

BONATHABA DAM

BOTANICAL STATEMENT

PROPOSED DEVELOPMENT OF AN INSTREAM DAM ON PORTION 2 & 3 OF FARM 1100,
BONATHABA (MALMESBURY), SWARTLAND LOCAL MUNICIPALITY, WESTERN CAPE PROVINCE.



November 12, 2020

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©

EXECUTIVE SUMMARY

VEGETATION TYPE	Swartland Shale Renosterveld The area in which the dam is located was historically covered by Swartland Shale Renosterveld, which is now considered critically endangered and not protected (Skowno <i>et. al.</i> , 2019).
VEGETATION ENCOUNTERED	The proposed dam will have a footprint of 16 – 18 ha in size. The largest portion of this footprint will overlap areas currently under permanent crops (mostly vines). The northern (middle) portion of the proposed dam will however, impact on an area of virgin soil. According to the foreman of the farm, this area used to be under wheat cultivation, which was confirmed by historic Google images (Figure 7). The site was cultivated at least until 2006, while the next available Google image (from 2009) shows the site lying fallow.
CONSERVATION PRIORITY AREAS	According to the Swartland spatial dataset of the WCBSP, the dam does not fall within any CBA, but it overlaps proposed ecological support areas (Class 2) associated with the channelled valley bottom seasonal streams (Refer to the yellow areas shown in Figure 5).
CONNECTIVITY	The proposed footprint is bordered by permanent crop to the north, south and by the Porseleinberg Road to the east. Remaining fallow land which is still connected to potential remaining natural veld (west of the fallow land) can be found to the west. However, this area was also under cultivation at least up till 2006.
LAND-USE	According to the National Land Use map (Figure 6), the proposed footprint overlaps fallow land, but also potential herbaceous wetland and low shrubland. However, the site visit confirmed that the site (the small seasonal streams included) can only be described as degraded and should be classified as fallow land or virgin soils (soils that were previously under cultivation).
PROTECTED PLANT SPECIES	No protected or red-listed plant species were observed.
WATER COURSES AND WETLANDS	The impact on the water courses is not discussed in this report as a freshwater specialist was appointed to evaluate these features.
MAIN CONCLUSION	The proposed development will have very little impact on any remaining natural veld, as the site and its surroundings are already disturbed to transform. Probably the most significant botanical feature encountered was the presence of a few beautiful indigenous <i>Olea europaea</i> trees, located in the area that where the proposed dam wall will be constructed. However, <i>Olea</i> trees can be transplanted, and it is suggested that these trees are carefully removed and transplanted, next to the new dam. It is considered highly unlikely that the development had or will contribute significantly to any of the following: <ul style="list-style-type: none"> • 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. <p>WITH THE AVAILABLE INFORMATION IT IS RECOMMENDED THAT PROJECT BE APPROVED, WITH THE PROPOSED MITIGATION ACTIONS</p>
NO-GO OPTION	The No-Go option is not likely to result in a “no-impact” scenario, as constant slow degradation is expected to continue as a result of agricultural activities in and around the site.

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 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 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:

4 October 2019

Date:

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1. INTRODUCTION

EnviroAfrica CC was appointed to conduct an environmental application for the development of an in-stream dam on Portions 2 & 3 of Farm No. 1100 (Malmesbury), between Malmesbury and Wellington. The proposed dam will be located in veld that was historically covered by Swartland Shale Renosterveld, a vegetation type considered critically endangered and poorly protected. The stream that will be impacted by the proposed in-stream dam has been classified as an ecological support area (ESA 2), which means that it is recognized as being degraded, but that it should be protected from further impact and ideally restored to a more natural state in order to support some ecological processes. 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 suggest that the site and its surroundings had been heavily impacted or even transformed as a result of past and present agricultural practices, a view supported by aerial imagery and the latest BGIS land use maps. A site visit was performed during June 2020, during which the site was walked and scanned for potential remaining botanical features of significance. The timing of the site visit was reasonable, although too early for the potential spring flowering season. Renosterveld is known for its rich spring bulb component and the site visit was conducted in winter. However, it was quite clear that the dam site and its surroundings had been heavily degraded and even transformed as a result of intensive agricultural practices over a long period of time. Apart from single hardy and mostly weedy indigenous species, no remaining natural veld was encountered. It is also highly unlikely that bulbs would have survived the prolonged period of intensive cultivation. The small seasonal stream only supported remnants of a healthy riparian corridor.

Probably the most significant botanical feature encountered was the presence of a few beautiful indigenous *Olea europaea* trees, located in the area that where the proposed dam wall will be constructed. However, *Olea* trees can be transplanted, and it is suggested that these trees are carefully removed and transplanted, next to the new dam.

