

TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT

for

**THE PROPOSED ROAD MAINTENANCE ALONG THE DR1489 NEAR
DE DOORNS, WESTERN CAPE PROVINCE.**



PREPARED FOR:

ENVIROAFRICA

PREPARED BY:

PJJ BOTES (PRI. SCI. NAT.)

20 April 2026

DOCUMENT ISSUE STATUS

TITLE	Terrestrial biodiversity compliance statement for the proposed road maintenance along the DR1489 near De Doorns, Western Cape Province.
AUTHOR	P.J.J. Botes
REPORT VERSION	Initial Report (20 April 2026)

DETAILS OF THE AUTHOR

COMPANY NAME	PB Consult Sole Proprietor
SPECIALIST	Peet J.J. Botes
SACNASP REG. NO.	400184/05 (<i>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</i>).
PHYSICAL ADDRESS	22 Buitekant Street, Bredasdorp, 7280
CELL PHONE	+27 (82) 921 5949
EMAIL	peet@pbconsult.co.za

EXECUTIVE SUMMARY

Mariswe (Pty) Ltd (Engineers) was appointed to do maintenance work on the DR1435, DR1438, and DR1489 near De Doorns in the Hex River Valley. The project aims to upgrade and maintain provincial roads, create work opportunities, support emerging CIDB contractors, and promote black economic empowerment. Works include repairing pavement distress, maintaining major structures, resealing roads, and performing ancillary tasks.

Almost all the work will be within the disturbed or transformed road reserves and will not impact any significant remaining natural features. However, the **proposed work on one culvert and one bridge along the DR1489 may trigger NEMA EIA regulations**. Remaining natural veld may include Breede Alluvium Fynbos (endangered) or Cape Lowland Alluvial Vegetation (endangered). The Western Cape Biodiversity Spatial Plan (WC BSP, 2023) maps, CBA's in close vicinity to both structures.

Plant Species Sensitivity: The DFFE screening report for this project (Appendix 1) gives the relative plant species sensitivity as Medium Sensitive because of the potential impact on plant species of conservation concern (SoCC).

- The site visit confirmed that the proposed will not impact on any remaining representative natural veld (not even remnant indigenous species), and that the river systems have been severely degraded because of the long history of agricultural and anthropogenic impacts in the valley. No plant SoCC were observed (Refer to Heading 3.1 – 3.2).
- For this project, a **plant species** sensitivity of **Low Sensitive** is considered more appropriate.

Animal Species Sensitivity: The DFFE Screening report (Appendix 1) gives the Animal Species theme as potentially Medium Sensitive because of the potential impacts on one sensitive bird species (Southern Black Korhaan) and one sensitive invertebrate species (Peringuey's Meadow Katydid).

- Both species are regionally vulnerable, but it is considered highly unlikely that the proposed project will have any additional impact or risk to the survival of these species (Refer to Heading 3.3.1).
- For this project an **animal species** sensitivity rating of **Low Sensitive** is considered appropriate.

Terrestrial Biodiversity Sensitivity: The DFFE Screening report (Appendix 1) identifies the Terrestrial Biodiversity theme as Very High Sensitive because of the potential impact on CBA's associated with an endangered ecosystem (Breed Alluvium Fynbos).

- However, site verification confirmed that no natural vegetation of any significance remained and no SoCC were observed within the road reserve, while the rivers systems had been severely degraded. As a result, the proposed development should not have any additional impact on indigenous vegetation or plant SoCC (and thus not directly on any CBA).
- For this project, a **terrestrial biodiversity** sensitivity of **Low Sensitive** is considered appropriate.

It is considered highly unlikely that the development will contribute 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 plant species.
- Loss of ecosystem connectivity.

No sensitive areas were observed in the vicinity of the two structures. As a result, a site sensitivity map was not prepared.

WITH THE AVAILABLE INFORMATION IT IS RECOMMENDED THAT PROJECT BE APPROVED

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 in order 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.

Mr. Botes is a registered Professional Botanical, Environmental and Ecological Scientists at SACNASP (South African Council for Natural Scientific Professions) as required in terms of Section 18(1)(a) of the Natural Scientific Professions Act, 2003, since 2005.

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:

20 April 2026

Date:

CONTENTS

DOCUMENT ISSUE STATUS	I
DETAILS OF THE AUTHOR	I
EXECUTIVE SUMMARY.....	II
INDEPENDENCE & CONDITIONS.....	III
RELEVANT QUALIFICATIONS & EXPERIENCE OF THE AUTHOR	III
DECLARATION OF INDEPENDENCE	IV
1. INTRODUCTION.....	1
1.1. Legislation governing this study.....	1
1.2. Terms of reference	1
1.3. Location & Layout	2
1.4. Activity description	3
2. DESKTOP ANALYSIS	5
2.1. Approach & methodology	5
2.2. Broadscale vegetation patterns	5
2.3. The vegetation in context	6
2.4. Western Cape Biodiversity Spatial Plan	6
2.4.1. Significant CBA areas associated with the roads	7
2.5. Landuse	7
2.6. Site verification	8
2.7. Limitations, assumptions and uncertainties	8
3. SITE VERIFICATION RESULTS.....	9
3.1. DR1489: Vegetation encountered	9
3.2. Flora.....	11
3.2.1. Plant species sensitivity theme	11
3.3. Fauna and avi-fauna	11
3.3.1. Animal species theme sensitivity	11
3.4. Terrestrial biodiversity theme sensitivity.....	12
4. DISCUSSIONS	13
4.1. Site Sensitivity map.....	13
5. RECOMMENDATIONS.....	14
6. REFERENCES.....	15
APPENDIX 1: DFFE SCREENING REPORT	16
APPENDIX 2: CURRICULUM VITAE – P.J.J. BOTES.....	17

LIST OF FIGURES

Figure 1: A map showing the location of the 3 roads (DR1489 – yellow) in the Hex River Valley (CapeFarmMapper).	2
Figure 2: The location of the 3 roads within the Hex River Valley (DR1489 – yellow) (CapeFarmMapper).	3
Figure 3: VEGMAP of South Africa (2024 beta), showing DR1489 (red) and the location of the bridge (blue diamond) and culvert (yellow circle) (CapeFarmMapper).	5
Figure 4: The WCBSP (2023) CBA map showing the DR1489 (yellow) – culverts and bridges (CapeFarmMapper).	7
Figure 5: The DFFE Land Cover map 2022 (9-class) showing the DR1489 (red) (CapeFarmMapper).	8

