PB CONSULT
ENVIRONMENTAL MANAGEMENT SERVICES

BOTANICAL & TERRESTRIAL BIODIVERSITY STATEMENT

SHABBY FUFU LIFESTYLE FARM

24G APPLICATION WITH REGARDS TO ALLEGATIONS OF THE COMMENCEMENT OF LISTED ACITIVITIES, ON FARM HARKERVILLE NO. 428/4, NEAR PLETENBERG BAY LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE.

PREPARED FOR:

ENVIROAFRICA.

PREPARED BY:

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15 May 2024

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EXECUTIVE SUMMARY

"Shabby Fufu" is a family-oriented restaurant/farm stall with a kids play area, an animal sanctuary and accommodation in log cabins. It focuses on the tourist industry and is located on Portion 4 of the Farm Harkerville No. 428 along the N2 between Plettenberg Bay and Harkerville along the Garden Route of the Western Cape.

During a site investigation by Environmental Management Inspectors of the Western Cape's Department of Environmental Affairs and Development Planning (DEA&DP) on the 23rd of October 2023, allegations were made that the landowner commenced with the clearance of indigenous vegetation, construction of a dam within a watercourse, and the transformation of land without environmental authorization in terms of the NEMA EIA regulations.

VEGETATION TYPE & STATUS

According to the 2018 Vegetation map of South Africa, the property would, originally, have been covered by South Outeniqua Sandstone Fynbos, with a potential intrusion of Southern Afrotemperate Forest to the south. Both of these vegetation types are classified as "Least Threatened", in terms of the "*Revised National list of ecosystems that are threatened and in need of protection*" (GN. No. 2747 of 18 November 2022) (Refer to Heading 4.1).

WATER COURSES AND WETLANDS

According to SANBI BGIS information a watercourse, a watercourse used to run from west to east through the top half of the property (Figure 10) and the newly constructed dam seems to have been built within this watercourse. The site visit shows that the dam is located in a natural depression (and, according to the landowner, is filled from natural drainage from the road). The stream had been totally degraded as a result of historical agricultural activities. No riparian vegetation remains, and the stream had basically been integrated into the agricultural landscape (grazing pastures).

A freshwater specialist had been appointed to evaluate the aquatic impact of the construction of the dam.

SPECIAL HABITAT CONDITIONS

The study area did not contain any significant differences in biophysical features, which could have resulted in special habitat for fauna or flora. There is one small pond/dam (next to the N2) with emergent vegetation that might be considered a suitable habitat for the **endangered** Knysna banana frog (Photo 15). The development did not impact this pond.

LAND-USE

Historical Google Images shows that the property had been used for agriculture on and before 2004. Most of the property had been cleared of natural vegetation. Portions of the cleared area had been used for crop cultivation, while the rest had probably been used for grazing (most likely ploughed to establish or promote the growth of grasses for grazing) (Figure 3 to Figure 8).

According to landowners, municipal approval was obtained for the development of the Shabby Fufu development.

VEGETATION ENCOUNTERED

The property is about 16 ha in size most of which had been used for agricultural purposes (crop cultivation and grazing) in the past (and according to the current landowners, was still used for grazing when they bought the property). The site visit confirmed that most of the property had been disturbed as a result of past landuse practices (the orange area in Figure 11). Of the disturbed area, especially the top two-thirds had been severely impacted, while the southern part of the old agricultural area had been allowed to slowly recover and portions is now covered with a good layer of indigenous vegetation (although mostly still early successional species or pioneer species) (Refer to Heading 5.1 for a description of vegetation encountered).

All of the Shabby Fufu infrastructure were placed within the footprint of the historical

agricultural land, apart from one log cabin that was placed within the remaining wooded area to the southwest of the site (Figure 7). The footprint of this log cabin is less than 200 m^2, and even this cabin seems to have been placed within an existing small clearing within the wooded area. Most of the development would have impacted on historical agricultural land that might still have been used for grazing purposes, but that has most likely not been physically worked within the last 10 years. Only the small log cabin described above, would have impacted on indigenous vegetation.

CONSERVATION PRIORITY AREAS

ESA1 status has been assigned to protect the small stream that runs through the north of the property (Refer to Figure 10). The site visit confirmed that the stream had been totally degraded as a result of historical agricultural activities. No riparian vegetation remains, and the stream had basically been integrated into the agricultural landscape (grazing pastures). The new dam was constructed within the historical drainage of this stream (a natural depression).

CONNECTIVITY

The development impacted on historical agricultural land (some of it recovering) and would not have had any significant impact on connectivity.

Because of the small size of the development footprint and the site's location, the impact on connectivity is considered **Low Significant**.

THREATENED AND PROTECTED PLANT SPECIES

According to the **DFFE Environmental Screening Tool** report for this site (Appendix 2), the **plant species theme sensitivity is considered Low Sensitive**.

No red-listed or protected plant species were observed and the plant species sensitivity rating of **Low Sensitive**, is supported.

FAUNA & AVI-FAUNA

According to the **DFFE National Web Based Environmental Screening Tool** the relative Animal species theme sensitivity is considered of **Medium Sensitivity** because of the potential presence of 6 sensitive animal species, which include one frog, one eagle, two mammal, one butterfly and one grasshopper species (Refer to Table 11).

A small pond (next to the N2) with emergent vegetation and relative clean water was observed that might be considered a suitable habitat for the endangered Knysna banana frog (Photo 15). The dam was not impacted and seems to be protected as a water feature by the landowners. Duthie's golden mole might still occur on site, but the likelihood of significant impact to the habitat or breeding of any of the 6 species is considered very low (Refer to Heading 6.4.1 for a more detailed discussion per species).

With regards to this project the animal sensitivity rating is considered to be **Low Sensitive.**

MAIN CONCLUSION

According to the **DFFE National Web Based Environmental Screening Tool** the relative Terrestrial Biodiversity theme sensitivity is considered of **Very High Sensitivity** because it overlaps an aquatic ESA 1, within a Freshwater Ecosystem Priority Area (FEPA) subcatchment and within a Strategic Water Source Area (SWSA) (Refer to Heading 4.3 & Figure 10).

The aim of the terrestrial biodiversity assessment is to evaluate the impacts resulting from the development of the Shabby Fufu lifestyle farm and its associated activities, taking all of the discussion in this report into account. Table 12 aims to rate the significance of the each identified environmental impact associated with the development. .

According, this assessment, the main impacts associated with the development might have been:

- The potential impact on a degraded conservation priority area (ESA1);

- The potential impact on sensitive animal species (Refer to Table 11).

Because of the location and small size of the proposed development even the cumulative impact given in Table 12 is **Low Sensitive**.

No fatal flaws or any other obstacles were found with respect to the flora, vegetation, fauna, and terrestrial biodiversity.

It is considered unlikely that the development would have contributed significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g., migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened species.
- Loss of ecosystem connectivity.

The findings of this assessment suggests that the relative terrestrial biodiversity theme sensitivity should be **Low Sensitive** (not Very High Sensitive as suggested in the DFFE screening report).

Refer to heading 8 for mitigation recommendations.

DETAILS OF THE AUTHOR

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SACNASP REG. NO.: **400184/05** *(Registered Professional Botanical, Environmental and Ecological Scientists with SACNASP as required in terms of Section 18(1)(a) of the Natural Scientific Professions Act, 2003, since 2005).*

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INDEPENDENCE & CONDITIONS

PB Consult is an independent entity with no interest in the activity other than fair remuneration for services rendered. Remunerations for services are not linked to approval by decision making authorities and the company have no interest in secondary or downstream development because of the authorization of this project. There are no circumstances that compromise the objectivity of this report. The findings, results, observations and recommendations given in this report are based on the author's best scientific and professional knowledge and available information. The author reserves the right to modify aspects of this report, including the recommendations if new information become available which may have a significant impact on the findings of this report.

RELEVANT QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

Mr. Peet Botes holds a BSc. (Hons.) degree in Plant Ecology from the University of Stellenbosch (Nature Conservation III & IV as extra subjects). Since qualifying with his degree, he had worked for more than 20 years in the environmental management field, first at the Overberg Test Range (a Division of Denel) managing the environmental department of OTR and being responsible for developing and implementing an ISO14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld, working closely with CapeNature (De Hoop Nature Reserve).

In 2005 he joined Enviroscientific, an independent environmental consultancy specializing in wastewater management, botanical and biodiversity assessments, developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits and was also responsible for helping develop the biodiversity part of the Farming for the Future audit system implemented by Woolworths. During his time with Enviroscientific he performed more than 400 biodiversity and environmental legal compliance audits.

During 2010 he joined EnviroAfrica to move back to the biodiversity aspects of environmental management. Experience with EnviroAfrica includes NEMA EIA applications, environmental management plans for various industries, environmental compliance audits, environmental control work as well as more than 70 biodiversity & botanical specialist studies.

Towards the end of 2017, Mr Botes started his own small environmental consulting business focusing on biodiversity & botanical assessments, biodiversity management plans and environmental compliance audits.

DECLARATION OF INDEPENDENCE

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Petrus, Jacobus, Johannes Botes, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- 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 the NEMA, the Environmental Impact Assessment Regulations, 2014, as amended, and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 326) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 13 of GN No. R. 326.

Note: The terms of reference must be attached.

Signature of the specialist:

PB Consult (Sole Proprietor)

Name of company:

15 May 2024

Date:

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ABBREVIATIONS

BAR	Basic Assessment Report
CBA	Critical biodiversity area (in terms of the 2017 City of Cape Town Biodiversity Network)
EA	Environmental Authorization (Record of Decision)
EAP	Environmental assessment practitioner
ECO	Environmental Control Officer
EIA	Environmental impact assessment
EMP	Environmental Management Plan or Program
EMS	Environmental management system
EN	Endangered
ESA	Ecological support area (in terms of the 2017 City of Cape Town Biodiversity Network)
LT	Least Threatened
NEMA	National Environmental Management Act, 1998 (Act no. 107 of 1998)
VU	Vulnerable

1. INTRODUCTION

"Shabby Fufu" is a family-oriented restaurant/farm stall with a kids play area, an animal sanctuary and accommodation in log cabins. It focuses on the tourist industry and is located on Portion 4 of the Farm Harkerville No. 428 along the N2 between Plettenberg Bay and Harkerville along the Garden Route of the Western Cape.

During a site investigation by Environmental Management Inspectors of the Western Cape's Department of Environmental Affairs and Development Planning (DEA&DP) on the 23rd of October 2023, allegations were made that the landowner commenced with the clearance of indigenous vegetation, construction of a dam within a watercourse, and the transformation of land without environmental authorization in terms of the NEMA EIA regulations.

According to the 2018 Vegetation map of South Africa, the property would, originally, have been covered by South Outeniqua Sandstone Fynbos, with a potential intrusion of Southern Afrotemperate Forest to the south. Both of these vegetation types are classified as "Least Threatened", in terms of the "*Revised National list of ecosystems that are threatened and in need of protection*" (GN. No. 2747 of 18 November 2022) (Refer to Heading 4.1). According to the 2017 Western Cape Biodiversity Spatial Plan (WCBSP), ecological support areas (ESA's) had been mapped along the watercourse, expected on the site (Heading 4.3).

Historical Google Images (dating back to 2004) show that most of the property had **been used for agricultural purposes,** in the past (at least up until 2004/2006). Portions of the site had clearly been ploughed, while other areas were cleared of natural vegetation to allow (or plant) a grassy ground cover used for livestock grazing. According to the current landowners, the site had still been used for intermittent grazing, when they bought the site around 2015/16.

The DFFE screening report (Appendix 2) for the proposed site, downloaded by PB Consult on the 29th of April 2024, identified various areas of potential environmental sensitivity, of which the following will be discussed in this report:

- The relative Animal species theme sensitivity is considered of **Medium Sensitivity**;
- The relative Plant species theme sensitivity is considered of **Low Sensitivity**;
- The relative Terrestrial Biodiversity theme sensitivity is considered of **Very High Sensitivity**.

A freshwater specialist had been appointed to evaluate the relative Aquatic Biodiversity Theme, which is also considered of Very High Sensitivity.

1.1. LEGISLATION GOVERNING THIS REPORT

EnviroAfrica was appointed to manage the environmental aspects and to facilitate the NEMA EIA 24G application for the proposed project. PB Consult was appointed by EnviroAfrica to conduct a botanical and terrestrial biodiversity evaluation of the impacted area.

This is a 'specialist report', compiled in terms of:

- The National Environmental Management Act, Act. 107 of 1998 (NEMA);
- The "Protocol for the Specialist Assessment and Minimum report content requirements for environmental impacts on terrestrial biodiversity" in terms of Sections 24(5)(a) and (h) and 44 of the NEMA (Government Notice No. 320 of 20 March 2020).

1.2. TERMS OF REFERENCE

The Terms of Reference for this study were to undertake a site visit and to compile a specialist report that assesses the potential impacts on *Botanical and Terrestrial Biodiversity* features of the existing development footprint.

Study should address:

- Habitat sensitivity;
- Threatened ecosystems (including critical biodiversity areas and ecological support areas);
- Flora and fauna species of conservation concern;
- Any significant botanical or other terrestrial biodiversity features that might be impacted because of the proposed development as identified in the DFFE Screening Report for the site.
- Potential direct and cumulative impacts resulting from the proposed development on the receiving environment.

2. STUDY AREA

2.1. LOCATION & LAYOUT

"Shabby Fufu" lifestyle farm is a family oriented restaurant/farm stall with accommodation on Portion 4 of the Farm Harkerville No. 428. The farm is located in the Bitou Local Municipality on the Garden Route or N2 between Plettenberg Bay and Harkerville in the Western Cape (Figure 1). A closer map of the property and study area is given in Figure 2.