Based on the findings of the site visit and desktop studies the author is of the opinion that the site can only be described as heavily impacted to transform as a result of past and present agricultural practices. Ideally the upper ecological corridors of the seasonal stream should be re-vegetated and protected after the construction of the new dam. Another biodiversity feature that should be considered is to design the water intake areas as shallow “wetland” areas. This will allow incoming water to be filtered through the “wetland” area and will also support a richer fauna & avi-fauna over time.

Please note that because of the poor environmental status of the site this report only gives a short description of the botanical elements and its status encountered on 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.

1.1. TERMS OF REFERENCE

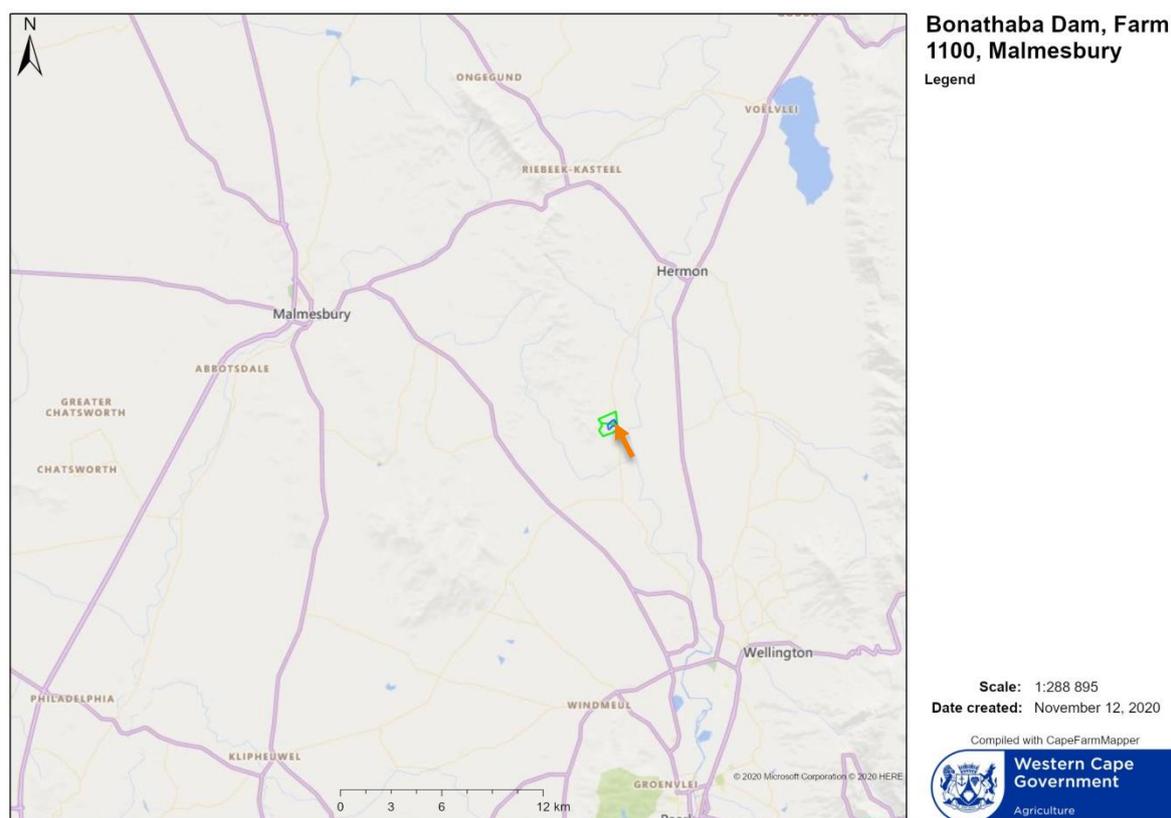
The terms of reference for this appointment were to:

- 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

Bonathaba Farm (Portions 2 & 3 of the Farm No. 1100) is located just west the Porseleinberg Road between Wellington to the south and Malmesbury to the north in the Swartland local Municipality, Western Cape Province (Figure 1). The two farm portions (approximately 110 ha in size) are part of the larger Bonathaba Farm.

