



BRANDVLEI BORROW PIT

Proposed establishment of a small borrow pit near Brandvlei (Northern Cape Province).

BOTANICAL SCAN

A Botanical scan of the proposed site in order to identify significant environmental features (and to identify the need for additional studies if required).

19 April 2017



PREPARED BY: PB Consult

PREPARED FOR: ENVIROAFRICA CC

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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 OTB and being responsible for developing and implementing an ISO14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld, working closely with CapeNature (De Hoop Nature Reserve). In 2005 he joined Enviroscientific, an independent environmental consultancy specializing in wastewater management, botanical and biodiversity assessments, developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits and was also responsible for helping develop the biodiversity part of the Farming for the Future audit system implemented by Woolworths. During his time with Enviroscientific he performed more than 400 biodiversity and environmental legal compliance audits. During 2010 he joined EnviroAfrica in order to move back to the biodiversity aspects of environmental management. Experience with EnviroAfrica includes EIA applications, biodiversity assessment, botanical assessment, environmental compliance audits and environmental control work.

Mr. Botes is also 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.

Yours sincerely,



P.J.J. Botes (*Pr.Sci.Nat: 400184/05*)
Registered Professional Environmental and Ecological Scientist

SUMMARY - MAIN CONCLUSIONS

PREPARED BY:		PREPARED FOR:	
PB Consult 22 Buitekant Street Bredasdorp 7280		EnviroAfrica CC PO Box 5367 Helderberg 7135	
CONTACT PERSON		CONTACT PERSON	
Peet Botes Cell: +(27)82 – 921 5949 Fax: +(27)86 – 415 8595 Email: pbconsult@vodamail.co.za		Mr. Bernard de Witt Tel: +(27) 21 – 851 1616 Fax: +(27) 86 – 512 0154 Email: bernard@enviroafrica.co.za	
SUMMARY OF POSSIBLE SIGNIFICANT BIODIVERSITY FEATURES			
ASPECT	DESCRIPTION	POTENTIAL IMPACT	SIGNIFICANCE
Threatened or protected vegetation types	Bushmanland Basin Shrubland is categorized as “Least Threatened” but in need of formal protection.	Potential impact on provincial or national conservation targets	Low to very low Because of the small size and the slightly disturbed nature of the site.
Special habitats	No special habitats encountered	Potential impact on special habitats, which may support special biodiversity features.	N/a None observed. However, the access road must not encroach on the nearby floodplain.
Connectivity and conservation networks	The footprint falls within a terrestrial ESA (corridor)	Potential impact on connectivity and/or proposed CBA's or ESA's (in this case a terrestrial migration corridor)	Very low The larger site still shows excellent connectivity, but the small size of the development should not have any significant impact on the proposed ESA or connectivity of the larger area.
Protected species	No red listed species or NEM:BA protected species encountered, but two NCNCA protected species were encountered.	Potential impact on vulnerable or endangered species.	Low The protected species encountered are not considered vulnerable or endangered and are both commonly found locally.
Direct impacts	Potential impacts resulting from direct interaction with an environmental, social or economic component.	Impact of the physical footprint (and access road) on biodiversity features (a combination of impacts discussed above).	Low to Medium-Low In this instance direct impacts are a combination of the impacts discussed above, the potentially most significant being the direct impact on the ESA and NCNCA protected species.
Indirect impacts	Potential impact that is not a direct result of the project often produced away from or as a result of direct impacts (e.g. impacts on water quality).	Since the proposed activity should not result in any changes, including chemical (apart from physical) indirect impacts is considered to be limited to potential erosion and pollution.	Low It is important that the site is rehabilitated with erosion control in mind and that waste and pollution is strictly managed throughout the life span of the activity.
Cumulative impacts	The incremental impact of the proposed activity together with past, present and reasonably foreseeable future impacts.	Cumulative impact refers to the combined impacts discussed above.	Low to Medium-low The physical footprint will be small, and is unlikely to impact significantly on any of the identified environmental aspects discussed above as long as good environmental control is implemented through development and rehabilitation.
RECOMMENDATION			
With mitigation it is considered highly unlikely that the proposed development will have any significant additional biodiversity impact in terms of local or regional conservation targets.			
With the available information to the author's disposal it is recommended that the project be approved, but that all mitigation measures described in this document is implemented.			

