformis* (Mollusc). See **Figure 4-5**.

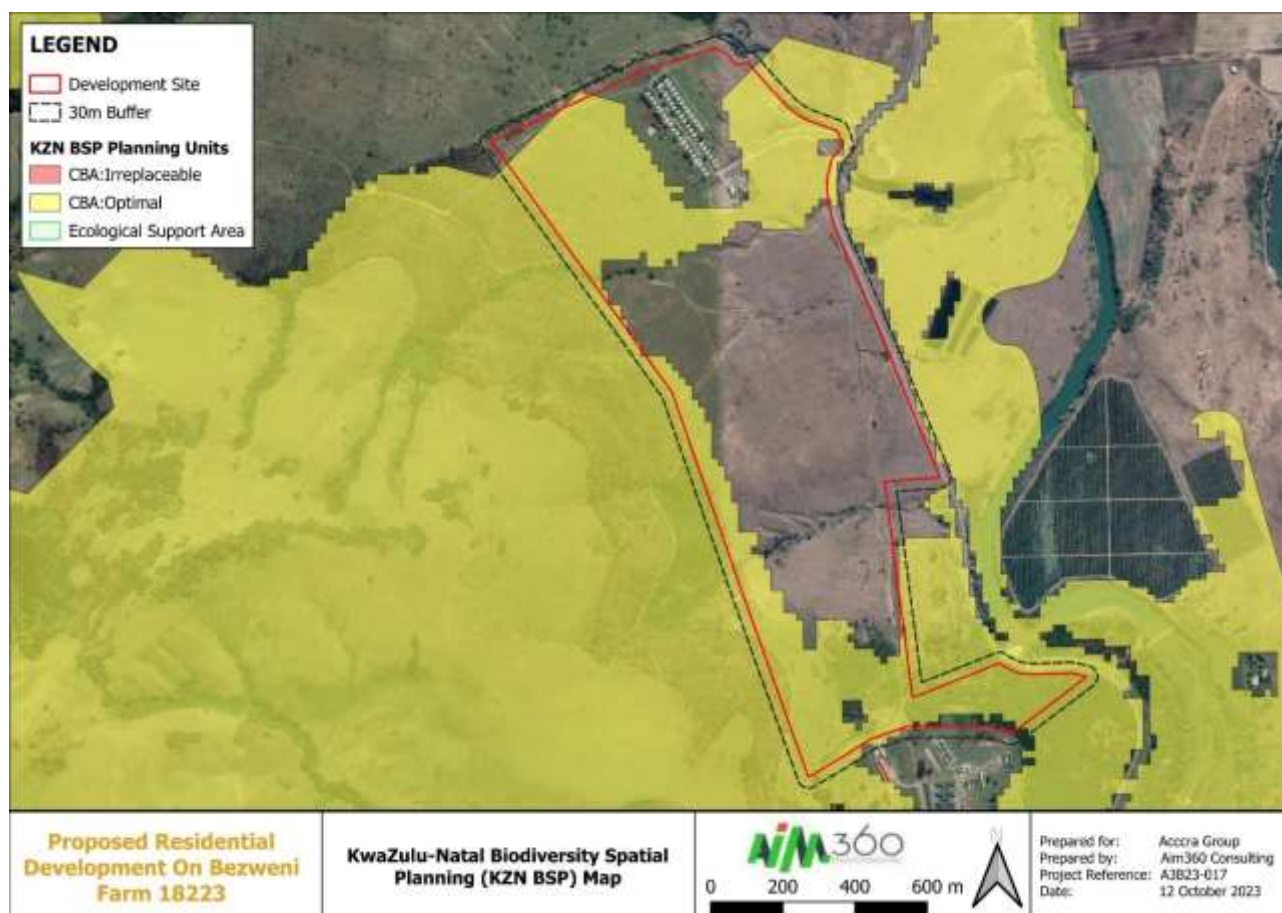


Figure 4-5: Map showing the KwaZulu-Natal Biodiversity Spatial Planning Units.

4.4.2 Protected Areas

Review of the South Africa Protected Areas Database (SAPAD_OR_2022_Q2) confirmed the absence of a national protected area within 50km of the development site. However, 3 Ezemvelo KZN Wildlife Proclaimed Protected Areas occur at least 32km away. See **Figure 4-6**.

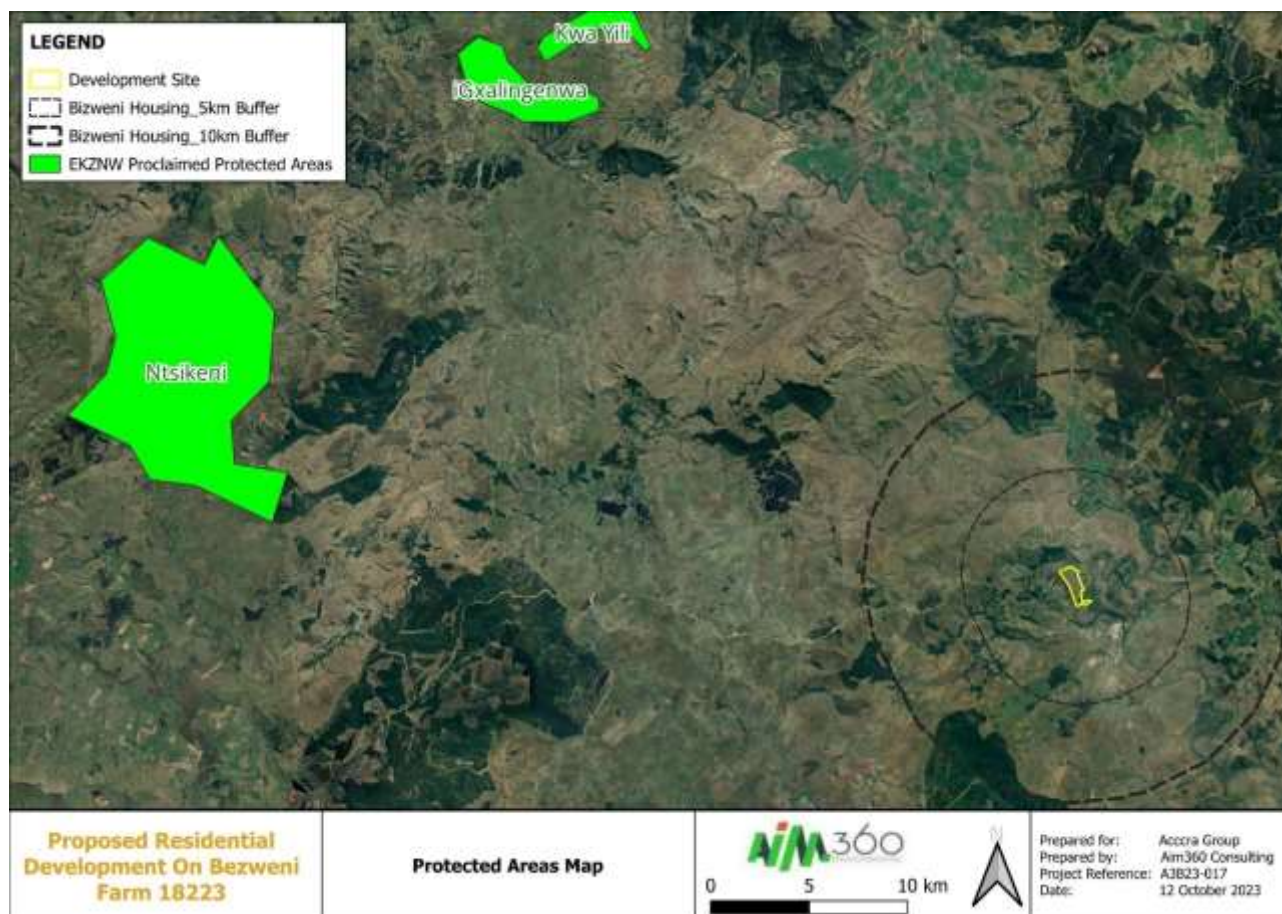


Figure 4-6: Map showing the Ezemvelo KZN Wildlife Proclaimed Protected Areas.

4.4.3 Important Bird and Biodiversity Areas

Review of the Important Bird and Biodiversity Areas (IBA) database revealed that the proposed development occurs within an unprotected IBA, namely the KZN Mistbelt Grasslands (No. SA078). See **Figure 4-7**. A second IBA was identified at least 7.5km away from the development site.