Figure 1: The approximate location of the Bonathaba Dam (indicated by the arrow) and the properties (in green)

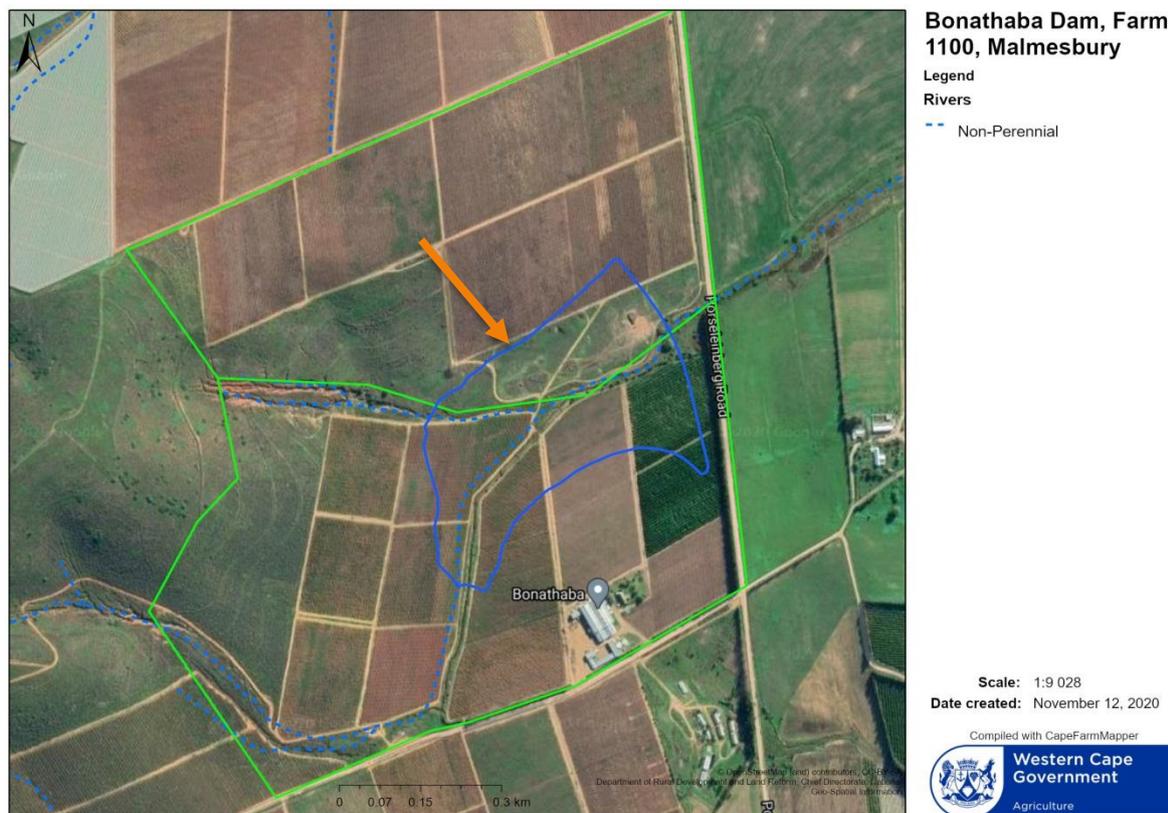


The proposed dam will overlap both properties while the dam wall will be almost on the eastern boundary of these properties (Figure 2). The proposed footprint of the new dam will be 16 – 18 ha in size, most of which will impact on existing vineyards and/or orchards.

However, the northern portion of the proposed dam will cover an area that is not currently cultivated and can be described as “virgin” soils in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983 (CARA). Land use maps still describe portions of this area as low shrubland, although the site visit suggests that it is

more likely fallow land, currently used as lay-down area and potentially for grazing. Figure 3 gives more detail of the proposed layout of the new dam.

Figure 2: The proposed location of the new dam (blue) within the two properties (green)



