Terrestrial Biodiversity Compliance Statement for the proposed Soventix Solar Photovoltaic (PV) Facility

Springs, Gauteng Province, South Africa

February 2023

CLIENT

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Report Name	**Terrestrial Biodiversity Compliance Statement for the proposed Soventix Solar Photovoltaic (PV) Facility**
Submitted to/Client	ecoleges Environmental Consultants
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Report Reviewer	**Andrew Husted**  Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 13 years' experience in the environmental consulting field.
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

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1 Introduction

1.1 Background

The Biodiversity Company was commissioned by Ecoleges Environmental Consultants to conduct a Terrestrial Biodiversity (fauna and flora) Assessment for the proposed development of a 1.8 MWp Solar PV Facility at the Element Six Facility, Springs, Ekurhuleni Metropolitan Municipality, Gauteng Province (**Error! Reference source not found.** and Figure 1-2).

To assess the baseline ecological state of the project area and to present a detailed description of the receiving environment, both, a desktop assessment as well as a field survey were conducted during February 2023. Furthermore, the assessment involved the detection, identification and description of any locally relevant sensitive receptors, and the manner in which these sensitive receptors may be affected by the proposed development was also investigated.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations, 2014 (No. 326, 7 April 2017) of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998). The approach has taken cognisance of the recently published Government Notice 320 in terms of NEMA dated 20 March 2020 as well as the Government Notice 1150 in terms of NEMA dated 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation”. The National Web based Environmental Screening Tool has characterised the terrestrial biodiversity theme for the project area as ‘Very High’ sensitivity (National Environmental Screening Tool, 2022).

The purpose of the assessment is to provide relevant input into the environmental application process. This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making as to the ecological viability of the project and the impacts that its implementation may have on the natural environment.

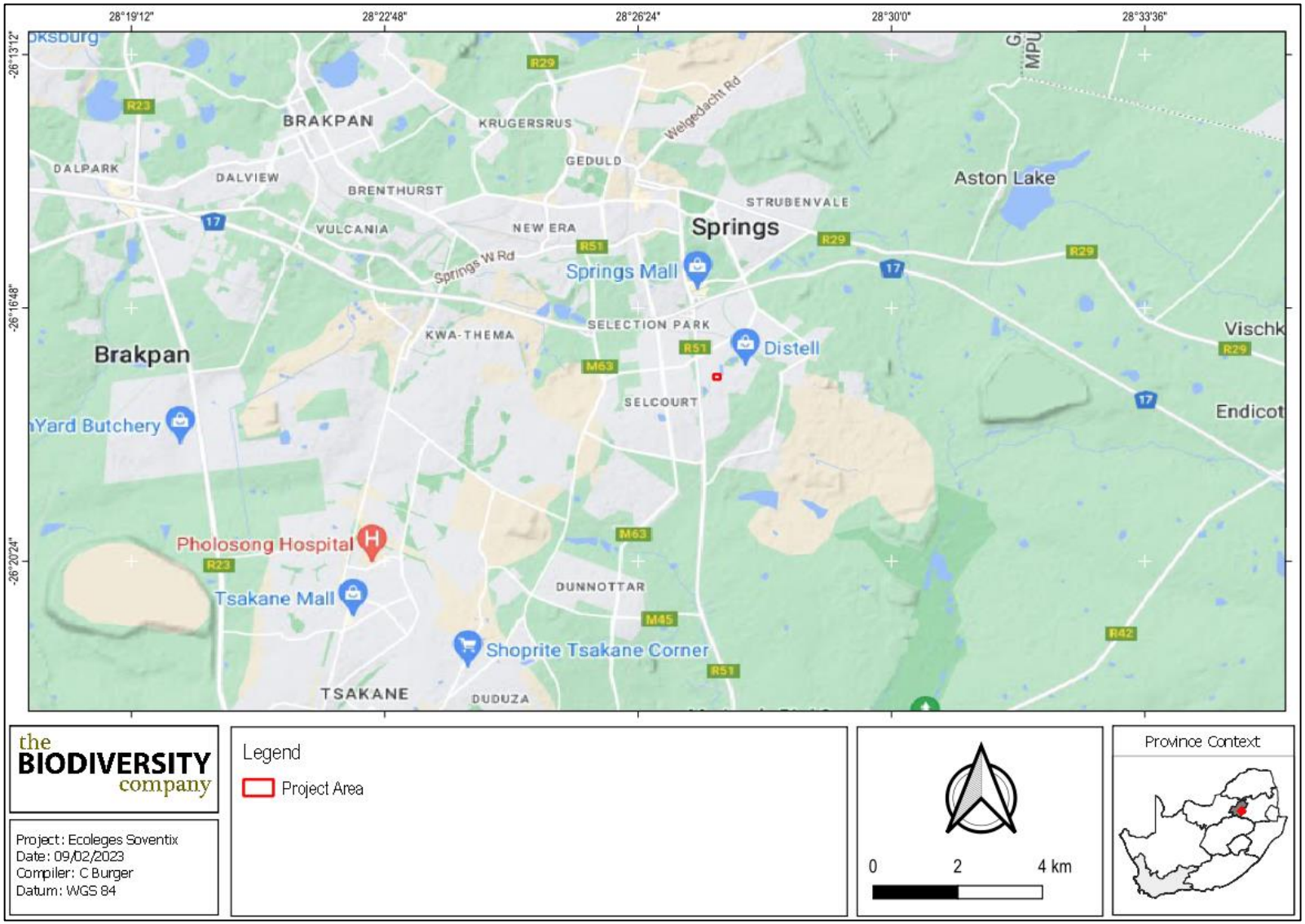


Figure 1-1 Map illustrating the regional overview of the project area

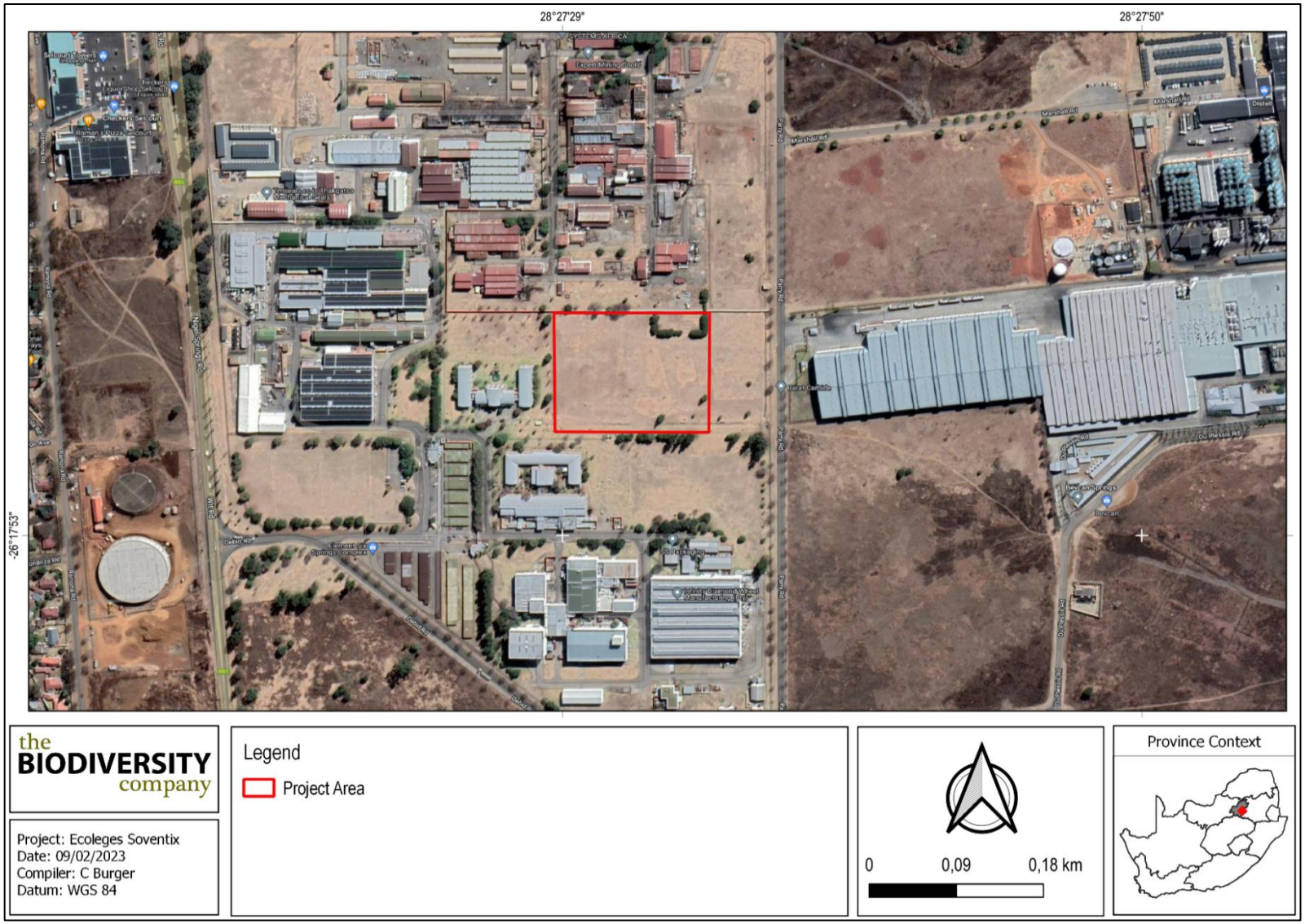


Figure 1-2 Map illustrating the details of the project area

1.2 Terms of Reference

The principal aim of the assessment was to adequately assess the current state of the terrestrial biodiversity in order to identify any significant and/or sensitive ecological receptors that may be impacted upon by the proposed activity. The following are the Terms of Reference that guide the assessment:

- Description of the baseline receiving environment specific to the field of expertise (including the general surrounding area as well as the site-specific environment);
- Identification and description of any sensitive receptors in terms of relevant specialist disciplines (i.e., terrestrial biodiversity) that occur in the project area, and the manner in which these sensitive receptors may be affected by the activity;
- Provide a map illustrating the location and extent of these sensitive receptors, if any, in the project area;
- Screening to identify any critical issues (potential fatal flaws) that may result in a rejection of the application; and
- Presentation of recommend mitigation measures (outcomes to be included in the Management Plan) that should be used to mitigate or minimise impacts from the proposed activity.

1.3 Key Legislative Requirements

The legislation, policies and guidelines listed below are applicable to the current project in terms of biodiversity and ecological support systems. The list provided, although extensive, is not exhaustive and other legislation, policies and guidelines may apply in addition to those listed below (Table 1-1).

Table 1-1 A list of key legislative requirements relevant to ecosystems and biodiversity in Gauteng Province

Region	Legislation
National	Constitution of the Republic of South Africa (Act No. 108 of 2006)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24, No 42946 (January 2020)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24, No 43110 (March 2020)
	The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
	The National Environmental Management: Waste Act (Act No. 59 of 2008)
	The Environment Conservation Act (Act No. 73 of 1989) and associated EIA Regulations
	National Environmental Management Air Quality Act (Act No. 39 of 2004)
	National Protected Areas Expansion Strategy (NPAES, 2016)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (Act No. 101 of 1998)
	World Heritage Convention Act (Act No. 49 of 1999)
	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)

	Alien and Invasive Species Regulations, 2014
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP 2015 - 2025)
	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
	Threatened or Protected Species Regulations, 2007 (TOPS)
	National Water Act (Act No. 36 of 1998)
Provincial	GDARD Requirements for Biodiversity Assessments (Version 3, 2014a)
	Gauteng Department of Agriculture and Rural Development (GDARD): Checklist for Biodiversity Assessments
	Gauteng Conservation Plan (GDARD, 2014)
	Gauteng Ridges Guidelines (GDARD, 2019)

1.4 Report Legislative Framework

In line with the protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity, as per Government Notice 320 published in terms of NEMA, dated 20 March 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation" – section 3, subsection 1:

- An applicant intending to undertake an activity identified in the scope of the protocol, on a site identified on the screening tool as being of 'Very High' sensitivity for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment; however
- Where the information gathered from the site sensitivity verification differs from the designation of 'Very High' terrestrial biodiversity sensitivity on the screening tool and it is found to be of a 'Low' sensitivity, then a Terrestrial Biodiversity Compliance Statement must be submitted.