LIST OF PHOTOS

Photo 1: Looking from south to north at the entrance to the DR1489. Note the transformed road verges.	9
Photo 2: Looking from end of the road west towards the farmhouses in the background (the railings of Culvert 10432 can be seen in the foreground). Note the transformed status of the site.	9
Photo 3: Hex River. The inlet of the small bridge over the Hex River. Note the severely degraded state of the river.	10
Photo 4: Hex River. The outlet (western side) of the bridge over the Hex River.	10
Photo 5: The severely degraded inlet wing of Culvert 10432. Note the general degraded status.	10
Photo 6: The severely degraded outlet wing of Culvert 10432. Note the general degraded status and woody invasive species.	10

ABBREVIATIONS

CBA	Critical biodiversity area
DFFE	Department of Fisheries, Forestry and Environment
EA	Environmental Authorization (=Record of Decision)
EAP	Environmental assessment practitioner
ECO	Environmental Control Officer
EIA	Environmental impact assessment
EMP	Environmental Management Plan or Program
EN	Endangered
ESA	Ecological support area
LT	Least Threatened
NEMA	National Environmental Management Act, 1998 (Act no. 107 of 1998)
NFA	National Forest Act, Act 84 of 1998
NPAES	National Protected Area Expansion Strategy
SoCC	Species of Conservation Concern
TOPS	Threatened or Protected Species
VU	Vulnerable

1. INTRODUCTION

Mariswe (Pty) Ltd (Engineers) was appointed by the Western Cape Government: Department of Infrastructure: Transport Infrastructure Branch for the provision of professional engineering services for maintenance work of the DR1435, DR1438 and DR1489 in the Hex River Valley, between Sandhills and De Doorns in the Breede Valley Municipality of the Western Cape. The objectives are to upgrade, rehabilitate and maintain provincial roads in the Western Cape Province, as well as to provide work opportunities, develop emerging CIDB contractors and contribute towards black economic empowerment within the local communities. The Works to be undertaken for this project includes the repair of localised pavement distress, maintenance of major structures, the resealing of the roads and ancillary works.

Almost all the work will be within the disturbed or transformed road reserves and will not impact any significant remaining natural features. However, the **proposed work on one culvert and one bridge along the DR1489 may trigger NEMA EIA regulations**. PB Consult was appointed to look at the potential impact on terrestrial biodiversity at these two features.

Remaining natural veld along the DR 1489 road section may still support Breede Alluvium Fynbos, while Cape Lowland Alluvial Vegetation may be encountered along the river systems (both are endangered ecosystems). The Western Cape Biodiversity Spatial Plan (WC BSP, 2023) maps terrestrial and aquatic critical biodiversity areas (CBA's) close to culvert and bridge. Unfortunately, the site visit confirmed that there is no remaining natural veld along the road verges, and that the river systems have been severely degraded because of long term agricultural and associated activities.

Even though completely transformed, the DFFE screening report, compiled by PB Consult (Appendix 1), identifies the following potential environmental sensitivities:

- The relative Animal species theme is considered of **Medium Sensitivity for the larger area, but Low sensitive along the DR1489;**
- The relative Plant species theme is considered of **Low Sensitivity for the DR1489;**
- The relative Terrestrial Biodiversity theme is considered of **Very High Sensitivity.**

A freshwater specialist was appointed to evaluate the potential impacts on aquatic ecosystems in a separate study.

1.1. LEGISLATION GOVERNING THIS STUDY

This is a specialist report, compiled in terms of:

- The National Environmental Management Act, Ac. 107 of 1998 (NEMA);
- The "Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes" in terms of Sections 24(5)(a) and (h) and 44 of the NEMA (GN No. 320 of 20 March 2020).

1.2. TERMS OF REFERENCE

DFFE screening report identified the terrestrial biodiversity along the DR 1489 as very high. As a result, a Terrestrial Biodiversity Assessment or Compliance Statement are required. PB Consult was

appointed by EnviroAfrica to perform a site sensitivity verification and to submit a terrestrial biodiversity statement or assessment report.

The terms of reference for this appointment were to:

- Perform a site visit and evaluate the sensitivity of the site in terms of the Biodiversity Protocol for specialist assessment.
- Determine and record the position of any flora or fauna species of special significance (e.g., protected species, or rare or endangered species) that must be protected or should be avoided or that may require “search & rescue” intervention.
- Locate and record sensitive areas from a terrestrial biodiversity perspective that may be interpreted as obstacles to the proposed development.
- Submit a site sensitivity map in terms of the terrestrial biodiversity themes discussed in this report.
- Make recommendations on impact minimization where applicable

1.3. LOCATION & LAYOUT

The project aims to carry out periodic maintenance on three sections of road, namely the DR1435, DR1438 and DR1489, between Sandhills and De Doorns in the Breede Valley Municipality of the Western Cape Province (Figure 1). The roads are within the intensively cultivated landscape of the Hex River Valley (Figure 2). Only the DR1489 (Yellow in Figure 1) is applicable to this report.