1.3. EVALUATION METHOD

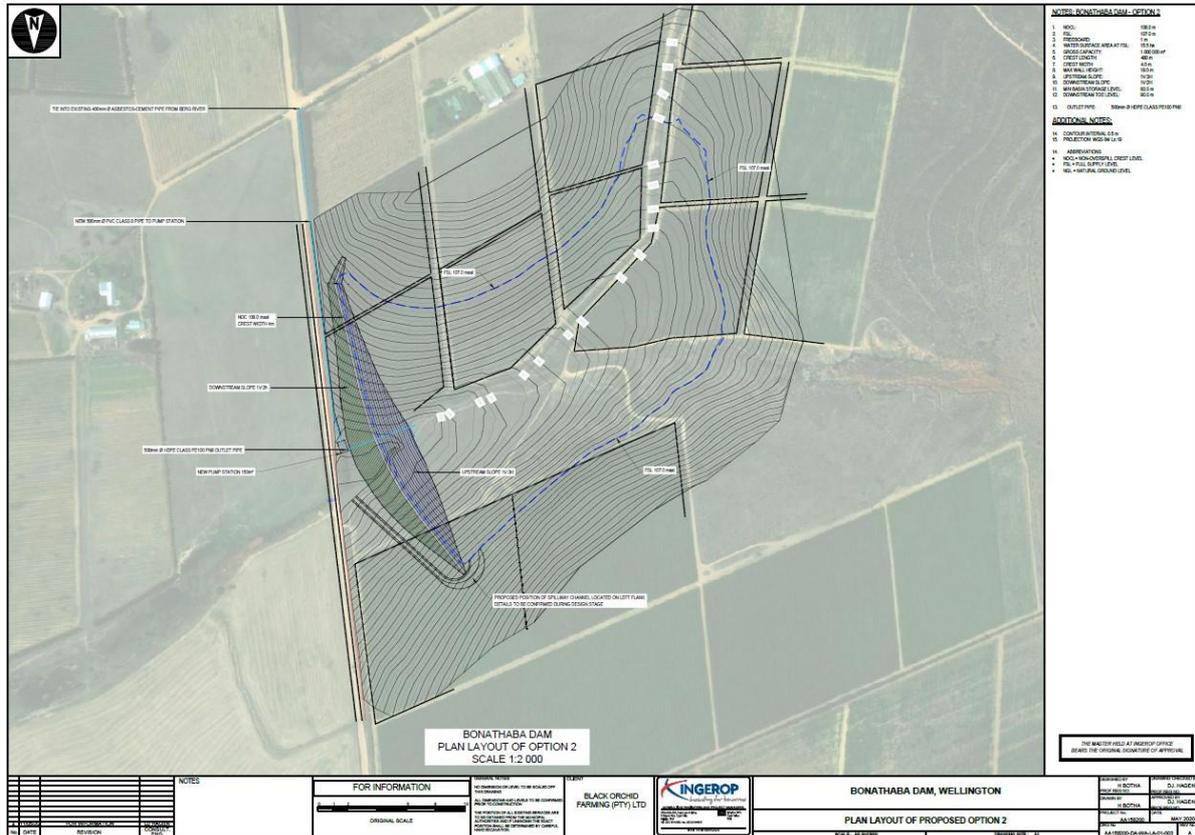
Desktop studies together with a site visit was performed to evaluate the proposed site in terms of potential impacts on botanical features of significance and to make recommendations on mitigation measures (should it be required). The timing of the site visit was reasonable, although too early for the potential spring flowering season. Renosterveld is known for its rich spring bulb component and the site visit was conducted in winter. However, it was quite clear that the dam site and its surroundings had been heavily degraded and even transformed as a result of intensive agricultural practices over a long period of time. Apart from single hardy and mostly weedy indigenous species, no remaining natural veld was encountered. It is also highly unlikely that bulbs would have survived the prolonged period of intensive cultivation. The small seasonal stream only supported remnants of a healthy riparian corridor.

Confidence in the findings is high.

1.4. ACTIVITY DESCRIPTION

The applicant would like to establish additional winter storage capacity through the construction of a new storage dam on the above mentioned farm properties. The new dam will have a maximum wall height of 18 m, a water surface area of approximately 15.5 ha and a gross capacity of 1 000 000 m³ (Figure 3).