The information obtained from a site sensitivity verification, which involved both a desktop assessment as well as a field survey, confirmed that the site (project area) is of a 'Very Low' sensitivity. Therefore, a Terrestrial Biodiversity Compliance Statement will be completed and submitted for this project.

As per sections 2 and 3 of the protocol discussed above, a Terrestrial Biodiversity Compliance Statement must contain the information as presented in Table 1-2 below.

Table 1-2 Terrestrial Biodiversity Compliance Statement information requirements as per the relevant protocol, including the location of the information within this report

Information to be Included (as per GN 320, 20 March 2020)	Report Section
Methodology used to undertake the site assessment and survey, and prepare the compliance statement, including relevant equipment and modelling used	2
Description of the assumptions and any uncertainties or gaps in knowledge or data	1.6
A baseline profile description of biodiversity and ecosystems of the site	3
Site sensitivity verification: Desktop Analysis using satellite imagery and available information	3.1
A statement on the duration, date and season of the site inspection	3.2
Site sensitivity verification: Onsite inspection, include a description of current land use and vegetation found on-site	3.2.1
Site sensitivity verification: Photographs/evidence of environmental sensitivity	3.2.1
Screening tool confirmation/dispute: The assessment must verify the "low" sensitivity of the site, in terms of plant, animal, and terrestrial biodiversity themes	3.3
Proposed impact management outcomes or monitoring requirements for inclusion in the EMPr	5

Information to be Included (as per GN 320, 20 March 2020)	Report Section
Indicate whether or not the proposed development will have any impact on the terrestrial environment, animals and/or plants	6
A signed statement of independence by the specialist	8
Specialist details, including a CV	9

A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

1.5 Definitions

1.5.1 Species of Conservation Concern (SCC)

In accordance with the National Red List of South African Plants website, managed and maintained by the South African National Biodiversity Institute (SANBI), a Species of Conservation Concern (SCC) is species that has a high conservation importance in terms of preserving South Africa's rich biodiversity. This classification covers a range of red list categories as illustrated in **Error! Reference source not found.** below.

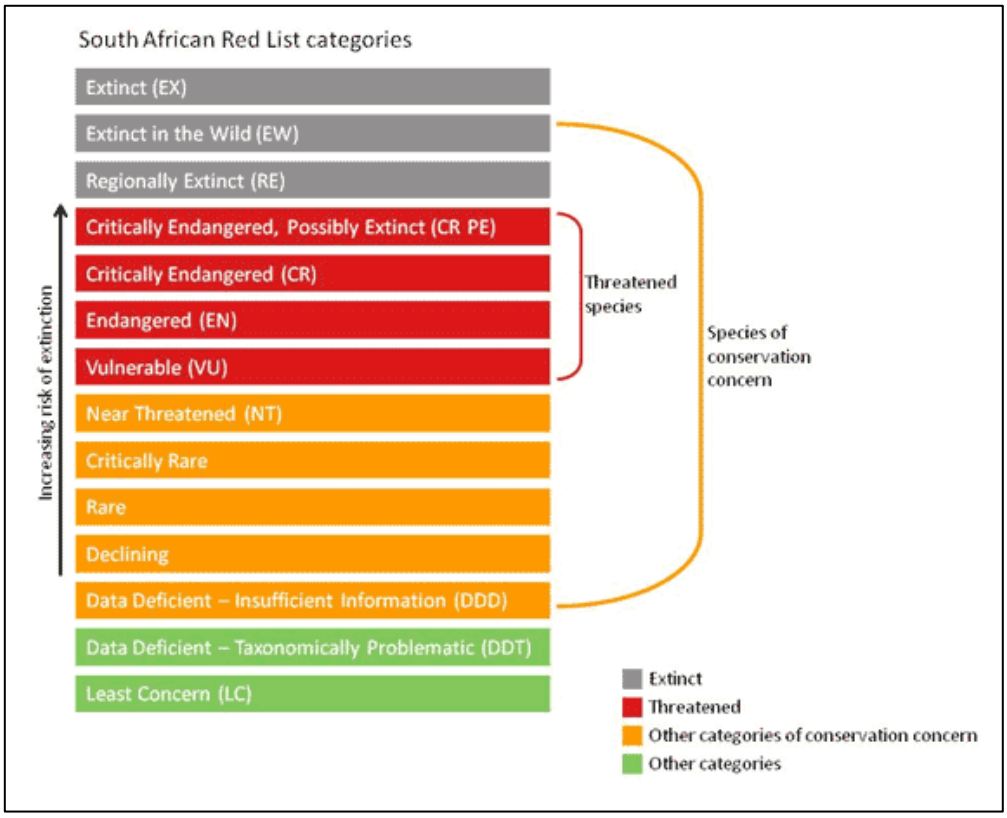


Figure 1-3 Threatened species and Species of Conservation Concern (SANBI, 2016)

South Africa uses the internationally endorsed International Union for Conservation of Nature (IUCN) Red List Categories and Criteria (IUCN, 2012). This scientific system is designed to measure species' risk of extinction and its purpose is to highlight those species that are in need of critical conservation action. As this system has been adopted from the IUCN, the definition of an SCC as described and categorised above is extended to all red list classifications relevant to fauna as well as the IUCN categories, for the purposes of this report.

1.5.2 Protected Species

Protected species include both floral and faunal species that are protected according to some form of relevant legislation, be it provincial, national, or international. Provincial legislation may include that which is published in the form of a provincial ordinance or a bill, national legislation includes that which is published in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) or the National Forest Act (Act No. 84 of 1998). Relevant national legislation includes the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 2021).

1.6 Limitations and Assumptions

The following limitations and assumptions should be noted for the assessment:

- The assessment area was based on the area provided by the client and any alterations to the route and/or missing GIS information pertaining to the assessment area would have affected the area surveyed;
- The area was only surveyed during a single site visit and therefore, this assessment does not consider temporal trends, however it was deemed sufficient to derive a meaningful baseline; and
- Whilst every effort is made to cover as much of the site as possible, it is possible that some plant and animal species that are present on site were not recorded during the field investigations due to the inherent secretive nature of fauna species or the lack of material required for flora species identification.

2 Methods

2.1 Desktop Assessment

2.1.1 Ecologically Important Landscape Features

Existing data layers were incorporated into GIS software to establish how the proposed project might interact with any ecologically important entities. Emphasis was placed around the following spatial datasets:

- The Gauteng Conservation Plan (Version 3.3) (GDARD, 2014b);
- The Gauteng Ridges Guidelines (GDARD, 2019);
- 2018 National Biodiversity Assessment (NBA, 2018) (Skowno *et al.,* 2019);
- Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018);
- SA Protected and Conservation Areas Databases, 2021 (DFFE, 2021a & DFFE, 2021b);
- National Protected Areas Expansion Strategy, 2016 (DEA, 2016);
- Important Bird and Biodiversity Areas, 2015 (Marnewick *et al.,* 2015);
- South African Inventory of Inland Aquatic Ecosystems (SAIIAE), NBA 2018 Rivers and Wetlands (Awuah, 2018 & Van Deventer et al., 2018);
- National Freshwater Priority Areas, Rivers and Wetlands, 2011 (Nel, 2011); and
- Strategic Water Source Areas, 2021 (Lötter & Le Maitre, 2021).

Brief descriptions of the standardised methods applied are provided below. More detailed descriptions of survey methods are available upon request.

2.1.2 Vegetation and Botanical Assessment

The desktop vegetation and botanical assessment encompassed an assessment of all the vegetation units and habitat types within the project area. The focus was on an ecological assessment of pre-anthropogenic habitat types as well as the identification of any Red Data and protected species within the known distribution of the project area. The South African National Biodiversity Institute (SANBI) provides an electronic database system, namely the Botanical Database of Southern Africa (BODATSA-POSA, 2019), which was used to access distribution records on Southern African plants and generate an expected species list. This new database replaces the old Plants of Southern Africa database which provided distribution data of flora at the quarter degree square resolution. The Red List of South African Plants website (SANBI, 2016) was used to provide the most current account of the national conservation status of flora.

Additional information regarding ecosystems, vegetation types, protected flora and Species of Conservation Concern (SCC) was obtained from the following sources:

- The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2012);
- Red List of South African Plants (Raimondo *et al.,* 2009; SANBI, 2016);
- Provincially Protected Plant Species (Schedules 11 and 12 of the Transvaal Nature Conservation Ordinance 12 of 1983); and
- List of Protected Tree Species (DFFE 2, 2021).

2.1.3 Fauna Assessment

The faunal desktop assessment involved the following:

- Compilation of expected species lists;
- Identification of any red-data/red-listed species or Species of Conservation Concern potentially occurring in the area and their likelihood of occurrence.

Distribution and SCC data were obtained from the following information sources:

- Animal Demography Unit (ADU, 2020);
- Southern African Bird Atlas Project 2 (SABAP2, 2019);
- South African Reptile Conservation Assessment (SARCA) (sarca.adu.org);
- Atlas and Red list of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al,* 2014);
- Red Data Book of Birds (Birdlife South Africa, 2015);
- Atlas and Red Data Book of Frogs of South Africa (Minter *et al*, 2004);
- South Africa's official site for Species Information and National Red Lists (SANBI, 2022);
- The 2016 Red List of Mammals of South Africa (EWT, 2016); and
- The International Union for Conservation of Nature's Red List of Threatened Species. Version 2021-3 (IUCN, 2021).

2.2 Field Assessment

The wet season fieldwork (completed during February 2023) and sample sites were placed within targeted areas (i.e., target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which included the latest

applicable biodiversity datasets) available prior to the fieldwork. The focus of the fieldwork was therefore to maximise coverage and navigate to each target site in the field in order to perform a rapid vegetation and ecological assessment at each sample site. Emphasis was placed on sensitive habitats, especially those overlapping with the proposed project area.

2.2.1 Flora Assessment

Homogenous vegetation units were subjectively identified using satellite imagery and existing land cover maps. The floristic diversity and search for protected plants and flora SCC were conducted through timed meanders within representative habitat units delineated during the desktop fieldwork. Emphasis was placed on any sensitive habitats overlapping with the proposed project area.

The timed random meander method is a highly efficient method for conducting floristic analysis, specifically in detecting protected plants and flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling observed flora species lists and therefore gives a rapid indication of flora diversity. The timed meander search was performed based on the original technique described by Goff *et al* (1982). Suitable habitat for SCC were identified according to Raimondo *et al* (2009) and targeted as part of the timed meanders.

At each sample site notes were made regarding current impacts (e.g., roads, erosion etc.), and this included the subjective recording of dominant vegetation species and any sensitive features (e.g., wetlands, rock outcrops etc.). In addition, opportunistic observations were made while navigating through the project area.