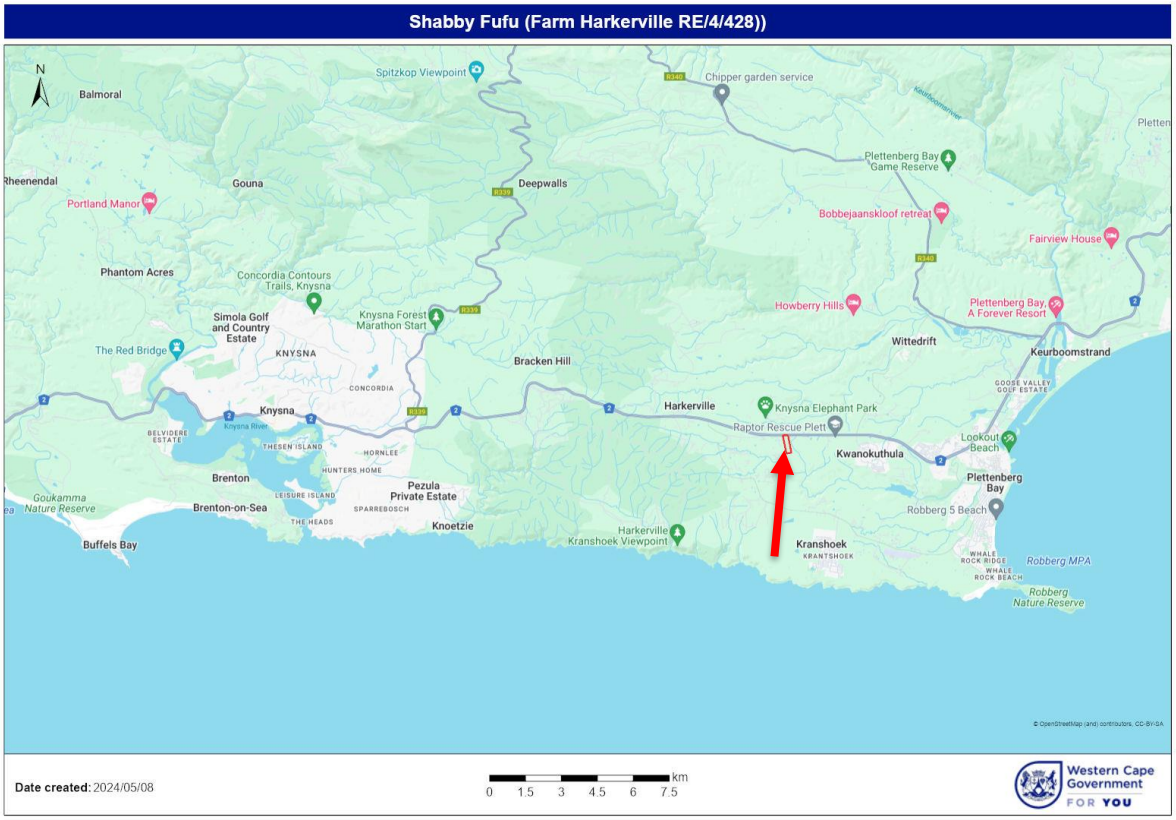

Figure 1: A map showing the location of the property (red) between Plettenberg Bay and Knysna (Western Cape).

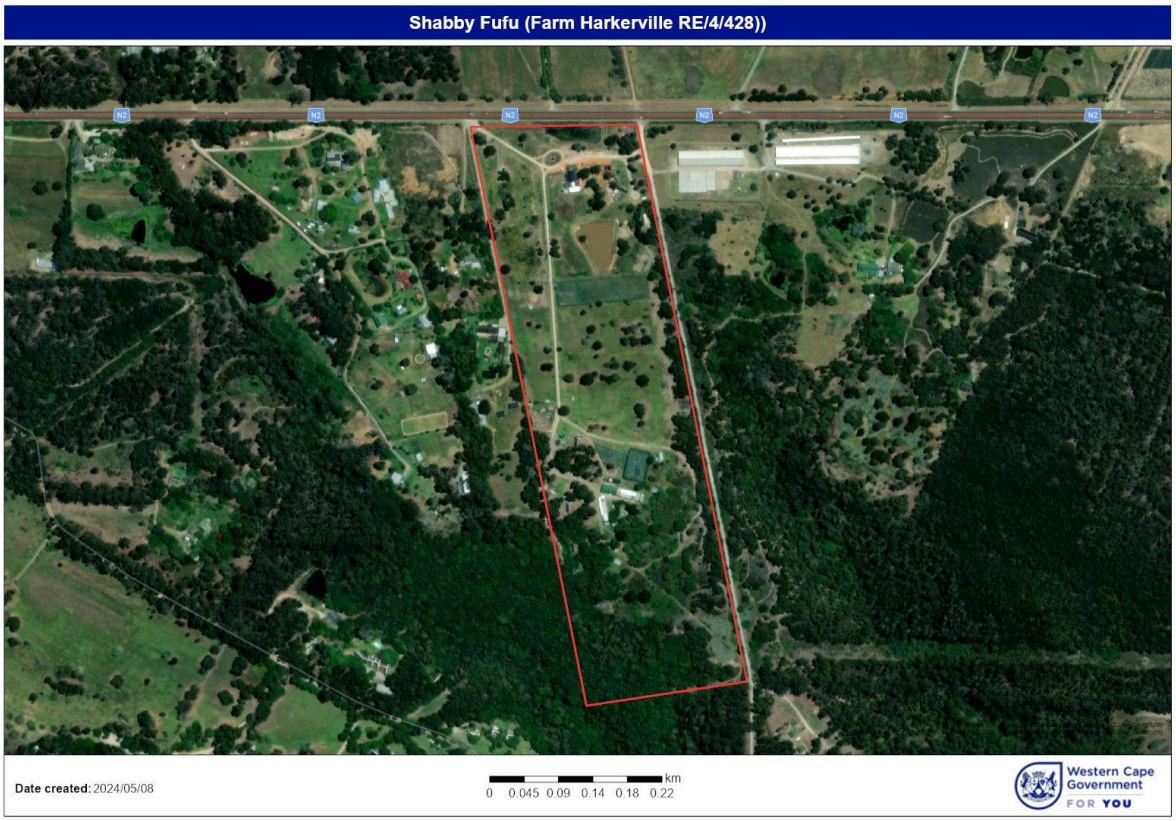

Figure 2: A close-up Google Image showing the property (red)

Table 1: Midpoint co-ordinates of the study area (WGS 84 format)

DESCRIPTION	CO-ORDINATE
Shabby Fufu Restaurant	34° 2'42.57"S 23°16'36.52"E

2.2. PROPERTY HISTORY

Historical Google Images were used in an effort to determine the historical land-use of the property in order to better evaluate the potential impacts associated with the development. Google images going back to 1985 were available, but the resolution of these image s are poor, although they do suggest that the site had been used for agriculture at that time. The first clear Google images of the site was from May 2004. Using these images the following deductions were made:

- 2004: Apart from a small section of forest or dense alien invasive species to the south, most of the property had been used for agriculture and had been cleared of natural vegetation in the past. The northwestern corner of the property seems to have been ploughed, based on the clear parallel lines that can be observed. It also seems as if some hardy natural vegetation is starting to grow back in the southern part of the site, suggesting that it has been laying fallow (Figure 3).
- 2007: Images from 2007 onwards seems to indicate that property had become fallow land and a slow regrowth of what is expected to be hardy indigenous species and alien invasive species can be observed (Figure 4 & Figure 5).

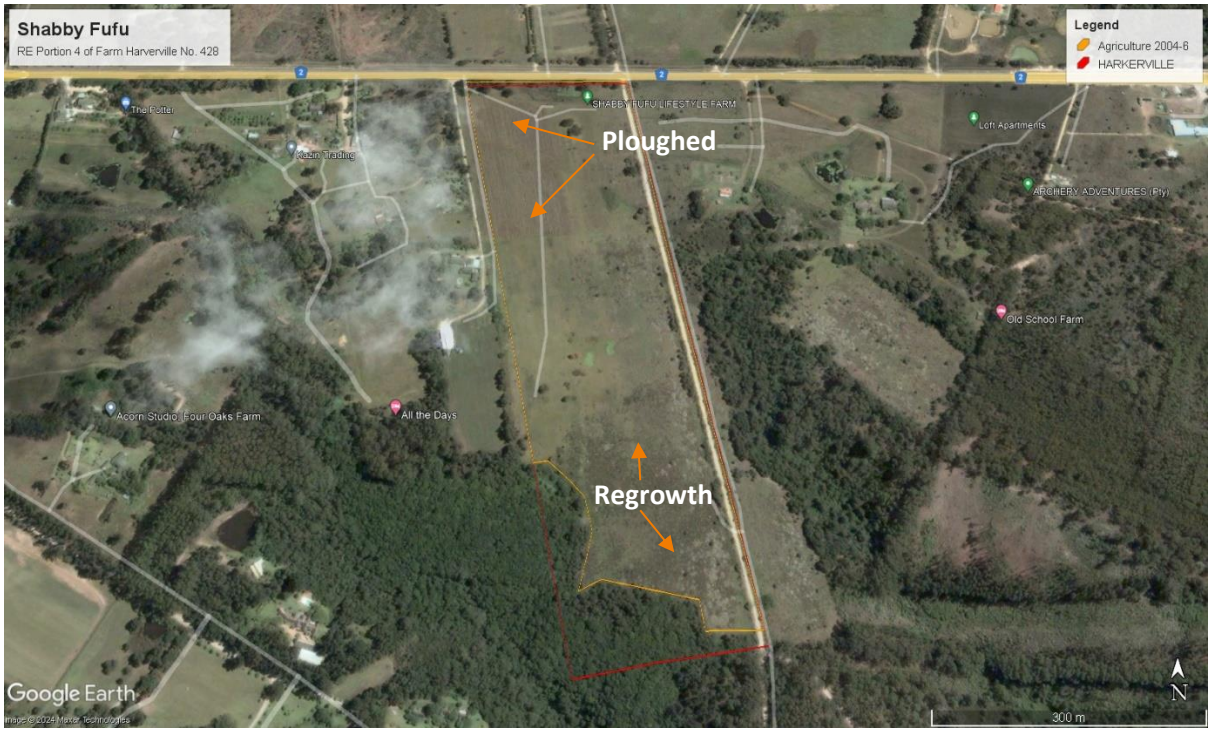

Figure 3: Google Image (May 2004) showing the property (red) and the existing disturbance footprint (orange)

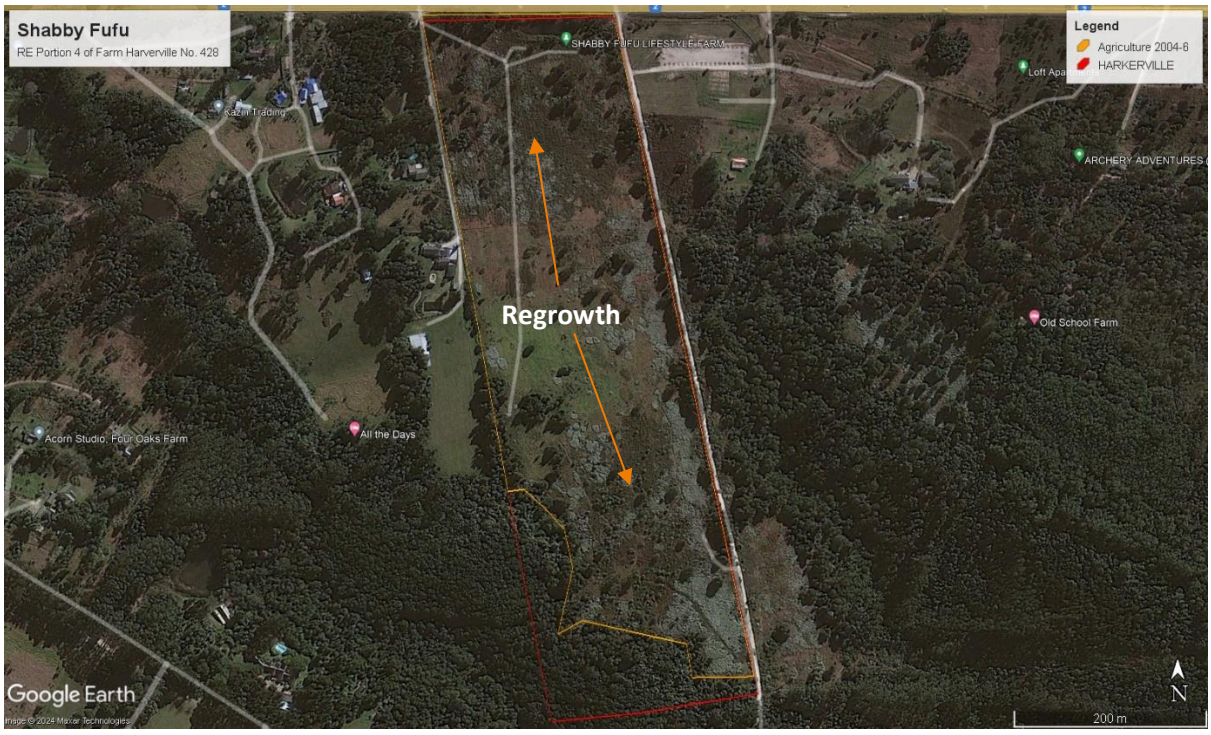

Figure 4: Google Image (December 2011) showing the slow regrowth within the original disturbance footprint (orange)

- 2013: Images from late 2013 shows a marked difference in vegetation cover, which might be the result of clearing to re-establish grazing grasses or it could be the result of fire (Figure 5).
- 2016: The first construction activities can be observed. The construction activities are all within the original disturbance footprint as indicated in Figure 3. The top half of the property seems to have been cleared of some of the alien vegetation, while the bottom half shows signs of further regrowth of alien and indigenous plant species (Figure 6).

Figure 5: Google Image (November 2013) showing new disturbance – possibly a fire.

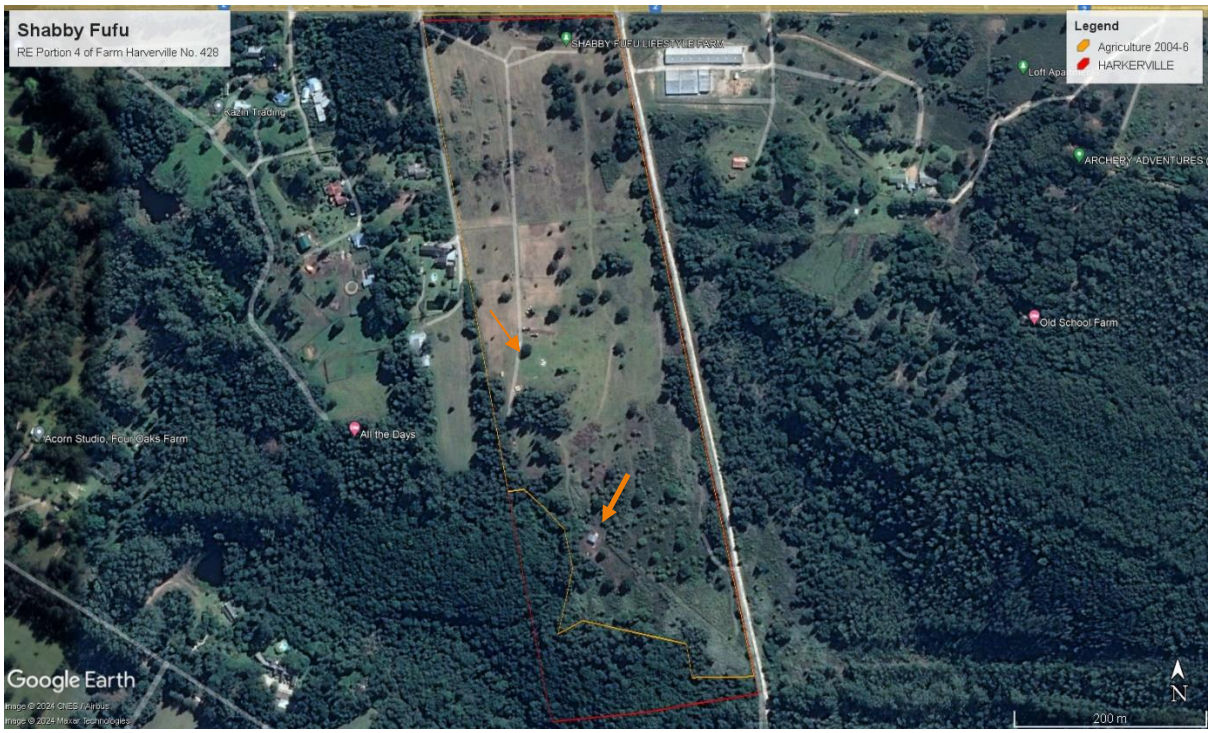

Figure 6: Google Image (June 2016) showing the start of construction of infrastructure on the property.