Figure 3: The proposed layout plans for the Bonathaba dam

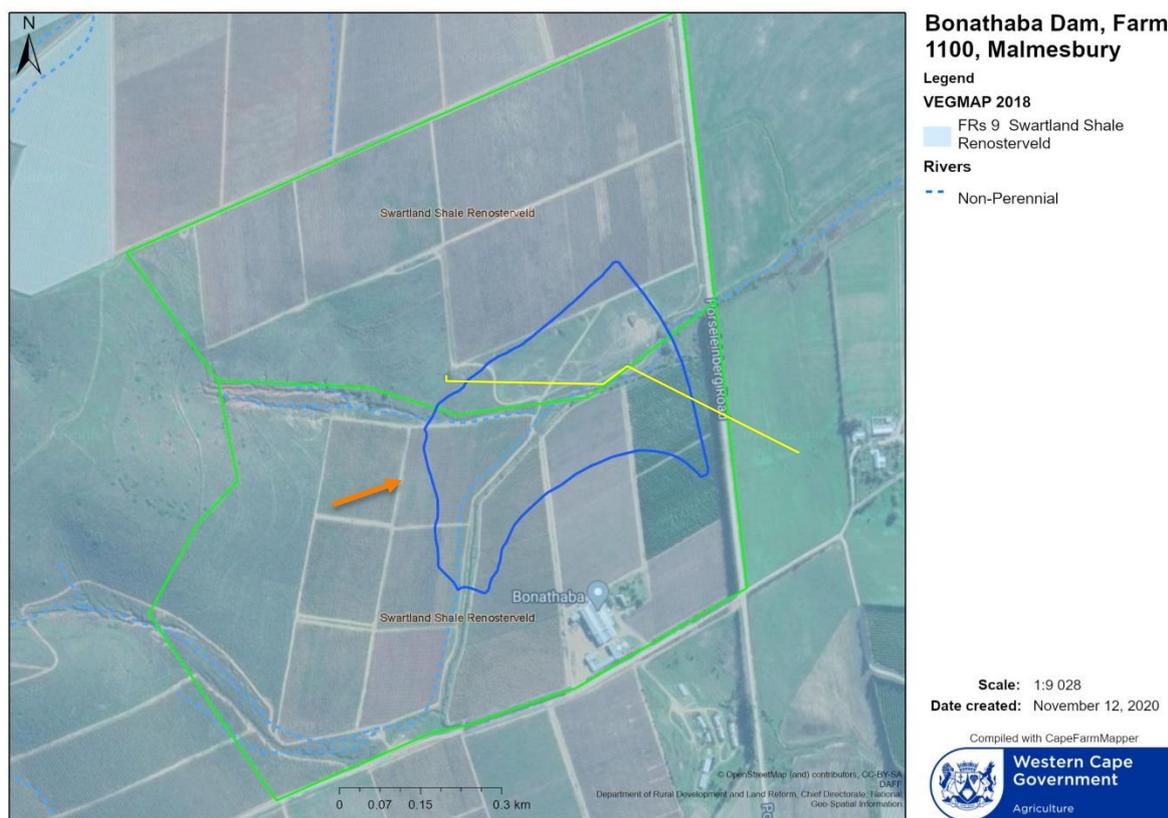


2. THE VEGETATION

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 the vegetation known as Swartland Shale Renosterveld (). 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, as well as the more recent (2018) National Biodiversity Assessment (Skowno *et. al.*, 2019). However, aerial imagery as well as BGIS land use results indicates that the site is most likely already transformed as a result of past and present agricultural practices.

Mucina & Rutherford (2006) describe Swartland Shale Renosterveld as occurring on moderately undulating plains and valleys which supports a low to moderately tall leptophyllous shrubland of varying canopy cover as well as low, open shrubland dominated by renosterbos. Heuweltjies are a very prominent local feature of the environment, forming ‘hummockveld’ near Piketberg and giving the Tygerberg Hills their name. Stunted trees and thicket are often associated with the heuweltjies. Disturbed areas are dominated by *Athanasia trifurcata* and *Otholobium hirtum*. Patches of *Cynodon dactylon* or ‘grazing lawn’ are often encountered.

Figure 4: The vegetation map of South Africa (Mucina, Rutherford & Powrie, 2005) showing the dam location

