BOTANICAL IMPACT ASSESSMENT

ASHTON CEMETERY EXPANSION

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APRIL 2019

PROJECT DETAILS

eco impact Environmental Health & Safety Legal Consulting	**TITLE:** BOTANICAL IMPACT ASSESSMENT ASHTON CEMETERY EXPANSION	
Eco Impact No: 1-04/2019	**Date:** 02 April 2019	**Report Status:** FINAL

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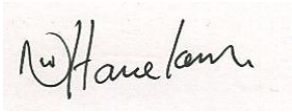
Verification	Capacity	Name	Signature	Date
By Author	Director: Environmental Management; Principle EAP & Ecologist Specialist	Nicolaas Hanekom		02/04/2019

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1. Background & Competency

Eco Impact has been appointed by Langeberg Municipality as the independent botanical assessment specialist for this project.

Eco Impact are independent and do not have any interest in the business nor receive any payment other than fair remuneration for services rendered as required in terms of the regulations.

A botanical assessment was conducted in order to determine the potential impacts on the vegetation and to describe any areas of sensitivity.

This botanical assessment was conducted by Nicolaas Hanekom who has 26 years' experience working as an ecologist for nature conservation organizations. He has extensive field experience and botanical knowledge, knowledge of Freshwater and wetlands ecology, is knowledgeable of the region in which they are working and exercises sound and unbiased scientific and professional judgment. He is a qualified Environmental Assessment Practitioner and a registered Professional Natural Scientist (Ecologist) with the SACNASP who holds a M. Tech, Nature Conservation from the Cape Peninsula University of Technology.

He meets the legal requirements to act as a specialist on this project.

2. Conditions Relating to this Report

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. Eco Impact and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from on-going research or further work in this field, as pertaining to this investigation.

This report may not be altered or added to without the prior written consent of the author. This restraint also refers to electronic copies of this report which are supplied as sub portion of other reports, including main reports. Similarly, any recommendations, statements, or conclusions drawn from or based on this report must specifically refer to this report. If such comments form part of a main report for this investigation, the base line report must be included in its entirety as an appendix or separate section to the main report.

3. Biodiversity Survey

Ecology is essentially a multi-disciplinary science concerned with the relationship between organisms themselves and between organisms and their environment, in which the emphasis may be on the organisms, populations, communities or ecosystems. It is also the scientific study of the interactions between man, living organisms and the abiotic environment (habitats) with one another and with the non-living environment of matter and energy. It concerns substantially the structure and function of nature. An ecologist is someone who has received appropriate comprehensive training and has experience in biological studies and the analysis of the responses of organisms to the environment and to each other, which then equips a person to be an ecologist.

Loss of natural habitat is the single biggest cause of biodiversity loss in South Africa and in much of the world. This means that it often makes sense to focus conservation action on preventing further habitat loss in priority ecosystems, in and out of protected areas, rather than on conserving individual species. Each plant community can therefore be considered as a different ecosystem (Bredenkamp *et al.* 2002).

It is on the above statement and principle that the National Spatial Biodiversity Assessment is based. This National Spatial Biodiversity Assessment is further based on the phytodiversity or vegetation types. The substrate, which in turn determine the flora component, is however seen as a baseline for all ecosystem functioning.

Faunal species rely on habitat and niches provided in most instances by vegetation types. It is therefore reasonable to make use of the National Spatial Biodiversity Assessment in making recommendations for this ecological and biodiversity study. Differences in environmental parameters result in differences in vegetation. Biodiversity conservation is linked to the preservation of critical habitat in priority ecosystems.

4. Purpose and Background to the Study

This biodiversity assessment covers terrestrial aspects. It intends to inform decisions regarding the proposed Ashton cemetery expansion project.

The National Environmental Management: Biodiversity Act (No. 10 of 2004) under Chapter 4 in particular relates to threatened and protected ecosystems and species and related threatening processes and restricted activities. This report has taken into consideration those indigenous species listed as threatened or protected species in terms of Section 56(1) of the Act.