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1. INTRODUCTION

Brandvlei is a small town in the Karoo region of the Northern Cape, South Africa located near the north-eastern boundary of the Hantam Local Municipality (Namakwa District Municipality). According to history Brandvlei got its name from a 19th-century trekboer called “*Ou Brand*”. Brand camped and later settled at this spot next to the Sak River. The Sak River is a dry river bed, subject to occasionally flooding after good rains (typically resulting in flash floods). The Brandvlei settlement was cut in two by such a flood in 1961. After it was recovered, a municipality was formed in 1962. Brandvlei is located in the Bushmanland, also known as the “*Dorsland*”. Fossil found in this area supports the theory that this area was once sub-tropical, such as during the Miocene period.

Today the area is mostly used as large open grazing for wildlife and stock (mostly sheep) farming. Vegetation of this desert like landscape is sparse open low shrubland with grasses prominent after good rains.

BVi engineers propose to develop a small borrow pit site near Brandvlei in order to extract gravel material to be used within the development of the new Brandvlei WWTW upgrades. The gravel will be used as planting medium for sedges within the treatment ponds (artificial wetland treatment system). EnviroAfrica was appointed task to evaluate the location in terms of the NEMA EIA regulations. PB Consult was appointed to conduct a botanical scan of the proposed site.

The proposed borrow pit site will be small (less than 1 ha), but a short access road will have to be established. The proposed site is situated just east of the Sak River, in close proximity to the R353 gravel road. It is located behind a small hillock, within a small natural inlet (approximately 0.7ha in size), which will reduce the potential visual impact significantly. The vegetation is a medium to low very sparse form of Bushmanland Basin Shrubland. At the time of the site visit the area was very dry (although recent rains did occur in the surrounding areas). No annuals were visible and the proposed site showed a very low species turn-over or diversity.

1.1 TERMS OF REFERENCE

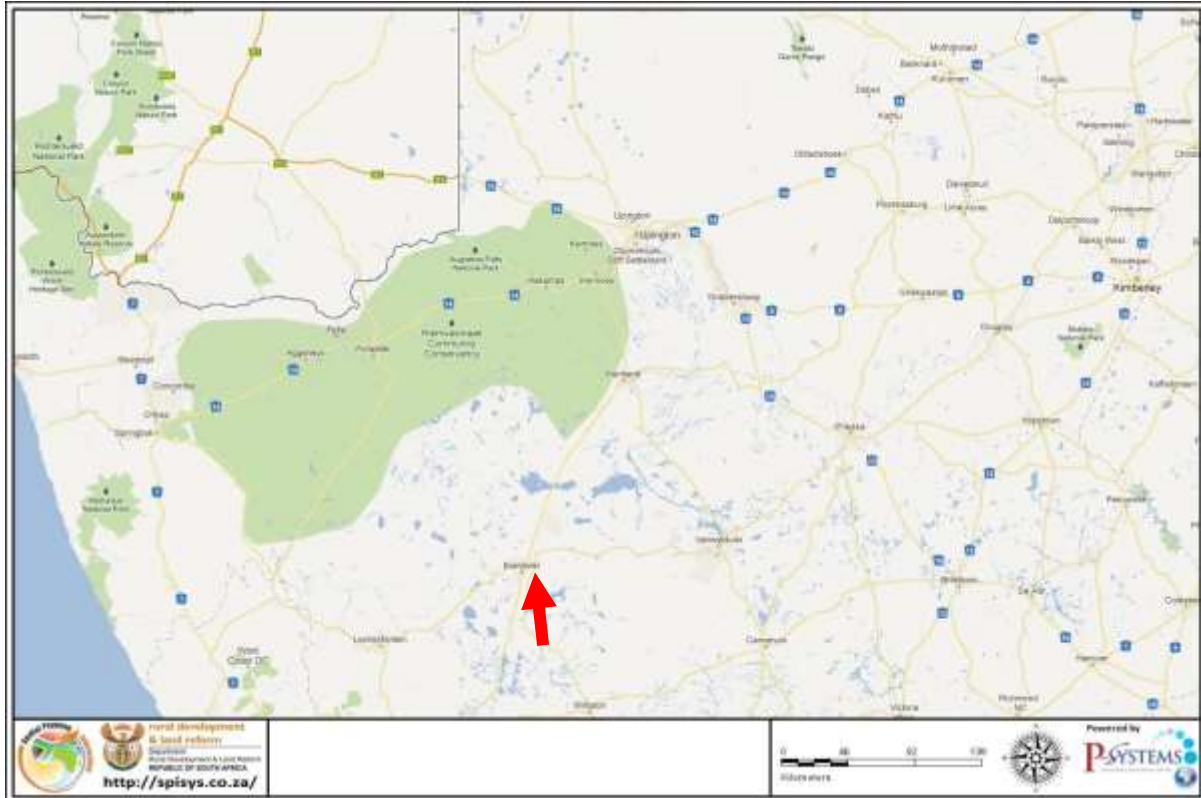
PB Consult was appointed within the following terms of reference:

