

BOTANICAL STATEMENT

(Revision 3)

ZWARTFONTEIN DAM

PROPOSED ENLARGEMENT OF AN EXISTING DAM ON PORTION 8 OF THE FARM NO. 792 AND REMAINDER OF THE FARM ZWARTFONTEIN NO. 792 (MALMESBURY), SWARTLAND LOCAL MUNICIPALITY, WESTERN CAPE PROVINCE.



16 February 2021

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SUMMARY - MAIN CONCLUSIONS

The proposed development entails the enlargement of the existing Zwartfontein dam. The capacity of the dam will increase from 150 000 m³ to 915 000 m³, while the footprint will increase from approximately 3.6 ha to 15 ha (including dam wall, overflow, pumphouse, and access road). Desktop studies and Google imagery shows small areas surrounding the existing dam that appears as if it may still support natural vegetation.

According to the 2018 (Vegetation map of SA (Mucina & Rutherford, 2006) the site is located within an area that historically would have been covered by Swartland Shale Renosterveld (a critically endangered vegetation type).

According to the Witzenberg spatial dataset of the WCBSP, the proposed dam may impact on a small CBA area (Figure 5) and will further impact on ecological support areas (Class 2) associated with the intermittent seasonal streams (Figure 5). Please note that the small CBA area as it is mapped at the moment, is actually located within the dam.

According to the 2018 winter crop census (*Cape Farm Mapper*), the dam is surrounded by intensive agriculture (which was consistent with the observations made during the site visit). To the north, west and south existing orchards surrounds the dam (portions of which will be impacted by the proposed dam enlargement (Refer to Figure 6). To the south-east, fallow land (previously planted by commercial annual crops) was observed, while an existing farm house and its yard is located to the east of the existing dam.

From the site visit it is clear that the remaining vegetation within the proposed footprint (and its immediate surroundings) can only be described as severely degraded to transformed, with very few indigenous species remaining. In fact it is almost certain that most of these areas were impacted by the construction of the original dam, meaning that most of these areas had been stripped of its topsoil (with its indigenous seed store) and the original vegetation cover. In conclusion, the proposed footprint and its immediate surroundings do not support any remaining natural vegetation of conservation importance.

Botanically speaking the proposed dam is not expected to have any significant long term impacts on vegetation, since the site is already transformed. It is the opinion of the author that a full botanical assessment will not produce any significant additional information.

WITH THE AVAILABLE INFORMATION IT IS RECOMMENDED THAT PROJECT BE APPROVED, TAKING THE RECOMMENDATIONS INTO ACCOUNT (Refer to Heading 6).

INDEPENDENCE & CONDITIONS

PB Consult is an independent consultant and has 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 PB Consult have no interest in secondary or downstream development as a result of the authorization of this proposed 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. PB Consult reserve 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 en 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:

16 February 2021

Date:

COMPLIANCE WITH APPENDIX 6 OF GN. 982 (4 DECEMBER 2014)

Specialist reports

1.	A specialist report prepared in terms of these regulations must contain -	
a)	Details of –	Refer to:
	(i) The specialist who prepared the report; and	Refer to Page ii & Appendix 1
	 (ii) The expertise of the specialist to compile a specialist report including a curriculum vitae; 	Refer to Appendix 1
b)	A declaration that the specialist is independent in a form as may be specified by the competent authority;	Refer to Page iii
c)	An indication of the scope of, and the purpose for which the report was prepared;	Refer to HeadingError! Reference source not found.
d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Refer to Heading 1.3
e)	A description of the methodology adopted in preparing the report or carrying out the specialist process inclusive of equipment and modeling used;	Refer to Heading 1.3
f)	Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructures, inclusive of a site plan identifying site alternatives;	Refer to Headings 5 & Figure 7
g)	An identification of any areas to be avoided, including buffers;	Refer to Figure 7
h)	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Refer to Figure 7
i)	A description of any assumptions made and any uncertainties or gaps of knowledge;	Refer to Heading 1.3
j)	A description of the findings and potential implications of such findings on the impact of the proposed activity, [including identified alternatives on the environment] or activities;	Refer to Heading 5
k)	Any mitigation measures for inclusion in the EMPr;	Refer to Heading 6
I)	Any conditions for inclusion in the environmental authorization;	Refer to Heading 6
m)	Any monitoring requirements for inclusion in the EMPr or environmental authorization;	Refer to Heading 6
n)	A reasoned opinion -	
	 [as to] whether the proposed activity, activities or portions thereof should be authorized; 	Refer to the <i>"Main conclusion"</i> within the executive summary
	(iA) regarding the acceptability of the proposed activity or activities; and	(Page i)
	 (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorized, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable the closure plan; 	Refer to Heading 6
o)	A description of any consultation process that was undertaken during the course of preparing the specialist report;	N/a
p)	A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/a
q)	Any information requested by the competent authority.	N/a
2.	Where a government notice gazetted by the Minister provides for any requirement to be applied to a specialist report, the requirements as indicated i	protocol or minimum information n such notice will apply.