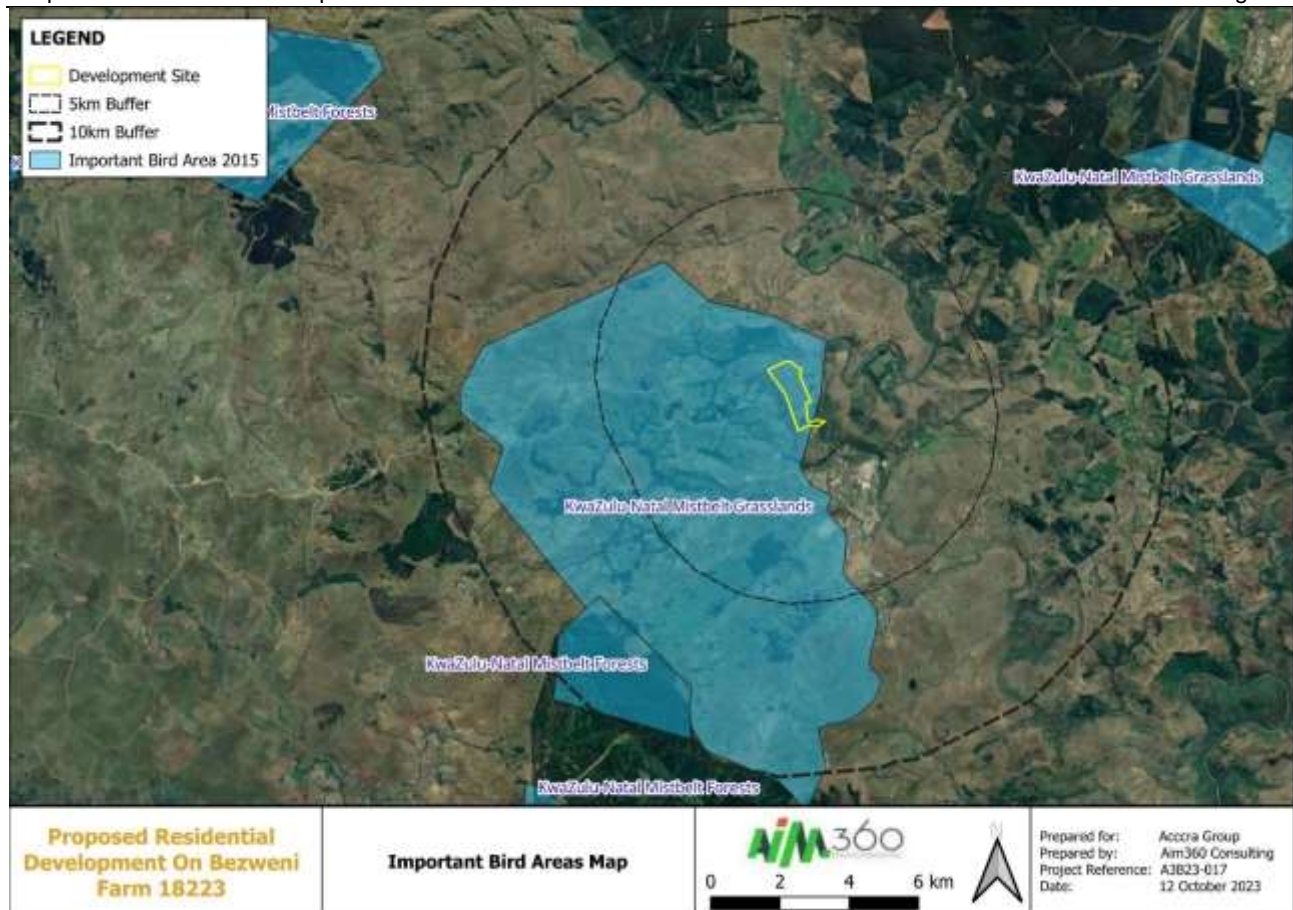


Figure 4-7: Map showing the spatial location of Important Bird and Biodiversity Areas.

5 INVESTIGATION RESULTS –Terrestrial Ecological

5.1 Flora

5.1.1 Desktop Study Results

The proposed project is located within 3029BB Quarter Degree Grid Square (QDGS) in South Africa. South African National Biodiversity Institute (SANBI) datasets were overlaid on the quarter degree square to determine the availability of potential Red Data plant species or species of conservation significance.

According to the South African Red data list categories done by SANBI, threatened species are species that are facing a high risk of extinction. Any species classified in the IUCN categories Critically Endangered, Endangered or Vulnerable is a threatened species whereas Species of conservation concern are species that have a high conservation importance in terms of preserving South Africa's high floristic diversity and include not only threatened species, but also those classified in the categories Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare, Declining and Data Deficient - Insufficient Information (DDD). **Table 5-1** below shows the South African Red Data list categories according to SANBI.

Table 5-1: Definitions of Red Data Status.

Family	Species	Threat Status
CR/ PE	Critically Endangered (Possibly Extinct)	Critically Endangered (Possibly Extinct) taxa are those that are, on the balance of evidence, likely to be extinct, but for which there is a small chance that they may be extant. Hence they should not be listed as Extinct until adequate surveys have failed to record the taxon.
CR	Critically Endangered	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the five International Union for Conservation of Nature (IUCN) criteria for Critically Endangered, and is therefore facing an extremely high risk of extinction in the wild.
EN	Endangered	A taxon is Endangered when the best available evidence indicates that it meets any of the five IUCN criteria for Endangered, and is therefore facing an extremely high risk of extinction in the wild.
VU	Vulnerable	A taxon is Vulnerable when the best available evidence indicates that it meets any of the five IUCN criteria for Vulnerable and it is therefore considered to be facing a high risk of extinction in the wild.
NT	Near Threatened	A taxon is Near Threatened when available evidence indicates that it is close to meeting any of the five IUCN criteria for Vulnerable and it is therefore likely to qualify for a threatened category in the near future.
D	Declining	A taxon is Declining when it does not meet any of the five IUCN criteria and does not qualify for the categories Critically Endangered, Endangered, Vulnerable or Near Threatened, but there are threatening processes causing a continuing decline in the population.

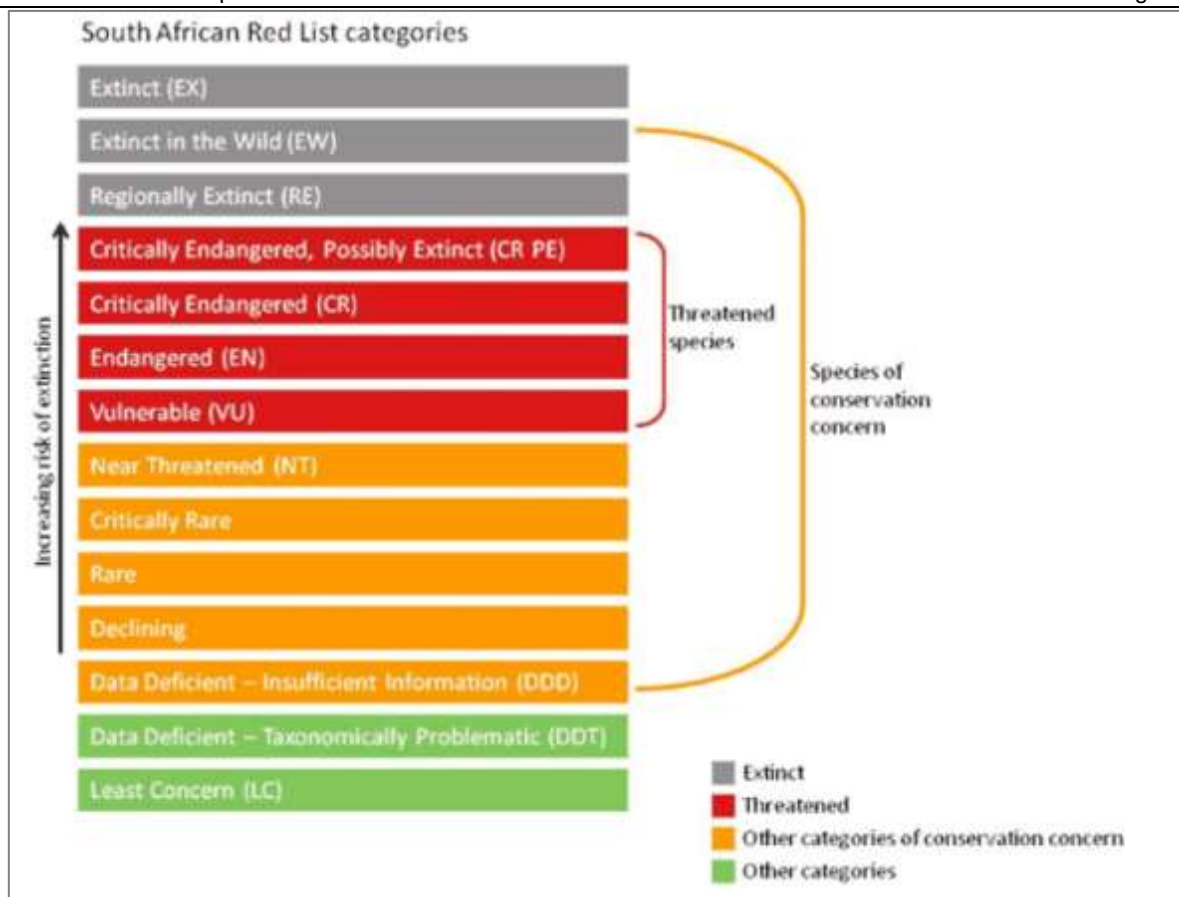


Figure 5-1: South African Red Data list categories according to SANBI.

To determine the likelihood of presence of Red Data plants species, a Potential of Occurrence (POC) was used. Habitat suitability was used as the determinant. POC was categorised according to **Table 5-2** below.

Table 5-2: Categorisation of Potential of Occurrence.