5. Description of the Study Area

The site of ±70ha on RE/71/158 as surveyed is situated next to the existing cemetery. Significant land uses on the site and immediate surrounds are the existing cemetery, waste water treatment works, industrial erven, railway line along the southwestern border and cattle farming.

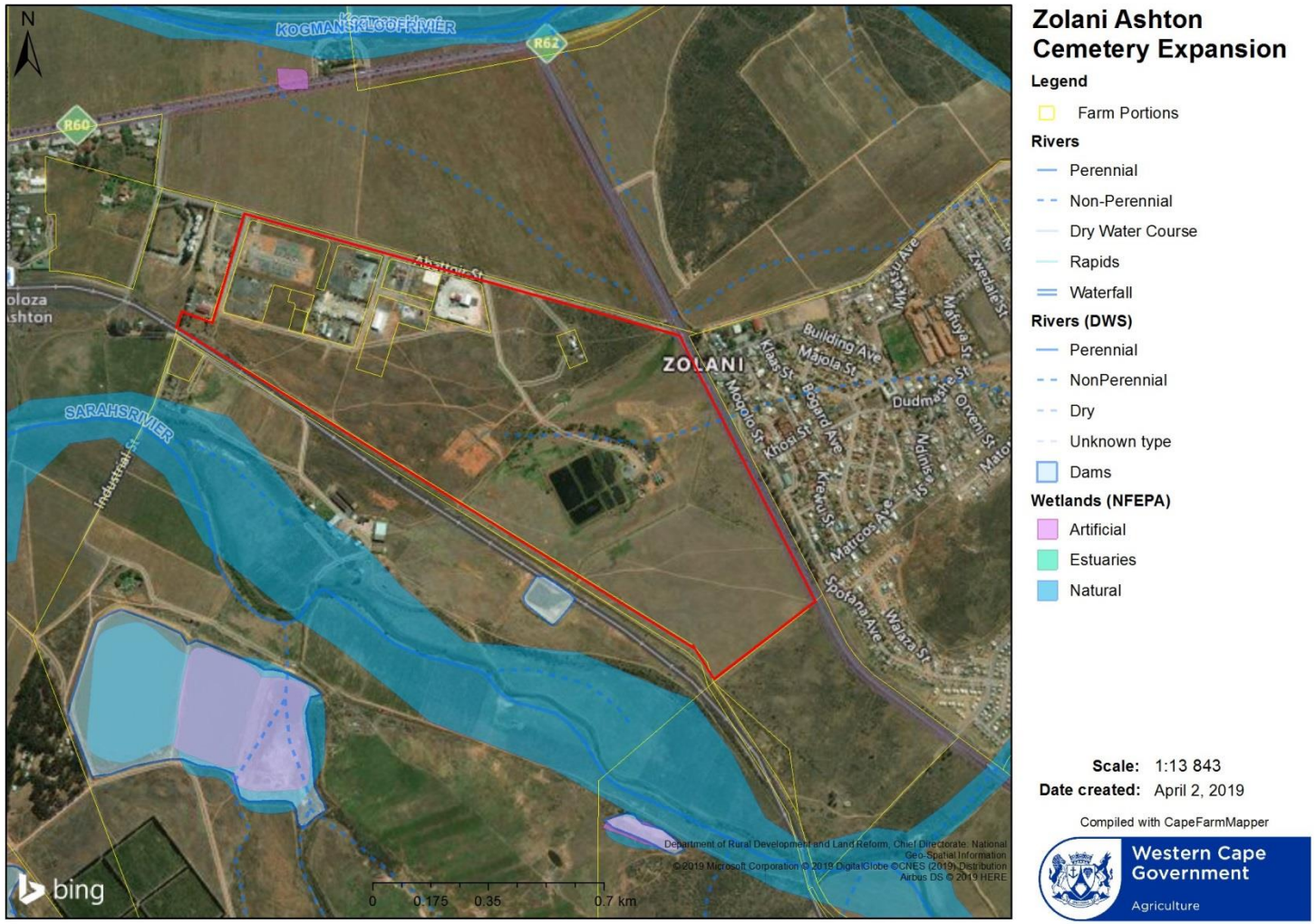


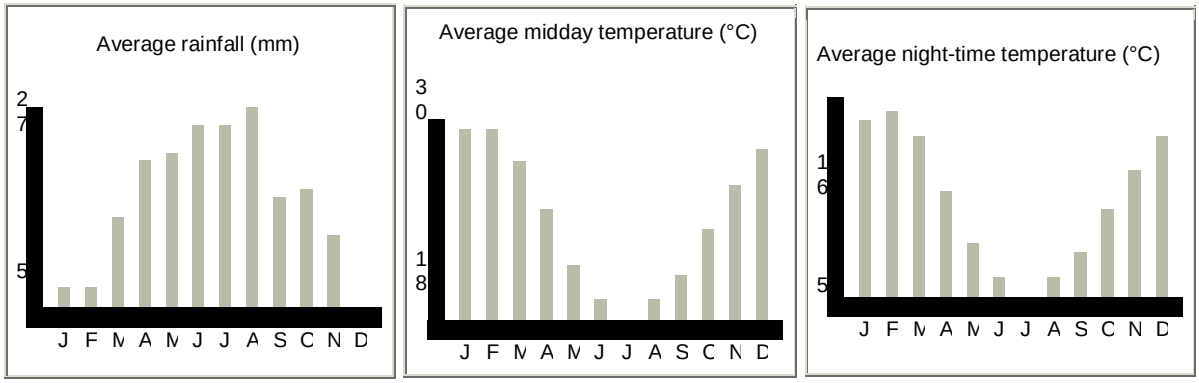
Figure 1: Farm RE/71/158 ±70ha as surveyed

5.1. Topography

The site is situated on a flat area.

5.2. Climate

The area normally receives about 201mm of rain per year and because it receives most of its rainfall during winter it has a Mediterranean climate. The chart below (lower left) shows the average rainfall values for the area per month. It receives the lowest rainfall (5mm) in December and the highest (27mm) in August. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for the area range from 17.6°C in July to 29.3°C in February. The region is the coldest during July when the mercury drops to 4.8°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures.



5.3. Geology

The site is underlain by geological formations derived from shales.

6. Site Visits and Methods Used

The study area was visited on 28 February and surveyed on foot. The vegetation and study area were described in terms of general quality and degree of disturbance, sensitivity and conservation importance. Plant species were identified in the field or collected for identification. Potential impacts were measured against the following criteria:

- Conservation planning: Western Cape Biodiversity Spatial Plan (2017).
- Ground-truthing of CBA's is important since the site may reflect a different scenario to the Western Cape Biodiversity Spatial Plan (2017).