- 2017: From 2016 onwards the development expanded, with the addition of various other buildings and the cottages, all of which are still within the original disturbance footprint.
- 2018: Late in 2017, early 2018 (Figure 7), construction of the dam commenced. An additional cottage was also constructed, the first and only structure, that was build outside of the original disturbance footprint. This cottage seems to have been located in small clearing within the bush with an estimated footprint of less than 200 m^2.

Figure 7: Google Image (May 2018) showing the construction of the dam and one small cottage outside of the original disturbance footprint (pink).

- 2019: The Shabby Fufu shop had been constructed, the dam had been enlarged, a bird sanctuary and a nursery (netting) had been added.

Figure 8: The latest Google Image (March 2024), showing the development as is, but it also shows how natural vegetation had been allowed to regrow to the south of the site (arrow).

It appears as if, apart from one cottage (with an estimated footprint of less than 200 m^2), the development footprint had remained within the original disturbance footprint (shown in Figure 3).

3. APPROACH & METHODOLOGY

The protocol for specialist assessment and minimum report content and requirements for environmental imp acts on terrestrial biodiversity was published in GN. No. 320 of 20 March 2020. It includes the requirements for a desktop analysis and site verification.

3.1. DESKTOP ANALYSIS

The first step of the study was to conduct a desktop analysis of the study area and its immediate surroundings. Using historical Google images a site history was established. The DFFE screening tool report and spatial information from online databases such as SANBI BGIS and CapeFarmMapper were used to evaluate the site in terms of vegetation, obvious differences in landscape (e.g., variations in soil type, rocky outcrops etc.) or vegetation densities , which might indicate differences in plant community or species composition, critical biodiversity areas and other terrestrial biodiversity features as identified in the screening tool.

This information was used to prepare a study area map, which is used as a reference during the physical site visit. Plant species lists were prepared, and species of special significance were flagged.

3.2. SITE SENSITIVITY VERIFICATION

The fieldwork for project was carried out on the 19th of March 2024. The site survey was conducted over a 4-hour period, by walking the site and evaluating the vegetation condition.

Protected or other special plants and any terrestrial feature of significance was, marked by waypoints and/or on the study map, and photographed. A hand-held Garmin GPSMAP 62s was used to track the sampling route and for recording waypoints. During the survey notes, and photographic records were collected. All efforts were made to ensure that any variation in vegetation or soil condition, which might indicate special botanical features (e.g., rocky outcrops, watercourses or heuweltjies), were visited. Efforts was also made to ensure that the plant species list was as complete as possible.

3.3. LIMITATIONS, ASSUMPTIONS & UNCERTAINTIES

The findings are based on a one-day site visit (not long-term repetitive sampling), which means that it is likely that plant species might have been missed (or were out of season). The timing of the site visit is considered reasonable as most of the plants were identifiable (the main aim of the site visit was to evaluate vegetation condition and was not to perform a full botanical assessment). Essentially all perennial plants were identifiable and a good understanding of the status of the vegetation and plant species in the study areas could be obtained (confidence in the findings are high). There should be no limiting factors which could significantly alter the outcome of this study.

3.4. IMPACT ASSESSMENT METHOD

The concept of environmental impact assessment in terms of the National Environmental Management Act, Act 107 of 1998 (NEMA) and the Environmental Impact Assessment (EIA) was developed to identify and evaluate the nature of potential impact to determine whether an activity is likely to cause significant environmental impact on the environment. The concept of significance is at the core of impact identification, evaluation and decision making, but despite this the concept of significance and the method used for determining significance remains largely undefined and open to interpretation (DEAT, 2002).

The objective of this study was to evaluate the status of the veld within the study area to identify special or significant environmental features which might be impacted by the proposed development.

The Ecosystem Guidelines for Environmental Assessment (De Villiers *et. al*., 2005), were used to evaluate the botanical significance of the property with emphasis on:

- Significant ecosystems
    - Threatened or protected ecosystems
    - Special habitats
    - Corridors and or conservancy networks
- Significant species
    - Threatened or endangered species
    - Protected species.

3.4.1. DETERMINING SIGNIFICANCE

Determining impact significance from predictions of the nature of the impact has been a source of debate and will remain a source of debate. The author used a combination of scaling and weighting methods to determine significance based on a simple formula. The formula used is based on the method proposed by Edwards (2011). However, the criteria used were adjusted to suite its use for botanical assessment. In this document significance rating was evaluated using the following criteria.

Significance = Conservation Value x (Likelihood + Duration + Extent + Severity) (Edwards 2011)

3.4.2. CRITERIA USED

***Conservation value*:** Conservation value refers to the intrinsic value of an attribute (e.g., an ecosystem, a vegetation type, a natural feature or a species) or its relative importance towards the conservation of an ecosystem or species or even natural aesthetics. Conservation status is based on habitat function, its vulnerability to loss and fragmentation or its value in terms of the protection of habitat or species (Refer to Table 2 for categories used).

Likelihood refers to the probability of the specific impact occurring because of the proposed activity (Refer to Table 3, for categories used).

Duration refers to the length in time during which the activity is expected to impact on the environment (Refer to Table 4).

Extent refers to the spatial area that is likely to be impacted or over which the impact will have influence, should it occur (Refer to Table 5).

Severity refers to the direct physical or biophysical impact of the activity on the surrounding environment should it occur (Refer to Table 6).

Table 2: Categories used for evaluating conservation status.

CONSERVATION VALUE	
Low (1)	The attribute is transformed, degraded not sensitive (e.g., Least threatened), with unlikely possibility of species loss.
Medium/low (2)	The attribute is in good condition but not sensitive (e.g., Least threatened), with unlikely possibility of species loss.
Medium (3)	The attribute is in good condition, considered vulnerable (threatened), or falls within an ecological support area or a critical biodiversity area, but with unlikely possibility of species loss.
Medium/high (4)	The attribute is considered endangered or, falls within an ecological support area or a critical biodiversity area, or provides core habitat for endemic or rare & endangered species.
High (5)	The attribute is considered critically endangered or is part of a proclaimed provincial or national protected area.

Table 3: Categories used for evaluating likelihood.

LIKELHOOD	
Highly Unlikely (1)	Under normal circumstances it is almost certain that the impact will not occur.
Unlikely (2)	The possibility of the impact occurring is very low, but there is a small likelihood under normal circumstances.
Possible (3)	The likelihood of the impact occurring, under normal circumstances is 50/50, it may, or it may not occur.
Probable (4)	It is very likely that the impact will occur under normal circumstances.
Certain (5)	The proposed activity is of such a nature that it is certain that the impact will occur under normal circumstances.

Table 4: Categories used for evaluating duration.

DURATION	
Short (1)	Impact is temporary and easily reversible through natural process or with mitigation. Rehabilitation time is expected to be short (1-2 years).
Medium/short (2)	Impact is temporary and reversible through natural process or with mitigation. Rehabilitation time is expected to be relative short (2-5 years).
Medium (3)	Impact is medium-term and reversible with mitigation but will last for some time after construction and may require ongoing mitigation. Rehabilitation time is expected to be longer (5-15 years).
Long (4)	Impact is long-term and reversible but only with long term mitigation. It will last for a long time after construction and is likely to require ongoing mitigation. Rehabilitation time is expected to be longer (15-50 years).
Permanent (5)	The impact is expected to be permanent.

Table 5: Categories used for evaluating extent.

EXTENT	
Site (1)	Under normal circumstances the impact will be contained within the construction footprint.
Property (2)	Under normal circumstances the impact might extent outside of the construction site (e.g., within a 2 km radius), but will not affect surrounding properties.
Surrounding properties (3)	Under normal circumstances the impact might extent outside of the property boundaries and will affect surrounding landowners or –users, but still within the local area (e.g., within a 50 km radius).
Regional (4)	Under normal circumstances the impact might extent to the surrounding region (e.g., within a 200 km radius), and will impact on landowners in the larger region (not only surrounding the site).
Provincial (5)	Under normal circumstances the effects of the impact might extent to a large geographical area (>200 km radius).

Table 6: Categories used for evaluating severity.

SEVERITY	
Low (1)	It is expected that the impact will have little or no affect (barely perceptible) on the integrity of the surrounding environment. Rehabilitation not needed or easily achieved.
Medium/low (2)	It is expected that the impact will have a perceptible impact on the surrounding environment, but it will maintain its function, even if slightly modified (overall integrity not compromised). Rehabilitation easily achieved.
Medium (3)	It is expected that the impact will have an impact on the surrounding environment, but it will maintain its function, even if moderately modified (overall integrity not compromised). Rehabilitation easily achieved.
Medium/high (4)	It is expected that the impact will have a severe impact on the surrounding environment. Functioning may be severely impaired and may temporarily cease. Rehabilitation will be needed to restore system integrity.
High (5)	It is expected that the impact will have a very severe to permanent impact on the surrounding environment. Functioning irreversibly impaired. Rehabilitation often impossible or unfeasible due to cost.

3.4.3. SIGNIFICANCE CATEGORIES

The formal NEMA EIA application process was developed to assess the significance of impacts on the surrounding environment (including socio-economic factors), associated with any specific development proposal to allow the competent authority to make informed decisions. Specialist studies must advise the environmental assessment practitioner (EAP) on the significance of impacts in his field of specialty. To do this, the specialist must identify all potentially significant environmental impacts, predict the nature of the impact, and evaluate the significance of that impact should it occur.

Potential significant impacts are evaluated, using the method described above, to determine its potential significance. The potential significance is then described in terms of the categories given in Table 7. Mitigation options are evaluated, and comparison is then made (using the same method) of potential significance before mitigation and potential significance after mitigation (to advise the EAP).

Table 7: Categories used to describe significance rating (adjusted from DEAT, 2002)

SIGNIFICANCE	DESCRIPTION
Insignificant or Positive (4-22)	There is no impact, or the impact is insignificant in scale or magnitude because of low sensitivity to change or low intrinsic value of the site, or the impact may be positive.
Low (23-36)	An impact barely noticeable in scale or magnitude because of low sensitivity to change or low intrinsic value of the site or will be of very short-term or is unlikely to occur. Impact is unlikely to have any real effect and no or little mitigation is required.
Medium Low (37-45)	Impact is of a low order and therefore likely to have little real effect. Mitigation is easily achieved. Social, cultural, and economic activities can continue unchanged, or impacts may have medium to short term effects on the social and/or natural environment within site boundaries.
Medium (46-55)	Impact is real, but not substantial. Mitigation is both feasible and easily possible but may require modification of the project design or layout. Social, cultural, and economic activities of communities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long term effect on the social and/or natural environment, within site boundary.
Medium high (56-63)	Impact is real, substantial, and undesirable, but mitigation is feasible. Modification of the project design or layout may be required. Social, cultural, and economic activities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long-term effect on the social and/or natural environment, beyond site boundary within local area.
High (64-79)	An impact of high order. Mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural, and economic activities of communities are disrupted and may come to a halt. These impacts will usually result in long-term change to the social and/or natural environment, beyond site boundaries, regional or widespread.
Unacceptable (80-100)	An impact of the highest order possible. There is no possible mitigation that could offset the impact. Social, cultural, and economic activities of communities are disrupted to such an extent that these come to a halt. The impact will result in permanent change. Very often these impacts are un-mitigatable and usually result in very severe effects, beyond site boundaries, national or international.

4. DESKTOP ASSESSMENT

The results of the desktop analysis are discussed in this chapter.

4.1. BROAD-SCALE VEGETATION EXPECTED

According to the 2018 update to the South African vegetation map (Mucina & Rutherford, 2006), the property would, originally, have been covered by South Outeniqua Sandstone Fynbos, with a potential intrusion of Southern Afrotemperate Forest to the south. Both of these vegetation types are classified as "Least Threatened", in terms of the "*Revised National list of ecosystems that are threatened and in need of protection*" (GN. No. 2747 of 18 November 2022).

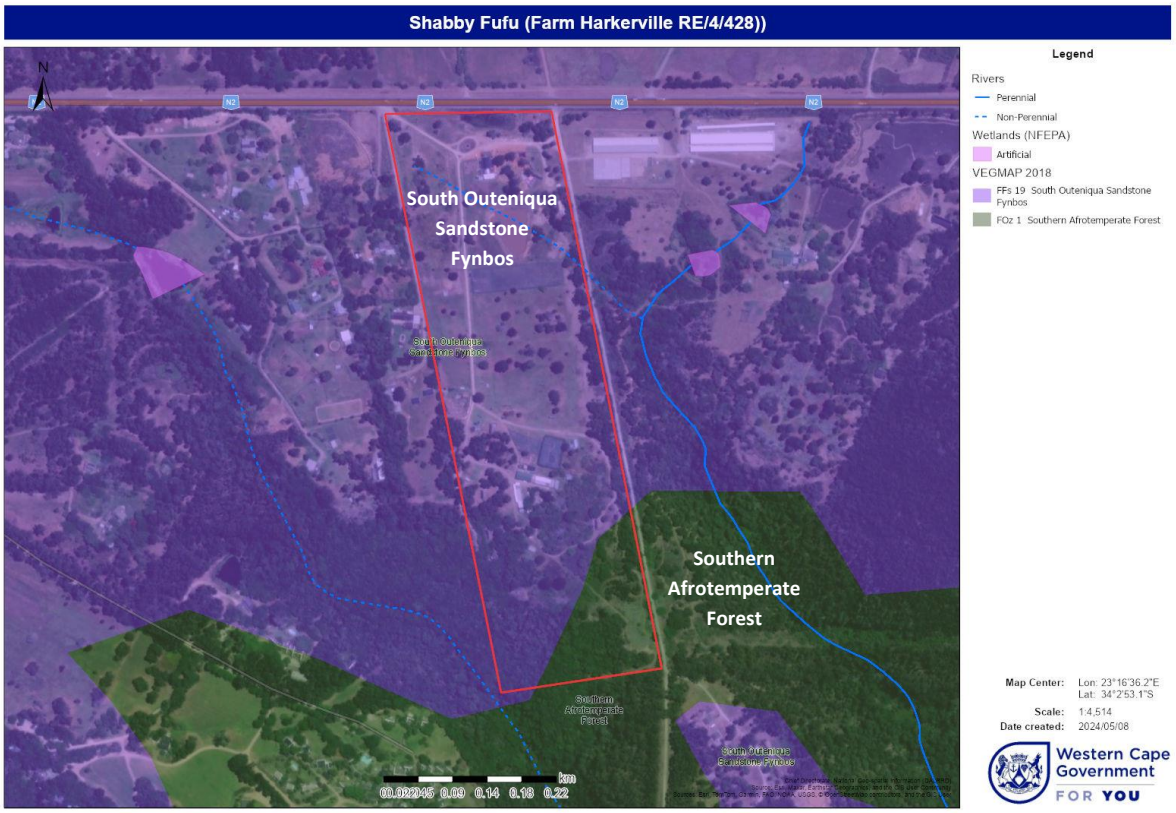

Figure 9: Vegetation map of South Africa (2018), showing the expected vegetation type (CapeFarmMapper)

South Outeniqua Sandstone Fynbos is described as occurring on gentle to steep south-facing slopes, with moderately sloping intra-montane valleys in the west. The dominant vegetation is a tall, open to medium dense shrubland with medium dense, medium tall shrub understory—mainly proteoid and restioid fynbos, with extensive ericaceous fynbos on the upper slopes. Some grassy fynbos at lower altitudes, and scrub fynbos in riverine areas. Patches of this unit are not confined to south-facing slopes but are found on all slopes south of the highest peaks in the range. Thus, there are extensive northern slopes in some intra-montane valley systems, the most significant of those found in the Doring River Wilderness Area (Mucina & Rutherford, 2006). Acocks (1953) described this vegetation as Knysna Forest or False Macchia, while Low & Rebelo (1996) described it as Mountain Fynbos.