Relevant field guides and texts consulted for identification purposes in the field during the surveys included the following:

- A field guide to Wildflowers (Pooley, 1998);
- Field Guide to the Wild Flowers of the Highveld (van Wyk & Malan, 1998);
- Orchids of South Africa (Johnson & Bytebier, 2015);
- Guide to the Aloes of South Africa (Van Wyk & Smith, 2014);
- Mesembs of the World (Smith *et al.,* 1998);
- Medicinal Plants of South Africa (Van Wyk *et al*., 2013);
- Freshwater Life: A field guide to the plants and animals of southern Africa (Griffiths & Day, 2016);
- Aquatic and Wetland Plants of Southern Africa (van Ginkel & Cilliers, 2020);
- Identification guide to southern African grasses. An identification manual with keys, descriptions and distributions (Fish *et al.,* 2015); and
- Field guide to trees of Southern Africa, Struik Publishers (Van Wyk & Van Wyk, 1997).

The field work methodology included the following survey techniques:

- Timed meanders;
- Sensitivity analysis based on structural and species diversity;
- Identification of protected floral species; and
- Identification of floral red-data or red-listed species (Species of Conservation Concern).

2.2.2 Fauna Assessment

The field survey component of the assessment utilised a variety of sampling techniques including, but not limited to, the following:

- Visual observations (involving the use of binoculars and specialist camera equipment);
- Active hand-searches, used for species that shelter in or under particular micro-habitats (typically rocks, exfoliating rock outcrops, fallen trees, leaf litter, bark etc.);
- Identification of tracks and signs; and
- Utilisation of local knowledge.

Relevant field guides and texts consulted for identification purposes in the field during the survey included the following:

- Roberts Bird Guide, Second Edition (Chittenden *et al.,* 2016);
- A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007);
- Field guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- A Complete Guide to the Frogs of Southern Africa (du Preez & Carruthers, 2009);
- The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005);
- Bats of Southern and Central Africa (Monadjem *et al.,* 2010);
- Spiders of Southern Africa (Leroy & Leroy, 2003); and
- Tortoises, Terrapins, and Turtles of Africa (Branch, 2008).

2.3 Site Ecological Importance

The different habitat types within the assessment area were delineated and identified based on observations during the field assessment as well as information from available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of Species of Conservation Concern (SCC) and their ecosystem processes.

Site Ecological Importance (SEI) is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present on the site) and Receptor Resilience (RR) (its resilience to impacts).

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor. The criteria for the CI and FI ratings are provided in Table 2-1 and Table 2-2, respectively.

Table 2-1 Summary of Conservation Importance criteria

Conservation Importance	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global EOO of < 10 km^2. Any area of natural habitat of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent) of natural habitat of an EN ecosystem type. Globally significant populations of congregatory species (> 10% of global population).

Conservation Importance	Fulfilling Criteria
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2. 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. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.
Low	No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.
Very Low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

Table 2-2 Summary of Functional Integrity criteria

Functional Integrity	Fulfilling Criteria
Very High	Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts with no signs of major past disturbance.
High	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 with no signs of major past disturbance and good rehabilitation potential.
Medium	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	Small (> 1 ha but < 5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
Very Low	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

BI can be derived from a simple matrix of CI and FI as provided in Table 2-3.

Table 2-3 Matrix used to derive Biodiversity Importance from Functional Integrity and Conservation Importance

Biodiversity Importance		Conservation Importance				
		Very high	**High**	**Medium**	**Low**	**Very low**
Functional	**Very high**	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low

	Biodiversity Importance	Conservation Importance				
		Very high	High	Medium	Low	Very low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor as summarised in Table 2-4.

Table 2-4 Summary of Receptor Resilience criteria

Resilience	Fulfilling Criteria
Very High	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
Low	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.
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

After the determination of the BI and RR, the SEI can be ascertained using the matrix as provided in Table 2-5.

Table 2-5 Matrix used to derive Site Ecological Importance from Receptor Resilience and Biodiversity Importance

	Site Ecological Importance	Biodiversity Importance				
		Very high	High	Medium	Low	Very low
Receptor Resilience	Very Low	Very high	Very high	High	Medium	Low
	Low	Very high	Very high	High	Medium	Very low
	Medium	Very high	High	Medium	Low	Very low
	High	High	Medium	Low	Very low	Very low
	Very High	Medium	Low	Very low	Very low	Very low

Interpretation of the SEI in the context of the proposed activities is provided in Table 2-6.

Table 2-6 Guidelines for interpreting Site Ecological Importance in the context of the proposed activities

Site Ecological Importance	Interpretation in relation to proposed development activities
Very High	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.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

The SEI evaluated for each taxon can be combined into a single multi-taxon evaluation of SEI for the assessment area. Either a combination of the maximum SEI for each receptor should be applied, or the SEI may be evaluated only once per receptor but for all necessary taxa simultaneously. For the latter, justification of the SEI for each receptor is based on the criteria that conforms to the highest CI and FI, and the lowest RR across all taxa.

3 Receiving Environment

3.1 Desktop Spatial Assessment

Table 3-1 presents a summative breakdown of the ecological features considered and the associated relevance that each has to the project area. Where a feature is regarded as relevant it is considered an ecologically important landscape feature and discussed further as part of the sub-sections that follow.

Table 3-1 Relevance of the desktop spatial features examined

Desktop Information Considered	Relevance	Section
Ecosystem Threat Status	Relevant – Overlaps with an Endangered Ecosystem.	3.1.1
Ecosystem Protection Level	Relevant – Overlaps with a Poorly Protected Ecosystem.	3.1.2
Provincial Conservation Plan	Irrelevant – The project area does not overlap with any conservation areas.	3.1.3
Protected Areas	Relevant – The Blesbokspruit Conservation Area and the Marivale Nature Reserve is located 4 km east of the project area.	3.1.4
National Protected Areas Expansion Strategy	Irrelevant – The project area does not overlap with any NPAES areas.	3.1.5
Important Bird and Biodiversity Areas	Relevant – Located 4 km from east from the Blesbokspruit IBA.	3.1.6
South African Inventory of Inland Aquatic Ecosystems	Relevant – The 500 m Regulated Area overlaps with LC and CR wetlands.	3.1.7
National Freshwater Priority Area	Relevant – The 500 m Regulated Area overlaps with several unclassified FEPA wetlands.	3.1.8
Strategic Water Source Areas	Irrelevant – The project area does not overlap with any SWSAs.	-
Powerline Corridor	Relevant – The project area overlaps with the Central corridor.	3.1.9
Renewable Energy Development Zones	Irrelevant – Does not overlap with any REDZs.	-

3.1.1 Ecosystem Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset, the proposed project area overlaps with a EN ecosystem (Figure 3-1).

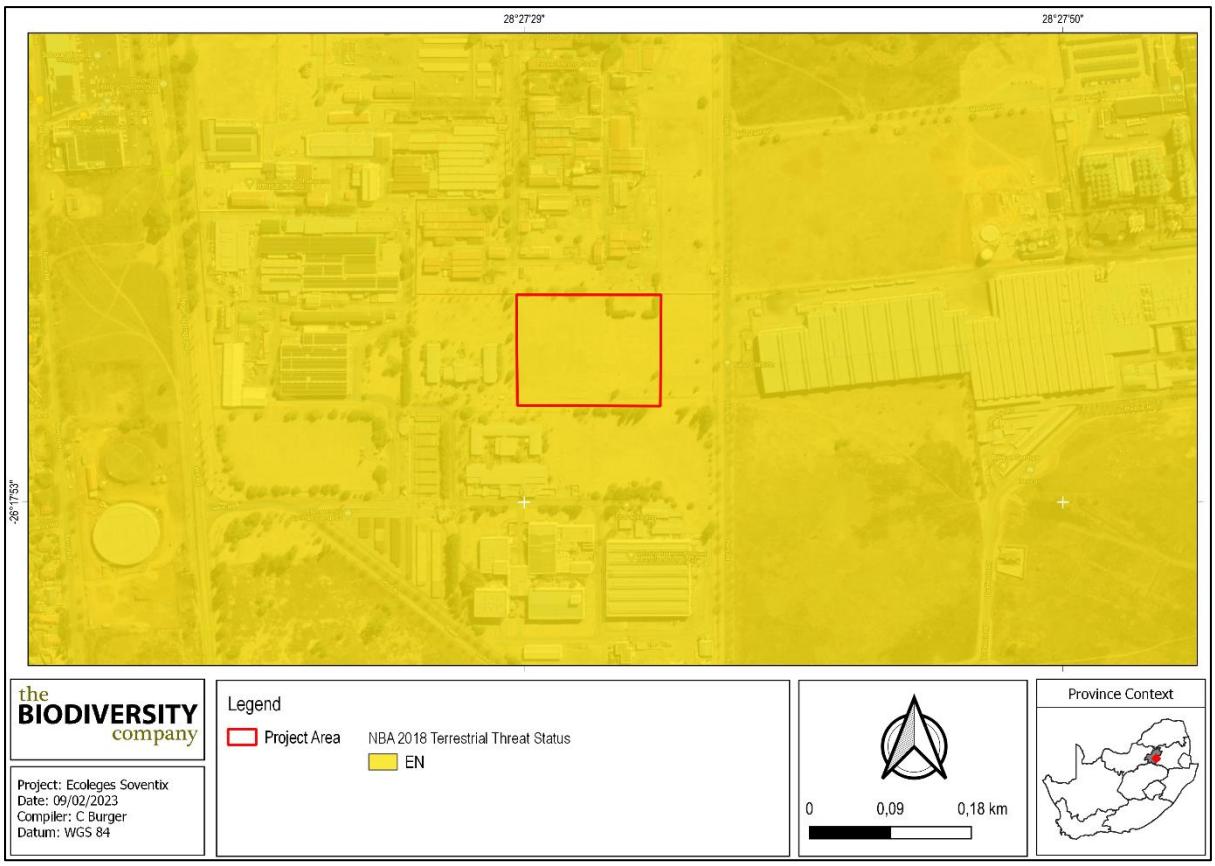


Figure 3-1 Map illustrating the ecosystem threat status associated with the project area.

3.1.2 Ecosystem Protection Level

This is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed project overlaps with a Poorly Protected ecosystem (Figure 3-2).