- Complete a Botanical Scan of the proposed site in order to determine whether any significant features will be impacted as a result of the proposed development.
- Make recommendations on impact minimisation should it be required
-
- Consider short- to long-term implications of impacts on biodiversity and highlight irreversible impacts or irreplaceable loss of species.

1.2 LOCATION & LAYOUT

The town of Brandvlei is located on the R27, between Calvinia (approximately 150 km north off) and Kenhardt (approximately 140 km south off) in the Namakwa District Municipality, Northern Cape Province (Figure 1). The proposed site is located approximately 3 km east of Brandvlei (just east of the Sak River) and just north of the R353.

Figure 1: Map indicating the location of Brandvlei in the Northern Cape (<http://spisys.co.za>)



The proposed site will also not fall within 32m of the Sak River and should not have any impact on the riverine corridor and its associated floodplain. However, the access route should be located east of the floodplain, which is in close proximity to the proposed site. The site is also located behind a small hillock, which will significantly reduce the potential visual impact.

Table 1: GPS coordinates for Brandvlei Borrow pit

DESCRIPTION	LATITUDE AND LONGITUDE	ALTITUDE
Brandvlei Borrow pit (Centre point)	S30° 28' 17.5" E20° 31' 12.4"	920 m
Borrow pit Southwest corner	S30° 28' 19.6" E20° 31' 11.5"	919 m
Borrow pit Southeast corner	S30° 28' 17.9" E20° 31' 14.4"	923 m
Borrow pit Northeast corner	S30° 28' 16.1" E20° 31' 13.0"	920 m
Borrow pit Northwest corner	S30° 28' 17.3" E20° 31' 10.4"	919 m

Figure 2: The proposed borrow pit location in relation to Brandvlei (<http://bgisviewer.sanbi.org>)



1.3 METHODS

Desktop studies were conducted, coupled by a physical site visits on the 10th of March 2017. Although the Brandvlei area, received recent rains, the site itself still showed no signs of annual or herbaceous plants, except for grass species. The timing of the site visit was thus not ideal, but all perennial plants were identifiable and although the possibility remains that a few species may have been missed, the author is confident that a fairly good understanding of the vegetation status in the area was obtained. The site itself showed signs of having been disturbed in the past (small scale gravel mining) and this reflected in the species turn-over, which was very low, even for this semi-desert area.

The survey was conducted by walking and driving the route, examining, marking and photographing any area of interest. Confidence in the findings is high.

2. APPLICABLE LEGISLATION

Constitution of the Republic of South Africa (1996): of special relevance in terms of environment is section 24

Conservation of Agricultural Resources Act 43 of 1983 (CARA): supports conservation of natural agricultural resources (soil, water, plant biodiversity) by maintaining the production potential of the land and combating/preventing erosion; for example, by controlling or eradicating declared weeds and invader plants.

Hazardous Substances Act 15 of 1973: to control substances that may cause injury, ill-health, or death through their toxic, corrosive, irritant, strongly sensitizing or flammable nature, or by the generation of pressure

National Environmental Management Act 107 of 1998 (as amended): replaces the Environmental Conservation Act (ECA) and establishes principles for decision-making on matters affecting the environment, and for matters connected therewith.

- **Environmental Impact Assessment Regulations (R543 of 2010):** procedures to be followed for application to conduct a listed activity.