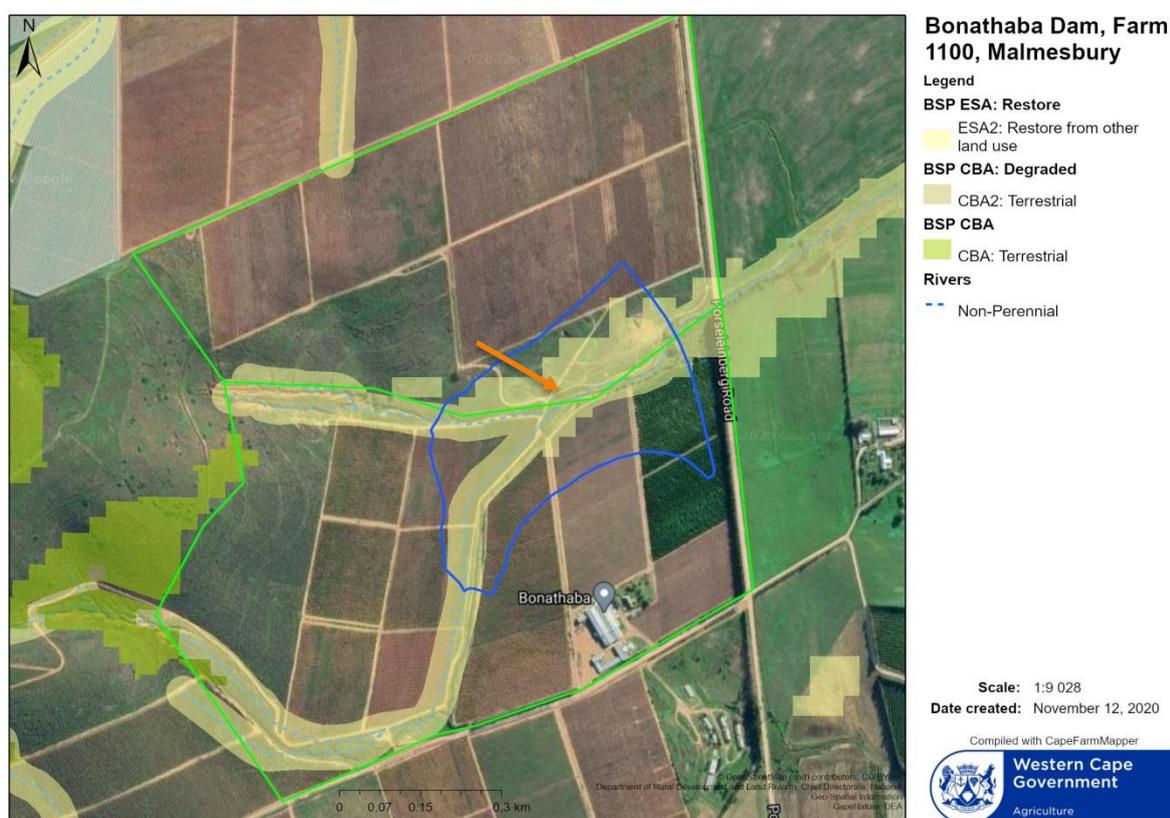


3. SWARTLAND CRITICAL BIODIVERSITY MAP

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 Swartland spatial dataset of the WCBSP, the dam does not fall within any CBA, but it overlaps proposed ecological support areas (Class 2) associated with the channeled valley bottom seasonal streams (Refer to the yellow areas shown in Figure 5).

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



In this case the small seasonal streams (ecological support areas) have been quite clearly impacted over a long period of time. As a result, very little or only remnants of the expected riparian vegetation remains.

4. NATIONAL LAND USE MAP

According to the National Land Use map (Figure 5), the dam will for the largest part overlap permanent commercial crops (mostly vines in this case), but the northern part of the dam will also overlap herbaceous wetland and low shrubland areas. To the north-west of the proposed dam site, fallow land is expected.

However, the observations made during the site visit shows that the whole valley bottom had been degraded almost to the extent of being transformed by past and present agricultural practices. According to the farm foreman all of these areas used to be cultivated with wheat by the previous owners.

Figure 6: National Land Use map, indicating the expected status of the proposed site



5. VEGETATION ENCOUNTERED

The proposed dam will have a footprint of 16 – 18 ha in size. The largest portion of this footprint will overlap areas currently under permanent crops (mostly vines). The northern (middle) portion of the proposed dam will however, impact on an area of virgin soil. According to the foreman of the farm, this area used to be under wheat cultivation, which was confirmed by historic Google images (Figure 7). The site was cultivated at least until 2006, while the next available Google image (from 2009) shows the site lying fallow.

The site visit confirmed that remaining virgin soils had clearly been cultivated or similarly disturbed over a long period of time. Very few indigenous plants were observed and most of these were weedy or pioneer species. The small stream was also subject to disturbance as is typical in an intensive agricultural landscape.

At present the site is covered in dense grassy layer covered mostly by the indigenous grass *Cynodon dactylon* (Fynkweek) with weedy or hardy shrubs scattered in between. It is also used as laydown and storage area for various items including straw bales. The shrubs observed were mostly disturbance indicators like the *Galenia*

africana (weedy species) and *Dicrothamnus rhinocerotis* (Renosterbos) or hardy species like *Asparagus* species, *Eriocephalus cf. africanus* and *Stoebe plumosa*. A great number of alien weeds like *Atriplex semibaccata*, *Echium vulgare*, *Salsola kali*, *Brassica cf. napus* (Canola), *Solanum retroflexum* (nightshade) were observed and even a few beefwood trees (*Casuarina* species) starting to establish itself.