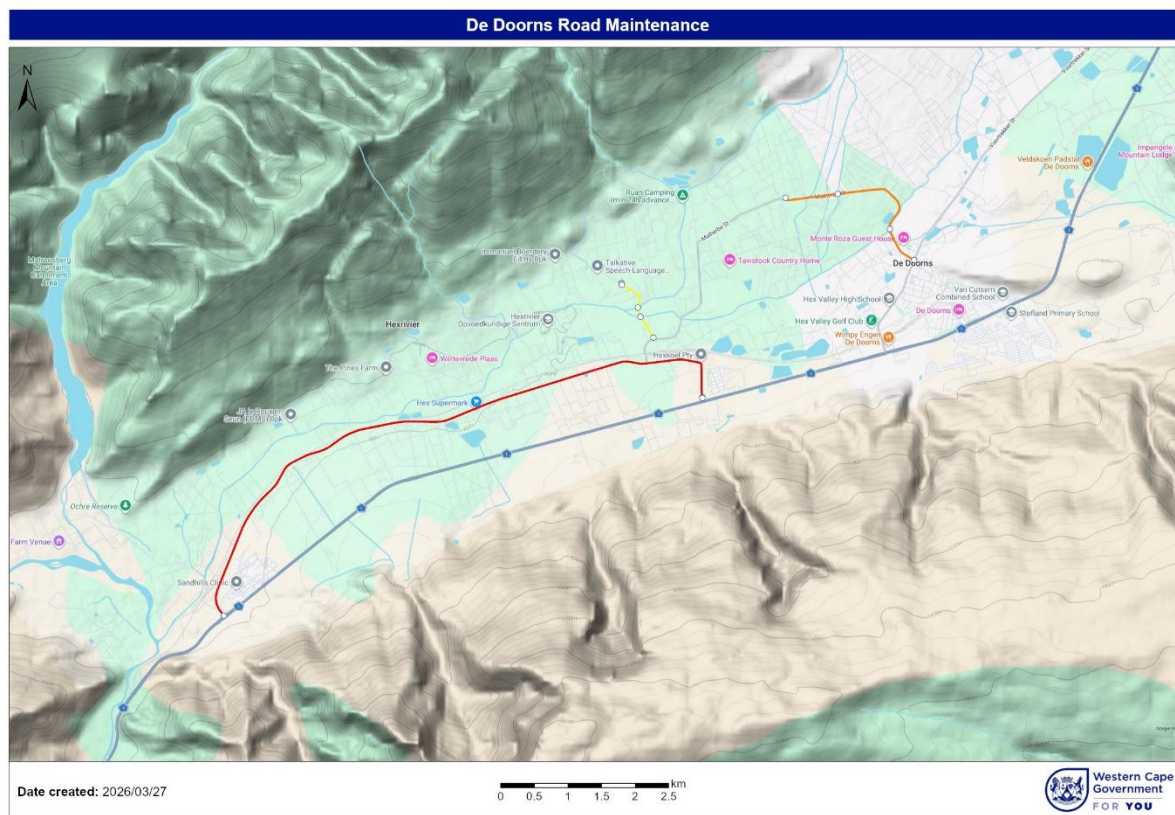


Figure 1: A map showing the location of the 3 roads (DR1489 – yellow) in the Hex River Valley (CapeFarmMapper).



Figure 2: The location of the 3 roads within the Hex River Valley (DR1489 – yellow) (CapeFarmMapper).

1.4. ACTIVITY DESCRIPTION

The following sections of roads are included under this project:

- Divisional Road (DR1435) from km 0.0 to km 9.66;
- Divisional Road (DR1489) from km 0.0 to km 1.03; and
- Divisional Road (DR1438) from km 0.5 to km 3.22;

DR1435 consists of a two-lane single carriageway accompanied by a surfaced shoulder in each direction up to km 9.19, the remainder of the section consists only of surfaced lanes with a gravel shoulder. **One major culvert** exists at km 9.61.

DR1489 typically consists of a surfaced two-lane single carriageway accompanied by gravel shoulders in each direction. There are **two bridges** and **one major culvert** along the project section. The bridges are located at km 0.38 and km 0.53 and the major culvert is located at km 1.03.

DR1438 consists of a two lane, single carriageway accompanied by gravel shoulders up to approximately km 0.8 and thereafter surfaced shoulders in each direction. **One bridge** (B0507) exists along the route, crossing the Hex River, at km 0.6.

The works to be undertaken include the following:

Road works:

- Surfacing repairs prior to resurfacing where identified. Repairs, consisting of ruts greater than 20 mm and localised depressions in the wheel tracks, will typically consist of milling the

distressed area to a depth of 40 mm and backfill using a continuously graded asphalt wearing course. Localised surface failures (other than ravelling) where the surfacing thickness is less than 20mm, will be repaired using a coarse slurry.

- Base repairs will be completed by milling the distressed area to a depth of 200 mm, compacting the floor of the excavation and backfilling 160 mm with a cement stabilised blend of 50 % in situ material and 50 % imported material of G3 quality. The surfacing will consist of a 40 mm thick continuously graded asphalt wearing course.
- Base and subbase reconstruction are envisaged on DR1435, between km 4.0 and km 4.13, and DR1438, between km 0.5 and km 0.89, where severe undulations are located.
- All the roads will be resealed with a 14mm Singel Seal using bitumen rubber modified binder.

Structures along DR1489: One major culvert and two bridges:

Culvert

- Treat corroded guard rail posts over culvert and replace guardrails;
- Install new guard rails on approaches to culvert with terminal ends;
- Remove silting from culvert inlet and culvert barrels C1/C3;
- Remove debris from inside barrel C1/C3;
- Repair spalling on walls/top slabs of C1-C3 – will prevent further spalling and deterioration of the concrete; and
- Add gabion retaining/scour protection on outlet E2.

Bridges

Hex River Bridge at km 0.38:

- Treat corroded reinforcement and repair spalling concrete on bridge abutments A1/A2 and deck S1-S2;
- Treat corrosion of reinforcement and spalling of concrete on parapet posts and rails;
- Clean and paint parapet posts and rails;
- Determine legality of HDPE water pipe along LHS of bridge deck, and if required replace with steel pipe appropriately attached to deck;
- Clean scupper drains and lengthen under deck;
- Replace bridge expansion joints with similar existing i.e. asphalt plug;
- Remove loose rockfill at outlet stream LHS and install erosion protection;
- Install erosion protection around Pier 1 base;
- Install new guard rails on both approaches with terminal ends.

Groothoekkloof River bridge B0495 at km 0.53:

- Treat plastic shrinkage cracks on new Parapets

2. DESKTOP ANALYSIS

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

2.1. APPROACH & METHODOLOGY

The DFFE screening report and spatial information from online databases such as CapeFarmMapper, SANBI BGIS and Google images were used to establish a baseline of expected terrestrial biodiversity site sensitivities. This included vegetation type and status, conservation priority areas (e.g., critical biodiversity areas), obvious differences in landscape and landscape features (e.g., heuweltjies, rocky outcrops) or vegetation densities, which might indicate differences in plant community or species composition, current and historical landuse and variations in soil type. Flora & fauna species lists were prepared on which species of conservation concern (SoCC) were flagged (as reference for the site visit).