- Ecosystem status: ecosystem status of the vegetation type was the gained using the List of Threatened Terrestrial Ecosystems (Government Gazette, 2011). The gazette listings are crucial to commenting on the level of sensitivity in relation to natural vegetation quantity and quality.
- Special habitats: the presence of rare or sensitive habitats.
- Restoration potential and biodiversity corridors: degraded areas or alien-infested areas have the potential to be restored depending on the level of disturbance or transformation. Degraded and transformed areas may also be of importance if these areas link portions or remnants of good quality or highly threatened

vegetation types.

Reports on biodiversity surveys serve as input into either Environmental Scoping Reports, Impact Assessments (EIA's) or Management Programmes (EMP's). Eco Impact in doing such applies certain values and principles. Such values and principles are herewith explicitly stated so the user of this report is apprised of both approach and assumptions. This report takes into recognition the Terms of Reference for biodiversity assessments as provided by Brownlie (2005), De Villiers *et al*. (2005).

7. Observations and Findings Relative to the Terms of Reference highlighted below

7.1. Describe the broad ecological characteristics of the site and surrounds:

Individual plant localities were not plotted in detail. The site was surveyed and plant communities were identified and species recorded. The habitat approach was preferred. Species collection was focused on the different plant communities present on site.

The site in question is located in the Cape Floristic Region, one of 34 'global biodiversity hotspots'– areas of great natural wealth that are under extreme pressure. At a regional scale, ecosystems and habitats would be those associated with the south-western parts of the Fynbos Biome.