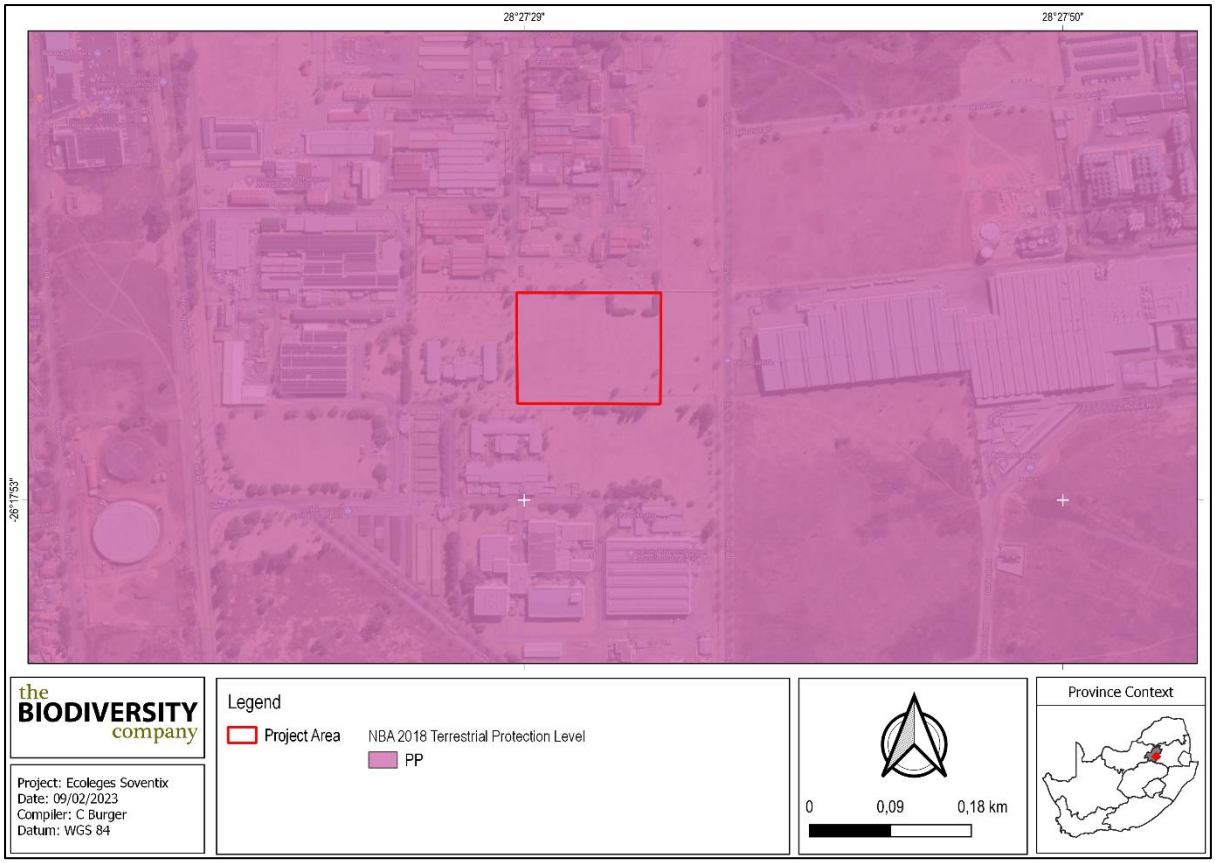


Figure 3-2 Map illustrating the ecosystem protection level associated with the project area

3.1.3 Gauteng Conservation Plan

The Gauteng Conservation Plan (Version 3.3) (GDARD, 2014b) classified areas within the province on the basis of its contribution to reach the conservation targets within the province. These areas are classified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) to ensure sustainability in the long term. The CBAs are classified as either 'Irreplaceable' (must be conserved), or 'Important'.

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met.

Figure 3-3 shows the project area superimposed on the Gauteng Conservation Plan (GDARD, 2014b). The project area does not overlap with any CBA or ESA.

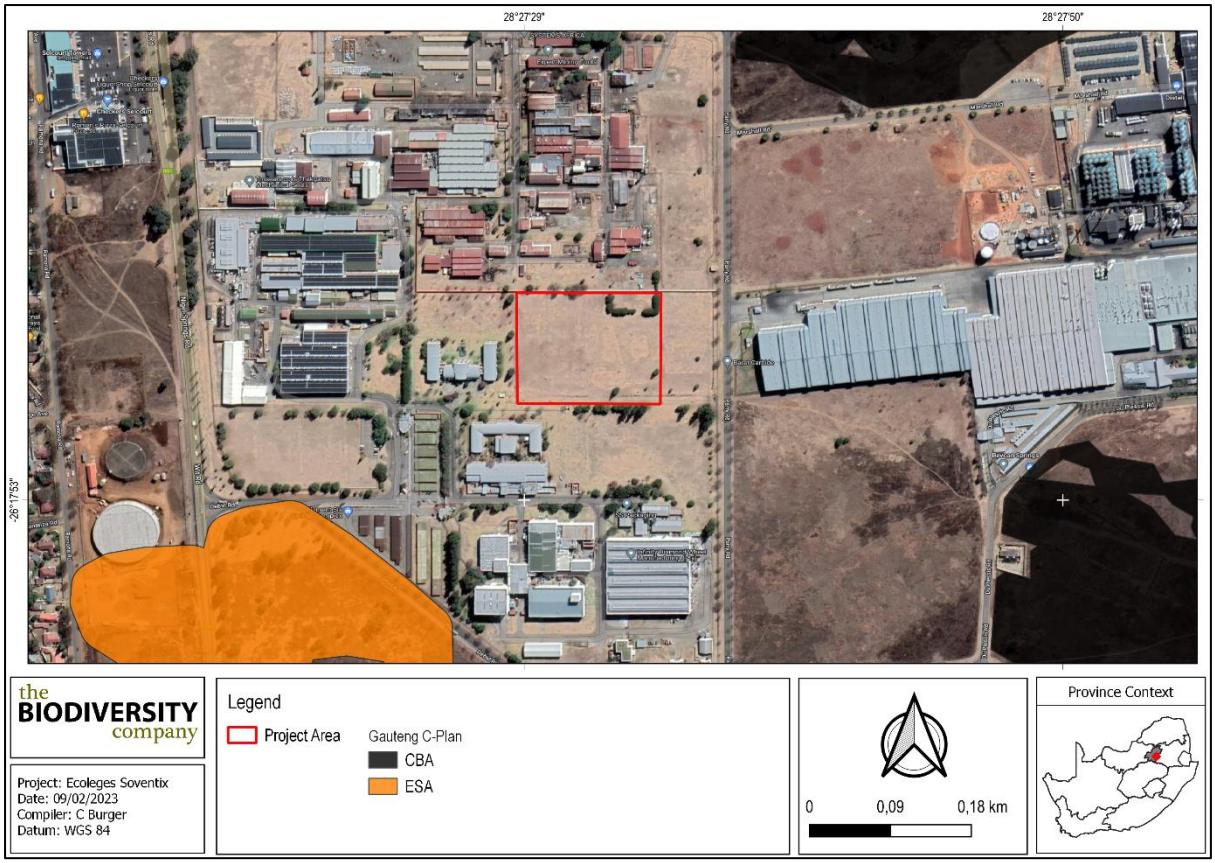


Figure 3-3 Map illustrating the project area in relation to the Gauteng Conservation Plan

3.1.4 Protected Areas

According to the spatial data for SAPAD (2022) and SACAD (2022), the Blesbokspruit Conservation Area and the Marivale Nature Reserve is located 4 km east of the project area (Figure 3-4).

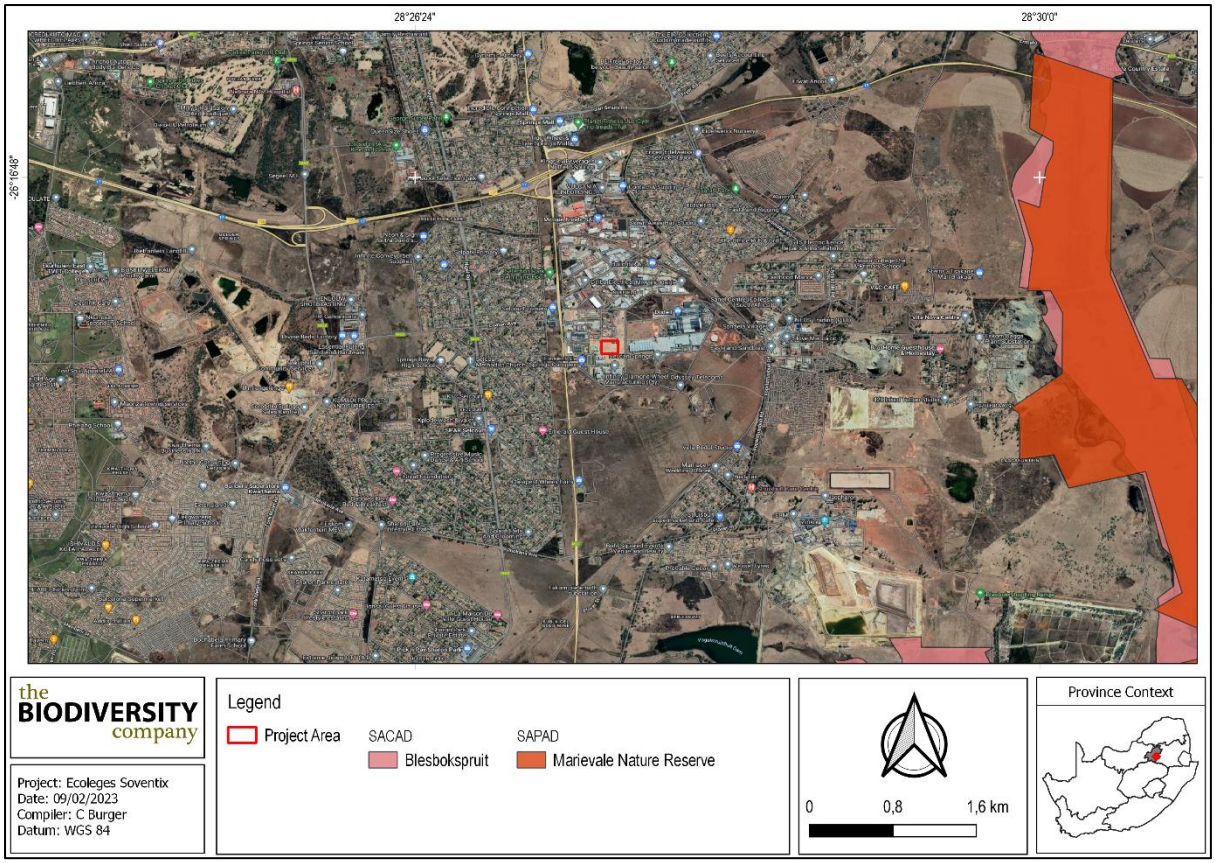


Figure 3-4 Map illustrating the project area in relation to the nearest protected areas

3.1.5 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2017 (NPAES) were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for finescale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2017). The project area does not overlap with any NPAES areas (Figure 3-5).

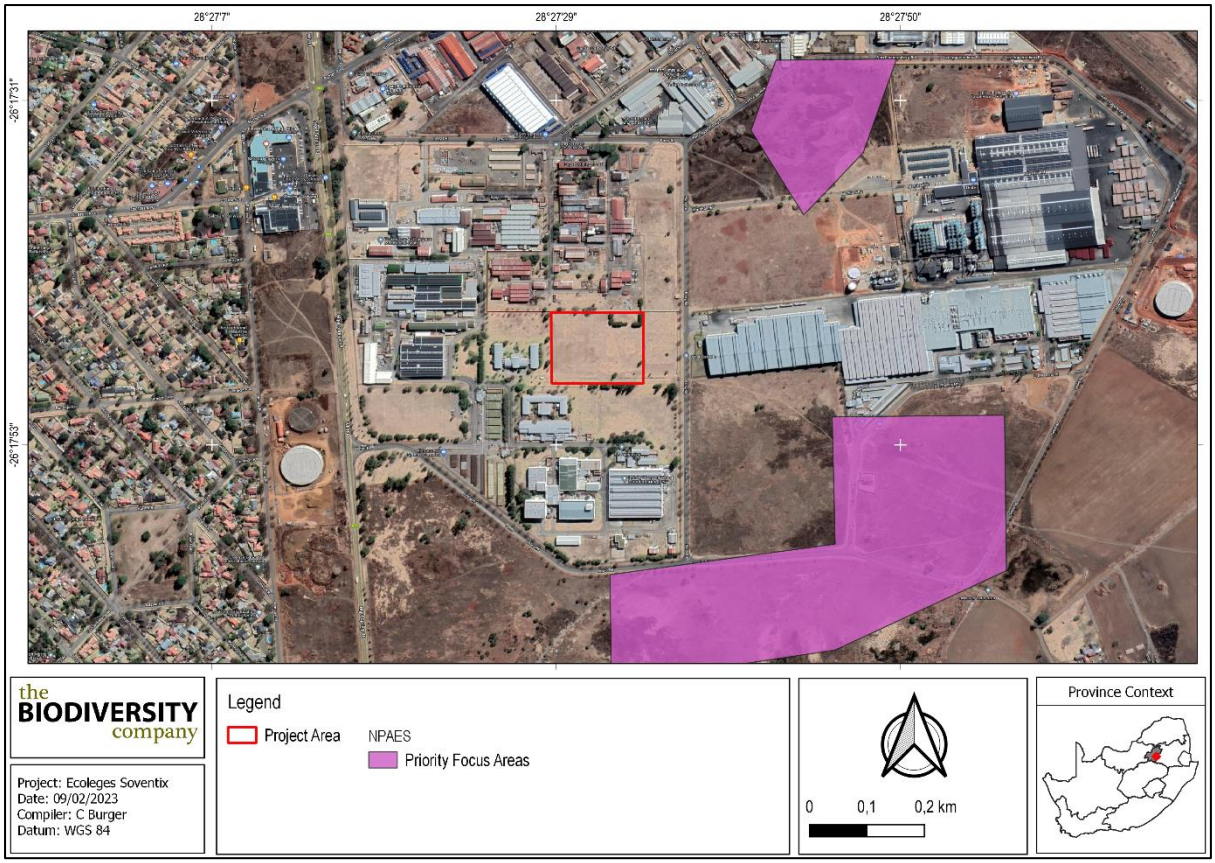


Figure 3-5 The project area in relation to the National Protected Area Expansion Strategy

3.1.6 Important Bird and Biodiversity Area

Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife, 2017). The project area is situated 4 km west of the nearest IBA, the Blesbokspruit, (Figure 3-6).