2.2. BROADSCALE VEGETATION PATTERNS

According to the 2024 beta VEGMAP of South Africa (Figure 3), the proposed activity overlaps an area that would, originally, have supported **Breede Alluvium Fynbos**, and ecosystem that has been classified as of “**Endangered**” (being narrowly distributed with a high rate of habitat loss since the 1990’s with evidence of ongoing biotic disruption from invasive species) in terms of the “*Revised List of ecosystems that are threatened and in need of protection*” (GN 2747 of 18 November 2022).

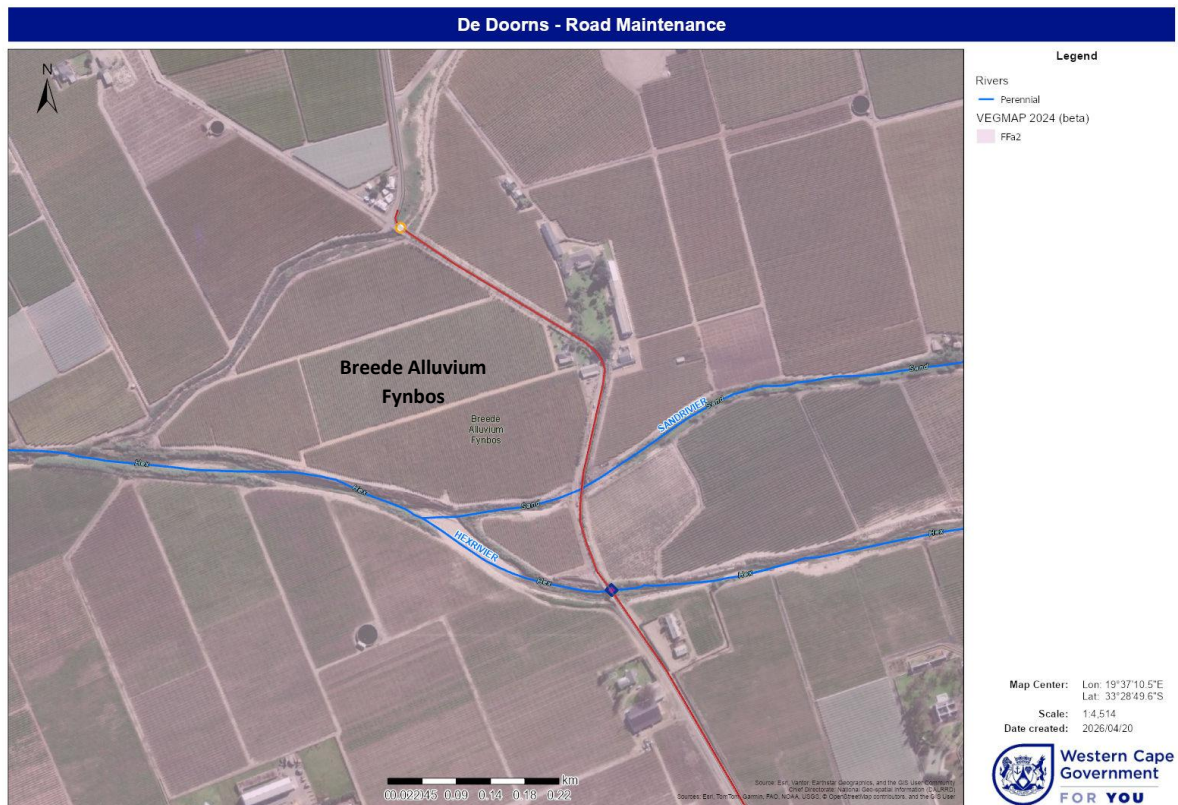


Figure 3: VEGMAP of South Africa (2024 beta), showing DR1489 (red) and the location of the bridge (blue diamond) and culvert (yellow circle) (CapeFarmMapper).

The river systems would originally have supported Cape Lowland Alluvial Vegetation (**endangered**). Unfortunately, the site visit confirmed that no representative indigenous vegetation remains at either structure (the river systems had been compromised to the extent of being transformed into a channel system with almost no riparian vegetation remaining, apart from some weedy or woody invasive species).

2.3. THE VEGETATION IN CONTEXT

Alluvium Fynbos is a relatively rare and distinctive subtype within the broader **Fynbos** vegetation of South Africa. Fynbos is part of the **Cape Floristic Region**, one of the richest plant biodiversity hotspots on Earth. It is characterized by nutrient-poor, acidic soils, a Mediterranean climate (wet winters, dry summers), high plant diversity and endemism. Characterized plants from the Proteaceae, Ericaceae (heaths) and Restionaceae (restios or reed-like plants). Most fynbos types grow on **sandstone-derived soils**, which are extremely low in nutrients.

Alluvium Fynbos, on the other hand occurs on **alluvial soils**—these are **fertile soils deposited by rivers and floods**, unlike the typical nutrient-poor fynbos soils. The soils are usually deeper, more fertile and often finer-textured (loams, silts, clays). The vegetation is **denser and taller** than typical fynbos with a higher presence of broad-leaved shrubs and even tree elements (less common in classic fynbos). It acts as a **transition zone** between fynbos and other vegetation types (like thicket or renosterveld) and includes species that can tolerate **richer soils and occasional flooding**. Alluvium fynbos is highly threatened, because these more fertile soils are better for agriculture.

Breede Alluvium Fynbos occurs on slightly undulating plains and adjacent high mountains, with numerous alluvial fans and streams. It is described as open emergent tall proteoids in a moderately tall shrub matrix with a graminoid understorey. Asteraceous and proteoid fynbos are dominant, with localised restioid fynbos and ericaceous fynbos

2.4. WESTERN CAPE BIODIVERSITY SPATIAL PLAN

The 2023 Western Cape Biodiversity Spatial Plan (WCBSP), adopted on December 13, 2024, under the Western Cape Biodiversity Act (No. 6 of 2021), replaces the 2017 BSP. The BSP aims to guide land-use planning and decision-making. It addresses terrestrial and freshwater areas, as well as significant coastal and estuarine habitats. It maps Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) that need protection to ensure the survival and functionality of species and ecosystems, including the provision of ecosystem services (CapeNature, 2024).