Potential of Occurrence	Likelihood
Low	Unlikely to occur in such a habitat.
Moderate	May occur in the habitat albeit in limited population.
High	Most likely to occur in significant population as the habitat is conducive.

Table 5-3 below highlights Plants species potentially occurring in the vicinity of the development site and their probability of occurrence.

Table 5-3: Plants species potentially occurring in the vicinity of the development site.

Family	Genus	Species	Threat Status	Ecology	
Asteraceae	<i>Senecio</i>	<i>decurrens</i>	LC	Indigenous	
Scrophulariaceae	<i>Selago</i>	<i>hyssopifolia</i> ssp. <i>retrotricha</i>	LC	Indigenous; Endemic	
Asteraceae	<i>Senecio</i>	<i>bupleuroides</i>	LC	Indigenous	
Asteraceae	<i>Senecio</i>	<i>latifolius</i>	LC	Indigenous	
Asteraceae	<i>Senecio</i>	<i>erubescens</i> var. <i>erubescens</i>	LC	Indigenous; Endemic	
Rubiaceae	<i>Conostomium</i>	<i>natalense</i> var. <i>natalense</i>	LC	Indigenous	
Hyacinthaceae	<i>Dipcadi</i>	<i>viride</i>	LC	Indigenous	
Lamiaceae	<i>Stachys</i>	<i>sessilis</i>	LC	Indigenous	
Lamiaceae	<i>Syncolostemon</i>	<i>teucriffolius</i>	LC	Indigenous	
Asteraceae	<i>Helichrysum</i>	<i>sessile</i>	LC	Indigenous; Endemic	
Asteraceae	<i>Senecio</i>	<i>pterophorus</i>	LC	Indigenous	
Asteraceae	<i>Senecio</i>	<i>tanacetopsis</i>	LC	Indigenous	
Asteraceae	<i>Senecio</i>	<i>albanensis</i> var. <i>albanensis</i>	LC	Indigenous	
Fabaceae	<i>Indigofera</i>	<i>placida</i>	LC	Indigenous	
Asteraceae	<i>Senecio</i>	<i>serratuloides</i>	LC	Indigenous	
Scrophulariaceae	<i>Jamesbrittenia</i>	<i>breviflora</i>	LC	Indigenous	
Lobeliaceae	<i>Cyphia</i>	<i>natalensis</i>	LC	Indigenous; Endemic	
Scrophulariaceae	<i>Gomphostigma</i>	<i>virgatum</i>	LC	Indigenous	
Lobeliaceae	<i>Lobelia</i>	<i>laxa</i>	LC	Indigenous	
Lobeliaceae	<i>Lobelia</i>	<i>vanreenensis</i>	LC	Indigenous	

5.1.2 Findings of the infield investigation

Following a site visit undertaken on 30 September 2023, three distinct vegetation communities were identified within and around the proposed development site.

- Open Primary Grassland (belonging to the Dry Coast Hinterland Grassland - **Vulnerable**)
- Vachellia* Thicket
- Eucalyptus* Plantation

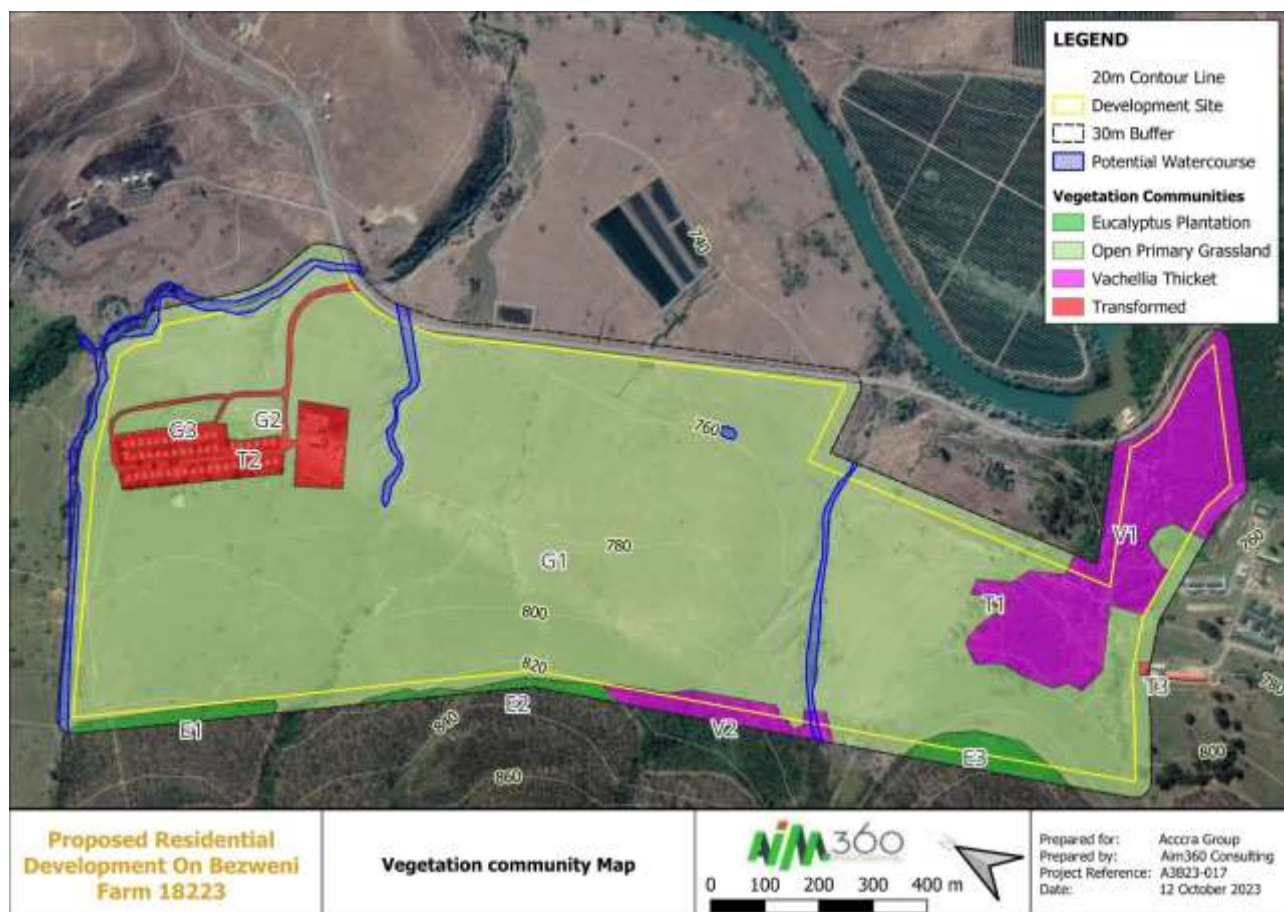


Figure 5-3: Map showing the spatial distribution of vegetation communities within and around the development site.

A. Open Primary Grassland

The majority of the proposed development site was identified as an Open Primary Grassland belonging to the Dry Coast Hinterland Grassland – **Vulnerable**. (Units G1 – G3 in Figure 5-1). The grassland was characterised by medium tall grasses and scattered thorny trees. Dominant grasses included *Aristida junciformis*, *Sporobolus Africana*, *S. pyramidalis* and *Eragrostis chloromelas*. *Vachellia sieberiana* was identified as a dominant tree species. Other trees and woody plants recorded include *Aloe ferox*, *Cussonia spicata*, *Searsia dentata* and *Ziziphus mucronata*. The grassland had a poor diversity of forbs. Common forbs recorded include *Aloe maculata*, *Hypoxis hemerocallidea*, *Hypoxis spp.*, *Gazania krebsiana*, *Rhynchosia adenoids*, *R. totta*, *Polygaga fruiticosa*, *Bekheya macrocephala*, *Hypochaeris radicata*, *Scadoxus puniceus*, *Ipomoea crassipes*, *Ruella cordata* and *Solanum acanthoideum*.

Notable disturbances included prescribed veld burning, overgrazed and informal foot paths. At the time of undertaking fieldwork, the grassland had been burnt which made plant identification difficult. Photographs of the Open Primary Grassland are provided below.



Photo 1: View of the Open Primary Grassland. This photograph was taken standing in the southern portion of the property facing north. Note that the grass is short due to prescribed burning.



Photo 2: Another view of the Open Primary Grassland. This photograph was taken standing in the northern portion of the property facing south. The *Eucalyptus* Plantation can be seen in the background.



Photo 3: Close-up view of the groundcover.

B. *Vachellia* Thicket

The southern portion of the development site was identified as a thicket dominated by two indigenous thorny trees namely *Vachellia natalitia* and to a lesser extent *V. karroo* (Units V1 and V2 in Figure 5-1). Review of historical Google Earth imagery revealed that the *Vachellia* thicket is a result on woody plant encroachment on what was once an open grassland. As depicted in Figures 5-2 and 5-3, the site was largely a grassland in year 2001, however, signs of woody plant encroachment were evident. Twenty-one years later (in year 2022) the site was dominated by woody plants.