Figure 3-6 The project area in relation to the Blesbokspruit IBA

3.1.7 Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al.,* 2019). The project area's 500m Regulated Area overlaps with LC and CR wetlands (Figure 3-7).

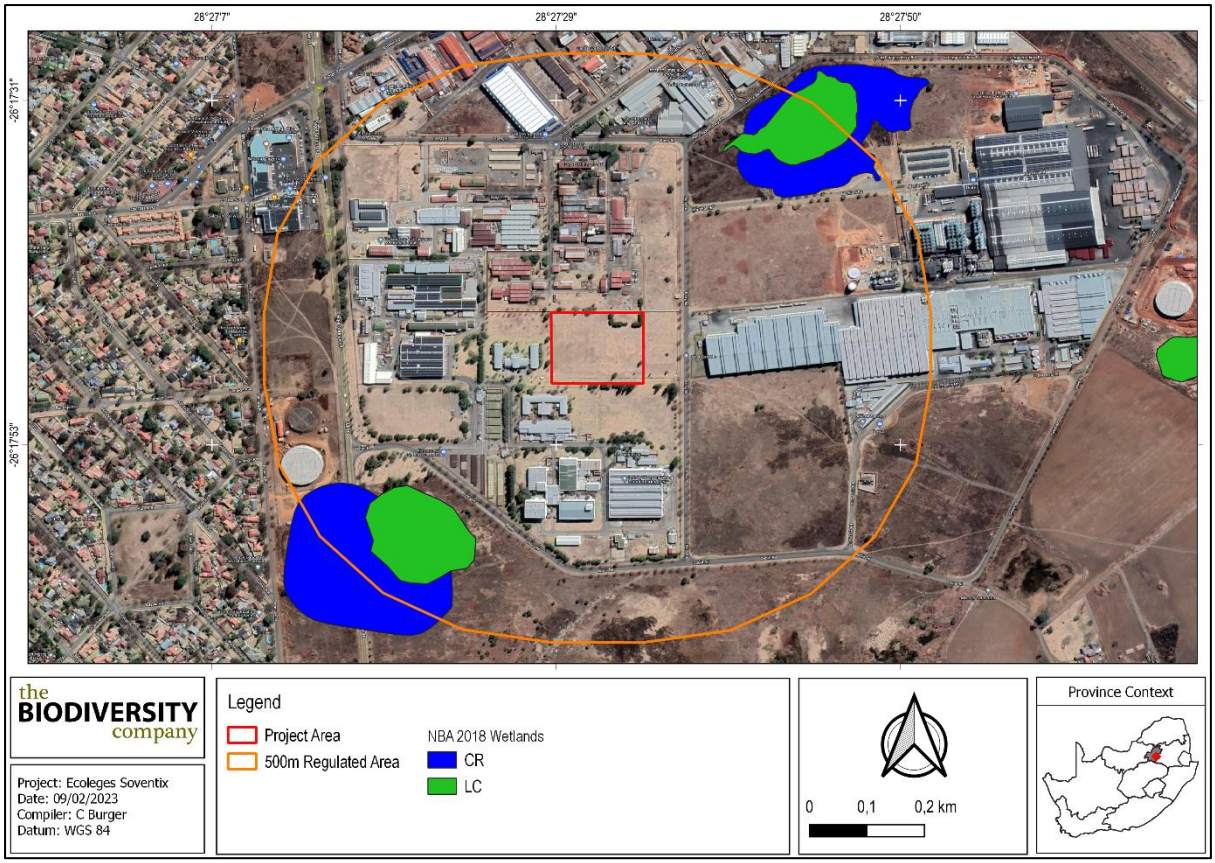


Figure 3-7 Map illustrating the project area in relation to the South African Inventory of Inland Aquatic Ecosystems

3.1.8 National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.,* 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.,* 2011).

Figure 3-8 shows that the project area's 500m Regulated Area overlaps with several unclassified FEPA wetlands.

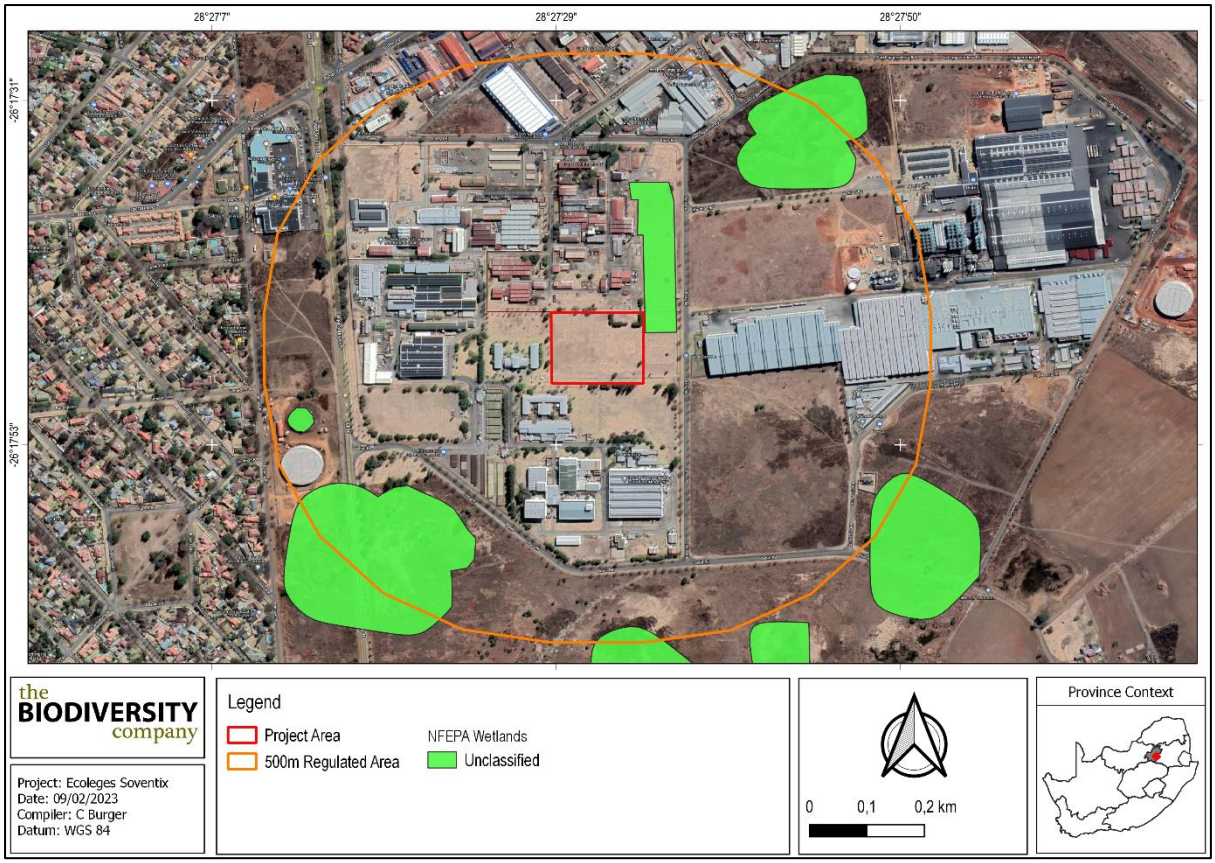


Figure 3-8 The project area in relation to the National Freshwater Ecosystem Priority Areas

3.1.9 Strategic Transmission Corridors (EGI)

On the 16 February 2018 Minister Edna Molewa published Government Notice No. 113 in Government Gazette No. 41445 which identified 5 strategic transmission corridors important for the planning of electricity transmission and distribution infrastructure as well as procedure to be followed when applying for environmental authorisation for electricity transmission and distribution expansion when occurring in these corridors.

On 29 April 2021, Minister Barbara Dallas Creecy published Government Notice No. 383 in Government Gazette No. 44504, which expanded the eastern and western transmission corridors and gave notice of the applicability of the application procedures identified in Government Notice No. 113, to these expanded corridors. More information on this can be obtained from https://egis.environment.gov.za/egi. Figure 3-9 indicates that the project area falls within the Central EGI corridor.

Figure 3-9 Map illustrating the project in relation to the Strategic Transmission Corridors

3.1.10 Flora Assessment

This section is divided into a description of the vegetation type expected under natural conditions and the expected flora species.

3.1.10.1 Vegetation Type

The project area is situated within the Grassland biome.

Grassland biome

In South Africa, the Grassland Biome occurs mainly on the high central plateau (Highveld), the inland areas of the eastern seaboard, the mountainous areas of KwaZulu-Natal (KZN) and the central parts of the Eastern Cape (Mucina & Rutherford, 2006). However, grasslands can also be found below the Drakensberg, both in KZN and the Eastern Cape, with floristic links to the high-altitude Drakensberg grassland (Mucina & Rutherford, 2006). The topography is mainly flat to rolling, but also includes mountainous regions and the Escarpment (Mucina & Rutherford, 2006). Altitude is mostly from about 300 to 400 m.a.s.l., but reaches up to 3 482 m on Thabana Ntlenyana, the highest mountain in southern Africa (Mucina & Rutherford, 2006).

In terms of climate, the temperate grasslands of the Highveld in South Africa have cold and dry conditions, with rainfall during the summer (which can sometimes be a strong summer rainfall) and winter drought (Mucina & Rutherford, 2006). Frost is common and there is a high risk of lightning-induced fires (Mucina & Rutherford, 2006).

In terms of vegetation structural composition, grasslands are characteristically dominated by grasses of the Poaceae Family (Mucina & Rutherford, 2006). On the Lesotho Plateau and highest peaks of the

Drakensberg, grassland plants xeromorphic characteristics due to the severity of the climate in these places (Mucina & Rutherford, 2006).

On a fine-scale vegetation type, the project area overlaps with the Tsakane Clay Grassland (Figure 3-10).

Figure 3-10 Map illustrating the vegetation type associated with the project area.