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 Together with PAs, to ensure that a viable representative sample of all ecosystem types and species can persist. Must stay in largely natural ecological condition.
- **Ecological support areas (ESA's)** are areas that should be protected to that ensure the long-term ecological functioning of the landscape. The Objective should be to retain ecological processes, which often requires at least semi-natural ecological condition.

2.4.1. SIGNIFICANT CBA AREAS ASSOCIATED WITH THE ROADS



Figure 4: The WCBSP (2023) CBA map showing the DR1489 (yellow) – culverts and bridges (CapeFarmMapper).

According to the 2024, WCBSP (**Error! Reference source not found.** to **Error! Reference source not found.**) the maintenance work may impact on critical biodiversity areas as follows:

DR1489: Again, the road reserve is expected to be transformed, but the works on the two bridges (crossing the Hex- and Sand Rivers) and Culvert 10432 may impact on aquatic or terrestrial CBA's (GPS waypoints are: S33° 28' 56.4" E19° 37' 16.9", S33° 28' 52.1" E19° 37' 15.4" & S33° 28' 41.1" E19° 37' 06.1", respectively) (Refer to **Figure 4**).

2.5. LANDUSE

The 2022 DFFE Land Cover map (9-class) shows that the both the bridge and the culvert may still support a low shrubland (which might be indigenous) or herbaceous wetland vegetation (at the bridge) (Figure 5). The potential for encountering remaining indigenous vegetation is also the reasons why these areas had been identified or mapped as CBA areas in the WCBSP (2023).



Figure 5: The DFFE Land Cover map 2022 (9-class) showing the DR1489 (red) (CapeFarmMapper).

2.6. SITE VERIFICATION

Fieldwork for this project was carried out on the 26st of February 2026, by evaluating the areas associated with the bridge and culvert that might still support natural vegetation (or that were mapped as potential CBA areas) to examine the vegetation in these areas. A hand-held Garmin GPSMAP 62s was used to track the sampling route and for recording waypoints (tracks available if required). Protected or other special plants and any terrestrial feature of significance was, marked by waypoints and/or on the study map, and photographed. During the survey notes, and photographic records were collected.

Where applicable, 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.

2.7. LIMITATIONS, ASSUMPTIONS AND UNCERTAINTIES

Findings are based on a one-day site visit (not long-term repetitive sampling), which means that it is likely that some species might have been missed, but because of the degraded/transformed state of the site, it is unlikely that it would have had any significant impact on the outcome and confidence in the findings is high. There should be no limiting factors which could significantly alter the outcome of this study. It is unlikely that a full botanical assessment will result in any additional findings that would have a significant impact on the outcome.

3. SITE VERIFICATION RESULTS

3.1. DR1489: VEGETATION ENCOUNTERED

The DR1489 is a short section of road (about 1.03 km in length) giving access to several farms, which crosses both the Hex River and the Sand River with a small culvert to the north. The road runs through the intensively cultivated vineyards of the Hex River Valley (Photos 7 & 8). There is no remaining natural veld within the road verges, and the river systems have been severely degraded over time.



Photo 1: Looking from south to north at the entrance to the DR1489. Note the transformed road verges.



Photo 2: Looking from end of the road west towards the farmhouses in the background (the railings of Culvert 10432 can be seen in the foreground). Note the transformed status of the site.

Almost all the rivers and drainage lines within the Hex River Valley had been converted into rocky channels to protect the existing vineyards. In recent years the valley experienced severe floods on at least two occasions, which resulted in further erosion and degradation of the river system. Apart from the occasional indigenous tree or shrub, no representative natural veld or riparian vegetation remains. This was the case with at the bridges and the culvert along this road section (Refer to Photo 3 -6).

As a result, the potential **risk** of any significant additional impact on natural vegetation or SoCC, because of the planned maintenance work, is considered **negligible**.



Photo 3: Hex River. The inlet of the small bridge over the Hex River. Note the severely degraded state of the river.



Photo 4: Hex River. The outlet (western side) of the bridge over the Hex River. .



Photo 5: The severely degraded inlet wing of Culvert 10432. Note the general degraded status.



Photo 6: The severely degraded outlet wing of Culvert 10432. Note the general degraded status and woody invasive species.

3.2. FLORA

No remaining natural veld was of any significance will be impacted by the proposed road maintenance program.

3.2.1. PLANT SPECIES SENSITIVITY THEME

The DFFE screening report for this project (Appendix 1) gives the relative plant species sensitivity as potentially Medium Sensitive. The Screening report lists several sensitive species (refer to Pages 16 – 17 of the screening report) related to the expected vegetation types. However, no natural vegetation of any significance remained at the bridge or culvert, and the rivers system are severely degraded.

Site verification shows that a plant species sensitivity theme of **Low Sensitive** is more appropriate for this development.

3.3. FAUNA AND AVI-FAUNA

The Hex River Valley has a very long history of agriculture (since the late 18th century) and very little natural veld remains in the intensively cultivated valley area. Even the small patches that has not been ploughed are usually disturbed to very disturbed because of historic and long-term impacts related to agricultural or anthropogenic activities. The roads run through the intensively cultivated vineyards of the Valley. There is no remaining natural veld within the road verges, and the river systems have been severely degraded.

3.3.1. ANIMAL SPECIES THEME SENSITIVITY

The DFFE Screening report (Appendix 1) gives the Animal Species theme as potentially **Medium Sensitive** because of the potential impacts on one sensitive bird species (Southern Black Korhaan) and one sensitive invertebrate species (Peringuey's Meadow Katydid). Refer to the discussions below.

The number of bird species in the Hexriver Complex is low (105 species) and are typical of mountain fynbos habitat. The reserve complex is not important in terms of threatened species with only two species of conservation concern recorded. The Verreaux's Eagle (*Aquila verreauxii*) was recorded from Wittebrug-, Ben-Etive-, Fonteintjiesberg- and Bokkeriviere Nature Reserves while the Ground Woodpecker (listed globally as Near Threatened) was only recorded once from the Wittebrug Nature Reserve (Taylor et al. 2015, in CapeNature, 2021).