National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA): replaces the Atmospheric Pollution Prevention Act (No. 45 of 1965).

National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA): supports conservation of plant and animal biodiversity, including the soil and water upon which it depends.

- **National list of ecosystems that are threatened and in need of protection (GN 1002 of 9 December 2011).**

National Environmental Management: Protected Areas Act 57 of 2003 (as amended Act 31 of 2004) (NEMPAA): To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes.

National Environmental Management: Waste Act 59 of 2008 (NEMWA): To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.

- **List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment (GN 718 of 3 July 2009):** Identifies activities in respect of which a waste management license is required.

National Forests Act 84 of 1998 (as amended): supports sustainable forest management and the restructuring of the forestry sector.

- **List of protected tree species (GN 716 of 7 September 2012)**

National Heritage Resources Act 25 of 1999: supports an integrated and interactive system for the management of national heritage resources, including supports soil, water and animal and plant biodiversity.

National Veld and Forest Fire Act 101 of 1998 (NVFFA): protects soil, water and plant life through the prevention and combating of veld, forest, and mountain fires

National Water Act 36 of 1998 (NWA): promotes the protection, use, development, conservation, management, and control of water resources in a sustainable and equitable manner.

Northern Cape Nature Conservation Act 9 of 2009 (NCNCA): which provides for the sustainable utilization of wild animals, aquatic biota and plants.

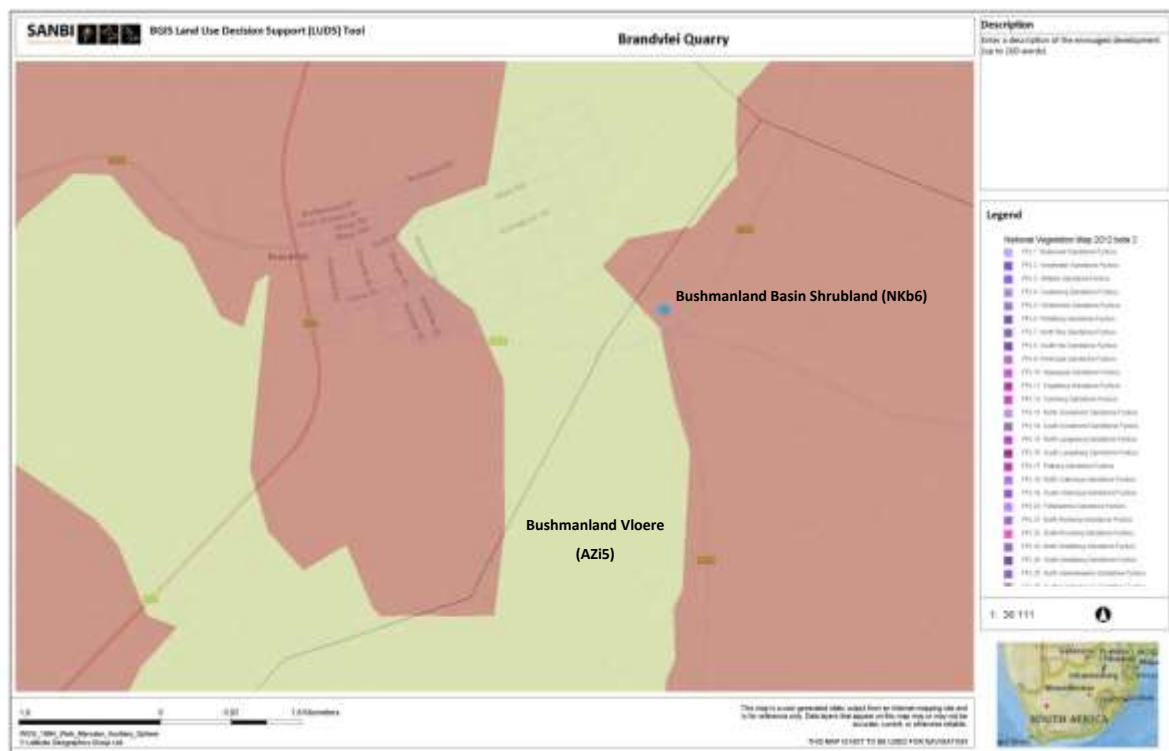
3. GENERAL SITE DESCRIPTION

Brandvlei receives about 54 mm of rain on average per year, most of which occur during autumn. It receives its lowest rainfall (0mm) in August and the highest (17mm) in March. Average daily maximum temperatures range from 17.1°C in July to 32°C in January. Average minimum night time temperatures is experienced during July (2°C) (www.saexplorer.co.za).