The Tsakane Clay Grassland is characterised by flat to slightly undulating plains and low hills. Vegetation is short, dense grassland dominated by a mixture of common highveld grasses such as *Themeda triandra, Heteropogon contortus, Elionurus muticus* and a number of *Eragrostis* species (Mucina & Rutherford, 2006). Most prominent forbs are of the families Asteraceae, Rubiaceae, Malvaceae, Lamiaceae and Fabaceae. Disturbance often leads to an increase in the abundance of the grasses *Hyparrhenia hirta* and *Eragrostis chloromelas* (Mucina & Rutherford, 2006).

Important Taxa (d = dominant)

Graminoids: *Brachiaria serrata (d), Cynodon dactylon (d), C. hirsutus (d), Digitaria ternata (d), Elionurus muticus (d), Eragrostis chloromelas (d), E. patentipilosa (d), E. plana (d), E. racemosa (d), Heteropogon contortus (d), Hyparrhenia hirta (d), Microchloa caffra (d), Setaria sphacelata (d), Themeda triandra (d), Trachypogon spicatus (d), Abildgaardia ovata, Andropogon schirensis, Cymbopogon caesius, Diheteropogon amplectens, Melinis nerviglumis, Panicum gilvum, Setaria nigrirostris.*

Herbs: *Acanthospermum australe, Ajuga ophrydis, Eriosema salignum, Euryops transvaalensis subsp. transvaalensis, Gerbera viridifolia, Helichrysum nudifolium var. nudifolium, H. rugulosum, Hermannia depressa, Lotononis macrosepala, Nidorella hottentotica, Pentanisia prunelloides subsp. latifolia, Peucedanum caffrum, Rotheca hirsuta, Selago paniculata, Senecio coronatus, S. inornatus, Sonchus nanus, Vernonia oligocephala.*

Geophytic Herbs: *Aspidoglossum ovalifolium, Hypoxis rigidula var. pilosissima.*

Semiparasitic Herb: *Striga asiatica*.

Low Shrubs: *Anthospermum rigidum* subsp. *pumilum*, *Chaetacanthus setiger*, *Tephrosia capensis* var. *acutifolia*. Semiparasitic

Shrub: *Thesium impeditum*.

Conservation Status

This vegetation is classified as EN, with a conservation target of 24% (Mucina & Rutherford, 2006). Only 1.5% conserved in statutory reserves (Suikerbosrand, Olifantsvlei, Klipriviersberg, Marievale) and a small portion also in private nature reserves (Mucina & Rutherford, 2006).

3.1.10.2 Expected Flora Species

Based on the Plants of Southern Africa (BODATSA-POSA, 2019) database, over 400 plant species have the potential to occur within the project area and its surroundings. Of these species, nine are listed as being an SCC. Table 3-2 below outlines the SCC species identified through the desktop assessment. All species have a low likelihood of occurrence based on the transformed nature of the project area and thus lack of suitable habitat.

Table 3-2 Plant Species of Conservation Concern potentially occurring in the project area

Family	Taxon	Author	Conservation Status	Likelihood of Occurrence
Aizoaceae	*Lithops lesliei* subsp. *lesliei*	(N.E.Br.) N.E.Br.	NT	Low
Apiaceae	*Alepidea peduncularis*	Steud. ex A.Rich.	DD	Low
Apocynaceae	*Pachycarpus suaveolens*	(Schltr.) Nicholas & Goyder	VU	Low
Asphodelaceae	*Kniphofia typhoides*	Codd	NT	Low
Euphorbiaceae	*Acalypha caperonioides* var. *caperonioides*	Baill.	DD	Low
Fabaceae	*Indigofera hybrida*	N.E.Br.	VU	Low
Hyacinthaceae	*Drimia elata*	Jacq. ex Willd.	DD	Low
Iridaceae	*Gladiolus robertsoniae*	F.Bolus	NT	Low
Orchidaceae	*Habenaria bicolor*	Conrath & Kraenzl.	NT	Low

3.1.11 Fauna Assessment

Largely based on the South African Bird Atlas Project Version 2 (SABAP2, 2017), IUCN Digital Distribution Maps (IUCN, 2016), and the Animal Demography Unit (ADU, 2020) databases, Table 3-3 summarises the total number of animal species that have the potential to occur in or around the project area, and the corresponding number of SCC. This excludes any species that only occur within protected areas.

Table 3-3 Total number of potential fauna species present, and corresponding Species of Conservation Concern (SCC)

Fauna Type	Total Potential No.	Total SCC
Avifauna	285	14
Mammals	84	17
Herpetofauna (Reptiles and Amphibians)	64	3

Of the fourteen avifaunal SCC, two have a moderate likelihood of occurring in the vicinity of the project area, although they are not expected within the project footprint; *Oxyura maccoa* (Maccoa Duck), and

Tyto capensis (African Grass-Owl). The other twelve SCC are unlikely to occur within the project area due to a lack of suitable habitat and the associated transformed nature of the project area and surrounds.

Of the seventeen total mammal SCC listed, all have a low likelihood of occurrence based on a lack of suitable habitat across the project area.

No reptile SCC are expected to occur within the project area while one of the two amphibian SCC; *Pyxicephalus adspersus* (African bullfrog) have a low-moderate likelihood of occurring in the vicinity of the project area, although it is not expected within the project footprint based on the lack of suitable habitat.

3.2 Field Survey

This section details the observations recorded during an on-site field survey conducted to ground truth the floral, faunal, and habitat features of the project area. These observations pertain to the current state of the area as of February 2023.

3.2.1 Terrestrial Fauna and Flora

During the terrestrial survey the floral and faunal communities within the project area were assessed and photographs were captured, some of which are provided in this section of the report. For ease of reading, the observations and discussions pertaining to the floral and the faunal species recorded are separated below.

3.2.1.1 Flora and Vegetation

During the field assessment one habitat unit was identified and included transformed habitat that encompasses the entire project area.

Transformed Habitat

The project area comprised of modified habitat associated with the existing Element Six Facility (Figure 3-11). As such the area was characterised by an open field of short, maintained lawn, alien and invasive trees and fencing. The transformed area has little to no remaining natural vegetation due to land transformation that has taken place to accommodate the adjacent anthropogenic activities, predominantly industrial activities. Indigenous flora observed comprised of *Hypoxis hemerocallidea, Selago densiflora, Olea europaea* and *Searsia lancia* (Figure 3-12). While alien and invasive species predominantly comprised of *Melaleuca citrina* (Crimson Bottlebrush) which is listed as a Category 3 AIP in terms of the NEMBA (Figure 3-13).

The modified habitat exists in a constant disturbed state as it cannot recover to a more natural state unless through human intervention. No protected or SCC flora species were observed in this habitat unit and is not expected to occur due to the modified nature of the majority of the area.

Figure 3-11 Modified habitat associated with the project area

Figure 3-12 Indigenous flora species observed: A) Olea europaea; B) Selago densiflora and C) Hypoxis hemerocallidea

Figure 3-13 Alien and invasive tree species (Melaleuca citrina) observed across the project area

3.2.1.2 Fauna

Due to modified character of the project area and surrounds, the species richness of the avifauna community was considered to be low, and only common species that are well-adapted to urban areas were observed. These included species such as *Burhinus capensis* (Spotted Thick-Knee), *Vanellus coronatus* (Crowned Lapwing) and *Spilopelia senegalensis* (Laughing Dove) (Figure 3-14). No avifauna SCC were observed, and due to the modified character of the area it is unlikely that any avifauna SCC will occur.

Mammal activity was low and evidence of only one mammal species, *Lepus saxatilis* (Scrub Hare) (Figure 3-15), was observed during the assessment and can most likely be attributed to the fact that the project area is situated within an industrial area and is fenced off from adjacent areas. No herpetofauna species (reptiles and amphibians) were observed within the project area. However, there is the possibility of some common herpetofauna species being present due to suitable habitat in the vicinity of the project area. Certain reptile and amphibian species are secretive and longer-term surveys are required in order to ensure adequate sampling. Due to the project area being situated in an industrial area and the limited suitable habitat found within the project area it is unlikely that any mammal or herpetofauna SCC will occur nearby.

Figure 3-14 *Photographs illustrating some of the avifauna recorded across the project area. A) Burhinus capensis (Spotted Thick-Knee) and B) Vanellus coronatus (Crowned Lapwing).*

Figure 3-15 Evidence of mammal species, Lepus saxatilis (Shrub hare), observed

3.3 Habitat Survey and Sensitivity Verification

The main habitat types identified across the project area were initially identified and pre-delineated largely based on aerial imagery from 2022. These habitat types were then refined based on the field coverage and data collected during the survey. A single habitat unit was delineated for the project area: transformed habitat.

Based on the criteria provided in section 2.3 of this report, the delineated habitat type has been allocated a sensitivity category, or SEI, and this breakdown is presented in Table 3-4 below. In order to identify and spatially present sensitive features in terms of the relevant specialist discipline, the sensitivity of the habitat type delineated within the project area is mapped in Figure 3-16.

It is important to note that this map does not replace any local, provincial, or national government legislation relating to these areas or the land use capabilities or sensitivities of these environments.

Table 3-4 Site Ecological Importance summary of the habitat type delineated within the project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Modified	Low - < 50% of receptor contains natural habitat with limited potential to support SCC.	Low - Several major current negative ecological impacts.	Low	Very High	Very Low

Consider the following guidelines when interpreting SEI in the context of any proposed development or disturbance activities:

- Very Low: Minimisation mitigation – Development activities of medium to high impact acceptable and restoration activities may not be required.