Afrotis afra (the Southern Black Korhaan) is considered **vulnerable** and is endemic to southwestern South Africa. It is suspected of undergoing rapid population decline owing to habitat fragmentation (Hofmeyer *et. al.*, 2015). **Habitat:** It prefers semi-arid habitats such as grasslands, shrublands and savannas. It feeds mainly on insects, such as termites, grasshoppers, and beetles, but it also eats small reptiles and plant products such as seeds, foraging on the ground and picking up food items with its bill. In the Western Cape it is uncommon to common in the remnants of renosterveld and Strandveld. It is considered highly unlikely that the Southern Black Korhaan will feed or breed or even visit this very intensively cultivated landscape. With regards to the project a sensitivity rating of **Low Sensitive** is considered appropriate.

Invertebrates are a vital component of terrestrial ecosystems and constitute more than 80% of all animal diversity, yet they are grossly under-represented in studies of African diversity. Site biodiversity estimates that do not consider invertebrates not only omit the greatest components of what they are attempting to measure but also ignore groups that are very significant contributors to terrestrial ecosystem processes. The core of the CFR represents a distinct zoogeographic zone, characterized by the phylogenetic antiquity of much of its invertebrate fauna. The component species of this Centre represent what is probably the richest known assemblage of post-Gondwanan relict species and is a pronounced hotspot for faunal endemism within southern Africa, where high levels of endemism are characterized by virtually all taxa examined (CapeNature, 2021).

Conocephalus peringueyi (Peringuey's Meadow Katydid) is considered **vulnerable** because its extent of occurrence and area of occupancy are relatively small and has only been recorded in six known locations. The greatest threats to this species are habitat destruction due to livestock grazing and habitat shifts caused by climate change (Bazelet & Naskrecki, 2013). **Habitat:** This species of grasshopper is only known from mountains in the Fynbos biome of South Africa. It is a mountain specialist and is only known to occur at high elevations. Because it is a mountain specialist, as temperatures rise and suitable conditions are found at higher elevations, this species will have nowhere to go since it is already found at high elevations. (Bazelet & Naskrecki, 2013). This species of grasshopper is only known from mountains in the Fynbos biome at high elevations (altitude not specified). While the proposed site might fall within the larger distribution range for this species, the site itself is disturbed and located in the valley bottom and the proposed maintenance work should not impact any remaining natural veld. It is much more likely that this species will occur on the mountain slopes to the north and south of the Hex River Valley. With regards to this species a sensitivity rating of **Low Sensitive** is considered appropriate for this project.

Based on the discussions above an animal species sensitivity rating of **Low Sensitive** is considered appropriate for this development.

3.4. TERRESTRIAL BIODIVERSITY THEME SENSITIVITY

The DFFE Screening report (Appendix 1) identifies the Terrestrial Biodiversity theme as Very High Sensitive because of the potential impact on critical biodiversity areas associated with an endangered ecosystem (Breed Alluvium Fynbos).

However, site verification confirmed that no natural vegetation of any significance remained and no SoCC were observed at the two sites, while the rivers systems had been severely degraded. As a result, the proposed development should not have any additional impact on indigenous vegetation or plant SoCC (and thus not directly on any CBA).

For this project, a Terrestrial Biodiversity sensitivity of **Low Sensitive** is considered appropriate.

4. DISCUSSIONS

The proposed maintenance work will remain within the existing road reserve and will only impact on the disturbed inlet and outlet structures of the bridge and culvert associated with the DR1489.

Vegetation and flora: The site visit confirmed that the proposed will not impact on any remaining representative natural veld (not even remnant indigenous species), and that the river systems have been severely degraded because of the long history of agricultural and anthropogenic impacts in the valley. No plant SoCC were observed (Refer to Heading 3.1 – 3.2).

Fauna & Avifauna: The DFFE screening support suggest that the project may potentially impact on one sensitive bird species (Southern Black Korhaan) and one sensitive invertebrate species (Peringuey's Meadow Katydid). Both species are regionally vulnerable, but it is considered highly unlikely that the proposed project will result in any additional impact or risk to the survival of these species (Refer to Heading 3.3.1).

Terrestrial Biodiversity: Site verification confirmed that no natural vegetation of any significance remained at either structure, and that the river systems had been severely degraded. As a result, the proposed development should not have any additional impact on indigenous vegetation or plant species of conservation concern (and thus not directly on any CBA).

It is considered highly unlikely that development will contribute 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 plant species.
- Loss of ecosystem connectivity.

4.1. SITE SENSITIVITY MAP

No sensitive areas were observed in the vicinity of the two structures. As a result, a site sensitivity map was not prepared.

5. RECOMMENDATIONS

The proposed road maintenance will only impact on areas considered of low terrestrial biodiversity significance. The following are general recommendations to ensure the implementation of good environmental practices:

1. A suitably qualified Environmental Control Officer (ECO) should be appointed to oversee the construction phase of the project.
2. The ECO must approve all areas to be used for site offices or laydown areas.
3. All works should be kept within the existing disturbance footprint (most of the road shoulders falls within this category).
4. Any area that might still support indigenous species (even disturbed vegetation or areas being dominated by hardy shrubs such as *Searsia* species) should be protected during the road works.
5. Alien- and invasive species within the road reserve or near the bridge or culvert structures should be removed.