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1. INTRODUCTION

The Zwartfontein farm is located in the Swartland, about 22 km east-south-east of Malmesbury (Figure 1). The property (Portion 8 of the Farm Zwartfontein No. 792 and Remainder of the Farm Zwartfontein No. 792) is approximately 255.85 ha in size and can be divided into a southern and northern portion (Figure 2). The Zwartfontein Dam is located on the southern portion of the farm (which is basically fully developed). The northern portion still supports a large area with natural vegetation in good condition. The owners propose to enlarge the dam capacity, by lifting the dam wall from 11.7 m to 22.5 m. This will increase the physical footprint of the dam from approximately 3.6 ha to 10.9 ha. The enlargement will allow the landowner to store more of Berg River water allocation on site. The dam enlargement is proposed as a relative simple operation of lifting the dam wall, using material excavated from within the footprint of the enlarged dam area. The total footprint (including dam wall, overflow, pumphouse, and access road) will be approximately 15 ha.

EnviroAfrica CC was appointed to conduct an environmental assessment for the proposed Zwartfontein Dam. Since the property is located in an area that used to be covered by Swartland Shale Renosterveld (a vegetation type classified as "Critically endangered" in terms of the "List of ecosystems that are threatened and in need of protection", GN 1002, December 2011), PB Consult was appointed to perform a botanical scan of the site and its immediate surroundings in order to determine potential impacts on botanical features of significance.

Desktop studies and Google imagery shows small area surrounding the existing dam that appears if it may still support natural vegetation. Given the fact that area surrounding the dam has been subject to intensive cultivation over a long period of time it was considered highly unlikely that the area surrounding the dam will still support natural vegetation, but it may still support some species of significance. The Western Cape Biodiversity Spatial Plan (2017) shows ecological support areas (ESA2) associated with the small seasonal stream within which the dam was build. It even shows a small Terrestrial CBA area (located within the existing dam). As a result the pre-cautionary had to be followed.

A site visit was performed during March 2019, during which the site was walked and scanned for potential remaining botanical features of significance. The timing of the site visit was not great, in that Renosterveld is generally known for its rich bulb component that usually shows best during spring. Still it was quite clear that the dam site and its surroundings had been transformed as a result of intensive agricultural practices over a long period of time and that almost the only species remaining were a few hardy shrubs and weedy pioneer species. This report only gives a short description of the botanical elements and its status encountered at the site and its immediate surroundings and was not intended as a full botanical assessment. It is the opinion of the author that a full botanical assessment will not produce any significant additional information.

NG: The first two revision of this report related to changes in design and layout of the dam. This revision was prompted by recommendations from the DEA&DP and includes various updates. It replaces all previous versions.

1.1. TERMS OF REFERENCE

The terms of reference for this appointment were to:

- Give a short statement on the vegetation and its conditions encountered at the site and its immediate surroundings.
- Determine and record the position of any plant species of special significance (e.g. protected tree species, or rare or endangered plant species) that should be avoided or that may require "search & rescue" intervention.
- Make recommendations on impact minimization should it be required

1.2. LOCATION & LAYOUT

Zwartfontein farm refers to Portion 8 of the Farm Zwartfontein No. 792 and Remainder of the Farm Zwartfontein No. 792, which is located about halfway between Malmesbury and Wellington and almost halfway between the R45 (Malmesbury Road) and the R44 (Gouda Road) within the Swartland Municipality, Western Cape Province (Figure 1). The farm is approximately 255.85 ha in size and located within an area characterized by intensive agriculture (wheat, vineyards and orchards). The larger area had been subject to cultivation since the mid 1800's and as a result remaining natural veld is almost exclusively restricted to areas unsuitable for farming.