3.1 VEGETATION

According to the National Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006 (as updated) the proposed site is expected to fall within the Bushmanland Basin Shrubland vegetation type (Figure 3). Bushmanland Basin Shrubland (part of the Nama-Karoo Biome) is classified as “Least Threatened” (GN 1002, December 2011), which forms part of the Nama-Karoo Biome. The site is also not located within any formal (National Biodiversity Assessment, 2011) or informal (National Protected Areas Expansion Strategy) protected areas (<http://bgisviewer.sanbi.org>).

Figure 3: National Vegetation map of SA, Lesotho and Swaziland (2012, Beta 2) (<http://bgisviewer.sanbi.org>)



The arid Nama-Karoo flora is not particularly rich in flora and does not contain any centre of endemism. Unlike other biomes of South Africa, local endemism is very low, which might indicate a relatively youthful biome linked to the remarkable geological and environmental homogeneity of the Nama-Karoo. Rainfall seasonality and frequency are too unpredictable and winter temperatures too low to enable leaf succulents to dominate (like in the Succulent Karoo), while summers are too dry for dominance by perennial grasses alone, and the

soils are generally too shallow and rainfall too low for trees. On the other hand, soil type, soil depth and local differences in moisture availability can cause abrupt changes in vegetation structure and composition.

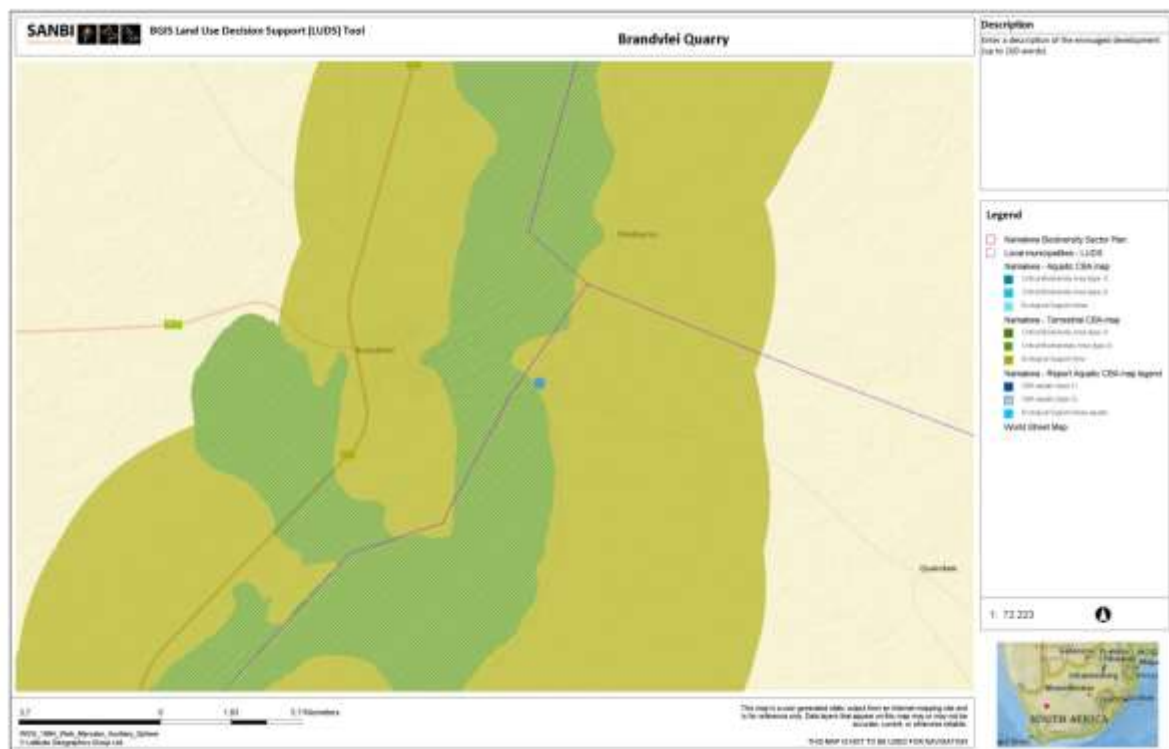
3.1.1 *Bushmanland Basin Shrubland*

Bushmanland Basin Shrubland type is found in the large Bushmanland Basin centred on Brandvlei and Van Wyksvlei area, spanning Granaatboskolk in the west to Copperton in the east, and Kenhardt vicinity in the north to Williston vicinity in the south. Altitude ranges mostly from 800-1 200 m. It forms part of the Nama Karoo Biome and is described as occurring on slightly irregular plains with dwarf shrubland dominated by a mixture of low sturdy and spiny (and sometimes also succulent) shrubs (*Rhigozum*, *Salsola*, *Pentzia*, *Eriocephalus*), “white” grasses (*Stipagrostis*) and in years of high rainfall also by abundant annuals such as species of *Gazania* and *Leysera* (Mucina & Rutherford, 2006).

3.2 CRITICAL BIODIVERSITY AREAS