At the time of undertaking the assessment, the two *Vachellia* species had formed an impenetrable thicket. Other woody species forming part of the thicket, albeit to a lesser extent include *V. sieberiana*, *Ziziphus mucronata* as well as exotics namely *Acacia mearnsii*, *Eucalyptus spp.*, *Melia azedarach*, *Morus alba* and *Jacaranda mimosifolia*. The thicket was noted for its poor light penetration which resulted in a poorly developed undergrowth. Groundcover was poor. Common arborescent plants included *Lantana camara* and *Solanum mauritianum*. *A. junciformis* was the most dominant grass. Other random plant species recorded include *Opuntia stricta* and *Solanum incanum*. Photographs of the *Vachellia* Thicket are provided in the following pages.



Figure 5-4: Google Earth orthophoto map of the development site in June 2001. Note that the site is largely a grassland and a small woody thicket.



Figure 5-5: Google Earth orthophoto map of the development site in August 2022. Note that the Vachellia thicket had encroached much of the southern portion of the development site.



Photo 4: View of the *Vachellia* Thicket.



Photo 5: Another view of the *Vachellia* Thicket.



Photo 6: View of the interior of the *Vachellia* Thicket.

C. *Eucalyptus* Plantation

The vegetation community along the western edge of the entire development site was identified as a commercial *Eucalyptus* Plantation. The plantation largely occurs outside the development site but a small area of the plantation extends into the development site. As expected, the plantation comprised exclusively of *Eucalyptus* spp. The undergrowth was largely barren with only a few scattered grasses. Photographs of the *Eucalyptus* Plantation are provided below.



Photo 7: View of the interior of the *Eucalyptus* Plantation.



Photo 8: View of the Eucalyptus Plantation in the background and the Open Primary Grassland in the foreground.

5.1.3 Plant Species of Conservation Concern (SCC)

There are three key pieces of legislation in South Africa that provide for the protection of threatened plant species in need of protection to ensure their survival in the wild. Furthermore, they provide for the protection of ecosystems that are threatened or in need of protection. These include the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), the National Forest Act, 1998 (Act No. 84 of 1998) and the Natal Nature Conservation Ordinance, No. 15 of 1974. **Table 5-4** provides a description of relevant sections of the abovementioned legislation that pertain to the protection of threatened plants.

Table 5-4: South African legislation that deal with the management of threatened or protected plant species.

Legislation	Relevant section	Description	Responsible authority
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	Section 57(1)	The following is stated: “A person may not carry out a restricted activity involving a specimen of a listed threatened or protected species (TOPS) without a permit...”	EKZNW
National Forest Act, 1998 (Act No. 84 of 1998)	Section 7(1)	The following is stated: “No person may cut, disturb, damage or destroy any indigenous, living tree in, or remove or receive any such tree from, a natural forest except in terms of (a) a licence issued...”	DAFF
	Section 15(1)	The following is stated: “No person may (a) cut, disturb, damage, destroy or remove any protected tree; or (b) collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister”.	DAFF
Natal Nature Conservation Ordinance, No. 15 of 1974	Schedule 12	Schedule 12 lists Specially Protected Indigenous Plants of the KwaZulu-Natal Province which require a permit to handle.	EKZNW

At least 5 species of conservation concern were identified on site. These include *Aloe ferox*, *A. maculata*, *H. hemerocallidea*, *Hypoxis spp.* and *S. puniceous*. Further details on these species are provided in **Table 5-5** and the spatial distribution of these species is provided in Photos 9 – 13.

Table 5-5: Basic information on identified species of conservation concern, applicable legislation, approval required and the responsible authority.

Botanical name	Common name	Plant type	Conservation status	Applicable legislation	Approval required	Responsible authority
<i>Aloe ferox</i>	Bitter Aloe	Succulent tree	Least Concern	Natal Nature Conservation Ordinance, No. 15 of 1974	Ordinary Permit	EKZNW
<i>Aloe maculata</i>	Common Soap Aloe	Succulent	Least Concern			
<i>Hypoxis hemerocallidea</i>	African potato	Bulbous	Least Concern			
<i>Hypoxis spp.</i>		Bulbous	Least Concern			
<i>Scadoxus puniceous</i>	Blood Lily	Forb	Least Concern			

Included below is a selection of photographs of species of conservation concern found at the site.



Photo 9: *Aloe ferox*.



Photo 10: *Aloe maculata*.



Photo 11: *Hypoxis hemerocallidea*.



Photo 12: *Hypoxis spp.*



Photo 13: *Scadoxus puniceus*

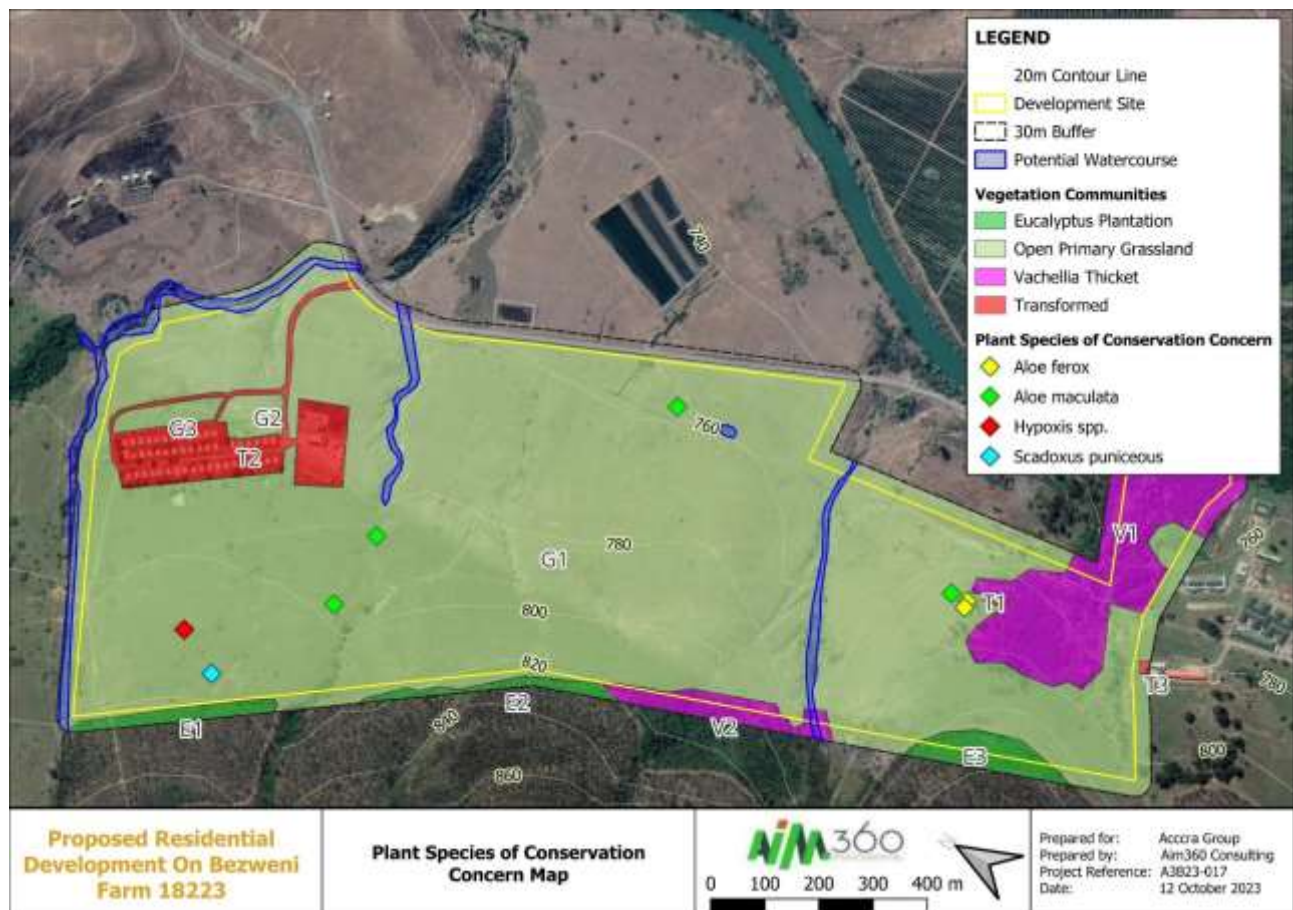


Figure 5-6: Map showing the spatial distribution of species of conservation concern within and around the development site.

5.1.4 Plant Species Inventory

Provided in **Table 5-6** is a list of all plant species recorded on site.

Table 5-6: Plants species that were recorded within the study site.