Figure 7: A Google image from 2005, clearly showing the area the remaining area under cultivation

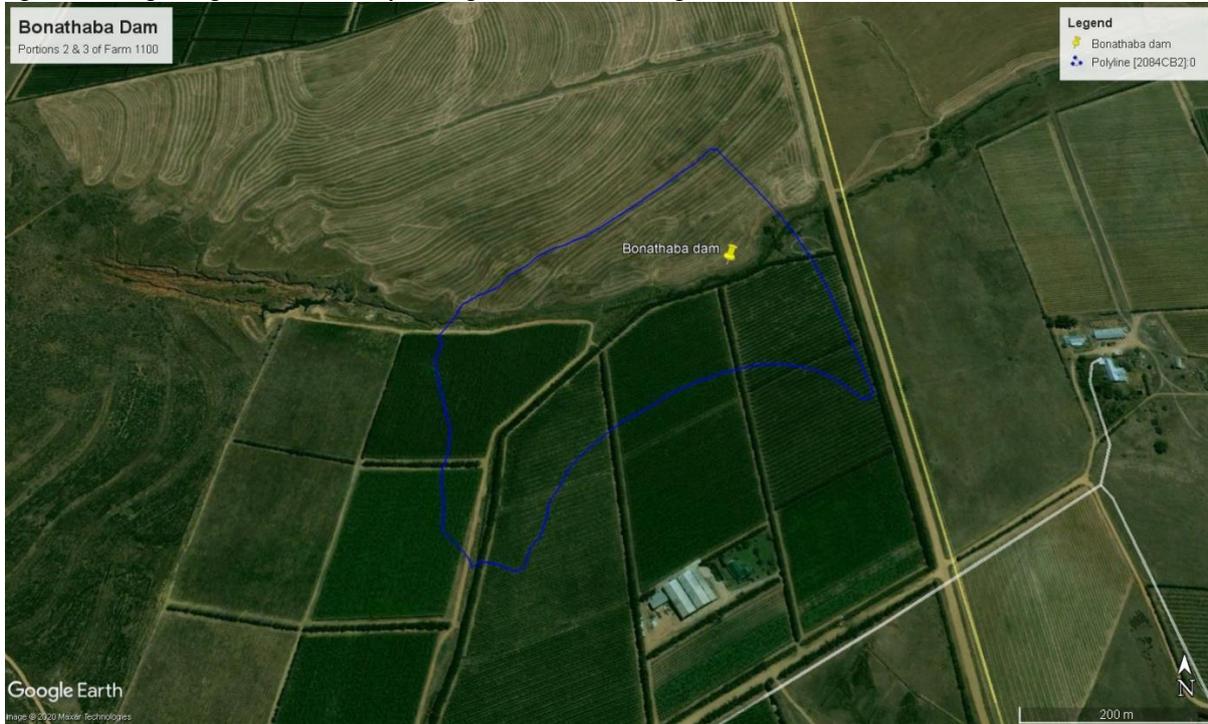


Figure 8: Google image, showing the proposed dam and the area that will be impacted



The most significant observation in terms of botanical significance was a number of *Olea europaea* trees as well as a rather large *Searsia lancea* that was observed near the small stream. Two of these were relative large individuals located next to the stream where the new dam wall will be located.

The following pictures aim to give an overview of the vegetation encountered.



Photo 1: Looking over the dam location from east to west from the Porseleinberg Road. Note the absence of natural vegetation apart from a grassy layer of *Cynodon dactylon* and a few hardy or weedy shrubs, like *Galenia africana*. To the left the seasonal stream can be seen dominated by weedy shrubs and the reed, *Phragmites australis*.



Photo 2: A view over the site from west to east, showing the grassy ground cover and occasional shrubs. In the background the two larger *Olea europaea* and *Searsia lancea* trees can be seen where the dam wall will be located (indicated by arrows)



Photo 3: Looking back from east to west over the proposed dam site, again showing the dense grassy bottom layer with occasional shrubs in between.



Photo 4: Looking upstream over the small seasonal stream that will be impacted from by the dam. Taken from just west of the proposed dam wall – looking east over the small stream. In this area the vegetation associated with the stream was dominated by *Phragmites australis* with *Galenia africana* along the banks (Renosterbos patch in the background).



Photo 5: Showing two more *Olea europaea* trees growing on the disturbed river sides.



Photo 6: A dense patch of *Galenia africana* encountered to the west of the site, next to the stream.



Photo 7: A view over one branch of the stream that will be impacted. Note the disturbed state of the small stream and the lack of a real riparian vegetation corridor.



Photo 8: A closer look at the two *Olea europaea* trees (one located almost within the *Searsia lancea* tree).

6. RECOMMENDATIONS

Having evaluated the proposed site and its immediate surroundings, it is highly unlikely that the proposed development will lead to any significant impact on any remaining indigenous vegetation as a result of its placement. The site and its immediate surroundings are considered transformed with no significant natural veld remaining. Probably the most significant botanical feature encountered was the presence of a few beautiful indigenous *Olea europaea* trees, located in the area that where the proposed dam wall will be constructed. However, *Olea* trees can be transplanted, and it is suggested that these trees are carefully removed and transplanted, next to the new dam.