Figure 1: The location of the Zwartfontein farm (green) within between Malmesbury and Wellington.



Figure 2: The proposed location of the Zwartfontein Dam (blue) within the larger farm (green)

1.3. EVALUATION METHOD

Desktop studies together with a site visit was performed to evaluate the proposed site in terms of potential impacts on botanical features of significance and to make recommendations on mitigation measures (should it be required).

As part of the desktop study spatial information from online databases such as SANBI BGIS, CapeFarmMapper and Google Earth were used to evaluate the site in terms of vegetation type(s) expected, potential significant features that might be encountered (e.g. variations in soil type, rocky outcrops etc.) and obvious differences in landscape or vegetation densities, which might indicate differences in plant community or species composition. Expected plant species lists were prepared and species of special significance were flagged (to be used as reference during the site visit).

The following general conclusions were drawn on completion of the desktop assessment:

- The site and its immediate surroundings might still support some vegetation, but it is expected to be degraded veld, covered by weedy or pioneer species (which corresponded with information from the EnviroAfrica EAP, who had already done a scoping site visit);
- However, the site would have been covered by Swartland Shale Renosterveld (Figure 4), a vegetation type classified as a critically endangered in terms of the "List of ecosystems that are threatened and in need of protection" (GN 1002, December 2011), Refer to Heading 2).
- According to the Witzenberg spatial dataset of the 2017 Western Cape Biodiversity Spatial Plan (WCBSP) (Refer to Heading 3):
 - The proposed footprint may impact on a small terrestrial CBA (already located within the existing dam) and will impact on aquatic ecological support areas (Class 2) associated with the intermittent seasonal streams (Refer to the yellow areas shown in Figure 5).

The site visit was conducted during March 2019 (after recent rains). The survey was conducted by walking the site and examining, marking and photographing any area of interest. A hand-held Garmin GPSMAP 62s was used to track the sampling route and record waypoints of locations of specific importance. During the survey notes, together with a photographic record, were compiled for the vegetation and landscape. The author endeavoured to identify and locate all significant biodiversity features, special plant species and or specific soil conditions which might indicate special botanical features (e.g. rocky outcrops or heuweltjies). The timing of the site visit was not ideal in that Renosterveld is generally known for its rich bulb component that usually shows best during spring. Non-the-less, the site is so degraded as a result of agricultural practices (over a long period of time) that it can only be described as degraded to the point of being transformed. As a result it is considered highly unlikely that any plant species of significance remains in these areas.

1.4. ACTIVITY DESCRIPTION

The proposed development entails the enlargement of the existing Zwartfontein dam. The existing dam wall (11.7 m in height) will be raised to a height of approximately 22.5 m, using material that will be excavated from the proposed enlarged dam footprint. The increase in the dam wall height will result in an increase in the footprint and capacity of the new dam. The capacity of the dam will increase from 150 000 m³ to 915 000 m³, while the total footprint will increase from approximately 3.6 ha to 15 ha (including dam wall, overflow, pumphouse, and access road).

Figure 3 shows the existing dam and illustrates the approximate footprint enlargement. It also shows the areas that will be impacted by the proposed footprint.



Figure 3: The Zwartfontein Dam, showing the dam wall location (Red) and the area that may be affected (blue dotted line)

2. THE VEGETATION MAP OF SA

According to the 2012 (beta 2) version of the Vegetation map of SA (Mucina & Rutherford, 2006) the site is located within an area that historically would have been covered by a vegetation type known as Swartland Shale Renosterveld (Figure 4). Swartland Shale Renosterveld is classified as a critically endangered vegetation type in terms of *"List of ecosystems that are threatened and in need of protection"* (GN 1002, December 2011), promulgated in terms of the National Environmental Management Biodiversity Act, Act 10 of 2004. However, the proposed dam enlargement will overlap areas that were already disturbed as a result of cultivation and associated practices. BGIS land use results indicates that the site is most likely transformed as a result of past and present agricultural practices.