Species Name	Common Name	Type	Species Status	Status
<i>Acacia mearnsii</i>	Black Wattle	Tree	Alien (invasive)	N/A
<i>Agave sisalana</i>	Sisal	Tree	Alien (invasive)	N/A
<i>Aloe maculata</i>	Common soap aloe	Succulent	Indigenous	Provincially Protected
<i>Aloe ferox</i>	Bitter Aloe	Tree	Indigenous	Provincially Protected
<i>Aristida junciformis</i>	Ngongoni Grass	Grass	Indigenous	LC
<i>Bekheya macrocephala</i>		Herb	Indigenous	LC
<i>Centella asiatica</i>		Herb	Indigenous	LC
<i>Coddia rudis</i>	Small Bone Apple	Tree	Indigenous	LC
<i>Cussonia spicata</i>	Common cabbage tree	Tree	Indigenous	LC
<i>Cynodon dactylon</i>	Couch grass	Grass	Indigenous	LC
<i>Eragrostis chloromelas</i>	Curly Leaf	Grass	Indigenous	LC
<i>Eragrostis curvular</i>	Weeping love grass	Grass	Indigenous	LC
<i>Eucalyptus sp.</i>	Gum tree	Tree	Alien (invasive)	N/A
<i>Gazania krebsiana</i>		Herb	Indigenous	LC
<i>Hypochaeris radicata</i>	Hairy Wild Lettuce	Herb (upright)	Indigenous	LC
<i>Hypoxis hemerocallidea</i>	African potato	Herb	Indigenous	Provincially Protected
<i>Hypoxis spp.</i>		Herb	Indigenous	Provincially Protected
<i>Ipomoea crassipes</i>	Leafy-flowered Ipomoea	Herb	Indigenous	LC
<i>Jacaranda mimisifolia</i>	Jacaranda tree	Tree	Alien (invasive)	N/A
<i>Lantana camara</i>	Lantana	Shrub	Alien (invasive)	N/A
<i>Lobelia anceps</i>	Wild/swamp lobelia	Herb (upright)	Indigenous	
<i>Melia azedarach</i>	Syringa	Tree	Alien (invasive)	N/A
<i>Monopsis decipiens</i>	Butterfly Monopsis	Herb	Indigenous	LC
<i>Morus alba</i>	Mulberry	Tree	Alien (invasive)	N/A
<i>Opuntia sp.</i>		Herb (upright)	Alien (invasive)	N/A
<i>Parchycarpus natalensis</i>	Natal Parchycarpus	Herb	Indigenous	LC
<i>Polygala fruticosa</i>		Herb	Indigenous	LC
<i>Rhynchosia adenoides</i>		Herb	Indigenous	LC
<i>Rhynchosia totta</i>		Herb	Indigenous	LC
<i>Ruellia cordata</i>	Veld violet	Herb (upright)	Indigenous	LC
<i>Scadoxus puniceus</i>	Snake lily/Blood lily	Rush	Indigenous	Provincially Protected

<i>Searsia dentata</i>	Nana-berry	Tree	Indigenous	LC
<i>Solanum acanthoideum</i>	Bitter Apple	Tree	Indigenous (weed)	LC
<i>Solanum incanum</i>	Grey bitter apple	Herb (upright)	Indigenous (weed)	LC
<i>Solanum mauritianum</i>	Bugweed	Tree	Alien (weed)	N/A
<i>Sporobolus africanus</i>	Rat's tail dropseed	Grass	Indigenous	LC
<i>Sporobolus pyramidalis</i>	Cats tail dropseed	Grass	Indigenous	LC
<i>Ziziphus mucronata</i>	Buffalo thorn	Tree	Indigenous	LC
<i>Vachellia ataxacantha</i>	Flame thorn	Shrub	Indigenous	LC
<i>Vachellia karroo</i>	Sweet Thorn	Tree	Indigenous	LC
<i>Vachellia sieberiana</i>	Paperback thorn	Tree	Indigenous	LC
<i>Vachellia natalitia</i>		Tree	Indigenous	LC

5.2 Mammals

According to the Animal Demography Unit (2022), about 11 mammal species are modelled to occur within grid square 3029BB within which the development site is situated and all of them are of **Least Concern**. The study area does not harbour any mammal species of conservation concern (SCC).

Mammals modelled as present within the study area include the following:

- i. *Aonyx capensis* - African Clawless Otter (**Least Concern**)
- ii. *Orycteropus afer* - Aardvark (**Least Concern**)
- iii. *Herpestes ichneumon* - Egyptian Mongoose (**Least Concern**)
- iv. *Hystrix africaeaustralis* - Cape Porcupine (**Least Concern**)
- v. *Caracal caracal* - Caracal (**Least Concern**)
- vi. *Herpestes pulverulentus* - Cape Gray Mongoose (**Least Concern**)
- vii. *Sylvicapra grimmia* - Bush Duiker (**Least Concern**)
- viii. *Tragelaphus scriptus* - Bushbuck (**Least Concern**)
- ix. *Redunca arundinum* – Reedbuck (**Least Concern**)
- x. *Herpestes ichneumon* - Large Grey Mongoose (**Least Concern**)
- xi. *Proteles cristata* – Aardwolf (**Least Concern**)

There were no sightings of the above mammals during the field investigation. Furthermore, anthropogenic disturbances associated with the study site have resulted in high levels of modification of the habitat, thus the likelihood of any mammals being present on site is determined as very low.

5.3 Avifaunal

According to data from the Southern African Bald Atlas Project (SABAP2, 2023) a total of 136 bird species have been recorded within pentads 3010_2950 and 3010_2955. Of these species, eight (8) are considered threatened species as per the 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland (**Table 5-7**). These are the Denham's Bustard, Grey Crowned Crane, Lanner Falcon, African Marsh Harrier, Southern Ground Hornbill, Secretarybird, Woolly Necked Stork and Cape Vulture. At least 5 are moderately likely to utilise the development site whilst there is a low probability that the other 3 will utilise the site.

Table 5-7: Red Data bird species modelled to occur within pentads 3010_2950 and 3010_2955.

Scientific & Common Name	Status	Habitat	Findings	Likelihood of Occurrence
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Denham's Bustard (<i>Neotis denhami</i>)	VU	Occupies grassland habitats including dense shrubland, light woodland, farmland, dried marsh and arid plains.	Not recorded during the site visit	Moderate
Grey Crowned Crane (<i>Balearica regulorum</i>)	EN	Wetland and open grassland habitats, including floodplains, marshes, rivers and savannah. Medium-height open grassland near wetlands are preferred foraging habitat, while tall trees are required for nesting.	Not recorded during the site visit	Moderate
Lanner Falcon (<i>Falco biarmicus</i>)	VU	Cliffs for nesting. Open habitats for foraging.	Not recorded during the site visit	Low
African Marsh Harrier (<i>Circus ranivorus</i>)	EN	Breed in wetland areas, and most often seen in marshy areas.	Not recorded during the site visit	Low
Southern Ground Hornbill (<i>Bucorvus leadbeateri</i>)	VU	Savanna habitat with large trees for nesting and dense but short grass for foraging.	Not recorded during the site visit	Moderate
Secretarybird (<i>Sagittarius serpentarius</i>)	VU	Savannah biome with scattered thorn trees and short grasses as well as semi-deserts and areas that have shrubs.	Not recorded during the site visit	Moderate
Woolly Necked Stork (<i>Ciconia episcopus</i>)	NT	It is a resident breeder building nests on trees located on agricultural fields or wetlands, on natural cliffs, and on cell phone towers. They use a variety of freshwater wetlands including seasonal and perennial reservoirs and marshes, crop lands, irrigation canals and rivers, but are mostly seen in agricultural areas and in wetlands.	Not recorded during the site visit	Moderate
Cape Vulture (<i>Gyps coprotheres</i>)	EN	Open grassland, savannah and shrubland and is often found roosting on crags in mountainous regions.	Not recorded during the site visit	Low

During the site visit only the African Sacred Ibis (*Threskiornis aethiopicus*) was recorded (Photo 14). This species is considered of **Least Concern**. Also recorded was a nest in the *V. sieberiana* tree (Photo 15).



Photo 14: African Sacred Ibis (*Threskiornis aethiopicus*)



Photo 15: Nest in the tree.

5.4 Herpetofauna

Review of available Red Data Books highlighted that at least 1 species of conservation concern (i.e. KwaZulu-Natal Dwarf Chameleon) and 7 near-endemic or endemic species potentially occur within and around the study area (**Table 5-8**). All 8 species have a low likelihood of being present on site.

Table 5-8: Red Data herpetofauna species modelled to occur within and around the development site.

Scientific & Common Name	Conservation Status	Habitat	Findings	Likelihood of Occurrence
Spotted Gecko (<i>Pachydactylus maculatus</i>)	Near-Endemic	Mesic area where it uses rocks, old temitaria, logs or debris as refuge sites.	Not recorded during the site visit	Low
Delalande's Sandveld Lizard (<i>Nucras lalandii</i>)	Endemic	Montane and temperate grassland. Shelters in burrows in the ground or under rocks.	Not recorded during the site visit	Low
Cape Girdled Lizard (<i>Cordylus cordylus</i>)	Endemic	Abundant on shale bands in mesic thickets.	Not recorded during the site visit	Low
Darkensburg Crag Lizard (<i>Pseudocordylus melanotus</i>)	Endemic	Restricted to grassland biome. Found in colonies among rocks and on steep cliffs.	Not recorded during the site visit	Low
Eastern Long-tailed Seps (<i>Tetradactylus africanus</i>)	Endemic	Open or wooded grassland.	Not recorded during the site visit	Low
KwaZulu-Natal Dwarf Chameleon (<i>Bradypodion melanocephalum</i>)	VU	Grasses, bushes, thickets, trees and roadside verges.	Not recorded during the site visit	Low

Southern Rock Agama (<i>Agama atra</i>)	Near-Endemic	Rocky habitats, rocky hillsides to mountain tops. Shelters in rock crevices and under rocks.	Not recorded during the site visit	Low
Western Natal Green Snake (<i>Philothamnus natalensis occidentalis</i>)	Endemic	Lowlands forests, wooded grasslands and forest edges.	Not recorded during the site visit	Low

6 Ecological Habitat Condition and Sensitivity Analysis

6.1 Ecological Habitat Condition and Sensitivity Analysis

After identifying vegetation communities and delineating their respective boundaries, the various vegetation communities defined for the study site were further assessed qualitatively in terms of their ecological condition in order to estimate relative habitat sensitivity.