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

- Before construction commence the two larger *Olea europaea* trees (located where the dam wall will be constructed - Photo 2 and Photo 8) should be carefully removed and transplanted to just outside of the new dam footprint. In order to do so, the roots of these trees should be trimmed (*in-situ*). The trees should then be left for at least a couple of months to recover. Just before being transplanted the trees should be trimmed back (at least a third of the canopy), after which the tree can be transplanted, being careful to keep the tree in its same orientation (the north facing part of the tree, should again face north).
- The smaller trees on the disturbed river banks (e.g. Photo 5) should also be considered for transplantation, but these could probably be done in one go.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase.
- The development footprint should be clearly demarcated and all construction activities should remain within this footprint (including lay-down areas).
- Indiscriminate clearing of areas must be avoided.
- All areas impacted as a result of construction must be rehabilitated on completion of the project.

7. REFERENCES

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APPENDIX 1: COMPLIANCE WITH APPENDIX 6 OF GN. NO. 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 2
(ii) The expertise of the specialist to compile a specialist report including a curriculum vitae;	Refer to Appendix 2
b) A declaration that the specialist is independent in a form as may be specified by the competent authority;	Refer to Page ii
c) An indication of the scope of, and the purpose for which the report was prepared;	Refer to Heading Error! 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 modelling used;	Refer to Heading Error! Reference source not found.
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 2, 3, 4 & 5
g) An identification of any areas to be avoided, including buffers;	N/a
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 3
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
l) Any conditions for inclusion in the environmental authorization;	None
m) Any monitoring requirements for inclusion in the EMPr or environmental authorization;	N/a
n) A reasoned opinion -	
(i) [as to] whether the proposed activity, activities or portions thereof should be authorized;	Refer to the " <i>Main conclusion</i> " within the executive summary (Page i)
(iA) regarding the acceptability of the proposed activity or activities; and	
(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 protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

Curriculum Vitae: Peet JJ Botes

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

Nationality: South African

ID No.: 670329 5028 081

Language: Afrikaans / English

Profession: Environmental Consultant & Auditing

Specializations: Botanical & Biodiversity Impact Assessments

Environmental Compliance Audits

Environmental Impact Assessment

Environmental Management Systems

Qualifications: **BSc** (Botany & Zoology), with Nature Conservation III & IV as extra subjects; Dept. of Natural Sciences, Stellenbosch University 1989.

Hons. BSc (Plant Ecology), Stellenbosch University, 1989

More than 20 years of experience in the Environmental Management Field (Since 1997 to present).

Professional affiliation: Registered Professional Botanical, Environmental and Ecological Scientist at SACNASP (South African Council for Natural Scientific Professions) since 2005.

SACNAP Reg. No.: 400184/05

BRIEF RESUME OF RELEVANT EXPERIENCE

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

2005-2010: Joined Enviroscentific, 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-, 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 Western 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 (Western 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 Rheebofsfontein 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, Western Cape Province. A Botanical scan of the area that will be impacted. 28 July 2015.
- Botes, P. 2016(a): OWK Raisin processing facility, Blaauwskop Settlement, 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): Kamieskroon 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, Western 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 Plaaitye 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 !Gariëp Local Municipality, Northern Cape Province. 6 February 2020.
- Botes, P. 2020(b): Feldspar Prospecting & Mining, Farm Rozyne Bosch 104, Kakamas. Botanical assessment of the proposed prospecting and mining activities on Portion 5 of The Farm Rozyne 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): Gariiep housing project – Botanical assessment of the proposed formalization and development of 135 new erven on Plot 113, Gariiep Settlement, !Kheis Local Municipality, Northern Cape Province. 20 July 2020.
- Botes, P. 2020(j): Blaauwskop Settlement Low cost housing project – Botanical assessment of the proposed formalization and development of 500 erven on Portion 30 of the Farm Blauws Kop No. 36, Upington. Northern Cape Province. 24 August 2020.
- Botes, P. 2020(k): Kamieskroon Oxidation Ponds – Botanical assessment of the proposed upgrades to the existing WWTW & construction of new oxidation ponds, Kamiesberg Local Municipality, Northern Cape Province. 31 August 2020.
- Botes, P. 2020(l): Kuruman Erf 4440 – Botanical assessment of the proposed development of new business premises on Erf 4440, Kuruman, Ga-Segonyana Local Municipality, Northern Cape Province. 9 October 2020.
- Botes, P. 2020(m): Schaapkraal Erf 644, Michells Plain – Botanical of the proposed residential development on Erf 644, Schaapkraal, Michells Plain, City of Cape Town, Western Cape Province. 29 October 2020.