4.2. ECOLOGICAL DRIVERS & FUNCTIONING

South Outeniqua Sandstone Fynbos is part of the Cape Floristic Region (CFR). Located at the southern tip of Africa, the Cape Floral Kingdom (CFK) has been described as one of the wonders of the world. It covers an area of only approximately 87 892 km^2 but hosts an amazing 9 000 different kind of plant species of which 70% are endemic (does not occur anywhere else in the world). So special is this vegetation that the CFK has been designated as one of the earth's six plant kingdoms, putting it on par with the Boreal Forest Kingdom which covers 50 million square kilometres (Cowling & Richardson 1995). It has also been listed as one of 25 internationally recognized biodiversity hotspots. The CFR is one of the richest parts of the world in terms of floristic diversity and the degree of endemism is among the highest in the world. The CFK is also an Endemic Bird Area and levels of endemism are exceptionally high in freshwater ecosystems – many Cape Rivers show almost complete turn-over in species assemblages from one system to the next (Cowling & Richardson 1995).

Fynbos vegetation types occur predominantly on well-leached, infertile soils (e.g., the Cape Supergroup sandstones). Under high rainfall conditions, granites and even shales become sufficiently leached to support Asteraceous Fynbos, replacing Renosterveld. This usually occurs at about 600 to 800 mm annual rainfall (but may be much less on granites, especially at higher altitudes). Below 200 mm Fynbos is replaced by Succulent Karoo. Fynbos has a low animal biomass, although species richness of birds, mammals, frogs, reptiles and insects is quite high. Although these animals play a major role in pollination and seed dispersal, they appear to play a minor part in influencing vegetation structure and composition. This is partly due to the high carbon to nitrogen ratio, which effectively excludes browsing of all but the youngest leaves (https://pza.sanbi.org/vegetation/fynbos-biome).

Fire is a major influence on Fynbos community processes. Fynbos must burn at between 6 and 45 years of age in order to sustain its plant species. Many species store their fruit in fire-safe cones for release after a fire, and ants are enticed to bury fruit where they are safe from rodents and fire. After fire many plant species resprout, but the majority rely on the predictability of fires and only regenerate after the fire from seeds. Without fire, Fynbos becomes senescent, and Forest and Thicket elements begin invading (https://pza.sanbi.org/vegetation/fynbos-biome).

Habitat loss and fragmentation pose a major threat to biodiversity globally and is particularly relevant to Fynbos habitats. Within the CFK many of the lower lying areas is under pressure from agriculture, urbanization and alien plant invasion, which means that many of these range restricted plant species are also under severe pressure and even threat of extinction as habitat becomes more and more fragmented. Remaining fragments are often characterised by increased isolation and increased anthropogenic modified surroundings (loss of connectivity), which impacts negatively on biodiversity.

South Outeniqua Sandstone Fynbos occurs on the southern slopes of the Outeniqua Mountains from the Cloetesberg northeast of Albertinia in the west to the upper reaches of the Keurbooms River where it borders on FFs 20 Tsitsikamma Sandstone Fynbos. It includes sandstone outcrops on the lowlands from the vicinity of the Goukamma River near Knysna in the west and Komkromma Point near Nature's Valley in the east. Altitude from the coast to 1 579 m on Cradock's Berg north of George (Smit *et. al.,* 2006).

4.3. CRITICAL BIODIVERSITY AREAS & ECOLOGICAL CORRIDORS

The 2017 Western Cape Biodiversity Spatial Plan (WCBSP) includes a map of biodiversity importance for the entire province, covering both the terrestrial and freshwater realms, as well as major coastal and estuarine habitats (Pool-Stanvliet, 2017). The WCBSP is the product of a systematic biodiversity plan that delineates, on a map, Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services (CapeNature, 2017).

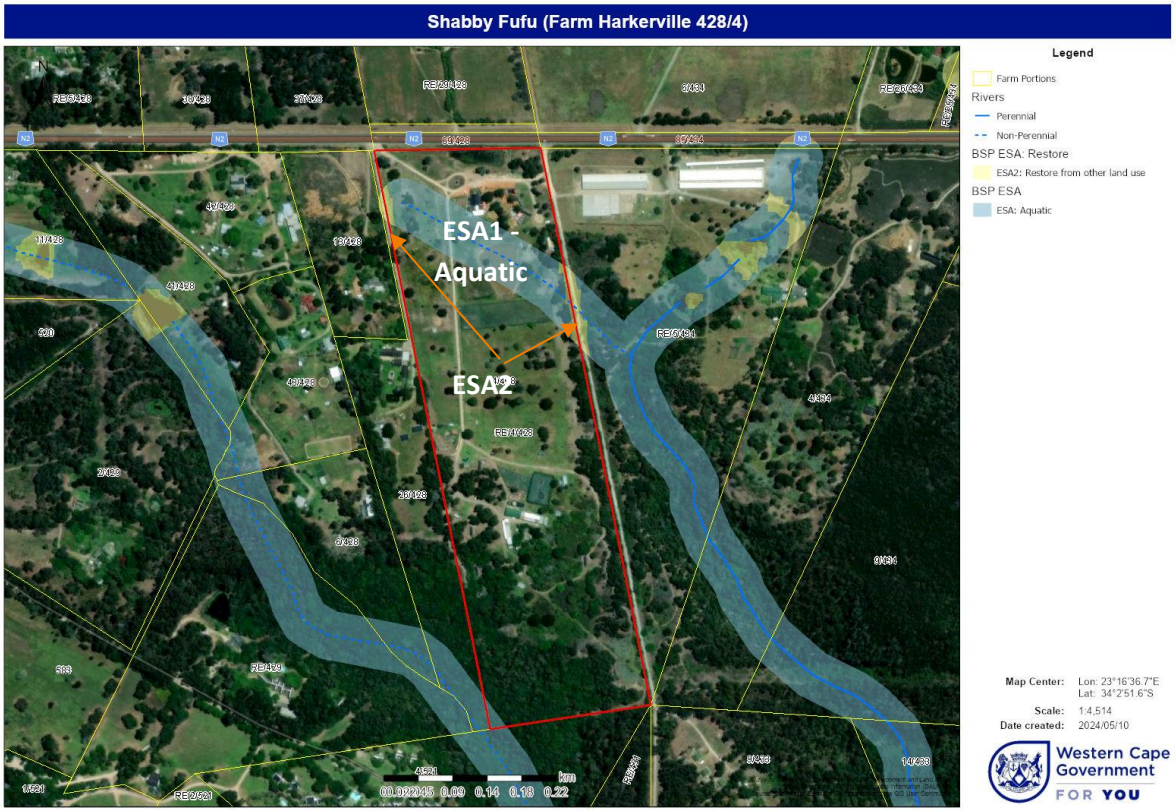

Figure 10: Western Cape Biodiversity Spatial Plan (2017) showing the study area and associated critical biodiversity areas.

Critical biodiversity areas (CBA's) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (SANBI 2007). The primary purpose of CBA's is to inform land-use planning to promote sustainable development and protection of important natural habitat and landscapes. CBA's can also be used to inform protected area expansion and development plans.

- **Critical biodiversity areas (CBA's)** are 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. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses.
- **Ecological support areas (ESA's)** are areas that are not essential for meeting biodiversity representation targets/thresholds, but which nevertheless play an important role in

supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas.

According to 2017 Western Cape Biodiversity Spatial Plan (WCBSP) for this Bitou Municipality, the dam might have impacted on an aquatic ecological support area (ESA1) (CapeNature, 2017) (Figure 10)**.** However, it would seem that the original watercourse had been impacted and even transformed as a result of past agricultural practices. Historical Google Images (Refer to Figure 3) seems to indicate that the site had been used for agricultural purposes (likely ploughed) and the original stream had been incorporated into the agricultural landscape (compromising it's aquatic integrity and riparian vegetation).

4.4. WATERCOURSES AND WETLANDS

According to SANBI BGIS information a watercourse, a watercourse used to run from west to east through the top half of the property (Figure 10) and the newly constructed dam seems to have been built within this watercourse. The site visit shows that the dam is located in a natural depression (and, according to the landowner, is filled from natural drainage from the road). The stream had been totally degraded as a result of historical agricultural activities. No riparian vegetation remains, and the stream had basically been integrated into the agricultural landscape (grazing pastures). According to the landowners, the dam was built as a feature of the development and to attract bird life and its water is not used for any purpose other than to establish a manmade wetland.

The **DFFE Screening Tool** report (Appendix 2) rates the relative Aquatic biodiversity theme sensitivity as of **Very High Sensitivity**. As a result, a freshwater specialist had been appointed to evaluate the aquatic impact of the construction of the dam. From a terrestrial point of view, the site visit confirmed that the original stream had been all but compromised as a result of past agricultural practices. The riparian sone had been removed and the whole landscape had probably been ploughed as part of one larger camp, used for agriculture or to establish grazing.

4.5. LANDUSE AND COVER

Historical Google Images shows that the property had been used for agriculture on and before 2004. Most of the property had been cleared of natural vegetation. Portions of the cleared area had been used for crop cultivation, while the rest had probably been used for grazing (most likely ploughed to establish or promote the growth of grasses for grazing) (Figure 3 to Figure 8).

According to landowners, municipal approval was obtained for the development of the Shabby Fufu development.

5. THE VEGETATION & FLORA

The property is about 16 ha in size most of which had been used for agricultural purposes (crop cultivation and grazing) in the past (and according to the current landowners, was still used for grazing when they bought the property). The last physical clearing was probably around 2004 – 2006, although Google Images from 2013 (Figure 5) suggest some further disturbances, which could be physical clearing or a fire.

Figure 11: Google Image showing the current landuse and historical disturbance footprint (orange).

5.1. THE VEGETATION ENCOUNTERED

The site visit confirmed that most of the property had been disturbed as a result of past landuse practices (the orange area in Figure 11). Of the disturbed area, especially the top two-thirds had been severely impacted, while the southern part of the old agricultural area had been allowed to slowly recover and portions is now covered with a good layer of indigenous vegetation (although mostly still early successional species or pioneer species).

5.1.1. THE PLOUGHED NORTHWESTERN CORNER

The north-western corner of the site had been ploughed in the past (evidence of the plough lines are still visible today) but has probably been laying fallow since 2006/07. It is now fenced and used as a holding camp for larger domestic animals (horses and donkeys) (Photo 1 to Photo 3). Today a number of shrubs patches and small trees can be observed within this area, but they are mostly hardy indigenous and weedy shrubs with a tree overstory of alien invasive trees (e.g., *Pinus* species, *Acacia mearnsii*, *Acacia melanoxylon* and even the occasional *Sesbania*).

The shrub patches are typically dominated by *Nidorella ivifolia* (bakbos), *Dicerothamnus rhinocerotis*

(renosterbos), *Anthospermum aethiopicum,* or *Helichrysum* cf. *pandurifolium* (kooigoed) (all of them widespread species, often abundant in disturbed veld) and on this property often in combination with dense stands of the thorny alien bramble (*Rubus* species). Other species included *Helichrysum foetidum*, patches of the fern *Pteridium aquilinum* (bracken fern), *Searsia laevigata*, the occasional *Cyperus congestus* (dense flat-sedge) and *Zantedeschia aethiopica* (varkblom) near wetter areas.

Alien weedy species (e.g. *Solanum* species & *Ricinus communis*) as well as fruit trees (e.g. *Psidium cattleyanum* or cherry guava) and ornamental trees such as *Paulownia tomentosa* and *Cinnamomum camphora* or kanferboom were also observed.

Photo 1: Looking from north to south over the fenced camp in the north western corner of the site. Note the larger alien trees and the disturbed shrub layer.

Photo 2: Looking from the western boundary east over the middle of the camp, showing one of the typical shrub patches, dominated by *Nidorella ivifolia* (and Blackwattle) to the back, dense stands of bramble in the foreground and *Helichrysum* cf. *pandurifolium* in the middle of picture.

Photo 3: A patch of bracken fern in the northern western camp (near the area where the old watercourse would have been located).

5.1.2. REMAINDER OF THE OLD FIELDS

Apart from the southeastern corner, the rest of the area originally used for agriculture (Orange in Figure 11) was just as disturbed or even more so and for the most part characterized by open grassy areas dominated by alien invasive trees. The area where the dam has been constructed seems to have totally transformed over time. Although the dam is located in a natural depression, no riparian vegetation remains, either above or below the dam (Photo 4 & 5).

Photo 4: Looking from the Shabby Fufu playground south onto the dam. Note the general degraded status of the veld, the scattered alien *Pinus* and *Acacia* trees. The vegetation in the background is a *Protea* orchard planted for its flowers.

Photo 5: Looking from west to east, towards the constructed dam (the area where the original watercourse would have been expected). Note the planted *Protea* orchard in the foreground and to the right. The degraded status of the rest of the property is clearly visible.

Google Images from 2006 onwards seems to indicate that this portion of the property had been laying fallow (although probably still used for grazing) and was slowly invaded by alien invasive species with the occasional patch of hardy indigenous species in open areas. Pine trees are scattered throughout the site with *Acacia mearnsii* and *Acacia melanoxylon* sometimes forming dense patches, especially along the eastern boundary (Photo 6 - Photo 8). Just as described above the patches of indigenous species consisted of hardy species, often abundant or associated with disturbed areas, such as *Dicerothamnus rhinocerotis, Helichrysum* cf. *pandurifolium*, *Anthospermum aethiopicum*, *Pteridium aquilinum, Nidorella ivifolia* often in association with invasive shrubs such as bramble (*Rubus* species) (Photo 9 & Photo 10). In the undergrowth beneath some of the alien trees larger shrubs/small trees such as *Searsia laevigata, Searsia* cf. *tomentosa*, *Gymnosporia heterophylla* were occasionally observed. Various non-indigenous ornamental trees were scattered throughout or planted along access roads. A few *Burchellia bubalina* (wild pomegranate) were observed along the western boundary (it is unsure whether they occurred naturally or had been planted as ornamental trees.

Photo 6: Looking from west to east onto the eastern boundary of the site. Note the dense stands of alien invasive species, mostly dominated by *Acacia melanoxylon*.

Photo 7: Looking from northeast towards the southwest over the middle of the site. Note the alien invasive species, infrastructure and the general degraded status of the area.

Photo 8: Looking from west to east over the middle portion of the site, showing scattered pine trees and other alien invasive species to the back.

Photo 9: One of the hardy shrub patches observed in small, protected areas between the alien invasive species. *Helichrysum*, *Anthospermum* and even bracken fern observed in this patch.

Photo 10: Another patch of hardy (mostly) indigenous pioneer species that has started to re-establish itself in protected open areas.