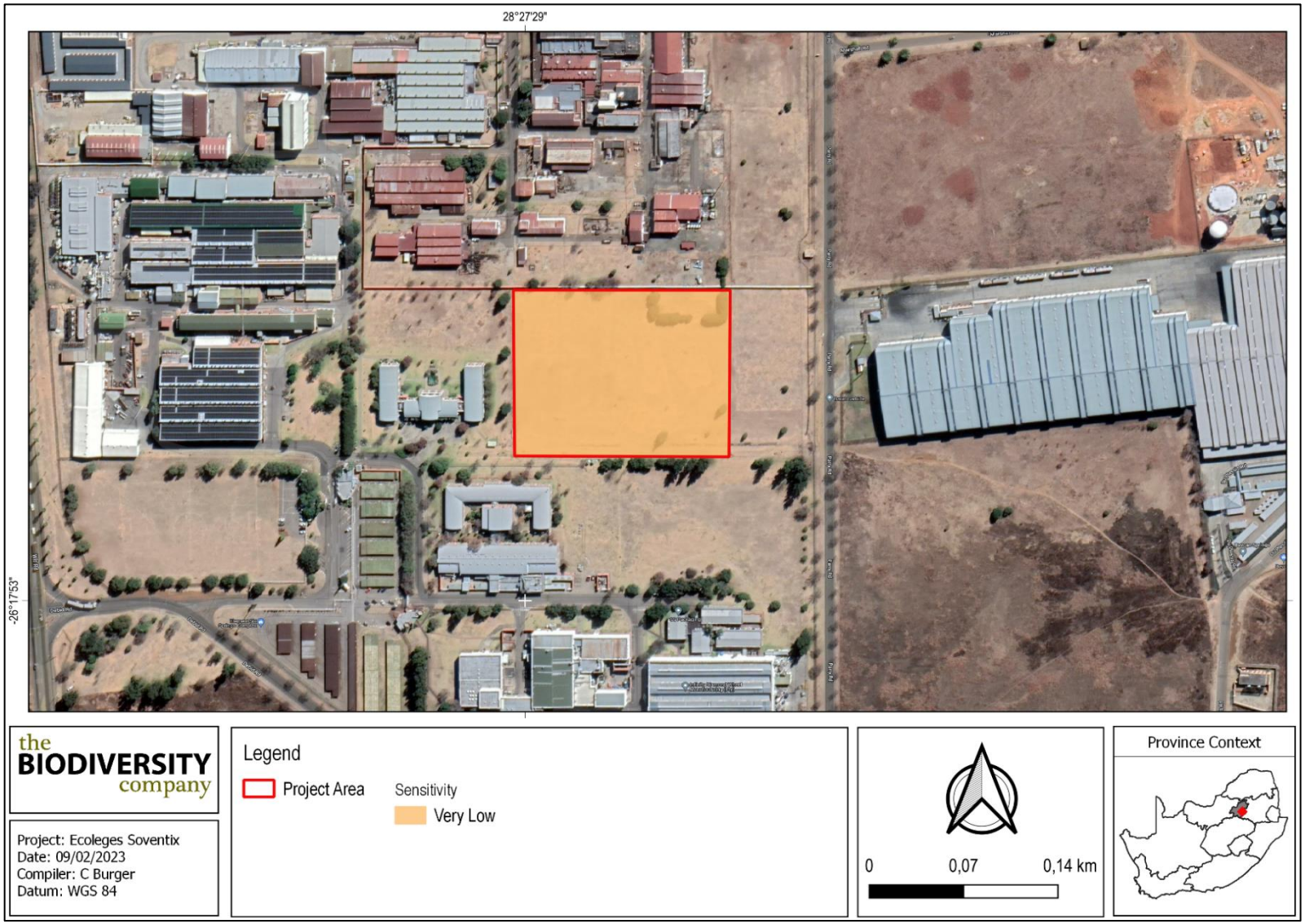
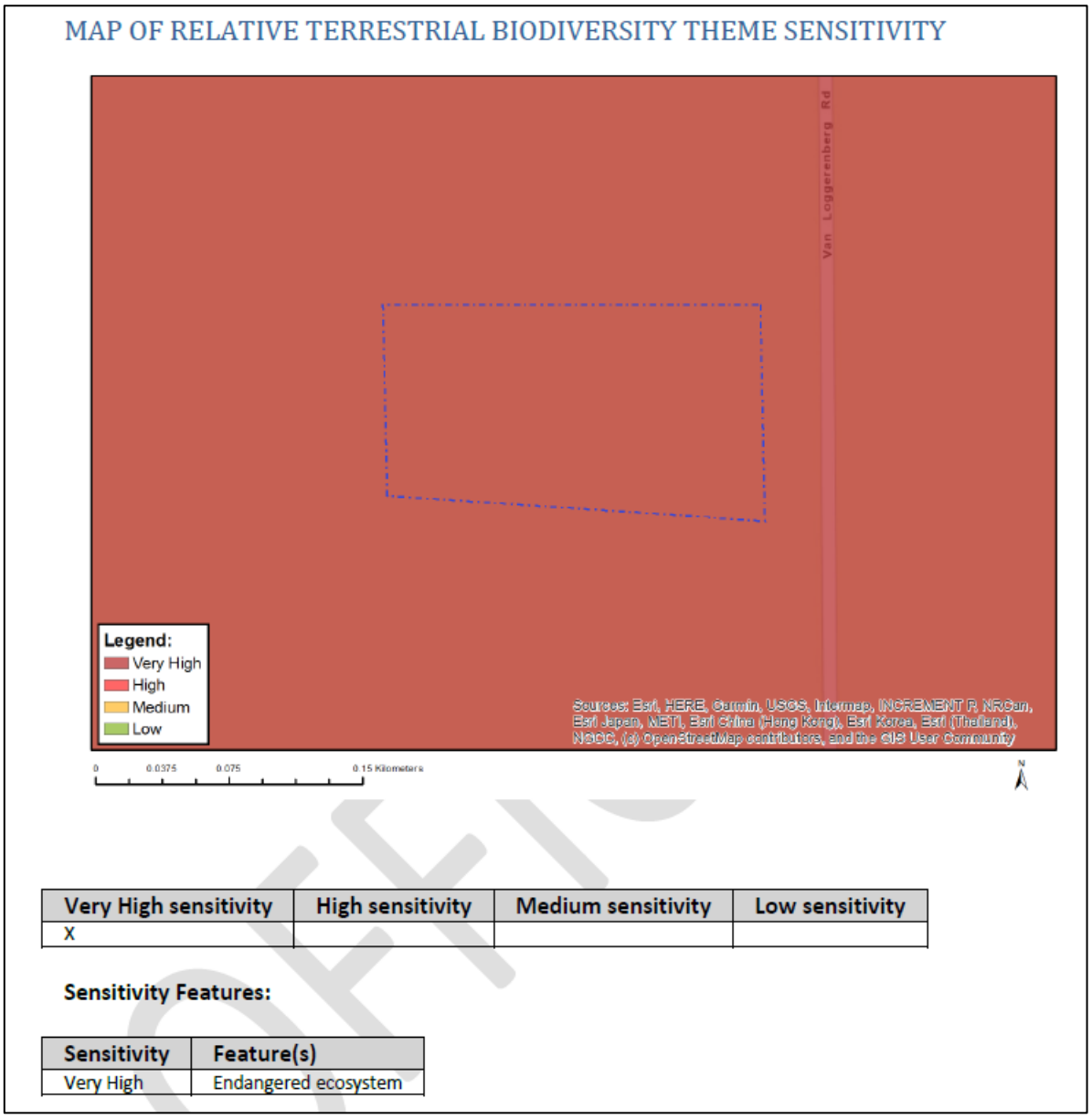


Figure 3-16 Map illustrating the Site Ecological Importance of the project area

The terrestrial biodiversity theme sensitivity as indicated in the screening report (compiled by the National Web based Environmental Screening Tool) was derived to be 'Very High' (Figure 3-17), mainly due to the fact that the project area lies within an EN ecosystem.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Endangered ecosystem

Figure 3-17 Biodiversity Sensitivity of the project area according to the Screening Report

The completion of the terrestrial desktop and field studies disputes the 'Very High' sensitivity presented by the screening report. As discussed above, the project area is largely transformed and as such is assigned a sensitivity rating of 'Very Low'.

The screening report classified the animal species theme sensitivity as being of a 'Medium' sensitivity and the plant species theme as 'Low' sensitivity. Following the findings of the field survey, both the animal and plant species themes may be classified as having 'Low' sensitivities. This is because there is very little suitable habitat available to support the occurrence of any SCC within the project area and its isolation from natural habitats within the broader landscape.

4 Biodiversity Risk Assessment

4.1 Present Impacts to Biodiversity

Considering that anthropogenic activities have historically taken place throughout most of the region, and continue to do so, several significantly negative impacts to biodiversity were observed within and adjacent to the project area (Figure 4-1). These include:

- Historic land modification largely in the form of roads and powerline infrastructure, and the associated land clearing and edge effects;
- Transformation of land to accommodate industrial activities;
- Minor and major roads (and associated vehicle traffic and the possibility of wildlife road mortalities); and
- Alien Invasive Plant infestations.

Figure 4-1 *Photograph illustrating current negative impacts associated with the project area: A) Alien and invasive tree species; B) Fencing and C) Vegetation clearing and servitudes*

4.2 Loss of Irreplaceable Resources

The proposed activities are likely to be of a low impact and it is expected that there will be no loss of irreplaceable resources because of the modified character of the project area.

Most of the project area comprised of transformed habitat, which has been impacted upon by anthropogenic related activities and retains a very low level of functionality. The recommendations put forward by the specialist at the end of this report must, however, still be implemented and mitigations must be put in place and implemented to prevent the total destruction and loss of all local natural resources in the vicinity of the project area.

5 Proposed Impact Management Plan

The aim of the Management Outcomes is to present mitigation actions in such a way that they can be incorporated into the Environmental Management Programme (EMPr) for the project, which should in turn allow for a more successful implementation and auditing of the mitigations and monitoring guidelines. Table 5-1 presents the recommended mitigation measures and the respective timeframes, targets, and performance indicators related to the terrestrial components.

The focus of mitigation measures is to reduce the significance of expected impacts associated with the development and thereby to:

- Prevent the further loss and fragmentation of vegetation communities within the CBA/ESA areas in the vicinity of the project area;
- Reduce the negative fragmentation effects of the development and enable the safe movement of fauna species; and
- Prevent the direct and indirect loss and disturbance of floral and faunal species and communities (including any potential Species of Conservation Concern).

Special attention must be paid to the ‘Vegetation and Habitats’ and ‘Fauna’ sections below as these sections provide recommended and important mitigation measures to be implemented.

Table 5-1 Mitigation measures from the terrestrial assessment; including requirements for timeframes, roles, and responsibilities

Management outcome: Vegetation and Habitats				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
It is recommended that areas to be developed be specifically demarcated so that during the construction/activity phase, only the demarcated areas be impacted upon.	Planning Phase, Construction Phase	Project manager, Environmental Officer	Construction footprint	During phase
All requirements and recommendations regarding the wetland areas found within the 500 m Regulated Area and their associated buffer zones as per the TBC Wetland Assessment (2023) must be adhered to.	Planning Phase, Construction Phase	Project manager, Environmental Officer	Construction footprint	During phase
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should not be fragmented or disturbed further.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing
All vehicles and personnel must make use of existing roads and walking paths, especially construction/operational vehicles.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	During phase
All laydown, chemical toilets etc. should be restricted to 'Very Low' sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas and material storage & placement	During phase
Areas that are denuded during construction that are not within the proposed footprint area need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds and to support the adjacent habitat. This will also reduce the likelihood of encroachment by Alien Invasive Plant species.	Closure Phase/Rehabilitation phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
It must be made an offence for any staff to take/bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	Life of operation	Project manager, Environmental Officer	Any instances	Ongoing
Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.	Life of operation	Environmental Officer & Contractor	Leaks and spills	Ongoing

A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. • **The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site.** • **Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use.** • **No servicing of equipment is to take place on site unless necessary.** • **All contaminated soil shall be treated in situ or removed and be placed in containers.** • **It is important to appropriately contain any diesel storage tanks and/or machinery spills (e.g., accidental spills of hydrocarbons, oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.**	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping	Ongoing

Management outcome: Fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this. These actions are illegal in terms of provincial environmental legislation.	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
A qualified environmental control officer must be on site when clearing begins. The area must be walked though by a qualified ecologist prior to construction to ensure that no faunal species remain in the habitat and get killed. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated.	Pre-Construction, Construction Phase	Environmental Officer, Contractor	Presence of any floral or faunal species	During phase
Any holes/deep excavations must be dug in a progressive manner in order to allow burrowing animals time to move off and to prevent trapping. Should the holes remain open overnight they must be covered temporarily to ensure no fauna species fall in.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of trapped animals and open holes	Ongoing

The areas to be developed (or activity areas) must be specifically demarcated to prevent the movement of staff or equipment/vehicles into the surrounding environments. Signs must be put up to enforce this.	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into surrounding areas	During phase
The duration of the construction should be minimized to as short a term as possible, to reduce the period of disturbance on fauna.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Construction timeframe	During phase
Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (yellow) lights should be used wherever possible.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light	During phase
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. Speed bumps should be built to force slow speeds.	Construction Phase	Health and Safety Officer	Compliance to the training	During phase
Noise must be kept to a minimum during the evenings/ at night to minimize all possible disturbances to amphibian species and nocturnal mammals.	Construction/Operational Phase	Environmental Officer	Noise levels	Ongoing
Signs must be put up in order to show the importance and sensitivity of surrounding areas and their functions. This especially pertains to the adjacent wetland areas.	Life of operation	Environmental Officer	Presence and condition of signs	Ongoing
Only use environmentally friendly dust suppressant products.	Construction and operation	Environmental Officer & Contractor, Engineer	Presence of chemicals in and around the project area	Ongoing