Mucina & Rutherford (2006) describe Swartland Shale Renosterveld as low to moderately tall leptophyllous shrubland of varying canopy cover as well as low, open shrubland dominated by renosterbos occurring on moderately undulating plains and valleys. Heuweltjies are a very prominent local feature of the environment, forming 'hummockveld' near Piketberg. Stunted trees and thicket are often associated with the heuweltjies. Disturbed areas are dominated by *Athanasia trifurcata* and *Otholobium hirtum*. Patches of *Cynodon dactylon* sometimes occur in abundance.



Figure 4: Vegetation map of South Africa (2018 version) showing the property and dam location

3. WITZENBERG CRITICAL BIODIVERSITY MAP

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.

According to the Witzenberg spatial dataset of the WCBSP, the proposed dam may impact on a small terrestrial CBA area (refer to the yellow arrow) and will further impact on an ecological support areas (Class 2) associated with the intermittent seasonal streams (Refer to the yellow areas shown in Figure 5). Please note that the small CBA area as it is mapped at the moment, is actually located within the dam. However, special care was taken when this areas was studied in order to check for any special vegetation features.



Figure 5: Western Cape Biodiversity Spatial Plan (2017) indicting the proposed dam location and surroundings

NB: It is always an excellent idea to let the inflow water to the dam run through a constructed or artificial wetland area. This will help to prevent siltation of the dam and will also help to clean the water from various micro-elements that may be detrimental to water health. Such a wetland should be established in the water inlet area and can be a simple affair like a shallow v-shaped inlet that widens as it drains towards the dam (the longer and larger the better). This inlet should then be planted with reeds like *Phragmites australis* and / or *Typha capensis*, which will over time, establish itself in a dense mat, which will help filtering / cleaning the inlet water before it reaches the dam.

Properly designed and managed farm dams can attract a variety of birds, insects and animals to the area and so contribute to conservation of biodiversity.

4. NATIONAL LAND USE MAP

According to the 2018 winter crop census (*Cape Farm Mapper*), the dam is surrounded by intensive agriculture (which was consistent with the observations made during the site visit). To the north, west and south existing orchards surrounds the dam (portions of which will be impacted by the proposed dam enlargement (Refer to Figure 6). To the south-east, fallow land (previously planted by commercial annual crops) was observed, while an existing farm house and its yard is located to the east of the existing dam.



Figure 6: The 2017-2018 Winter crop census map showing the current land use of the areas surrounding the proposed dam

5. VEGETATION ENCOUNTERED

Directly next to the existing dam a degraded vegetation cover was observed, located on soils that were impacted by the construction of the original dam (which would have stripped the topsoil and original vegetation layer). The vegetation in these areas can be at best described as severely degraded to transformed consisting mainly of hardy weedy pioneer plants mixed with weedy alien and invasive plant species (Photo 1).

Only a small section at the back of the existing dam (Photo 3 - 5), still supported a few hardy indigenous species such as *Eriocephalus* (kapokbossie) and *Stoebe* (slangbos) but even here the vegetation was dominated by the indigenous but weedy *Galenia africana* (commonly regarded as a disturbance indicator species). In this area it is likely that the topsoil had not been stripped (the reason for the remaining hardy species), but had been severely degraded over time as a result of the surrounding intensive agricultural practices.

Apart from the grasses like (*Briza minor, Bromus diandrus, Cynodon dactylon, Eragrostis* species and sedges like *Kallinga* species, *Phragmites australis, Typha capensis* most of this area was characterized by alien problem plants like: *Amaranthus deflexus* (pigweed), *Achyranthes* cf. *aspera* (Bur weed), *Chenopodium album, Conyza bonariensis* (Skraalhans), *Datura stramonium* (Olieboom), *Echium plantagineum, Nicotiana glauca* (Tabaco plant), *Ricinus communis* (Kasterolieplant), *Salsola kali* (tumbleweed) and *Urtica urens* (nettle). Indigenous plants include the weedy *Galenia africana* (Kraalbos), *Eriocephalus africanus* (kapokbossie), one of the hardy *Hermannia* species, *Stoebe* species and the common *Tribulus terrestris* (Dubbeltjie). A few young individuals of the following alien and invasive trees were also observed namely *Acacia saligna* (Port Jackson Willow) and *Casuarina cunninghamiana* (Beefwood, from the nearby windbreaks).