5.1.3. THE SOUTHEASTERN CORNER OF THE ORIGINALLY DISTURBED AREA

Just behind (south) of the storage areas and main buildings in the southern portion of the site an area of vegetation were encountered that seems to have been protected from fire and grazing for more than 15 years. Although this area had been cleared and grazed in the past, a dense stand of mostly indigenous vegetation is starting to show, although still dominated by hardy early successional or pioneer species.

Photo 11: Looking from east to west onto the areas discussed above. This picture was taken just south of the main building and shows an early successional fynbos shrubland, dominated by *Anthospermum aethiopicum,* with *Helichrysum foetidum* showing its yellow flowers.

Photo 12: Slightly further south of the main buildings (south of Picture 11).

Photo 11 shows the start of this patch, still mostly dominated by pioneer species such as *Anthospermum aethiopicum, Helichrysum* cf. *pandurifolium, Dicerothamnus rhinocerotis. Pteridium aquilinum* and *Helichrysum foetidum,* with a slight increase in species diversity as one moves further south (Photo 12). Unfortunately, it also included patches of the invasive/naturalised sword fern *Nephrolepis cordifolia, Acacia mearnsii, Acacia melanoxylon, Pinus* species as well as the occasional *Cinnamomum camphora* (kanferboom). Further south species such as *Erica* cf. *formosa, Erica* cf. *gracilis* and *Gnidia oppositifolia* were occasionally observed (Photo 14), while the woody component (e.g., *Searsia laevigata, Searsia* cf. *tomentosa*, *Gymnosporia heterophylla, Halleria lucida*) seems to increase.

Photo 13: A photo of the log cabin located within a small clearing within the wooded area.

Photo 14: One of the *Erica* species observed occasionally to the south of the site.

However, the proteoid and restioid component were still missing which shows the disturbed/early successional status of this vegetation.

5.2. FLORA ENCOUNTERED

Table 8 gives a list of the plant species encountered during this study. It is important to note that the species list is only based on a one-day site visit and that the purpose of the study was not to do a full botanical study, but rather to evaluate veld conditions. It is likely that some species might have been missed. However, the author is confident that a good understanding of the vegetation status was achieved and confidence in the findings is high.

Table 8: List of plant species observed within the proposed development footprint.

NO.	SPECIES NAME	FAMILY	STATUS	LOCATION
1.	*Acacia mearnsii*	FABACEAE	**Invasive Alien species**	
2.	*Acacia melanoxylon*	FABACEAE	**Invasive Alien species**	
3.	*Anthospermum aethiopicum*	RUBIACEAE	LC	Widespread species,
4.	*Burchellia bubalina*	RUBIACEAE	LC	Wild pomegranate – a small tree occasionally observed.
5.	*Cinnamomum camphora*	LAURACEAE	Naturalised alien species in the Eastern Cape.	Kanferboom – ornamental tree planted throughout the site.
6.	*Cyperus congestus*	CYPERACEAE	LC	Dense flat-sedge – widespread species occasional encountered.
7.	*Dicerothamnus rhinocerotis*	ASTERARCEA	LC	Renosterbos – relatively common in disturbed open areas.
8.	*Erica* cf. *formosa*	ERICACEAE	LC	Occasionally in the dense regrowth to the south.
9.	*Erica* cf. *gracilis*	ERICACEAE	LC	Occasionally in the dense regrowth to the south..
10.	*Gnidia oppositifolia*	THYMELAEACEAE	LC	Occasionally in the dense patch of regrowth to the southwest.
11.	*Gymnosporia heterophylla*	CELASTRACEAE	LC	Relatively common in woody areas
12.	*Halleria lucida*	STILBACEAE	LC	Occasionally in the dense regrowth to the south.
13.	*Helichrysum cf. pandurifolium*	ASTERACEAE	LC	Kooigoed – widespread often observed throughout the site.
14.	*Helichrysum foetidum*	ASTERACEAE	LC	Stinksewejaartjie – widespread species, often associated with watercourses.
15.	*Nephrolepis cordifolia*	NEPHROLEPIDACEAE	**Invasive Alien Species**	Sword fern, observed to the north and south of the site.
16.	*Nidorella ivifolia*	ASTERACEAE	LC	Bakbos – Often abundant in disturbed areas.
17.	*Paulownia tomentosa*	PAULOWNIACEAE	Potential Invasive Alien species	Empress tree – ornamental trees planted along driveways.
18.	*Pinus* species	FABACEAE	**Invasive Alien species**	
19.	*Psidium cattleyanum*	MYRTACEAE	**Invasive Alien species**	
20.	*Pteridium aquilinum*	DENNSTAEDTIACEAE	LC	Bracken fern –occasionally observed within shrub layer.
21.	*Ricinus communis*	EUPHORBIACEAE	**Invasive Alien species**	
22.	*Rubus* species	ROSACEAE	**Invasive Alien species**	Bramble - Common in the undergrowth in disturbed areas.
23.	*Searsia* cf. *tomentosa*	ANACARDIACEAE	LC	
24.	*Searsia laevigata*	ANACARDIACEAE	LC	
25.	*Searsia longispina*	ANACARDACEAE	LC	
26.	*Sesbania punicea*		**Invasive Alien species**	
27.	*Zantedeschia aethiopica*	ARACEAE	LC	Varkblom – occasionally near wetter areas.

5.3. THREATENED AND PROTECTED PLANT SPECIES

South Africa has become the first country to fully assess the status of its entire flora. Major threats to the South African flora are identified in terms of the number of plant taxa Red-Listed as threatened with extinction as a result of threats like, habitat loss (e.g. infrastructure development, urban

expansion, crop cultivation and habitat fragmentation), invasive alien plant infestation (e.g. outcompeting indigenous plant species), habitat degradation (e.g. overgrazing, inappropriate fire management etc.), unsustainable harvesting, demographic factors, pollution, loss of pollinators or dispersers, climate change and natural disasters (e.g. such as droughts and floods). South Africa uses the internationally endorsed IUCN Red List Categories and Criteria in the Red List of South African plants. However, due to its strong focus on determining risk of extinction, the IUCN system does not highlight species that are at low risk of extinction but may nonetheless be of high conservation importance. As a result, SANBI uses an amended system of categories to highlight species that may be of low risk of extinction but are still of conservation concern (SANBI, 2015).

Table 9: A summary of finding in terms of the status of threatened or protected plant species observed.

	SPECIES OBSERVED	STATUS
Red list of South African plant species: The Red List of South African Plants online provides up to date information on the national conservation status of South Africa's indigenous plants (SANBI, 2020).	No red-listed species observed.	N/a
NEM:BA protected plant species: The National Environmental Management: Biodiversity Act, Act 10 of 2004, provides for the protection of species through the "Lists of critically endangered, endangered, vulnerable and protected species" (GN. R. 152 of 23 February 2007).	No NEM:BA protected species observed.	N/a
NFA Protected plant species: The National Forests Act (NFA) of 1998 (Act 84 of 1998) provides for the protection of forests as well as specific tree species (as updated).	No NFA protected species observed	N/a

5.4. PLANT SPECIES SENSITIVITY THEME

According to the **DFFE Environmental Screening Tool** report for this site (Appendix 2), the **plant species theme sensitivity is considered Low Sensitive**.

No red-listed or protected plant species were observed and the plant species sensitivity rating of **Low Sensitive**, is supported.

6. FAUNA & AVI-FAUNA

The southern coast of South Africa and particularly the Garden route area is offer some of the most beautiful scenic areas and is often considered a natural paradise. The Garden Route National Park is home to some 85 species of mammals including Elephant (it is estimated that in the 1880s that there were between 400 - 600 Elephants roaming the Knysna Forests but today their numbers are possibly as low as 10 or less). The forests are home to Bushbuck and Blue Duikers while Common Eland can be found on the slopes in the east, and the Common Duiker are sometimes observed in clearings. Savanna Baboons, Vervet Monkeys and Rock Hyrax or Dassies are common. One of the main wildlife attraction in this region are birds of which 371 species of birds found in the reserve (including 45 are nomadic species). It include 15 species of Duck and Goose, such as Yellow-billed Duck, Cape Shovler and African Black Ducks, while the African (black) Oystercatcher is a rare resident along the coast. https://www.nature-reserve.co.za/wildlife-garden-route-national-park.html.

Within the Shabby Fufu property it is expected that some of the smaller animals, snakes and even some of the antelope might be observed from time to time, but they will not be common because of past and present anthropogenic impacts and constant human activity.

No fauna or avi-fauna screening was done as part of this study, but observations were made during the site visit (including droppings & burrows).

6.1. MAMMALS

Although Fynbos is not known for its high animal biomass, the nearby Garden Route National Park still supports an impressive diversity of mammal species although most of these are smaller mammals (Table 10). The remainder of Portion 4 of Farm Harkerville 428 (study area), however, is located in an area characterized by a long history of agricultural, forestry and tourist driven anthropogenic activity. As a result, none of the larger game, except maybe bushbuck (and then only to the south), is expected on the property. This would have been true even before the construction and activities associated with the Shabby Fufu development.

However, two sensitive species (Duthie's golden mole and Sensitive Species 8) might be encountered on site or in the surrounding areas (Refer to Table 11).

Table 10: List of mammal species encountered in the Garden Route National Park (Source: https://www.sanparks.org/parks/garden-route/explore/fauna-flora/mammals).

Common Name	Scientific Name	Common Name	Scientific Name
African elephant	*Loxodonta africana*	Grey rhebuck	*Pelea capreolus*
Black clinging bat	*Miniopterus fraterculus*	Grysbok	*Raphicerus melanotis*
Blue duiker	*Cephalophus monticola*	Honey badger	*Mellivora capensis*
Bushbuck	*Tragelaphus scriptus*	Hottentot golden mole	*Amblysomus tottentotus*
Bushpig	*Potamochoerus porcus*	Klipspringer	*Oreotragus oreotragus*
Cape dune molerat	*Bathyergus suillus*	Knysna golden mole	*Amblysomus iris*

Common Name	Scientific Name	Common Name	Scientific Name
Cape grey mongoose	*Herpestes pulverulentus*	Kuhl's bat	*Pipistrellus kuhlii*
Cape hairy bat	*Myotis tricolor*	Large grey mongoose	*Herpestes ichneumon*
Cape horseshoe bat	*Rhinolophus capensis*	Large-spotted genet	*Genetta tigrina*
Cape molerat	*Georychus capensis*	Leopard	*Panthera paradus*
Cape mouse	*Praomys verreauxi*	Long-eared bat	*Nycteris thebaica*
Cape porcupine	*Hystrix africaeaustralis*	Long-tailed housebat	*Eptesicus hottentotus*
Cape wild cat	*Felis lybica*	Red musk shrew	*Crocidura flavescens*
Caracal	*Felis caracal*	Rock dassie	*Procavia capensis*
Chestnut climbing mouse	*Dendromus mesomelas*	Scrub hare	*Lepus saxatilis*
Clawless otter	*Aonyx capensis*	Serval	*Felis serval*
Common molerat	*Cryptomys hottentotus*	Striped polecat	*Ictonyx striatus*
Duthie's golden mole	*Chlorotalpa duthiae*	Vervet monkey	*Cercopithecus pygerythrus*
Forest mouse	*Thamnomys dolichurus*	Vlei rat	*Otomys irroratus*
Forest shrew	*Mysorex variatus*	Water mongoose	*Atilax paludinosus*
Geoffroy's horseshoe bat	*Rhinolophus clivosus*	Wooly bat	*Kerivoula lanosa*

6.2. AVI-FAUNA

According to the Southern Africa Bird Atlas Project 2 (SABAP 2) data sets, about 179 bird species are known from this pentad (https://sabap2.birdmap.africa/) (Refer to Figure 12 & Appendix 3). However, many of these species are associated with the forest biome and waterbodies.

Sandstone Fynbos can potentially attract a number of bird species and even fragments of remaining natural veld can be used by birds as stepping stones (Sandberg *et.al*., 2016). However, the poor condition of the remaining natural veld on this property would most likely have impacted negatively on species diversity over time. Given the disturbed nature of the study area and the existing agricultural and anthropogenic history, it is considered unlikely that the construction and operation of the Shabby Fufu facility would have added significantly to the existing impact on bird species. The construction of the dam might even attract some bird species to the site, while allowing the fynbos to recover in the southern portion of the site will also have a positive impact over time.

One sensitive species (the crowned eagle) have been identified in the DFFE screening report (Appendix 2), that might be encountered in this area (Refer to Table 11), although, according to SABAP2, this species had not been observed in this pentad.

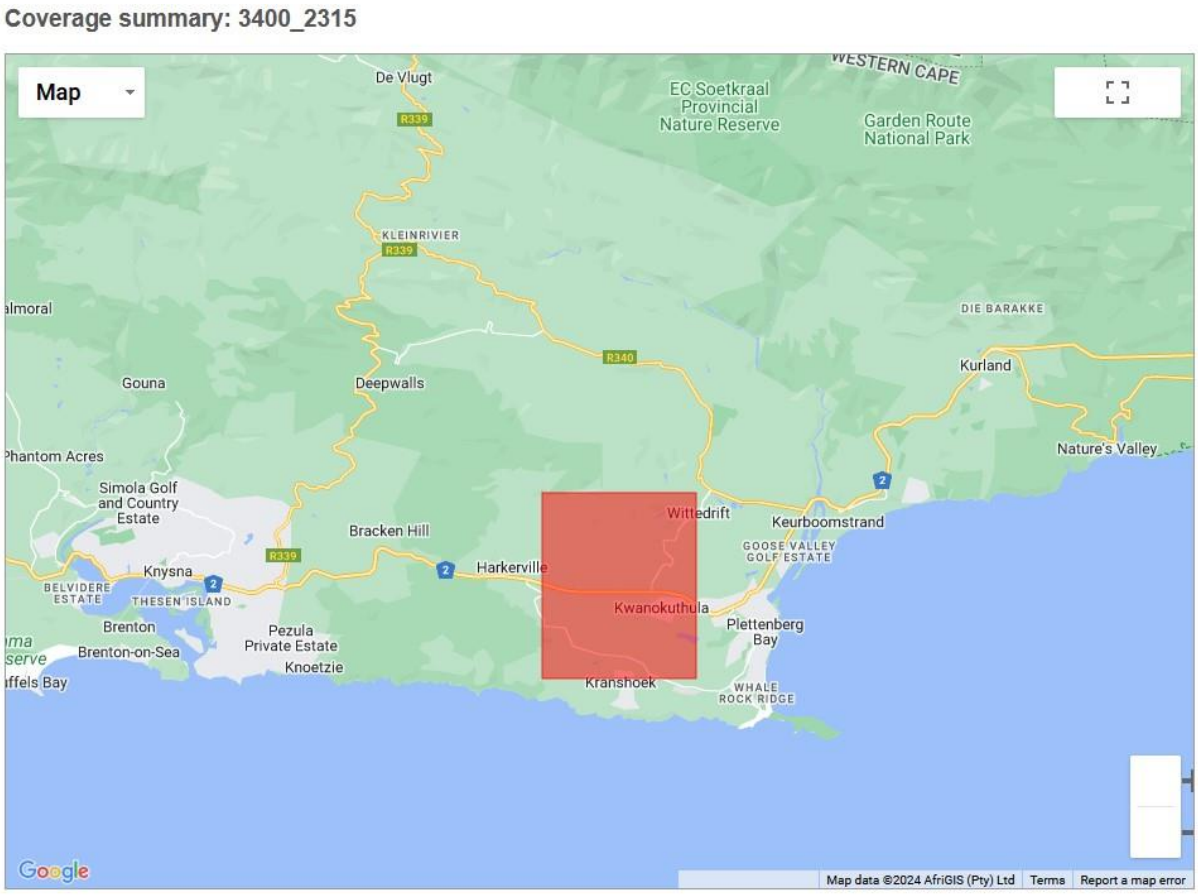

Figure 12: A map showing the location of the applicable Pentad (source SABAP2)

6.3. REPTILES, AMPHIBIANS & INSECTS

The Garden Route National Park's (GRNP) position within two vegetation biomes, contributes to a range of habitats in diverse successional stages that no doubt harbour rich species diversity. The following information was sourced from the 2012 Garden Route National Park Management Plan.