The Fynbos component accounts for 70-80% of the region's flora with a high degree of plant diversity at a local scale and between sites (Manning, 2007).

Much of the remnant lowland vegetation of the Cape Floristic Region and supporting ecosystems in these areas is either highly threatened (especially in the Fynbos Biome, which represents more than 66% of South Africa's Critically Endangered ecosystems) or hosts globally unique plants that have undergone unique evolutionary adaptations to their environments.

7.2. In terms of biodiversity pattern, identify or describe, at a community and ecosystem level-

7.2.1. The main vegetation type/s:

Approximately 90% of the study site vegetation used to be characterised as Breede Shale Renosterveld (Least Threatened) and less than 10% as Muscadel Riviere (Critically Endangered) and Breede Alluvium Renosterveld (Endangered) as according to Mucina and Rutherford 2006; updated 2012.

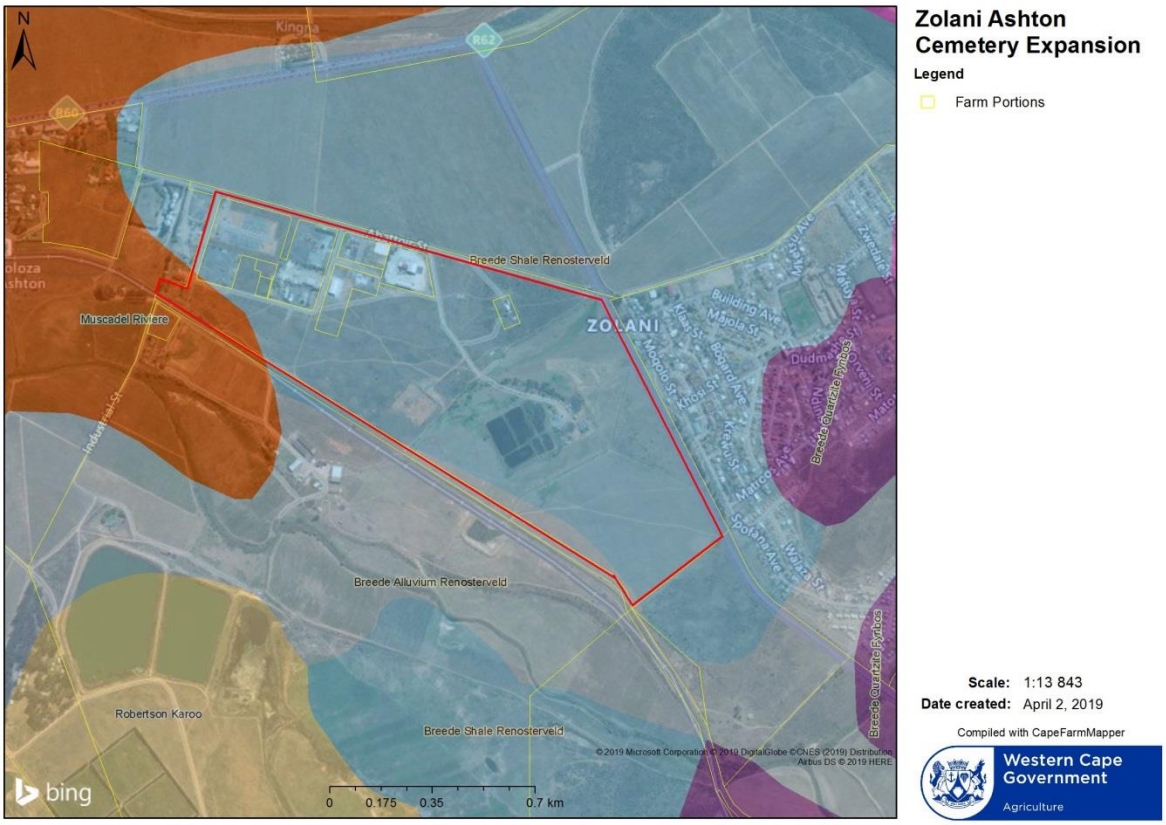


Figure 2: Terrestrial vegetation types according to the National Vegetation Map (Mucina and Rutherford, 2006; updated 2012).