Ecological functionality describes the structural and functional integrity of the vegetation communities/habitats which support the faunal communities. It also refers to the degree of ecological connectivity between the identified vegetation communities/habitats and other systems within the landscape (such as a combination of species composition; structural intactness and existing levels of anthropogenic disturbance, woody encroachment, etc.).

Systems with a high degree of landscape connectivity amongst each other are perceived to be more sensitive and may be considered as conservation important.

The matrix on **Table 6-1** below was used to determine the ecological condition of the vegetation communities/ ecological habitat.

Table 6-1: Generic matrix used for the estimation and rating of vegetation/habitat ecological condition (using joint consideration of species composition and structural intactness).

		SPECIES COMPOSITION			
		Natural	Good	Fair	Poor
		Representative of reference vegetation type	>75% of expected species occur compared with an undisturbed site in a comparable vegetation type	<75% of expected species occur compared with an undisturbed site in a comparable vegetation type	<25% of expected species occur compared with an undisturbed site in a comparable vegetation type
Structural Intactness	Contiguous (reference)	Natural	Good	Fair	Poor
	Clumped	Good	Good	Fair	Poor
	Scattered/patchy cover	Fair	Fair	Poor	Poor
	Sparse	Poor	Poor	Poor	Very Poor

The generic matrix in **Table 6-2** below was used for the assessment of vegetation/habitat sensitivity. The results are presented in **Table 6-3**.

Table 6-2 : Generic matrix used for the estimation of habitat sensitivity (based on the joint consideration of habitat condition and threat status of the vegetation type).

		HABITAT/VEGETATION CONDITION				
		Natural	Good	Fair	Poor	Very Poor/ Transformed
THREAT STATUS	CRITICALLY ENDANGERED	High	High	High	Moderate	Low
	Endangered	High	High	High	Moderate	Low
	Vulnerable	High	High	Moderate	Low	Low
	Near Threatened	Moderate	Moderate	Moderate	Low	Low
	Least Threatened	Moderate	Moderate	Low	Low	Very Low

The ecological condition of the 'Open Grassland' community was found to be good whilst that of the other vegetation communities was poor. The poor ecological condition was attributed to the vegetation communities being of secondary nature. The sensitivity of the 'Open Grassland' community was found to be high whilst that of the Vachellia Thicket was low and that of the Eucalyptus Plantation was very low. Summarised assessment results are presented in Table 6-3 and also illustrated in Figures 6-1.

Table 6-3: Summary of the ecological condition assessment results for the tree vegetation communities.

Vegetation Community	Species Composition	Structural Intactness	Ecological Condition	Threat Status	Sensitivity
Open Primary Grassland	Good	Contiguous	Good	Vulnerable	High
Vachellia Thicket	Poor	Contiguous	Poor	Vulnerable	Low
Eucalyptus Plantation	Poor	Contiguous	Poor	N/A	Very Low

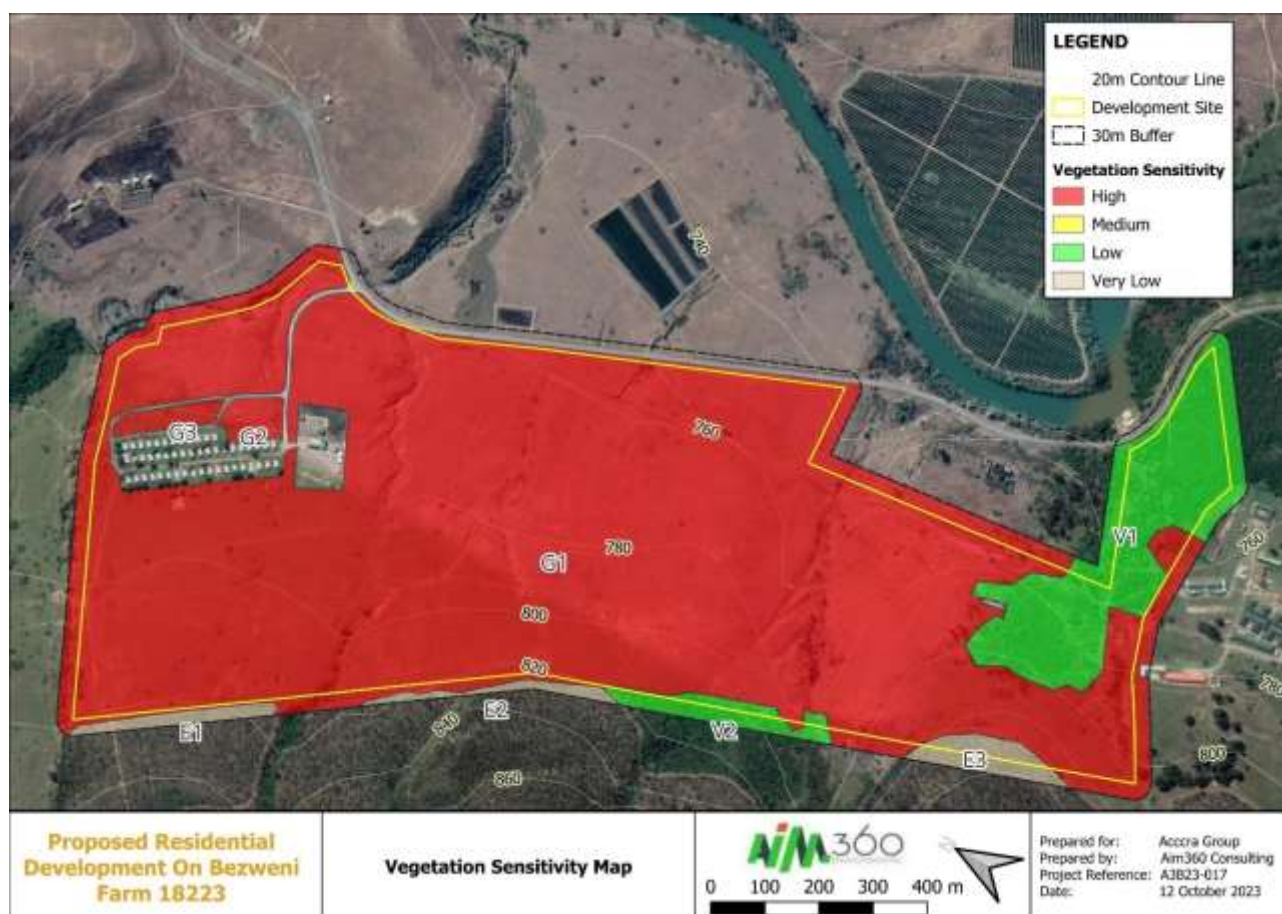


Figure 6-1: Ecological sensitivity map of the habitat/vegetation in the study site.

7 IMPACT ASSESSMENT & MITIGATION

Any development/road construction project taking place within a natural system has a potential to impose an impact in that particular environment as well as the surrounding. In most instances the associated impact to the development activity are negative. The main aim of this phase of study is to identify and assess the significance of the potential impacts which may be a result of the project and to provide a description of the mitigation measures required so as to restrict the identified impacts on the natural environment. Significance scoring both assesses and predicts the significance of environmental impacts through evaluation of the following factors; probability of the impact; duration of the impact; extent of the impact; and magnitude of the impact. The significance of environmental impacts is then assessed taking into account any proposed mitigations. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Each of the above impact factors have been used to assess each potential impact using ranking scales (Table 7-1).

Unknown parameters are given the highest score (5) as significance scoring follows the Precautionary Principle.

Table 7-1 : Significance scoring used for each potential impact.

	Score	Label	Criteria
Duration	1	Very short term	0 -1 years
	2	Short term	2 – 5 years
	3	Medium term	5 – 15 years
	4	Long term	>15 years
	5	Permanent	Permanent
Extent	1	Minor	Limited to the immediate site of the development
	2	Local	Within the general area of the town, or study area, or a defined Area of Impact
	3	Regional	Affecting the region, municipality, or province
	4	National	Country level
	5	International	International level
Magnitude	0	Negligible	Very small to no effect on the environment
	2	Minor	Slight impact on the environment
	4	Low	Small impact on the environment
	6	Moderate	A moderate impact on the environment
	8	High	The impacts on the environment are large
	10	Very high	The impacts are extremely high and could constitute a fatal flaw
Probability	1	Very improbable	Probably will not happen
	2	Improbable	Some possibility, but low likelihood
	3	Probable	Distinct possibility
	4	Highly probable	Most likely
	5	Definite	The impact will occur

Significance Points = (Magnitude + Duration + Extent) x Probability.