Management outcome: Alien Vegetation and Fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
The implementation of an Alien Invasive Plant management plan is very important, especially because of the invasive species identified on site which, if left unchecked, will continue to grow and spread prolifically leading to further and more significant deterioration to the health of the natural environment within the project area.	Life of operation	Project manager, Environmental Officer & Contractor	Assess and control presence and encroachment of alien vegetation	Quarterly monitoring

The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.	Construction/Operational Phase	Project manager, Environmental Officer & Contractor	Footprint Area	During phase
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. A location specific waste management plan must be put in place to limit the presence of rodents and pests and waste must not be allowed to enter surrounding areas.	Life of operation	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation
A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests.	Life of operation	Environmental Officer & Health and Safety Officer	Evidence or presence of pests	Life of operation
Management outcome: Dust				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
Dust-reducing mitigation measures must be put in place and must be strictly adhered to, particularly for all dirt roads and any earth dumps. Only environmentally friendly suppressants may be used to avoid the pollution of water sources. Speed limits must be put in place to reduce erosion, and speed bumps should also be constructed.	Construction Phase and Life of operation	Contractor	Dustfall	Ongoing, as per a dust monitoring program
Management outcome: Waste Management				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. • **Refuse bins must be emptied and secured;** • **Recycling must be encouraged;** • **Temporary storage of domestic waste shall be in covered waste skips; and** • **Maximum domestic waste storage period must be 10 days.**	Life of operation	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation

Any litter, spills, fuels, chemical and human waste in and around the project area must be removed and disposed of timeously and responsibly.	Construction/Closure Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Daily
It must be made an offence to litter or dump any material outside of specially demarcated and managed zones. Signs and protocols must be established to explain and enforce this.	Life of operation	Contractor, Environmental Officer & Health and Safety Officer	Presence of Waste and Dumping	Daily, Ongoing
A minimum of one toilet must be provided per 10 persons. Portable toilets must be regularly pumped dry to ensure that the system does not degrade over time and spill into the surrounding area.	Life of operation	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.	Life of operation	Environmental Officer & Health and Safety Officer, Contractor	Availability of bins and the collection of waste	Ongoing
Where a registered disposal facility is not available close to the project area, the Contractor/property owner shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site. Waste may never be stored in an open pit where it is susceptible to the elements such as wind and rain.	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Collection/handling of waste	Ongoing

Management outcome: Environmental Awareness Training				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
All personnel are to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on all sensitive environmental receptors within the project area to inform contractors and site staff of the presence of sensitive habitat features such as adjacent wetlands, and management requirements in line with the Environmental Authorisation and within the EMPr.	Life of operation	Environmental Officer, Health and Safety Officer	Compliance to the training	Ongoing
Contractors and employees must all undergo a strict environmental induction and be made aware of the sensitive habitats within the project area.	Life of operation	Environmental Officer, Health and Safety Officer	Compliance to the training	Ongoing

6 Conclusion

The project area has historically been modified to accommodate the development of the Element Six Industrial Complex and as such remain in a modified state. It does, however, remain important that the management outcomes presented be adhered to, in order to mitigate the negative expected environmental impacts that will stem from the development activities. These include:

- The loss and fragmentation of vegetation communities;
- The safe movement of fauna species; and
- The direct and indirect loss and disturbance of floral and fauna species and communities.

Completion of the Terrestrial Biodiversity Assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. However, the assessment has determined that the project area possesses a 'Very Low' sensitivity, as a result of the significant levels of environmental disturbance that have taken place and the fact that no SCC were observed - or are very likely to occur.

6.1 Specialist Recommendations

The portion of land within the project area that is classified as having a sensitivity rating of 'Very Low', namely the Modified habitat, is likely to face minimal further impacts from any development activities in term of terrestrial ecology, and as such the proposed activities may proceed within these areas.

It is, however, important to note that a separate Wetland Assessment has been compiled for the project and all requirements and recommendations as per the Wetland Assessment (2023) must be adhered to. It is the specialist's opinion that the proposed project can proceed on the condition that the recommendations made within this report as well as the prescribed mitigation measures be adhered to.

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8 Appendix A - Specialist Declarations

DECLARATION

I, Carami Burger, 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.

Carami Burger

Ecologist

The Biodiversity Company

February 2023

DECLARATION

I, Andrew Husted, 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.

Andrew Husted

Ecologist

The Biodiversity Company

February 2023

9 Appendix B - Specialists CVs

Carami Burger

B.Sc. Honours – Ecological Interactions and Ecosystem Resilience (Cum Laude)

(*Pr Sci Nat*)

Cell: +27 83 630 9077

Email: Carami@thebiodiversitycompany.com

Identity Number: 9606250185084

Date of birth: 25 June 1996

Profile Summary

Working experience in South Africa and Mozambique.

Specialist experience with infrastructure development, road development, renewable energy, mining and prospecting.

Specialist expertise include terrestrial ecology, wetland resources, rehabilitation and management plans, environmental compliance and monitoring.

Areas of Interest

Renewable Energy & Bulk Services Infrastructure Development, Mining, Farming, Sustainability and Conservation.

Key Experience

- Environmental Impact Assessments (EIA)
- Basic Assessments
- Terrestrial Ecological Assessments
- Wetland Delineation and Ecological Assessments
- Environmental Management Programmes (EMPr)
- Rehabilitation Plans
- Invasive Species Plans
- Search and Rescue Plans
- Environmental Compliance Audits
- Water Use License Applications
- Dust Fallout Monitoring
- Water Quality Monitoring

Countries worked in

South Africa

Mozambique

Zambia

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

- BSc Hons Ecological Interactions and Ecosystem Resilience.
- BSc Botany and Zoology.
- Pr Sci Nat (121757)

OVERVIEW

An overview of the specialist technical expertise includes the following:

- Terrestrial Ecological Assessments.

- Faunal surveys which include mammals, birds, amphibians and reptiles.
- Wetland Ecological Assessment.
- Management plan compilation (Plant Search and Rescue, Rehabilitation, Site Clearance, Alien Invasive Species Plans).
- Compliance audits.
- Water Use Licenses.
- Water Quality and Dust Fall Monitoring.

EMPLOYMENT EXPERIENCE

The Biodiversity Company (May 2022 - Present)

Ecologist.

EP3 Environmental (June 2019 - April 2022)

Senior Consultant and Ecologist

Scientific Aquatic Services (SAS) (November 2018 - June 2019)

Internship

ACADEMIC QUALIFICATIONS

North-West University of Potchefstroom (2017): BACCALAUREUS SCIENTIAE HONORIBUS (Hons) – Ecological Interactions and Ecosystem Resilience (Cum Laude)

Title: Mini-Dissertation on ecological information in Environmental Impact Assessments (EIA) at Mooi River Mall.

North-West University of Potchefstroom (2013): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Botany and Zoology.

Andrew Husted

M.Sc Aquatic Health (*Pr Sci Nat*)

Cell: +27 81 319 1225

Email: andrew@thebiodiversitycompany.com

Identity Number: 7904195054081

Date of birth: 19 April 1979

Profile Summary

Working experience throughout South Africa, West and Central Africa and also Armenia & Serbia.

Specialist experience in exploration, mining, engineering, hydropower, private sector and renewable energy.

Experience with project management for national and international multi-disciplinary projects.

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements, and international lenders.

Specialist expertise include Instream Flow and Ecological Water Requirements, Freshwater Ecology, Terrestrial Ecology and also Ecosystem Services.

Areas of Interest

Sustainability and Conservation.

Instream Flow and Ecological Water Requirements.

Publication of scientific journals and articles.

Key Experience

- Familiar with World Bank, Equator Principles and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Ecological Water Requirement determination experience
- Wetland delineations and ecological assessments
- Rehabilitation Plans and Monitoring
- Fish population structure assessments
- The use of macroinvertebrates to determine water quality
- Aquatic Ecological Assessments
- Aquaculture

Country Experience

Botswana, Cameroon

Democratic Republic of Congo

Ghana, Ivory Coast, Lesotho

Liberia, Mali, Mozambique

Nigeria, Republic of Armenia,

Senegal, Serbia, Sierra Leone, South Africa

Tanzania

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

German - Basic

Qualifications

- MSc (University of Johannesburg) – Aquatic Health.
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondi Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 (Expired) – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

OVERVIEW

An overview of the specialist technical expertise include the following:

- Aquatic ecological state and functional assessments of rivers and dams.
- Instream Flow Requirement or Ecological Water Requirement using PROBFLO studies for river systems.
- Ecological wetland assessment studies, including the integrity (health) and functioning of the wetland systems.
- Wetland offset strategy designs.
- Wetland rehabilitation plans.
- Monitoring plans for rivers and other wetland systems.
- Toxicity and metal analysis of water, sediment and biota.
- Bioaccumulation assessment of fish communities.
- Fish telemetry assessment that included the translocation of fish as well as the monitoring of fish in order to determine the suitability of the hosting system.
- Faunal surveys which includes mammals, birds, amphibians and reptiles.
- The design, compilation and implementation of Biodiversity and Land Management Plans and strategies.

TRAINING

Some of the more pertinent training undergone includes the following:

- Wetland and Riparian Delineation Course for Consultants (Certificate of Competence) – DWAF 2008
- The threats and impacts posed on wetlands by infrastructure and development: Mitigation and rehabilitation thereof – Gauteng Wetland Forum 2010
- Ecological State Assessment of Lentic Systems using Fish Population Dynamics – University of Johannesburg/Rivers of Life 2010
- Soil Classification and Wetland Delineation – Terra Soil Science 2010
- Wetland Rehabilitation Methods and Techniques - Gauteng Wetland Forum 2011
- Application of the Fish Response Assessment Index (FRAI) and Macroinvertebrate Response Assessment Index (MIRAI) for the River Health Programme 2011
- Tools for a Wetland Assessment (Certificate of Competence) – Rhodes University 2011
- PROBFLO for conducting Ecological Flow Assessments – 2018/19

EMPLOYMENT EXPERIENCE

The Biodiversity Company (January 2015 – Present)

Director / Ecologist.

Digby Wells Environmental (August 2008 – December 2014)

Freshwater & Terrestrial Ecologist

PREVIOUS EMPLOYMENT: Econ@UJ (University of Johannesburg)

Freshwater Ecologist

ACADEMIC QUALIFICATIONS

University of Johannesburg, Johannesburg, South Africa (2009): MAGISTER SCIENTIAE (MSc) - Aquatic Health:

Title: *Aspects of the biology of the Bushveld Smallscale Yellowfish (Labeobarbus polylepis): Feeding biology and metal bioaccumulation in five populations.*

Rand Afrikaans University (RAU), Johannesburg, South Africa (2004): BACCALAUREUS SCIENTIAE CUM HONORIBUS (Hons) – Zoology

Rand Afrikaans University (RAU), Johannesburg, South Africa (2001 - 2004): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Zoology and Botany.

PUBLICATIONS

Desai M., Husted A., Fry C., Downs C.T., & O'Brien G.C. 2019. Spatial shifts and habitat partitioning of ichthyofauna within the middle–lower region of the Pungwe Basin, Mozambique. *Journal of Freshwater Ecology*, 34(1), 685–702. doi: 10.1080/02705060.2019.1673221

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