Observations and Findings:
The following species were recorded during the site survey:

- *Crassula sp.*
- *Lampranthus sp*
- *Searcia laevigata*
- *Vachellia karoo*
- *Galenia Africana*

No species of conservation concern were recorded on site and none are expected to occur on the site in viable numbers/populations.

7.2.2. The types of plant communities that occur on, and in the vicinity of the sites:

The natural vegetation remaining on the site has the typical plant communities recorded in Breede Shale Renosterveld which is in a poor ecological state as a result of livestock over grazing and previous and ongoing developments.

The small sections (less than 10%/7ha) of the site which falls within the vegetation areas delineated as critically endangered Muscadel Riviere (northwestern corner) and endangered Breede Alluvium Renosterveld (southern border) does not show any characteristics of these vegetation types and no plant species of conservation concern were recorded within these areas. The Muschadel Riviere area has also been isolated by existing industrial developments and the railway line, similarly the Breede Alluvium

Renosterveld area has been isolated by the railway line not allowing feasible ecological connectivity between the site and any adjacent natural habitats.

7.2.3. Threatened or vulnerable ecosystems:

The remaining site vegetation is characterised as significantly transformed Breede Shale Renosterveld. The small sections on the site which falls within the vegetation areas delineated as Muscadel Riviere and Breede Alluvium Renosterveld does not show any characteristics of these vegetation types and no plant species of conservation concern were recorded within these areas.

Most of the site is classified as a Terrestrial Ecological Support Area. Two very small areas (2.5ha in total) are indicated as Terrestrial Critical Biodiversity Areas, but there are no terrestrial botanical characteristics/species remaining on these areas justifying the CBA status of these areas.

There are also areas on and surrounding the waste water treatment works identified as Aquatic Critical Biodiversity Areas, but all freshwater ecological impacts associated with the aquatic CBA and ESA was assessed in a separate freshwater impact assessment conducted and will therefore not be assessed nor discussed in this report.

Due to the limited indigenous terrestrial vegetation diversity; low ecological connectivity; previous and ongoing impacts i.e. livestock overgrazing and developments and current significantly degraded and transformed state of the ±70ha site the overall terrestrial botanical sensitivity of the site is rated as low.