6. REFERENCES

- Acocks, J.P.H. 1953.** Veld types of South Africa. *Mem. Bot. Surv. .S. Afr.* No. 28: 1-192.
- Bazelet, C.S. & Naskrecki, J. 2013.** *Conocephalus peringueyi*. Red List of South African Species. South African Biodiversity Institute. <http://speciesstatus.sanbi.org/assessment/last-assessment/4223/>. Downloaded on 8/05/2023.
- CapeNature. 2021.** Hexriver Complex: Protected Area Management Plan 2021-2031. Internal Report, CapeNature. Cape Town.
- CapeNature. 2024.** 2023 Western Cape Biodiversity Spatial Plan and Guidelines Overview V2.0. Unpublished Report.
- De Villiers C.C., Driver, A., Brownlie, S., Clark, B., Day, E.G., Euston-Brown, D.I.W., Helme, N.A., Holmes, P.M., Job, N. & Rebelo, A.B. 2005.** Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape. Fynbos Forum, c/o Botanical Society of South Africa: Conservation Unit, Kirstenbosch, Cape Town.
- Hofmeyer, S.D, Taylor, M.R, Young, D.J. & Smit-Robinson, H.A. 2015.** *Afrotis afra*. In: The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. Taylor, MR, Peacock F, Wanless RW (eds). BirdLife South Africa, Johannesburg, South Africa.
- Low, A.B. & Rebelo, A.(T.)G. (eds.) 1996.** *Vegetation of South Africa, Lesotho and Swaziland*. Department of Environmental Affairs and Tourism, Pretoria.
- Mucina, L. & Rutherford, M.C. (eds.) 2006.** The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- Rebelo, A.G., Boucher, C., Helme, N., Mucina, L. & Rutherford, M.C.** Fynbos Biome. In Mucina, L. & Rutherford, M.C. 2006. (eds.) *The Vegetation of South Africa. Lesotho & Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria. pp. 53 – 219.
- SANBI. 2024.** Statistics: Red List of South African Plants version 2024.1. Downloaded from Redlist.sanbi.org on 2025/10/03.
- South African National Biodiversity Institute. 2024.** Vegetation map of South Africa, Lesotho and Swaziland [vector geospatial dataset] 2024.

APPENDIX 1: DFFE SCREENING REPORT

APPENDIX 2: 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 <u>Botanical, Environmental and Ecological Scientist</u> 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 Enviroscentific 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. 2008:	Botanical assessment. Schaapkraal Erf 1129, Cape Town. A preliminary assessment of the vegetation using the Fynbos Forum Terms of Reference: Ecosystem guidelines for environmental Assessment in the Northern Cape. 20 July 2008.
Botes, P. 2010(a):	Botanical assessment. Proposed subdivision of Erf 902, 34 Eskom Street, Napier. A Botanical scan and an assessment of the natural vegetation of the site to assess to what degree the site contributes towards conservation targets for the ecosystem. 15 September 2010.
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. 2010(c):	Botanical assessment: Proposed Sparrenberg dam, on Sparrenberg Farm, Ceres. . A Botanical scan and an assessment of the natural vegetation of the site. 15 September 2010.
Botes, P. 2011:	Botanical scan. Proposed Cathbert development on the Farm Wolfe Kloof, Paarl (Revised). A botanical scan of Portion 2 of the Farm Wolfe Kloof No. 966 (Cathbert) with regards to the proposed Cathbert Development, taking into consideration the National Spatial Biodiversity Assessment of South Africa. 28 September 2011.
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.
- Botes, P. 2012(i): Askham (Kameelduin) 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). 1 November 2012.
- Botes, P. 2013(a): Groot Mier 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.
- 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.
- Botes, P. 2013(c): Noenieput 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.
- Botes, P. 2013(d): Rietfontein 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.
- Botes, P. 2013(e): Welkom 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.
- Botes, P. 2013(f): Zyperfontein Dam Biodiversity & Botanical Scan. Proposed construction of a new irrigation dam on Portions 1, 3, 5 & 6 of the Farm Zyperfontein No. 66, Vanrhynsdorp (Northern Cape) and a scan of the proposed associated agricultural enlargement. September 2013.
- Botes, P. 2013(g): Onseepkans Canal: Repair and upgrade of the Onseepkans Water Supply and Flood Protection Infrastructure, Northern Cape. A Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required). August 2013.
- Botes, P. 2013(h): Biodiversity scoping assessment with regards to a Jetty Construction on Erf 327, Malagas (Matjiespoort). 24 October 2013.
- Botes, P. 2013(i): Jacobsbaai pump station and rising main (Saldanha Bay Municipality). A Botanical Scan of the area that will be impacted by the proposed Jacobsbaai pump station and rising main. 30 October 2013.
- Botes, P. 2014(a): Brandvlei Bulk Water Supply: Proposed construction of a 51 km new bulk water supply pipeline (replacing the existing pipeline) from Romanskolk Reservoir to the Brandvlei Reservoir, Brandvlei (Northern Cape Province). A preliminary Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required). 24 February 2014.
- Botes, P. & McDonald Dr. D. 2014: Loeriesfontein Bulk Water Supply: Proposed construction of a new bulk water supply pipeline and associated infrastructure from the farm Rheeboksfontein to Loeriesfontein Reservoir, Loeriesfontein. Botanical scan of the proposed route to determine the possible impact on vegetation and plant species. 30 May 2014.
- Botes, P. 2014(b): Kalahari-East Water Supply Scheme Extension: Phase 1. Proposed extension of the Kalahari-East Water Supply Scheme and associated infrastructure to the Mier Municipality, ZF Mgcawu District Municipality, Mier Local Municipality (Northern Cape Province). Biodiversity & Botanical scan of the proposed route to determine the possible impact on biodiversity with emphasis on vegetation and plant species. 1 July 2014.
- Botes, P. 2014(c): The proposed Freudenberg Farm Homestead, Farm no. 419/0, Tulbagh (Wolseley Area). A Botanical scan of possible remaining natural veld on the property. 26 August 2014.
- Botes, P. 2014(d): Postmasburg WWTW: Proposed relocation of the Postmasburg wastewater treatment works and associated infrastructure, ZF Mgcawu District Municipality, Tsantsabane Local Municipality (Northern Cape Province). Biodiversity and botanical scan of the proposed pipeline route and WWTW site. 30 October 2014.