6.3.1. REPTILES & AMPHIBIANS

According to the Garden Route National Park Management Plan (2012), the GRNP forms the eastern limit of a distinct zoogeographic zone, called the Cape Faunal Centre where the fauna gradually changes to include more Ethiopian elements characteristic of much of Africa. Unfortunately, little is known of the reptiles inhabiting the National Parks of the eastern and southern Cape, but the reserve is home to 25 snake species, including venomous species like the Cape Cobra and Puff Adder. A checklist of the herpetofauna of the Tsitsikamma National Park list a total of 38 species (including marine species), which includes amongst others, 2 tortoise species (the Leopard and Agulate tortoises - both relatively uncommon), 8 lizards (including geckos, a chameleon, skinks and lizards), 11 snakes and 13 amphibian species (Branch *et. al.*, 1987). About twenty-two amphibian species, 10 genera and six families are known from the GRNP.

According to the DFFE screening report (Appendix 2), one sensitive amphibian species (the Knysna banana frog) might be encountered in this area (Refer to Table 11).

6.3.2. INVERTEBRATE

According to the GRNP Management Plan (2012) invertebrate surveys within the GRNP have been uncoordinated and are not representative of the entire GRNP and large parts have never been surveyed. Existing data relies largely on scattered records and species descriptions for individual taxa. However, an ancient life form found in the forest areas namely, *Peripatus*, is believed to have survived unaltered for 500 million years and is considered a living fossil dating back to the Cambrian period (Hey, 1973 cited in Cameron, 1982 in the GNPR Management Plan, 2012). According to the 2012 Garden Route National Park Management Plan, members of *Onycophora*, a rare, primitive Arthropod phylum, are relatively abundant in the Harkerville area and a number of apparently new species of *Drosophilae* were also collected in this area.

Endangered species that possibly occur (Picker et al, 2004) in the GRNP include all the *Colophon* (Stag Beetles) spp. The genus is highly sought after by collectors and is thus listed as a red data book genus.

According to the DFFE screening report (Appendix 2), one sensitive insect ant two sensitive invertebrate species might be encountered in this area (Refer to Table 11).

6.4. ANIMAL SPECIES THEME SENSITIVITY (AVES)

According to the **DFFE National Web Based Environmental Screening Tool** the relative Animal species theme sensitivity is considered of **Medium Sensitivity** because of the potential presence of the species discussed in Table 11.

Table 11: Discussion of the animal species theme as informed by the DFFE Environmental Sensitivity Screening results.

SPECIES	STATUS & DISCUSSION
Amphibia - Medium *Afrixalus knysnae* (Knysna banana frog) **Endangered (EN)**	**Status**: The Knysna banana frog is listed as **Endangered**, in view of its small extent of occurrence, the area of occupancy being 27 km^2, with all individuals in five locations, and a continuing decline in the quality of its habitat, area of occupancy, and number of mature individuals. Habitat decline is due to encroachment by urban development, alien invasive vegetation, chemical pollution, and trampling by livestock (Channing *et. al*., 2016). **Distribution**: This species is known from around five locations at low altitudes, on either side of the border between the Eastern Cape and Western Cape Provinces in South Africa. It was rediscovered at Covie in 2011, where it was previously thought to be extinct (W. Conradie pers. comm. August 2016). It occurs up to 300 m asl (Channing *et. al*., 2016 ; IUCN SSC Amphibian Specialist Group). According to the SA FrogMap (2024), this species occurs from Groenvlei (3422BB) in the west to Covie (3323DC) in the east and is confined to the coastal region by the Outeniqua and Tsitsikamma mountains (Minter *et. al*., 2004). **Habitat**: It occur in inland freshwater habitats and lives in a coastal mosaic of vegetation types, including mountain fynbos heathland and forest (Channing *et. al*., 2016). **Breeding**: It breeds in small dams and shallow semi-permanent water with much emergent vegetation, and even in well vegetated ornamental garden ponds. It is suspected that this species requires high water quality for breeding. Species in this genus deposit between 20 and 50 eggs on vegetation above water, folded in a grass

SPECIES	STATUS & DISCUSSION
	leaf. Tadpoles emerge, drop into the water and remain there until metamorphosis (Channing *et. al*., 2016).
Aves – Medium *Stephanoaetus coronatus* (Crowned Eagle) **Vulnerable (VU)**	**Status**: The Crowned Eagle is classified as **vulnerable** (population size estimated to number less than1 000 mature individuals) and the regional population is projected to undergo a continuous decline that may exceeds 10% over the next three generations (Taylor, 2015). The species is widespread throughout sub-Saharan Africa where it occurs from the lowland forests of West Africa, across to Ethiopia, and southwards to South Africa (Ferguson-Lees and Christie 2001). In southern Africa, it is restricted to Zimbabwe, central Mozambique and eastern South Africa and Swaziland, where it is strongly associated with Lowveld and escarpment forests, including riparian forest along the Limpopo and Luvuvhu rivers. Incidental records from SABAP2 show birds ranging as far west as the Overberg, Western Cape. Globally, this species is threatened by persecution through trapping, shooting and nest destruction, competition for prey from humans, and habitat loss through deforestation (Ferguson-Lees and Christie 2001). **Diet**: Crowned Eagles have been known to predate on small stock animals, chickens, dogs and domestic cats (Daneel, 1979), bringing the species into conflict with humans and resulting in persecution by stock farmers (Brown, 1982). The loss of forest habitat has had a relatively small negative impact on the species because it has been able to adapt relatively well to nesting in alien plantations.
Insecta - Medium *Aloeides thyra orientis* (The Red Copper) **Endangered (EN)**	**Status**: The Red copper is an **endangered** butterfly in the family Lycaenidae. It is a range restricted taxon, endemic to the southern coastal regions of the Western Cape Province (South Africa). There are only six known locations (including four for which taxonomic uncertainty exists). It is believed to occur from Witsand to Gouritsmond in the west, to Brenton Peninsula near Knysna in the east. There is a continuing decline in, area, extent and quality of its habitat. The Brenton Peninsula location is a case in point, where a formerly widespread and large single subpopulation has become fragmented through the building of roads, houses, infrastructure, agricultural activities and the spread of alien vegetation, into 5 smaller subpopulations where demographic or genetic interchange has now been compromised (Edge, *et. all*., 2018). **Habitat**: It is found in coastal fynbos on flat sandy ground (either naturally occurring or from anthropogenic disturbances such as footpaths or unsurfaced track) between 40 m to 240 m above sea level. Property development in these coastal habitats is an ever present threat and has already caused the loss of several subpopulations in the Knysna and Stilbaai areas. The reduction in frequency of fires near human habitation is also believed to have a detrimental effect on this species by leading to shading out of the habitat. The build-up in fuel-load can also lead to very severe fires, which have the potential to wipe out subpopulations (for example, the high intensity fires which took place in June 2017 around Knysna) (Edge, *et. all*., 2018). **Host plants**: The larvae feed on *Aspalathus acuminata*, *A. laricifolia* and *A. cymbiformis*. The larvae are attended to by *Lepisiota capensis* ants (Woodhall, 2005 – Source: Wikipedia).
Mammalia - Medium *Chlorotalpa duthieae* (Duthie's golden mole) **Vulnerable (VU)**	**Status & Distribution**: Duthie's golden mole is endemic to South Africa and considered **vulnerable**. It is fairly common in suitable habitats (Bronner & Jenkins, 2005), but is known from only nine locations in southern Cape Afrotemperate Forests, clustered in two subpopulations: an eastern subpopulation in the suburban parts of Port Elizabeth (three locations) where it occurs in pasture, agricultural land

SPECIES	STATUS & DISCUSSION
	and gardens; and a western subpopulation in the indigenous coastal forest belt from Wilderness to Tsitsikamma (six locations). Gene flow between these two subpopulations seems unlikely owing to intervening drier Strandveld habitats. This species tolerates mild habitat alteration and can be common in suburban gardens and pasturelands adjoining natural forests. As a result, it is likely to occur more widely than current records indicate. This taxon is not deemed severely fragmented as the (presumably isolated) eastern subpopulation occupies less than 50% of the observed or inferred area of occupancy (Bronner *et. al.*, 2014). About 60% of the forests in which the western subpopulation occurs are conserved within nature reserves and thus buffered from habitat alteration (inferred to be the main threat to this species). However, the extent and quality of their preferred forest habitats at some locations outside protected areas, are clearly being impacted by housing and tourism developments that are expanding along the entire coastline of this subpopulation. None of the eastern subpopulation locations are currently formally protected, and both the number of locations and the quality and extent of habitat are likely to decline as the city of Port Elizabeth continues to expand rapidly (Bronner *et. al.*, 2014). **Habitat & Diet**: The mole occurs on alluvial sands and sandy loams in Southern Cape Afrotemperate forests (especially coastal platform and scarp forest patches) in the Fynbos and Moist Savanna biomes. Coexists with *Amblysomus corriae* in parts of their range, but trapping data suggest that *A. c. corriae* prefers fynbos and forest fringes, and *C. duthieae* deeper forest. It thrives in cultivated areas and gardens. Adults are solitary, but up to four individuals per hectare have been trapped on the same night, suggesting that population densities are relatively high in areas of suitable habitat (Bronner *et. al.*, 2014). This mole digs an underground nest under the base of a tree and creates shallow passages radiating out into the surrounding area. It forages, mainly at night, in these tunnels and in the leaf litter, feeding mainly on earthworms. Little is known of the animal's breeding habits, but one female was recorded as being pregnant in the spring (November) with a litter of two young. The barn owl is a predator of this species ((Bronner & Jenkins, 2005).
Mammalia - Medium *Sensitive Species 8* (Antelope) **Vulnerable (VU)**	**Status & distribution**: Sensitive Species 8, refers to a small antelope that is considered **vulnerable**. It occurs in forested areas throughout western, central, eastern and southern Africa. Within southern Africa, it occurs in eastern Zimbabwe, parts of central Mozambique (IUCN SSC Antelope Specialist Group 2016), and along the eastern seaboard of South Africa. This species has a disjunct distribution between the eastern coastal forests of South Africa and the rest of its range. In South Africa, the species is inferred to be declining due to forest habitat loss from ongoing development along the coastal belt, illegal sand mining and indigenous timber extraction, while an increase in bushmeat poaching and hunting with domestic dogs are also suspected to be directly causing a decline in the number of mature individuals. Preliminary data indicate that around half the subpopulations on protected areas and private lands are declining. This antelope is estimated to be unable to disperse further than 0.88 km between forest patches (Venter *et. al.* 2016). **Habitat & Diet**: This species exist in a wide range of forested and wooded habitats, including primary and secondary forests, gallery forests, dry forest patches, coastal scrub farmland and regenerating forest (Hart & Kingdon 2013). In South Africa, they occur mainly within scarp and coastal forests, thickets or dense coastal bush (Skinner & Chimimba 2005), although they can occupy modified habitats. They frequent forest glades and open areas but need dense underbrush to rest or take cover. They are selective foragers which mainly feed on fruit, dicots and a small percentage of monocots (Hanekom & Wilson 1991; Gagnon & Chew 2000). They are a diurnal species, commonly living in pairs, with small mean home ranges (Bowland

SPECIES	STATUS & DISCUSSION
	& Perrin 1995; Mockrin, 2010). Substantial spatiotemporal variation in population densities has been recorded in the Garden Route National Park, Western Cape, and subpopulation densities were found to be affected by features of forest structure, moist versus dry forest types and geological substrate (Seydack *et al*. 1998). Frugivores like this species, are very important seed dispersers in forest ecosystems (Brodie & Maron, 2009; Abernethy & Maisels, 2013) and the ecosystem service they provide is crucial for ecosystem functioning. It forms a significant proportion of the diet of forest carnivores (Hanekom & Wilson 1991; Braczkowski & Randall, 2012) and it is also suspected that this species play a role in pruning tree seedlings, thus shaping forest succession.
Invertebrate - Medium *Aneuryphymus montanus* Yellow-winged Agile Grasshopper **Vulnerable (VU)**	**Status**: The Yellow-winged Agile Grasshopper is a **vulnerable** endemic to the Cape region of South Africa. The continuing decline in the quality of habitat have resulted in a continuing decline in the number of mature individuals inferred. It is only known from six localities in the Cape region of South Africa (Hochkirch *et. al*., 2018). **Habitat**: The species is associated with fynbos vegetation, where it has been collected "amongst partly burnt stands of evergreen sclerophyllous plants in rocky foothills" (Brown, 1960 in Hochkirch *et.al.*, 2018). It prefers south-facing cool slopes (Kinvig, 2005 in Hochkirch *et.al*., 2018).

6.4.1. ANIMAL SPECIES THEME SENSITIVITY: CONCLUSIONS

The following is a summary (per species) of the discussions in Table 11 with regards to the potential impacts on the identified sensitive animal species that might have been impacted by the Shabby Fufu development and associated activities:

6.4.1.1. AMPHIBIANS

The endangered Knysna banana frog (*Afrixalus knysnae*): The property falls within the geographical distribution range for this species. It occurs in inland freshwater habitat, where it breeds in small shallow dams with semi-permanent water of good quality with a good representation of emergent vegetation (even well vegetated ornamental garden ponds). There is one small pond/dam (next to the N2) with emergent vegetation that might be considered a suitable habitat for this species (Photo 15). However, the development did not impact this pond (in fact a further dam has been established) and it seems as if the owners are committed to protecting this dam as a water feature of the development. The new dam might, over time, add to its potential habitat (but at the moment it does not have a suitable cover of emergent vegetation or contain good water quality). It is considered unlikely that the development (to date) would have resulted in any significant additional impact on the habitat for this species.

With regards to this project the sensitivity rating is considered to be **Low Sensitive, BUT ANY FUTURE ACTIVITY THAT MIGHT IMPACT ON THE SMALL DAM MUST BE DONE WITH CARE.**

Photo 15: A photo of the small pond next to the N2 just north of the parking area in front of the Shabby Fufu Restaurant.