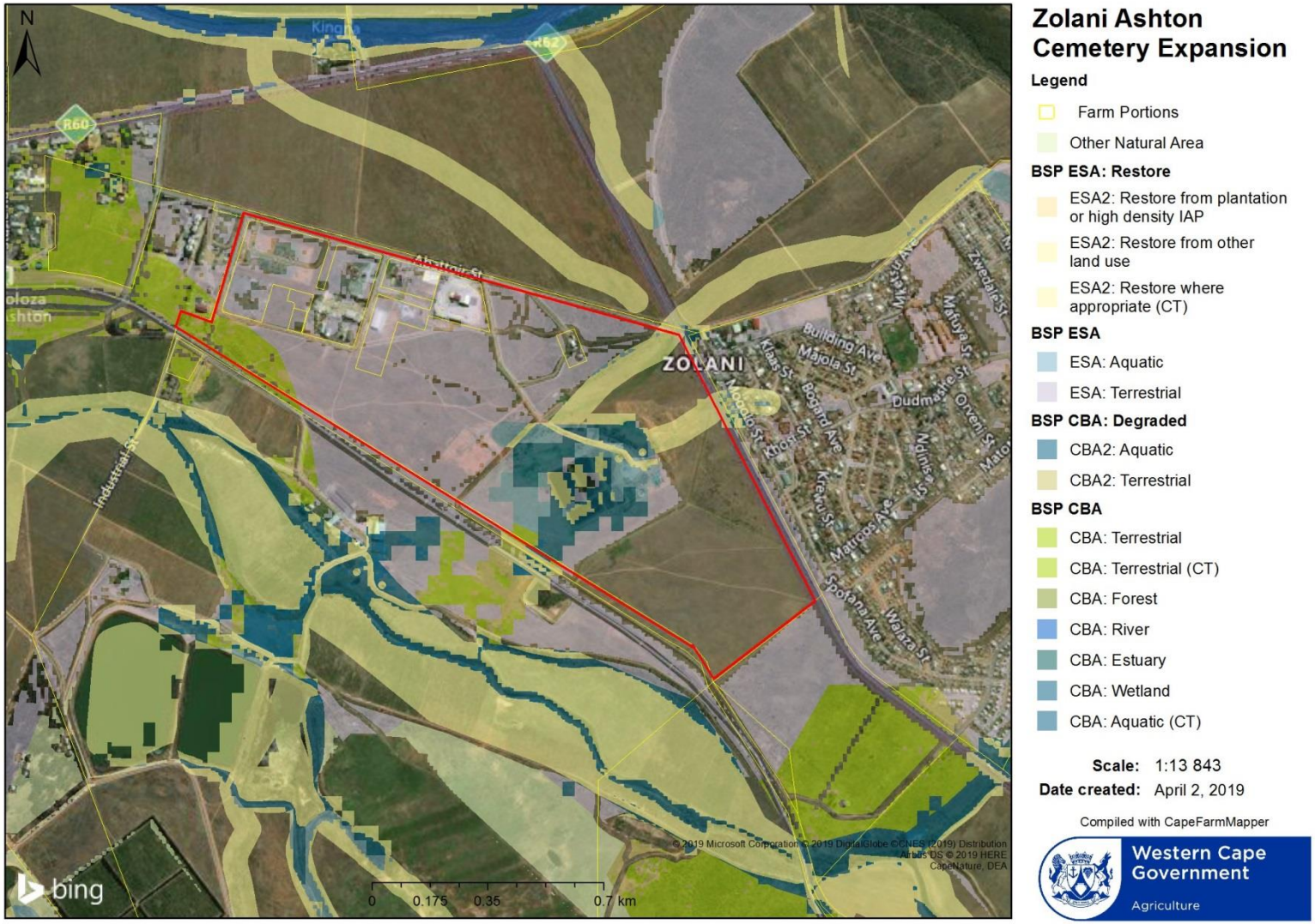


Figure 3: Location of the study area relative to spatial biodiversity categories (WCBSP, 2017)