According to the Namakwa District Biodiversity Sector Plan (Figure 4) the proposed site will be located within an identified ecological support area (ESA), class ESA_T (terrestrial corridor), proposed for conservation as part of the Sak River’s migration corridor, but because of the small size of the activity it is unlikely have any significant impact on the ESA.

Figure 4: The Namakwa District Biodiversity Sector Plan showing the proposed borrow pit location (blue dot) (<http://bgisviewer.sanbi.org>)



3.3 VEGETATION ENCOUNTERED

The site itself showed signs of previous disturbance (probably earlier gravel extraction) and had a very low species turnover (Photo 1 to Photo 4). The proposed site is located within a natural shallow inlet behind a small hillock, covering approximately 0.7 ha. Vegetation cover was as low as 30% for most of the area with clumps of larger *Lycium* dominated vegetation in the lower lying areas. It can be described as a medium to low sparse shrubland dominated by *Lycium cinereum* and *Tetraena retrofracta* in the lower lying areas and *Mesembryanthemum subnodosum* along the ridges of the hillock. Other species encountered were: *Aridaria noctiflora*, *Eriosephalus cf. microphyllus*, *Phaeoptilum spinosum*, *Pteronia viscosa*, *Rhigozum trichotomum*, *Salsola cf. aphylla*, *Stipagrostis ciliata* and *Stipagrostis obtusa*. A single individual of the alien invasive species *Prosopis grandulosa* was also encountered.

Photo 1: Open slightly disturbed area in bottom areas



Photo 2: Sparse vegetation within the site



Photo 3: Vegetation on the ridges of the hillock



Photo 4: A single Prosopis tree encountered within the site



3.4 FLORA ENCOUNTERED

Please note that this study never intended to be full botanical assessment. However, a scan of significant species was done during the site visit, and even though the author does not claim that all species encountered were identified, all efforts were made to do just that. Table 2 gives a list of the species encountered on the two sites. Table 2: List of species encountered on the sites (excluding grass species)

Table 2: List of species encountered on the sites (excluding grass species)

SPECIES NAME	COMMON NAME	FAMILY	SANBI / NCNCA / NFA Status
1. <i>Aridaria noctiflora</i>	Vleisbos	AIZOACEAE	LC, but all species protected in terms of the NCNCA
2. <i>Eriosephalus cf. microphyllus</i>	Kapokbos	ASTERACEAE	LC
3. <i>Lycium cinereum</i>	Kriedoring	SOLANACEAE	LC