6.4.1.2. AVES

The vulnerable Crowned eagle (*Stephanoaetus coronatus*): According to SABAP2 this species has not been observed within the pentad associated with the property and it prefers forest vegetation, including riparian vegetation. Most of the property had been severely degraded as a result of historical agricultural practices and alien infestation. However, this species had been able to adapt to nesting in alien plantations. The Shabby Fufu development resulted in very little additional impact on the remaining indigenous vegetation to the south of the site, but the increased human activity might deter future breeding on the property. On the other hand, the bird had not been observed in this pentad, the development itself is small scale and tend to blend into the remaining environment, while the surrounding land-use would have had the same deterring impact on this species. It is thus considered unlikely that the development would have any significant additional impact on the breeding or feeding habitats for this species.

With regards to this project the sensitivity rating is considered to be **Low Sensitive**

6.4.1.3. INVERTEBRATE & INSECTA

The endangered Red copper butterfly (*Aloeides thyra orientis*): The property probably falls slightly to the east of the geographical distribution range for this species and the development footprint impacted almost exclusively on an area that was historically used for agriculture. In addition, no *Aspalathus* species (its host plant) were observed (although *Aspalathus* species might be found on site). Overall, it is considered unlikely that the development would have resulted in any significant additional impact on the habitat or host plants for this species. The seeming commitment of the landowners to encourage the regrowth of natural vegetation to the back of the site, might even be slightly positive in the long run.

With regards to this project the sensitivity rating is considered to be **Low Sensitive**

The vulnerable Yellow-winged Agile Grasshopper (*Aneuryphymus montanus*): The vegetation on the property had been degraded as a result of historical agricultural practices, which is not the preferred habitat for this species, although it may occur in the recovering fynbos patch to the south (which was only slightly impacted by the development). Because of the small development footprint, which mostly impacted already disturbed areas it is considered unlikely that the development would have had any significant impact on the survival of this species. By allowing the fynbos vegetation to recover (protecting it), the current management of the site, might even be to the advantage of this species.

With regards to this project the sensitivity rating is considered to be **Low Sensitive**

6.4.1.4. MAMMALS

The vulnerable Duthie's golden mole (*Chlorotalpa duthieae*): Although no mole activity was observed during the site visit, the property falls within the geographical distribution range for this species, and the disturbed old agricultural fields is considered a likely habitat. It is also listed as occurring in the Garden Route National Park (Table 10). The soils might also be suitable, but the preference of this species for deeper natural forest areas coupled with sandy soils, means that the species will most probably occur towards the southern part of this property (if present). The development resulted in a relatively small impact on old agricultural fields, which might have resulted in a small impact on the movement of a few individuals, but it is unlikely to have impacted on its nesting sites or breeding activities, as a result is considered unlikely that the development would have had any significant additional impact on this species.

With regards to this project the sensitivity rating is considered to be **Low Sensitive**

The vulnerable Sensitive Species 8: Sensitive Species 8, refers to a small antelope occurring in forested and wooded areas (including coastal shrub farmland and regenerating forest) with dense underbrush. The property falls within the geographical distribution range for this species, and it occurs in the Garden Route National Park. Whitin the property, this species might have found suitable habitat towards the back of the property (with its denser shrub vegetation and higher tree cover). However, this area is very small and the site itself is fenced (and located within a landscape with continual human activity), which would made it improbable that this species would have maintained a presence on site. In addition, the development had very little additional impact on the shrubland/woodland to the back of the property.

With regards to this project the sensitivity rating is considered to be **Low Sensitive**

7. TERRESTRIAL BIODIVERSITY THEME SENSITIVITY

According to the DFFE National Web Based Environmental Screening Tool the relative Terrestrial Biodiversity theme sensitivity is considered of **Very High Sensitivity** because it overlaps an aquatic ESA 1, within a Freshwater Ecosystem Priority Area (FEPA) subcatchment and within a Strategic Water Source Area (SWSA) (Refer to Heading 4.3 & Figure 10).

The objective of Aquatic Ecological Support Areas, category 1 (ESA1) are areas that must be maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised. Freshwater ecosystems provide a range of ecosystem services, especially in the context of water scarcity.

Strategic Water Source Areas (SWSA's) are natural source areas for water that supply disproportionally large volumes of water per unit area and are considered national ecological assets, essential for water security in South Africa. These high rainfall areas make up just 10% of the land area of South Africa, Lesotho and Eswatine (Swaziland), but supply 50% of water to these countries.

The National Freshwater Ecosystem Priority Areas (NFEPA) project provides strategic spatial priorities for conserving South Africa's freshwater ecosystems and supports sustainable use of water resources, referred to as Freshwater Ecosystem Priority Areas (FEPA's).

7.1. CONSERVATION STATUS

ESA1 status has been assigned to protect the small stream that runs through the north of the property (Refer to Figure 10). The site visit confirmed that the stream had been totally degraded as a result of historical agricultural activities. No riparian vegetation remains, and the stream had basically been integrated into the agricultural landscape (grazing pastures). The construction of the dam (Figure 7) might have resulted in a small impact on a water source (downstream water delivery) but, because of the degraded state of the watercourse would have had almost no additional impact on the terrestrial or aquatic functioning/ecology of the watercourse. In fact, it might even have a positive impact in terms of establishing a manmade wetland, which could assist towards establishing a more functional system over time.

7.2. INDIRECT IMPACTS

Indirect impacts occur away from the 'action source' i.e., away from the development site. The impact assessed here is specifically how the proposed development would have an indirect impact on vegetation, flora, mammals, birds, reptiles, and invertebrates away from the development site.

The indirect impact in this case is minimal since almost all of the developments impacted on historical agricultural land. The landowners seem to be disposed towards establishing a more natural environment and are actively encouraging the re-generation of natural veld towards the back of the property. The implementation of a well-planned alien eradication program might even result in some positive indirect impacts over time.

Because of the small size of the development footprint, the indirect impact is considered to be **Low Significant**.

7.3. CUMULATIVE IMPACTS

Refer to Table 12. In this impact assessment method, cumulative impacts are calculated by using the worst scenarios for each aspect as input into the cumulative impact calculation.

7.4. THE "NO-GO" ALTERNATIVE

The **"No Go" alternative** is not applicable in this case, as this is an existing development without environmental approval.

7.5. TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

The aim of the terrestrial biodiversity assessment is to evaluate the impacts resulting from the development of the Shabby Fufu lifestyle farm and its associated activities, taking all of the discussion in this report into account. Table 12 aims to rate the significance of the each identified environmental impact associated with the development. It also evaluates the expected accumulative impact of the development.

In Table 12, the colouring and scores relates as follows:

Very Low (Insignificant) = 4-22
Low = 23-36
Medium/Low = 37-45
Medium = 46-55
Medium/High = 56-63
High = 64-79
Very High = 80-100

Table 12: Terrestrial biodiversity impact associated with the proposed development.

Impact assessment								
Aspect	**Mitigation**	**CV**	**Lik**	**Dur**	**Ext**	**Sev**	**Significance**	Short discussion
Special habitats: Potential impact on special habitats (e.g. true quartz or "heuweltjies")	Without mitigation	2	2	4	1	1	16	Construction of the new dam impacted on a degraded watercourse (ESA1).
	With mitigation	1	1	4	1	1	7	Refer to the impact minimisation recommendations.
Watercourses & Wetlands: Potential impact on natural water resources and it's ecological support areas.	Without mitigation						0	A Freshwater specialist was appointed to evaluate the impacts on watercourses and wetlands.
	With mitigation						0	
Landuse and cover: Potential impact on socio-economic activities.	Without mitigation	2	1	4	1	1	14	Historically the property was used for agriculture and livestock grazing but seems to have been laying fallow for more than 10 years (virgin soils).
	With mitigation	1	1	4	1	1	7	Refer to the impact minimisation recommendations.

Impact assessment								
Aspect	**Mitigation**	**CV**	**Lik**	**Dur**	**Ext**	**Sev**	**Significance**	Short discussion
Vegetation status: Loss of vulnerable or endangered vegetation and associated habitat.	Without mitigation	2	1	4	1	1	14	Most of the development impacted on historical agricultural land (apart from one cabin located in a old clearing <200 square meter in size).
	With mitigation	1	1	4	1	1	7	The impact on loss of vegetation is expected to be negligible.
Conservation priority: Potential impact on protected areas, CBA's, ESA's or Centre's of Endemism.	Without mitigation	2	2	4	1	1	16	Construction of the new dam impacted on a degraded watercourse (ESA1).
	With mitigation	1	1	4	1	1	7	The impact on conservation priority areas is considered low.
Connectivity: Potential loss of ecological migration corridors.	Without mitigation	1	1	4	1	1	7	Most of the development impacted on historical agricultural land (apart from one cabin located in an old clearing).
	With mitigation	1	1	4	1	1	7	The impact on loss of connectivity is expected to be negligible.
Protected & endangered plant species: Potential impact on threatened or protected plant species.	Without mitigation	2	2	4	1	1	16	No red-listed or protected species were observed (Table 9).
	With mitigation	1	1	4	1	1	7	The potential impact on red-listed or protected species is expected to be low to negligible.
Fauna & Avi-fauna Potential impact on mammals, reptiles, amphibians & birds.	Without mitigation	4	2	4	1	1	32	The potential impact on 6 sensitive animal species, but in all 6 cases the potential impact is considered low sensitive (Refer to Heading 6.4.1).
	With mitigation	4	1	4	1	1	28	The potential impact is considered "low sensitive" for all the species evaluated.
Cumulative impacts: Cumulative impact associated with proposed activity.	Without mitigation	4	2	4	1	1	32	The potential impact on sensitive animal species, an ESA1 (aquatic) and historical agricultural land that might still have been used for grazing but has not been worked for more than 10 years.
	With mitigation	4	1	4	1	1	28	Refer to the recommendations.

According, this assessment, the main impacts associated with the development might have been:

- The potential impact on a degraded conservation priority area (ESA1);
- The potential impact on sensitive animal species (Refer to Table 11).

Because of the location and small size of the proposed development even the cumulative impact in Table 12 is considered **Low Sensitive**.

No fatal flaws or any other obstacles were found with respect to the flora, vegetation, fauna, and terrestrial biodiversity. It is considered unlikely that the development would have contributed significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g., migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened species.
- Loss of ecosystem connectivity.

The findings of this assessment suggests that the relative terrestrial biodiversity theme sensitivity should be **Low Sensitive** (not Very High Sensitive as suggested in the DFFE screening report).

7.6. TERRESTRIAL BIODIVERSITY SENSITIVITY MAP

The site sensitivity map (Figure 13) aims at the protection of the recovering and remaining indigenous veld to the south of the site and the protection of the small pond to the north of the site (potential suitable habitat for the Knysna banana frog). The vegetation itself is not vulnerable or endangered, but an ESA1 has been identified along the watercourse to the north of the property (now degraded and integrated into the agricultural landscape).

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Figure 13: Site sensitivity map – focusing on the protection of the remaining and recovering natural veld and the small pond to the north of the site.

8. MITIGATION RECOMMENDATIONS

The proposed study area is considered of **Low** sensitivity in terms of terrestrial biodiversity, but some mitigation recommendations is still appropriate. Impact minimisation focuses on the protection of the remaining and recovering indigenous vegetation to the south of the site and the protection of a potential suitable habitat for an endangered frog species.

Recovering and remaining natural veld to the back of the site (Green area in Figure 12)

- Although the vegetation itself is not vulnerable or endangered the protection of the remaining natural veld to the back of the site, will add to the terrestrial diversity of the site, and may increase or provide habitat for a number of sensitive species animal species.
- A well-planned alien eradication program should be implemented, which should focus on clearing of clearing of the area to the back (Green in Figure 12), slowly working to the front. This will not only have the benefit of improving the condition of the natural vegetation but should also reduce the fire risk over time.
    - Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g., spreading of the AIP due to incorrect eradication methods);
    - Care must be taken to dispose of alien plant material responsibly.
- The pond (Blue area in Figure 12) should be protected and allowed to maintain its function as it could be a possible breeding site for the endangered Knysna banana frog.

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APPENDIX 1: REQUIREMENTS FOR SPECIALIST REPORTS

Minimum Content Requirements for Botanical and Terrestrial Biodiversity Specialist Reports as per Protocol for the Specialist Assessment of Environmental Impacts on Terrestrial Biodiversity (GN 320 of 20 March 2020).

Protocol Ref	**Botanical and Terrestrial Biodiversity Specialist Assessment Report Content**	**Section / Page**
3.1.1.	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page iv - v
3.1.2.	a signed statement of independence by the specialist;	Page v
3.1.3.	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Heading 3.2
3.1.4.	a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Heading 3.1, 3.2 & 3.3
3.1.5.	a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Heading **Error! Reference source not found.**
3.1.6.	a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Heading 7.6
3.1.7.	additional environmental impacts expected from the proposed development;	Heading 7
3.1.8.	any direct, indirect and cumulative impacts of the proposed development;	Heading 7
3.1.9.	the degree to which impacts and risks can be mitigated;	Heading 8
3.1.10.	the degree to which the impacts and risks can be reversed;	Heading 7 & 8
3.1.11.	the degree to which the impacts and risks can cause loss of irreplaceable resources;	Heading 7.5
3.1.12.	proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Heading 8
3.1.13.	a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	NA
3.1.14.	a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Page iii
3.1.15.	any conditions to which this statement is subjected.	N/A

APPENDIX 2: DFFE SCREENING REPORT

APPENDIX 3: SABAP2: BIRD SPECIES LIST

SABAP2 list of species recorded for Pentad 3400_2315.