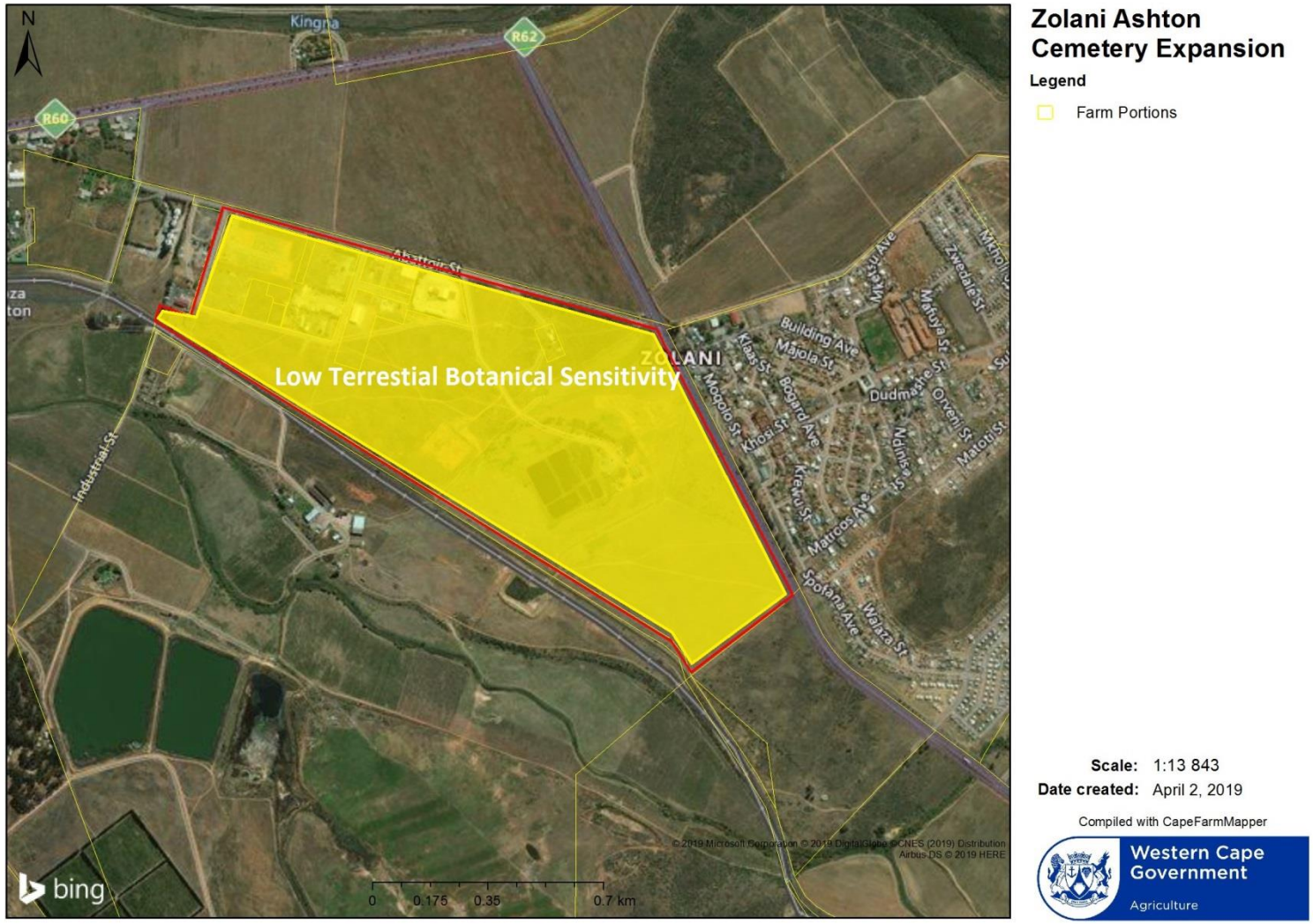


Figure 4: Terrestrial botanical sensitivity map.

Site Photo 1: Proposed cemetery expansion site as assessed.

Site Photo 2: Proposed cemetery expansion site as assessed.

Site Photo 3: Proposed cemetery expansion as assessed.

Site Photo 4: Proposed cemetery expansion site as assessed.

7.2.4. The types of animal communities (fish, invertebrates, avifauna, mammals, reptiles):

Fish

No fish species are present on site.

Invertebrates

Observations and Findings:

None observed. Site is degraded.

The proposed development will not have significant impact on invertebrate species. No known rare or special species were observed or are known to occur or breed on the site.

Birds (Avifauna)

207 species are known to occur in the bigger area (Hockey et al 2006).

Observations and Findings:

No bird species recorded at time of survey

No sensitive breeding or roosting sites were observed on site during the survey.

It is expected that the proposed development will not impact on any listed bird species. Other bird species known to occur on the property will be impacted upon by the proposed expansion and during burials, but they could simply fly away and move back after wards.

Mammals

As reported in Smithers (1983) small buck e.g. common duiker, steenbok and grysbok, rodents such as mole rats, field mice and hares, as well as carnivores such as genets and mongoose are likely to inhabit the area.

Some 73 mammal species are known to occur in the bigger area (Smithers 1983).

Observations and Findings:

None observed during survey.

Amphibians and Reptiles (Herpetofauna)

With respect to amphibians, Minter et al (2004) state that “habitat loss or modification as a result of agriculture and other forms of human activity remains the most important single threat to the survival of amphibian populations. The scale of these

changes and their relative permanence are the major cause. At greatest risk are species that have limited distributions."

As reported in Alexander *et al* (2007) 33 reptile species are likely to inhabit the area.

Observations and Findings:

None observed.