SPECIES NAME	COMMON NAME	FAMILY	SANBI / NCNCA / NFA Status
4. <i>Mesembryanthemum subnodosum</i> (= <i>Psilocaulon subnodosum</i>)		AIZOACEAE	LC, but all species protected in terms of the NCNCA
5. <i>Phaeoptilum spinosum</i>	Brosdoring, blou doringbos	NYCTAGINACEAE	LC
6. <i>Prosopis grandulosa</i>	Honey mesquite	FABACEAE	Category 2 invader
7. <i>Pteronia viscosa</i>		ASTERACEAE	LC
8. <i>Rhigozum trichotomum</i>	Driedoring	BIGNONIACEAE	LC
9. <i>Salsola cf. aphylla</i>	Blomkoolganna	CHENOPODIACEAE	LC
10. <i>Stipagrostis ciliata</i>	Langbeenboesman-gras	POACEAE	LC
11. <i>Stipagrostis obtusa</i>	Kortbeenboesman-gras	POACEAE	LC
12. <i>Tetraena retrofracta</i> (= <i>Zygophyllum retrofractum</i>)	Kleinskilpadbossie	ZYGOPHYLLACEAE	LC

3.5 SIGNIFICANT AND/OR PROTECTED PLANT SPECIES

South Africa has become the first country to fully assess the status of its entire flora.

3.5.1 Red list of South African Plants

The Red List of South African Plants online provides up to date information on the national conservation status of South Africa's indigenous plants (www.redlist.sanbi.org).

No species of conservation concern was recorded in terms of the latest Red List of species for South Africa.

3.5.2 Protected species in terms of the NFA

The National Forests Act (NFA) of 1998 (Act 84 of 1998) provides for the protection of forests as well as specific tree species (GN 71 6 of 7 September 2012).

No Species listed in terms of the NFA was encountered during the study.

3.5.3 Species protected in terms of NEM:BA

The National Environmental Management: Biodiversity Act, Act 10 of 2004, provides for the protection of species through the "Lists of critically endangered, endangered, vulnerable and protected species" (GN. R. 152 of 23 February 2007).

No species protected in terms of NEMBA was encountered on site.

3.5.4 Species protected in terms of the NCNCA

The Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) came into effect on the 12th of December 2011, and also provides for the sustainable utilization of wild animals, aquatic biota and plants. Schedule 1

and 2 of the act give extensive lists of specially protected and protected fauna and flora species in accordance with this act.

Two species listed in terms of the NCNCA were encountered along the route. However, all of these species are considered to be of Least Concern in terms of IUCN status (the International Union for the Conservation of Nature). In most cases these species was locally abundant, however, a flora permit will have to be applied for in terms of the NCNCA since there remains a possibility that some of these species will be impacted.

3.6 INVASIVE ALIEN INFESTATION

The whole of the proposed route show very little alien invader species, although the immediate river banks of the Sak River are more impacted. One individual of the alien tree *Prosopis grandulosa* (a category 1b invader in terms of NEMBA and a category 2 invader in terms of CARA) were encountered on site.

All *Prosopis* individuals within the footprint and its immediate vicinity must be removed.

4. BOTANICAL ASSESSMENT

The objective of this study was to evaluate the biological diversity associated with the study area in order to identify significant environmental features which should be avoided during development activities and or to evaluate short and long term impact and possible mitigation actions in context of the proposed development.

As such the report aim to evaluate the biological diversity of the area using the Ecosystem Guidelines for Environmental Assessment (De Villiers *et. al.*, 2005), with emphasis on:

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

4.1 SUMMARY OF POTENTIAL IMPACT

The Brandvlei borrow pit entails the establishment of a small (<1 ha) borrow pit for the extraction of suitable gravel material to be used as growth medium in the proposed new artificial wetlands for the Brandvlei wastewater treatment works (WWTW) upgrades.

The following were taken into account when the potential impact was evaluated:

- The development footprint will be very small.
- The footprint will not result in any significant impact on national or provincial conservation targets for the impacted vegetation type.
- The vegetation type is not rich in species with a very low species turn-over, meaning that it will be unlikely that a small localised impact will have any significant impact on any specific species or the vegetation type as a whole.
- However, the site is located within a proposed ecological support area (terrestrial corridor), but because of the small size of the proposed development it is unlikely that it will have any significant impact on the ESA.
- No species of special concern was encountered in terms of the South African red list or in terms of NEM:BA.
- Two species protected in terms of the NCNCA was encountered, but both species are locally common and not considered vulnerable or endangered in terms of the South African Red List and it is considered unlikely that the proposed development will have any significant impact on overall species populations.
- Direct impacts will be minimal and localised in terms of footprint size.
- One alien invasive species (a *Prosopis* tree) was encountered and must be removed.