NO.	COMMON GROUP	COMMON SPECIES	GENUS	SPECIES
1		Bokmakierie	*Telophorus*	*zeylonus*
2		Hamerkop	*Scopus*	*umbretta*
3		Neddicky	*Cisticola*	*fulvicapilla*
4		Secretarybird	*Sagittarius*	*serpentarius*
5	Apalis	Bar-throated	*Apalis*	*thoracica*
6	Barbet	Black-collared	*Lybius*	*torquatus*
7	Batis	Cape	*Batis*	*capensis*
8	Bishop	Southern Red	*Euplectes*	*orix*
9	Bishop	Yellow	*Euplectes*	*capensis*
10	Boubou	Southern	*Laniarius*	*ferrugineus*
11	Brownbul	Terrestrial	*Phyllastrephus*	*terrestris*
12	Bulbul	Cape	*Pycnonotus*	*capensis*
13	Bushshrike	Olive	*Chlorophoneus*	*olivaceus*
14	Bustard	Denham's	*Neotis*	*denhami*
15	Buzzard	Common	*Buteo*	*buteo*
16	Buzzard	Forest	*Buteo*	*trizonatus*
17	Buzzard	Jackal	*Buteo*	*rufofuscus*
18	Camaroptera	Green-backed	*Camaroptera*	*brachyura*
19	Canary	Brimstone	*Crithagra*	*sulphurata*
20	Canary	Cape	*Serinus*	*canicollis*
21	Canary	Forest	*Crithagra*	*scotops*
22	Canary	Yellow	*Crithagra*	*flaviventris*
23	Chat	Familiar	*Oenanthe*	*familiaris*
24	Cisticola	Cloud	*Cisticola*	*textrix*
25	Cisticola	Grey-backed	*Cisticola*	*subruficapilla*
26	Cisticola	Levaillant's	*Cisticola*	*tinniens*
27	Cisticola	Wing-snapping	*Cisticola*	*ayresii*
28	Cisticola	Zitting	*Cisticola*	*juncidis*
29	Coot	Red-knobbed	*Fulica*	*cristata*
30	Cormorant	Reed	*Microcarbo*	*africanus*
31	Cormorant	White-breasted	*Phalacrocorax*	*lucidus*

NO.	COMMON GROUP	COMMON SPECIES	GENUS	SPECIES
32	Coucal	Burchell's	*Centropus*	*burchellii*
33	Crake	Black	*Zapornia*	*flavirostra*
34	Crane	Blue	*Grus*	*paradisea*
35	Crow	Cape	*Corvus*	*capensis*
36	Crow	Pied	*Corvus*	*albus*
37	Cuckoo	African Emerald	*Chrysococcyx*	*cupreus*
38	Cuckoo	Black	*Cuculus*	*clamosus*
39	Cuckoo	Diederik	*Chrysococcyx*	*caprius*
40	Cuckoo	Klaas's	*Chrysococcyx*	*klaas*
41	Cuckoo	Red-chested	*Cuculus*	*solitarius*
42	Cuckooshrike	Grey	*Ceblepyris*	*caesius*
43	Darter	African	*Anhinga*	*rufa*
44	Dove	Cape Turtle	*Streptopelia*	*capicola*
45	Dove	Laughing	*Spilopelia*	*senegalensis*
46	Dove	Red-eyed	*Streptopelia*	*semitorquata*
47	Dove	Rock	*Columba*	*livia*
48	Drongo	Fork-tailed	*Dicrurus*	*adsimilis*
49	Duck	African Black	*Anas*	*sparsa*
50	Duck	Maccoa	*Oxyura*	*maccoa*
51	Duck	White-backed	*Thalassornis*	*leuconotus*
52	Duck	White-faced Whistling	*Dendrocygna*	*viduata*
53	Duck	Yellow-billed	*Anas*	*undulata*
54	Eagle	African Fish	*Haliaeetus*	*vocifer*
55	Eagle	Booted	*Hieraaetus*	*pennatus*
56	Eagle	Long-crested	*Lophaetus*	*occipitalis*
57	Eagle-Owl	Spotted	*Bubo*	*africanus*
58	Egret	Great	*Ardea*	*alba*
59	Egret	Little	*Egretta*	*garzetta*
60	Egret	Western Cattle	*Bubulcus*	*ibis*
61	Falcon	Lanner	*Falco*	*biarmicus*
62	Falcon	Peregrine	*Falco*	*peregrinus*
63	Fiscal	Southern	*Lanius*	*collaris*
64	Flycatcher	African Dusky	*Muscicapa*	*adusta*

NO.	COMMON GROUP	COMMON SPECIES	GENUS	SPECIES
65	Flycatcher	African Paradise	*Terpsiphone*	*viridis*
66	Flycatcher	Blue-mantled Crested	*Trochocercus*	*cyanomelas*
67	Flycatcher	Fiscal	*Melaenornis*	*silens*
68	Goose	Domestic	*Anser*	*anser*
69	Goose	Egyptian	*Alopochen*	*aegyptiaca*
70	Goose	Spur-winged	*Plectropterus*	*gambensis*
71	Goshawk	African	*Accipiter*	*tachiro*
72	Grassbird	Cape	*Sphenoeacus*	*afer*
73	Grebe	Little	*Tachybaptus*	*ruficollis*
74	Greenbul	Sombre	*Andropadus*	*importunus*
75	Guineafowl	Helmeted	*Numida*	*meleagris*
76	Gull	Kelp	*Larus*	*dominicanus*
77	Harrier-Hawk	African	*Polyboroides*	*typus*
78	Heron	Black-crowned Night	*Nycticorax*	*nycticorax*
79	Heron	Black-headed	*Ardea*	*melanocephala*
80	Heron	Grey	*Ardea*	*cinerea*
81	Heron	Purple	*Ardea*	*purpurea*
82	Honeyguide	Scaly-throated	*Indicator*	*variegatus*
83	Hoopoe	African	*Upupa*	*africana*
84	Ibis	African Sacred	*Threskiornis*	*aethiopicus*
85	Ibis	Glossy	*Plegadis*	*falcinellus*
86	Ibis	Hadada	*Bostrychia*	*hagedash*
87	Jacana	African	*Actophilornis*	*africanus*
88	Kestrel	Rock	*Falco*	*rupicolus*
89	Kingfisher	Brown-hooded	*Halcyon*	*albiventris*
90	Kingfisher	Giant	*Megaceryle*	*maxima*
91	Kingfisher	Pied	*Ceryle*	*rudis*
92	Kite	Black-winged	*Elanus*	*caeruleus*
93	Kite	Yellow-billed	*Milvus*	*aegyptius*
94	Lapwing	Black-winged	*Vanellus*	*melanopterus*
95	Lapwing	Blacksmith	*Vanellus*	*armatus*
96	Lapwing	Crowned	*Vanellus*	*coronatus*
97	Lark	Red-capped	*Calandrella*	*cinerea*

NO.	COMMON GROUP	COMMON SPECIES	GENUS	SPECIES
98	Longclaw	Cape	*Macronyx*	*capensis*
99	Martin	Brown-throated	*Riparia*	*paludicola*
100	Martin	Rock	*Ptyonoprogne*	*fuligula*
101	Moorhen	Common	*Gallinula*	*chloropus*
102	Mousebird	Red-faced	*Urocolius*	*indicus*
103	Mousebird	Speckled	*Colius*	*striatus*
104	Nightjar	Fiery-necked	*Caprimulgus*	*pectoralis*
105	Oriole	Black-headed	*Oriolus*	*larvatus*
106	Osprey	Western	*Pandion*	*haliaetus*
107	Pigeon	African Olive	*Columba*	*arquatrix*
108	Pigeon	Speckled	*Columba*	*guinea*
109	Pipit	African	*Anthus*	*cinnamomeus*
110	Pipit	Nicholson's	*Anthus*	*nicholsoni*
111	Pipit	Plain-backed	*Anthus*	*leucophrys*
112	Plover	Kittlitz's	*Charadrius*	*pecuarius*
113	Plover	Three-banded	*Charadrius*	*tricollaris*
114	Pochard	Southern	*Netta*	*erythrophthalma*
115	Prinia	Karoo	*Prinia*	*maculosa*
116	Puffback	Black-backed	*Dryoscopus*	*cubla*
117	Quail	Common	*Coturnix*	*coturnix*
118	Raven	White-necked	*Corvus*	*albicollis*
119	Robin	White-starred	*Pogonocichla*	*stellata*
120	Robin-Chat	Cape	*Cossypha*	*caffra*
121	Robin-Chat	Chorister Robin-Chat	*Cossypha*	*dichroa*
122	Roller	European	*Coracias*	*garrulus*
123	Saw-wing	Black (Southern Africa)	*Psalidoprocne*	*pristoptera holomelas*
124	Seedeater	Streaky-headed	*Crithagra*	*gularis*
125	Shelduck	South African	*Tadorna*	*cana*
126	Shoveler	Cape	*Spatula*	*smithii*
127	Siskin	Cape	*Crithagra*	*totta*
128	Snipe	African	*Gallinago*	*nigripennis*
129	Sparrow	Cape	*Passer*	*melanurus*
130	Sparrow	House	*Passer*	*domesticus*

NO.	COMMON GROUP	COMMON SPECIES	GENUS	SPECIES
131	Sparrow	Southern Grey-headed	*Passer*	*diffusus*
132	Sparrowhawk	Black	*Accipiter*	*melanoleucus*
133	Sparrowhawk	Little	*Accipiter*	*minullus*
134	Spoonbill	African	*Platalea*	*alba*
135	Spurfowl	Cape	*Pternistis*	*capensis*
136	Spurfowl	Red-necked	*Pternistis*	*afer*
137	Starling	Black-bellied	*Notopholia*	*corusca*
138	Starling	Common	*Sturnus*	*vulgaris*
139	Starling	Red-winged	*Onychognathus*	*morio*
140	Stonechat	African	*Saxicola*	*torquatus*
141	Stork	White	*Ciconia*	*ciconia*
142	Sugarbird	Cape	*Promerops*	*cafer*
143	Sunbird	Amethyst	*Chalcomitra*	*amethystina*
144	Sunbird	Collared	*Hedydipna*	*collaris*
145	Sunbird	Greater Double-collared	*Cinnyris*	*afer*
146	Sunbird	Grey	*Cyanomitra*	*veroxii*
147	Sunbird	Malachite	*Nectarinia*	*famosa*
148	Sunbird	Southern Double-collared	*Cinnyris*	*chalybeus*
149	Swallow	Barn	*Hirundo*	*rustica*
150	Swallow	Greater Striped	*Cecropis*	*cucullata*
151	Swallow	Lesser Striped	*Cecropis*	*abyssinica*
152	Swallow	Pearl-breasted	*Hirundo*	*dimidiata*
153	Swallow	White-throated	*Hirundo*	*albigularis*
154	Swift	African Black	*Apus*	*barbatus*
155	Swift	African Palm	*Cypsiurus*	*parvus*
156	Swift	Alpine	*Tachymarptis*	*melba*
157	Swift	Common	*Apus*	*apus*
158	Swift	Little	*Apus*	*affinis*
159	Swift	White-rumped	*Apus*	*caffer*
160	Tchagra	Southern	*Tchagra*	*tchagra*
161	Teal	Red-billed	*Anas*	*erythrorhyncha*
162	Thick-knee	Spotted	*Burhinus*	*capensis*

NO.	COMMON GROUP	COMMON SPECIES	GENUS	SPECIES
163	Thrush	Olive	*Turdus*	*olivaceus*
164	Turaco	Knysna	*Tauraco*	*corythaix*
165	Wagtail	Cape	*Motacilla*	*capensis*
166	Warbler	Knysna	*Bradypterus*	*sylvaticus*
167	Warbler	Lesser Swamp	*Acrocephalus*	*gracilirostris*
168	Warbler	Little Rush	*Bradypterus*	*baboecala*
169	Warbler	Victorin's	*Cryptillas*	*victorini*
170	Warbler	Yellow-throated Woodland	*Phylloscopus*	*ruficapilla*
171	Waxbill	Common	*Estrilda*	*astrild*
172	Waxbill	Swee	*Coccopygia*	*melanotis*
173	Weaver	Cape	*Ploceus*	*capensis*
174	Weaver	Southern Masked	*Ploceus*	*velatus*
175	White-eye	Cape	*Zosterops*	*virens*
176	Whydah	Pin-tailed	*Vidua*	*macroura*
177	Wood Hoopoe	Green	*Phoeniculus*	*purpureus*
178	Woodpecker	Knysna	*Campethera*	*notata*
179	Woodpecker	Olive	*Dendropicos*	*griseocephalus*

APPENDIX 4: CURRICULUM VITAE – P.J.J. BOTES

Curriculum Vitae: Peet JJ Botes

Address: 22 Buitekant Street, Bredasdorp, 7280; **Cell**: 082 921 5949

Nationality:	South African
ID No.:	670329 5028 081
Language:	Afrikaans / English
Profession:	Environmental Consultant & Auditing
Specializations:	Botanical & Biodiversity Impact Assessments
	Environmental Compliance Audits
	Environmental Impact Assessment
	Environmental Management Systems
Qualifications:	**BSc** (Botany & Zoology), with Nature Conservation III & IV as extra subjects; Dept. of Natural Sciences, Stellenbosch University 1989.
	Hons. BSc (Plant Ecology), Stellenbosch University, 1989
	More than 20 years of experience in the Environmental Management Field (Since 1997 to present).
Professional affiliation:	Registered Professional Botanical, Environmental and Ecological Scientist at SACNASP (South African Council for Natural Scientific Professions) since 2005.
SACNAP Reg. No.:	400184/05

BRIEF RESUME OF RELEVANT EXPERIENCE

1997-2005: Employed by the Overberg Test Range (a Division of Denel), responsible for managing the environmental department of OTB, developing and implementing an ISO14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld, working closely with CapeNature (De Hoop Nature Reserve).

2005-2010: Joined Enviroscientific, as an independent environmental consultant specializing in wastewater management, botanical and biodiversity assessments, developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits and was also responsible for helping develop the biodiversity part of the Farming for the Future audit system implemented by Woolworths. During his time with Enviroscientific he performed more than 400 biodiversity and environmental legal compliance audits.

2010-2017: Joined EnviroAfrica, as an independent Environmental Assessment Practitioner and Biodiversity Specialist, responsible for Environmental Impact Assessments, Biodiversity & Botanical specialist reports and Environmental Compliance Audits. During this time Mr Botes compiled more than 70 specialist Biodiversity & Botanical impact assessment reports ranging from agricultural-, infrastructure pipelines- and solar developments.

2017-Present: Establish a small independent consultancy (PB Consult) specialising in Environmental Audits, Biodiversity and Botanical specialist studies as well as Environmental Impact Assessment.

LIST OF MOST RELEVANT BOTANICAL & BIODIVERSITY STUDIES

Botes. P. 2007: Botanical assessment. Schaapkraal, Erf 644, Mitchell's Plain. A preliminary assessment of the vegetation in terms of the Fynbos Forum: Ecosystem guidelines. 13 November 2007.

Botes, P. 2010(b): Botanical assessment. Proposed Loeriesfontein low cost housing project. A preliminary Botanical Assessment of the natural veld with regards to the proposed low cost housing project in/adjacent to Loeriesfontein, taking into consideration the National Spatial Biodiversity Assessment of South Africa. 10 August 2010.

Botes, P. 2012(a): Proposed Danielskuil Keren Energy Holdings Solar Facility on Erf 753, Danielskuil. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 17 March 2012.

Botes, P. 2012(b): Proposed Disselfontein Keren Energy Holdings Solar Facility on Farm Disselfontein no. 77, Hopetown. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 28 March 2012.

Botes, P. 2012(c): Proposed Kakamas Keren Energy Holdings Solar Facility on Remainder of the Farm 666, Kakamas. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 13 March 2012.

Botes, P. 2012(d): Proposed Keimoes Keren Energy Holdings Solar Facility at Keimoes. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 9 March 2012.

Botes, P. 2012(e): Proposed Leeu-Gamka Keren Energy Holdings Solar Facility on Portion 40 of the Farm Kruidfontein no. 33, Prince Albert. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 27 March 2012.

Botes, P. 2012(f): Proposed Mount Roper Keren Energy Holdings Solar Facility on Farm 321, Kuruman. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 28 March 2012.

Botes, P. 2012(g): Proposed Whitebank Keren Energy Holdings Solar Facility on Farm no. 379, Kuruman. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 27 March 2012.

Botes, P. 2012(h): Proposed Vanrhynsdorp Keren Energy Holdings Solar Facility on Farm Duinen Farm no. 258, Vanrhynsdorp. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 13 April 2012.

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Botes, P. 2013(b): Loubos proposed low cost housing, Mier Municipality Residential Project, Northern Cape. A preliminary Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required. January 2013.

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Botes, P. 2016(b): Onseepkans Agricultural development. The proposed development of ±250 ha of new agricultural land at Onseepkans, Northern Cape Province. Biodiversity and Botanical Scan. January 2016.

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Botes, P. 2021(b) New Wave Dam, Trawal – Botanical Statement for the proposed construction of a new irrigation dam on Portions 101 & 168 of farm Melkboom 384, Vanrhynsdorp, Matzikama Local Municipality, Western Cape Province. 16 November 2021.

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