- Botes, P. 2015(a): Jacobsbaai pump station and rising main (Saldanha Bay Municipality) (Revision). A Botanical Scan of the area that will be impacted by the proposed Jacobsbaai pump station and rising main. 21 January 2015.
- Botes, P. 2015(b): Steenkampspan proving ground. Proposed establishment of a high speed proving (& associated infrastructure) on the farm Steenkampspan (No. 419/6), Upington, ZF Mgcawu (Siyanda) District Municipality, Northern Cape Province. Biodiversity and Botanical Scan of the proposed footprint. 20 February 2015.
- Botes, P. 2015(c): Proposed Bredasdorp Feedlot, Portion 10 of Farm 159, Bredasdorp, Cape Agulhas Municipality, Northern Cape Province. A Botanical scan of the area that will be impacted. 28 July 2015.
- Botes, P. 2016(a): OWK Raisin processing facility, Upington, Erf 151, Kenhardt, Northern Cape Province. A Botanical scan of the proposed footprint. 26 May 2016.
- 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.
- Botes, P. 2016(c): Henkries Mega-Agripark development. The proposed development of ± 150 ha of high potential agricultural land at Henkries, Northern Cape Province. Biodiversity and Botanical Scan of the proposed footprint. 28 February 2016.
- Botes, P. 2016(d): Proposed Namaqualand Regional Water Supply Scheme high priority bulk water supply infrastructure upgrades from Okiep to Concordia and Corolusberg. Biodiversity Assessment of the proposed footprint. March 2016.
- Botes, P. 2017: The proposed new Namaqua N7 Truck Stop on Portion 62 of the Farm Biesjesfontein No. 218, Springbok, Northern Cape Province. Botanical scan of the proposed footprint. 10 July 2017.
- Botes, P. 2018(a): Kamiesberg Bulk Water Supply – Ground water desalination, borehole- and reservoir development, Kamiesberg, Northern Cape Province. Botanical scan of the proposed footprint. 20 February 2018
- Botes, P. 2018(b): Rooifontein Bulk Water Supply – Ground water desalination, borehole- and reservoir development, Rooifontein, Northern Cape Province. Botanical scan of the proposed footprint. 23 February 2018
- Botes, P. 2018(c): Paulshoek Bulk Water Supply – Ground water desalination, borehole- and reservoir development, Paulshoek, Northern Cape Province. Botanical scan of the proposed footprint. 27 March 2018.
- Botes, P. 2018(d): Kakamas Wastewater Treatment Works Upgrade – Construction of a new WWTW and rising main, Khai !Garib Local Municipality, Northern Cape Province. Botanical assessment of the proposed footprint. 1 August 2018.
- Botes, P. 2018(e): Kakamas Bulk Water Supply – New bulk water supply line for Kakamas, Lutzburg & Cillie, Khai !Garib Local Municipality, Northern Cape Province. Botanical assessment of the proposed footprint. 4 August 2018.
- Botes, P. 2018(f): Wagenboom Weir & Pipeline – Construction of a new pipeline and weir with the Snel River, Breede River Local Municipality, Northern Cape Province. Botanical assessment of the proposed footprint. 7 August 2018.
- Botes, P. 2018(g): Steynville (Hopetown) outfall sewer pipeline – Proposed development of a new sewer outfall pipeline, Hopetown, Northern Cape Province. Botanical assessment of the proposed footprint. 8 October 2018.
- Botes, P. 2018(h): Tripple D farm agricultural development – Development of a further 60 ha of vineyards, Erf 1178, Kakamas, Northern Cape Province. Botanical assessment of the proposed footprint. 8 October 2018.
- Botes, P. 2018(i): Steynville (Hopetown) outfall sewer pipeline – Proposed development of a new sewer outfall pipeline, Hopetown, Northern Cape Province. Botanical assessment of the proposed footprint. 8 October 2018.
- Botes, P. 2019(a): Lethabo Park Extension – Proposed extension of Lethabo Park (Housing Development) on the remainder of the Farm Roodepan No. 70, Erf 17725 and Erf 15089, Roodepan Kimberley. Sol Plaatje Local Municipality, Northern Cape Province. Botanical assessment of the proposed footprint (with biodiversity inputs). 15 May 2019.
- Botes, P. 2019(b): Verneukpan Trust agricultural development – The proposed development of an additional ± 250 ha of agricultural land on Farms 1763, 2372 & 2363, Kakamas, Northern Cape Province. 27 June 2019.
- Botes, P. 2020(a): Gamakor & Noodkamp Low cost housing – Botanical Assessment of the proposed formalization of the Gamakor and Noodkamp housing development on the remainder and portion 128 of the Farm Kousas No. 459 and Ervin 1470, 1474 and 1480, Gordonias road, Keimoes. Kai !Gariep Local Municipality, Northern Cape Province. 6 February 2020.

- Botes, P. 2020(b): Feldspar Prospecting & Mining, Farm Rozynen Bosch 104, Kakamas. Botanical assessment of the proposed prospecting and mining activities on Portion 5 of The Farm Rozynen Bosch No. 104, Kakamas, Khai !Garib Local Municipality, Northern Cape Province. 12 February 2020.
- Botes, P. 2020(c): Boegoeberg housing project – Botanical assessment of the proposed formalization and development of 550 new erven on the remainders of farms 142 & 144 and Plot 1890, Boegoeberg settlement, !Kheis Local Municipality, Northern Cape Province. 1 July 2020.
- Botes, P. 2020(d): Komaggas Bulk Water supply upgrade – Botanical assessment of the proposed upgrade of the existing Buffelsrivier to Komaggas BWS system, Rem. of Farm 200, Nama Khoi Local Municipality, Northern Cape Province. 8 July 2020.
- Botes, P. 2020(e): Grootdrink housing project – Botanical assessment of the proposed formalization and development of 370 new erven on Erf 131, Grootdrink and Plot 2627, Boegoeberg Settlement, next to Grootdrink, !Kheis Local Municipality, Northern Cape Province. 14 July 2020.
- Botes, P. 2020(f): Opwag housing project – Botanical assessment of the proposed formalization and development of 730 new erven on Plot 2642, Boegoeberg Settlement and Farm Boegoeberg Settlement NO.48/16, Opwag, !Kheis Local Municipality, Northern Cape Province. 16 July 2020.
- Botes, P. 2020(g): Wegdraai housing project – Botanical assessment of the Proposed formalization and development of 360 new erven on Erven 1, 45 & 47, Wegdraai, !Kheis Local Municipality, Northern Cape Province. 17 July 2020.
- Botes, P. 2020(h): Topline (Saalskop) housing project – Botanical assessment of the pproposed formalization and development of 248 new erven on Erven 1, 16, 87, Saalskop & Plot 2777, Boegoeberg Settlement, Topline, !Kheis Local Municipality, Northern Cape Province. 18 July 2020.
- Botes, P. 2020(i): Gariep housing project – Botanical assessment of the proposed formalization and development of 135 new erven on Plot 113, Gariep Settlement, !Kheis Local Municipality, Northern Cape Province. 20 July 2020.