Photo 3: Looking from southeast to northwest over the bottom section of the existing dam. Note the slightly better vegetated area to the right of the picture.
Photo 4: Looking from east to west over the bottom part of the dam (the slightly better vegetated area). Dominated by <i>Galenia africana</i> and <i>Salsola</i> <i>kali</i> , but with hardy species like <i>Stoebe</i> and <i>Eriocephalus</i> scattered in between.
Photo 5: Looking from west to east over the bottom part of the dam. Again showing the <i>Galenia</i> dominated veld.
Photo 6: Salsola kali dominated vegetation to the west of the dam. Again it is clear that this area were subject to heavy disturbance in the past.



From the site visit it is clear that the remaining vegetation within the proposed footprint (and its immediate surroundings) can only be described as severely degraded to transformed, with very few indigenous species remaining. In fact it is almost certain that most of these areas were impacted by the construction of the original dam, meaning that most of these areas had been stripped of its topsoil (with its indigenous seed store) and the original vegetation cover.

Figure 7 aims to portray the sensitivity of the site as encountered during the survey (Refer to Page 11). Apart from the existing orchards, fallow land and farm yard surrounding the existing dam site the following was observed:

- The blue polygon represents the existing dam surrounded by a narrow band of degraded vegetation associated with the water body (as described above) and located on soils previously stripped of topsoil and its original vegetation layer;
- The yellow polygon represents small drainage ditches probably directing drainage from the surrounding orchards back to the dam. Unfortunately, as so often the case, these areas had also been heavily degraded over time as a result of the surrounding agricultural activities.
- The green polygon represents the remaining portion of the original small seasonal water course that would have drained the surrounding hills. As in the case of the drainage ditches (described above) the vegetation was also severely compromised and degraded, leaving only weedy pioneer species and weedy alien and invasive species in this area (Picture 6 showing a portion of this area).

In conclusion, the proposed footprint and its immediate surroundings do not support any remaining natural vegetation of conservation importance.

Botanical Scan



Figure 7: Vegetation sensitivity map as encountered during the plant survey. The blue polygon represents the dam and its associated degraded/transformed vegetation. The yellow polygon depicts drainage lines associated with weedy alien species and hardy pioneer species, the green polygon represents the remaining portion of a water course also associated with a very degraded vegetation cover.

Zwartfontein Dam

6. **RECOMMENDATIONS**

Having evaluated the proposed site and its immediate surroundings, it is unlikely that the proposed development will lead to any significant impact on any remaining vegetation or plant species of significant conservation value. In fact most of the terrain and its immediate surroundings are considered heavily degraded to transform. Only a few hardy indigenous species remains.

Recommendations on impact minimization are thus mostly limited to good environmental control (apart from potential positive off-sets):

- It is always an excellent idea to let the inflow water to the dam run through a constructed or artificial wetland area. This will help to prevent siltation of the dam and will also help to clean the water from various micro-elements that may be detrimental to water health. Such a wetland should be established in the water inlet area and can be a simple affair like a shallow v-shaped inlet that widens as it drains towards the dam (the longer and larger the better). This inlet should then be planted with reeds like *Phragmites australis* and / or *Typha capensis*, which will over time, establish itself in a dense mat, which will help filtering / cleaning the inlet water before it reaches the dam.
- Properly designed and managed farm dams can attract a variety of birds, insects and animals to the area and so contribute to conservation of biodiversity
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase.
- Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.
- Indiscriminate clearing of areas must be avoided and all areas impacted as a result of construction must be rehabilitated on completion of the project.
- An integrated waste management approach must be implemented during construction.

7. **REFERENCES**

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APPENDIX 1: 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.
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
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).
Qualifications: Professional affiliation:	 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). Registered Professional <u>Botanical, Environmental and Ecological Scientist</u> at SACNASP (South African Council for Natural Scientific Professions) since 2005.

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. 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): Zypherfontein Dam Biodiversity & Botanical Scan. Proposed construction of a new irrigation dam on Portions 1, 3, 5 & 6 of the Farm Zypherfontein 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, Kuruman, 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): Kuruman 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 Waste Water 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 Plaaitje Local Municipality, Northern Cape Province. Botanical assessment of the proposed footprint (with biodiversity inputs). 15 May 2019.
- Botes, P. 2019(b): Verneujkpan 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, Gordonia 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.