The maximum value is 100 Significance Points.

Potential Environmental Impacts are rated as high, moderate or low significance as per the following:

Table 7-2 : Significance weighting.

Score	Label	Motivation
<10	Negligible	The impact is very small to absent
10-20	Low	where this impact would not have a direct influence on the decision to develop in the area
20-50	Medium	where the impact could influence the decision to develop in the area unless it is effectively mitigated
50 -70	High	where the impact must have an influence on the decision process to develop in the area
>70	Very high	Where the impact may constitute a fatal flaw for the project

Table 7-3: Possible significance scores based on Effect and Likelihood ratings.

Likelihood	Effect																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Very improbable (1)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Improbable (2)	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Probable (3)	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
Highly probable (4)	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
Definite (5)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Each impact was assessed based on the methodology above, and a table produced, indicating the scores and the overall significance rating both without and with mitigation. Where relevant, mitigation measures are recommended.

7.1 Loss of faunal habitat and ecological structure

The proposed development will result in the transformation of the development which will result in the loss of faunal habitats within the area. The proposed layout plan suggests that at least 60% of the farm property will be transformed. These activities will have an impact on foraging, breeding and roosting ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors.

At the time of undertaking the assessment, the development site was primarily used as a grazing land for cattle. Due to poor management of the grassland, it unlikely that it harbours any species of conservation importance that are uniquely limited to this grassland. The impact of habitat transformation on non-Red Data species that potentially breeding in the area, such as any rodents,

will be local in extent, in that it will not have a significant effect on regional or national populations. Table 7-4 below provides recommendation measures for the above impact.

Table 7-4 : Loss of faunal habitat and ecological structure

Potential Impact		Recommended Mitigation							
Loss of faunal habitat and ecological structure		i. All construction activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development and its servitude must be kept to a minimum. In particular, care must be taken in the vicinity of the wetlands and existing access routes must be used for access.							
		ii. The construction area, including stockpiling areas, are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. No activities are to infringe upon any watercourses.							
		iii. Any natural areas beyond the footprint of the construction area, which have been disturbed, must be rehabilitated using indigenous plant species.							
		iv. Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.							
Construction Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
5	3	5	5	1	1	5	5	55 High	45 Medium
Operation Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
3	2	3	3	1	1	2	2	14 Low	12 Low

		ii. Vegetation clearing should be kept to a minimum, and this should only occur where it is absolutely necessary.									
		iii. Rehabilitate all disturbed areas as soon as construction is completed.									
		iv. Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental disturbance and this can be achieved through provision of appropriate awareness to all personnel.									
		v. The location of the site office and Contractor's camp must be situated outside environmental sensitive areas in agreement with the ECO.									
		vi. The control and eradication of a listed invasive alien species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs in.									
		vii. All invasive alien plants must be removed from the construction area.									
		viii. Mechanical control methods such as digging, hoeing, pulling out of weeds and invasive plants are recommended.									
		ix. Use of chemical treatment methods must be kept to a minimum.									
		x. Where chemical treatment methods are used, the contractor must ensure that he uses watercourse friendly herbicides.									
		xi. The methods employed to control and eradicate a listed invasive species must also be directed at the new growth, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.									
		Construction Phase									
		Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with				
5	3	2	2	1.5	1.5	3	2.5	25.5 Medium	16.3 Low		
Operation Phase											
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)		
without	with	without	with	without	with	without	with				
5	3	2	2	1.5	1.5	3	3	25.5 Medium	19.5 Low		

7.3 Loss of Faunal & Avifaunal Species of Conservation Concern (SCC)

Transformation of the development site may result in the direct loss of sedentary faunal species. The likelihood of sedentary faunal & avifaunal species of conservation concern being present on site is rather low. All faunal species recorded within and around the development site are non-sedentary and therefore capable of vacating the land during construction. This means there's less likelihood of any faunal species being killed by machinery during the construction phase.

Table 7-6 : Loss of faunal & avifaunal species of conservation concern (SCC)

Table 4-34: Loss of faunal and avifaunal species of conservation concern (SCC)									
Potential Impact		Recommended Mitigation							
Loss of faunal & avifaunal species of conservation concern (SCC)		Fauna Search and Rescue							
		i. A search and rescue operation must be undertaken prior to the commencement of construction on site.							
		ii. Translocation of any faunal species must be undertaken by a qualified ecologist.							
		iii. Any burrows or holes must be checked for fauna that either may have occupied the area prior to commencement of construction.							
Construction Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
4	2	2	2	2	2	2	2	16 Low	12 Low

Operation Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
4	2	2	2	2	2	2	2	16 Low	12 Low

7.4 Loss of Plant Species of Conservation Concern (SCC)

This assessment confirmed the presence of 4 plant species of conservation concern (SCC) within the development site. These include *A. maculala*, *A. ferox*, *H. hemerocallidea*, *Hypoxis spp.* and *S. puniceous*. The loss of these species will impact their conservation status within the province. Fortunately, listed plant species are easy to translocate thus reducing the impact of the development.

Table 7-7 : Impacts on plant species of conservation concern (SCC)

Table 7-1: Impacts on plant species of conservation concern (SCC)										
Potential Impact				Recommended Mitigation						
Loss of plant species of conservation concern (SCC)				Plant Search and Rescue						
				i. A search and rescue operation must be undertaken prior to the commencement of construction on site.						
				ii. If any protected plant species are found within the construction footprint, plant permits must be applied for and received from the Ezemvelo KZN Wildlife before breaking ground.						
				iii. Translocation of any plant species must be undertaken by a qualified ecologist.						
				iv. If any protected species die during the translocation process, specimen loss must be offset at a ratio of 1:3.						
Construction Phase										
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)	
without	with	without	with	without	with	without	with			
4	2	2	2	2	2	3	3			
								24 Medium	18 Low	
Operation Phase										
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)	
without	with	without	with	without	with	without	with			
4	2	2	2	2	2	2	2			
								16 Low	12 Low	

7.5 Other Mitigation Measures

7.5.1 Stormwater Management

Stormwater is generally a major problem in urban developments due to increased hardened surfaces which restrict infiltration but promote increased runoff. It is therefore of paramount importance that sustainable stormwater management methods are implemented for developments with hardened surfaces. The general principle for stormwater management is to reduce the rate of runoff to a pre-development state and ensure that runoff is not concentrated onto adjacent neighbouring sites or other infrastructure. In this regard we recommend the following mitigation measures:

Point-Source Mitigation Measures

- Hardened surfaces such as driveways, paved walkways, paved yards etc. must be kept to a minimum. If required, porous paving such as block paving must be used (Figure 4.3).
- All units must have rainwater harvesting infrastructure. A common and acceptable technology is diverting stormwater from the gutter into Jo-jo tanks for storage. Harvested water can then be used for gardening purposes as an example. The acceptable storage ratio for rainwater tanks is 60% of the

- volume of the tank. In other words, when calculating the volume of storage required (on the 1 m³ to 40 m² area) then 60% of the rainwater tank volume may be claimed on the assumption that the tank is 40% full at any given time.
- iii. Runoff generated by arterial roads must be conveyed using grassed swales (Figure 4.4). Where required, grassed swales must be reinforced with gabion mattresses to prevent erosion. Short runner grasses are preferred for this technology.
 - iv. Grassed swales must be designed to divert runoff away from the road and into the veld at regular intervals. This reduces discharge quantities at each discharge point and thus minimising the risk of erosion.
 - v. Stormwater must never be discharged into the sewer infrastructure. The two must always be kept separate.

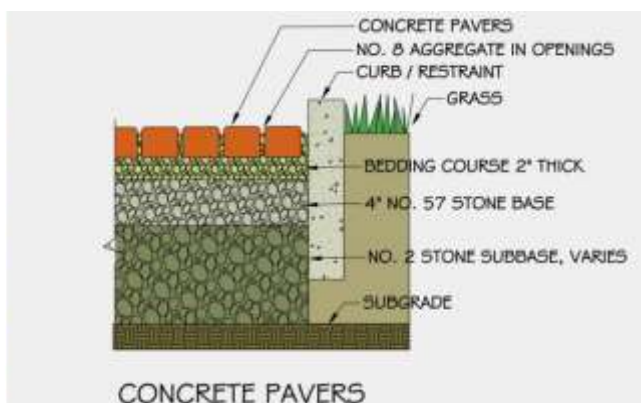


Figure 7-1: Permeable paving options that could be implemented for the roads and/or the parking bays onsite. Left image was extracted from Ecology Matters (2017), whilst the right image was extracted from Salmon Falls Nursery (2016).

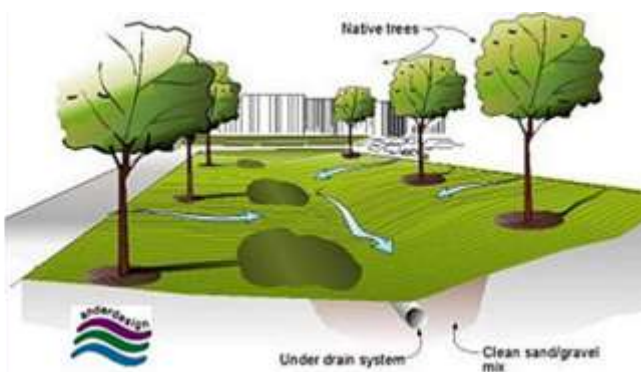


Figure 7-2: Examples of grass swales which can be implemented on low gradient areas within the site. Left image was extracted from Jaxshells (2019), whilst the right image was extracted from WBDG (2016).