4.2 EVALUATION OF POTENTIAL IMPACTS

Since the proposed development is very small and it is considered highly unlikely that it can have any significant impact on special habitats or national or provincial conservation targets a formal evaluation was not done. However, Table 3 gives a summary of potential significance as evaluated by the author.

Table 3: Summary of aspects and the potential significance of its associated impacts

ASPECT	DESCRIPTION	POTENTIAL IMPACT	SIGNIFICANCE
Threatened or protected vegetation types	Bushmanland Basin Shrubland is categorized as "Least Threatened" but in need of formal protection.	Potential impact on provincial or national conservation targets	Low to very low Because of the small size and the slightly disturbed nature of the site.
Special habitats	No special habitats encountered	Potential impact on special habitats, which may support special biodiversity features.	N/a None observed. However, the access road must not encroach on the nearby floodplain.
Connectivity and conservation networks	The footprint falls within a terrestrial ESA (corridor)	Potential impact on connectivity and/or proposed CBA's or ESA's (in this case a terrestrial migration corridor)	Very low The larger site still shows excellent connectivity, but the small size of the development should not have any significant impact on the proposed ESA or connectivity of the larger area.
Protected species	No red listed species or NEM:BA protected species encountered, but two NCNCA protected species were encountered.	Potential impact on vulnerable or endangered species.	Low The protected species encountered are not considered vulnerable or endangered and are both commonly found locally.
Direct impacts	Potential impacts resulting from direct interaction with an environmental,	Impact of the physical footprint (and access road) on biodiversity features (a	Low to Medium-Low In this instance direct impacts are a combination of

	social or economic component.	combination of impacts discussed above).	the impacts discussed above, the potentially most significant being the direct impact on the ESA and NCNCA protected species.
Indirect impacts	Potential impact that is not a direct result of the project often produced away from or as a result of direct impacts (e.g. impacts on water quality).	Since the proposed activity should not result in any changes, including chemical (apart from physical) indirect impacts is considered to be limited to potential erosion and pollution.	Low It is important that the site is rehabilitated with erosion control in mind and that waste and pollution is strictly managed throughout the life span of the activity.
Cumulative impacts	The incremental impact of the proposed activity together with past, present and reasonably foreseeable future impacts.	Cumulative impact refers to the combined impacts discussed above.	Low to Medium-low The physical footprint will be small, and is unlikely to impact significantly on any of the identified environmental aspects discussed above as long as good environmental control is implemented through development and rehabilitation.

4.3 THE NO-GO OPTION

The “No-Go alternative” does not signify significant biodiversity gain or loss especially on a regional basis. However, it will ensure that none of the potential impacts above occur. The current *status quo* will remain and there will be no direct additional impact on the ESA or protected species. But it will have economic implications (cost of project) on the project as material will have to be sourced further away.

5. RECOMMENDATIONS ON IMPACT MINIMIZATION

Having evaluated the biodiversity aspects and associated impacts pertaining to the proposed development, the author is of the opinion that the proposed activity is unlikely to result in any significant environmental impact so long as the following is adhered to.

- The development site should be located within the corner coordinates given in Table 1, Page 6. This will ensure that the site overlaps the already disturbed area, and will also reduce the potential visual impact (placing it behind the small hillock).
- The access route MUST be placed outside of the floodplain associated with the Sak River (to the east of the river). This will minimise potential impact on riparian ecology, but will also keep the road out of the floodplain and further away from the Sak River.
- A flora permit application must be submitted to DENC as a result of the impact on the identified listed species in terms of Schedule 1 and 2 of the NCNCA (no search and rescue is considered necessary).
- The top layer of soil (the top 10-20 cm of soil which contains 80-90% of seed and bulbs) must be removed from the footprint and stored separately and protected. This topsoil must be re-used during rehabilitation of the site (replaced over the disturbed soil to provide a source of seed and a seed bed to encourage re-growth of plant species).
- Before site closure, the site must be reshaped aiming specifically at erosion control and to minimising the visual impact.
- All alien vegetation must be removed from the footprint and its immediate surroundings.
- Good pollution management (e.g. prevention of oil and fuel spillages) and waste management must be implemented during the life span of the project.

6. REFERENCES

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