End-point Mitigation Measures

In the event that point-source mitigation measures are not adequate to handle stormwater end-point mitigation measures will need to be implemented. These include:

- vi. Stormwater over flows from rainwater harvesting infrastructure and any other infrastructure must be diverted into the stormwater infrastructure.
- vii. Where present, all stormwater collection, detention, attenuation, conveyance and outlet structures must be established outside delineated watercourses and their buffer zones. This is necessary to allow the buffer zone to dissipate and filter stormwater before it reaches downslope watercourses.
- viii. A series of smaller stormwater outlets should be considered over a few large outlets. For example, a stormwater discharge point can be constructed for each unit rather than one outlet serving many units.
- ix. All stormwater generated by the development must be attenuated onsite and within the property boundary.

7.5.2 Sewer Infrastructure Recommendations

Below is a list of recommended design option for consideration when designing the sewer infrastructure:

- i. Wastewater must be disposed of via the municipal sewer infrastructure.
- ii. All sewer pump stations must have a backup power source or the entire sewer system must operate using gravity alone.
- iii. All sewer pump stations must have a backup pump.
- iv. All manholes located within 30m of the edge of any wetland habitat must have a bund for handling any minor leakages/overflows from the manholes.

7.5.3 Construction Footprint Limit & Demarcation

- i. All watercourses and their buffers must be considered No-Go areas.
- ii. Areas outside the construction footprint must be considered No-Go areas.
- iii. Prior to commencement of construction recommended No-Go areas must be demarcated to prevent any accidental breaching.
- iv. The demarcation must be signed off by the Environmental Control Officer (ECO).
- v. The demarcation must be maintained construction is completed at each crossing.

7.5.4 Soil Erosion Control Measures

- i. Where the risk of soil erosion is high, a silt fence / curtain must be installed along the downslope edge of the construction footprint.
- ii. The silt fence / curtain must be maintained regularly to ensure that they function effectively.
- iii. After every rainfall event, the contractor must check the site for erosion damage and immediately repair any damage recorded.

7.5.5 Soil Management

- i. Prior to commencing with earthworks, the topsoil must be stripped and stockpiled separately from subsoil.
- ii. Topsoil must be kept for use during rehabilitation of landscaped areas.
- iii. Topsoil must be stockpiled in stockpiles not exceeding 2m in height.
- iv. All stockpiles must be kept free of weeds and invasive alien plants.
- v. If soil stockpiles are at risk of being eroded, they must be secured with sandbags around the base of the stockpile.
- vi. All stockpiles must be established within the development footprint.

7.5.6 Pollution Prevention Measures

- i. Any soil contaminated by hydrocarbons (fuel and oils), asphalt, bitumen, binding agents, concrete and/or any other chemical must be removed and the affected area rehabilitated immediately.
- ii. Chemical toilets must be provided to workers during the construction phase. A single chemical toilet must be provided for every 10 employees.
- iii. Chemical toilets must be serviced regularly by a registered service provider and waybills must be retained as proof of servicing.
- iv. Fuel must be stored in a bunded structure with a roof. The bund must be able to contain at least 110% of the volumes of fuel.
- v. Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface.
- vi. Drip trays should be utilised at all dispensing areas.
- vii. A chemical spill kit must be present onsite at all times and once used it must be disposed of at a registered hazardous landfill site.
- viii. All solid waste must be collected and placed in bins.

8 Conclusions

Infield assessment for the biodiversity impact study was undertaken in September 2023 as part of a suite of environmental specialist studies to determine ecological diversity and species composition for the proposed residential development on Bezweni Farm 18223 within uMzimkhulu Town.

The vegetation community within around the proposed development site was sub-divided into 3 communities which include:

- a) Open Primary Grassland (belonging to the Dry Coast Hinterland Grassland - **Vulnerable**)
- b) *Vachellia* Thicket
- c) *Eucalyptus* Plantation

The ecological condition of the 'Open Grassland' community was found to be good whilst that of the other vegetation communities was poor. The poor ecological condition was attributed to the vegetation communities being of secondary nature. The sensitivity of the 'Open Grassland' community was found to be high whilst that of the *Vachellia* Thicket was low and that of the *Eucalyptus* Plantation was very low. Of concern is the presence of at least 5 species of conservation concern within the development site. These include *A. ferox*, *A. maculata*, *H. hemerocallidea*, *Hypoxis* spp. and *S. puniceous*. These species will need to be translocation prior to commencing with construction.

In terms of faunal species, no species of conservation significance were confirmed present on site. The development site was evaluated as less likely to harbour any species of conservation significance. As such the proposed development is unlikely to compromise any provincial or national conservation efforts.

Although the proposed development is expected to have a medium to high impact significance under a poor mitigation scenario, implementation of recommended mitigation measures will reduce the impact significance a low to medium ratings. This means the proposed development environmentally acceptable. All recommended mitigation measures must be included in the EMPr in order to effectively mitigate negative impacts associated with the project.

Kindly contact the undersigned specialist using the contact details provided below for comments or queries pertaining to this report.

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Appendices

Appendix A: Study Methodology

10 METHODOLOGY

10.1 Flora

The flora assessment consisted of two complementary approaches:

- The assessment commenced in September 2023 with a desktop study during which data related to the study area was collected and studied using existing literature, maps and aerial photography and Geographical Information Systems (GIS). During the desktop exercise, floral species and vegetation types of conservation significance with a potential to be affected by the proposed project were identified before field verification. A broad-level desktop analysis was carried out using the following available information:
 - Latest and historic Imagery (Google Earth™).
 - Aerial photography shapefiles.
 - South African Vegetation Map (Mucina and Rutherford, 2006).
 - 5m Elevation Contours (Surveyor General).
 - Pretoria Computerised Information System (PRECIS).
 - South African National Biodiversity Institute (SANBI) Threatened Species Programme (TSP).
- Infield data was collected in September 2023 during a site survey conducted over two days. A walk through survey was carried out where different habitat units were identified prior to analysis of the composition of floral species. A species inventory list was compiled for each habitat unit. The species list was compared to the expected “benchmark” vegetation to provide an indicator of the ecological integrity and conservation value of each habitat unit.

10.2 Fauna

The presence of observed mammals and indicators (such as spoors and stool) were recorded during a field visit conducted in September 2023. The assessment was carried out during the day, no night surveys were conducted. Emphasis was made with regards to determining habitats that may potentially support faunal species. Animal calls, burrow traps and visual observation are some of the methods that were used to establish the presence of faunal inhabitants.

It is improbable that all faunal species could have been identified due to the behaviour (and consequently the availability) of some species being subject to seasonal changes. Breeding and foraging patterns amongst faunal species are determined by the season.

10.3 Avifauna

Desktop analysis to determine birds associated with the habitat systems was carried out using the following:

- Southern African Bird Atlas Project from the University of Cape Town.
- The Eskom Red Data book of birds of South Africa, Lesotho and Swaziland (Barnes, 2000).

Infield investigation was carried out in September 2023. A 10x42 Bushnell Waterproof Binocular was used to visually observe bird species. Bird calls and feathers were also used to identify species associated with the study site. Where required, Sasol Birds of Southern Africa (Sinclair *et al.* 2002) was used to verify certain bird species.

10.4 Reptiles

The reptile assessment was carried out by examining the habitat types associated with the presence of reptiles. Reptiles were identified by examining burrows, rocky ridges and kopjes. A list of reptiles potentially occurring within the study area was compiled from a Southern African distribution list.

10.5 Impact assessment

Finally, considering the outcome of the above-mentioned assessments, the potential impacts that the proposed development could have during the construction and operational phases of the activity were

investigated. Where possible, mitigation and / or management measures were proposed to limit the impact of the proposed development on wetland and other aquatic ecosystems. Rehabilitation or enhancements measures were also recommended where necessary.

Impact rating was carried out for the identified impacts. Different aspects of the impacts, outlined below, can affect the rating. These include the following:

- **Extent**– the area over which the impact will be experienced.
- **Intensity**– the magnitude of the impact in relation to the sensitivity of the receiving environment.
- **Duration**– the time frame for which the impact will be experienced.
- **Probability**– the likelihood of the impact occurring.

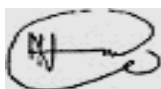
The different levels under each of the above aspects that were used in the impacts description are discussed in Section 6 of the report.

Appendix B: Specialist Declaration

Specialist Declaration

I, **Ntandokazulu Kumalo** declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Signature of the specialist:

Date: 17 October 2023

Specialist:	Mr Ntando Kumalo (Pr.Sci.Nat)
Company:	Aim360 Environmental Solutions (Pty) Ltd
Qualification:	BSc. (Hon) Forest Resources and Wildlife Management
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