7.3. In terms of biodiversity pattern, identify or describe, at species level- (Show the degree of confidence in predictions based on the availability of information and specialist knowledge, i.e. High 70 -100% confident, Medium 40 - 70% confident, Low 0 - 40% confident. Assess the likelihood of other RDB species, or species of conservation concern, occurring in the vicinity. Reflect this in degree of confidence indicator).

What is a Rare or Red Data Plant? This is a plant that is listed in one of the categories in the Red Data List of Plants. It is listed as such because it is under threat of extinction, often endemic to an area, and has a limited distribution. More than 10% of the world's threatened plant species are found in Southern Africa.

There are various categories in the Red Data List that give us an indication of the conservation status of each species. The categories are "Extinct", "Endangered", "Vulnerable", "Rare", "Indeterminate" and "Insufficiently Known". Plants classified as "Extinct" are those that are no longer known to exist in the wild. Those classified as "Endangered" are in danger of extinction if the factors causing their numbers to decline continue operating.

A number of factors can be responsible for a decline in the size of plant populations. They may eventually cause the extinction of a species. Once this species is lost, it can never be replaced. The most common threat too many arid plants are overgrazing. Overgrazing leads to a decrease in the number of plant species, a change in the ecological balance, and the eventual loss of plant diversity. Plant collectors that collect rare plants for trade or other purposes can pose a serious threat to some species. Fauna and flora have been classified in terms of the ever-increasing threats of over exploitation, illegal trade or habitat transformation and habitat loss. They are rated in terms of their vulnerability to extinction in Red Data books, one for each animal group. Some rare and localized plant species are known to be present in the area. Other protected species are listed under the Threatened or Protected Species regulations.

Red Data Book ("RDB") species are defined as "Species listed under the Threatened or Protected Species Regulations" ("TOPS"). Any activity impacting on these species listed under the TOPS regulations requires a permit.

7.3.1. The viability of, and estimated population size of the TOPS and RDB species that are present.

<u>Red Data Listed or species listed under TOPS regulation (Vegetation)</u>

Observations and Findings:

(High = 70-100% confident): During the survey no conservation worthy, Red data listed or Threatened or Protected plant species were recorded on site.

Red Data Listed or species listed under TOPS regulation (Reptiles and Amphibians)

None observed. Site is degraded.

Observation and Findings:

(High = 70-100% confident): No Red Data Listed or Threatened or Protected reptile or amphibian species are known to occur on site. No rare and localized species were recorded at the time of the survey.

Red Data Listed or species listed under TOPS regulation (Mammals)

The following table lists the Red Data mammal species (including their status) which are predicted, or confirmed to occur in the general area and possibly within the study area (Friedman & Daly, 2004):

COMMON NAME	SCIENTIFIC NAME	RED DATA CATEGORY	PREDICTED OCCURENCE
Lesueur's Wing-gland Bat	Cistugo lesueuri	Near threatened	Unlikely
Long-tailed Serotine Bat	*Eptesicus hottentotus*	Least Concern	Unlikely
Schreibers' Long-fingered Bat	*Miniopterus schreibersii*	Near Threatened	Possible
Temminck's Hairy Bat	*Myotis tricolor*	Near Threatened	Possible
Cape Serotine Bat	*Neoromicia capensis*	Least Concern	Possible
Egyptian Split Faced Bat	*Nycteris thebaica*	Near threatened	Possible
Cape horseshoe bat	*Rhinolophus capensis*	Near threatened	Possible
Geoffroy's horseshoe bat	*Rhinolophus clivosus*	Near threatened	Possible
Egyptian Fruit Bat	*Rousettus aegyptiacus*	Least Concern	Unlikely
Egyptian Free-tailed Bat	*Tadarida aegyptiaca*	Least Concern	Possible
Mauritian Tomb Bat	*Taphozous mauritianus*	Least Concern	Unlikely
Rock Hyrax	*Procavia capensis*	Least Concern	Likely
Cape Clawless Otter	*Aonyx capensis*	Least Concern	Unlikely
Water Mongoose	*Atilax paludinosus*	Least Concern	Likely
Black-backed Jackal	*Canis mesomelas*	Least Concern	Unlikely
Caracal	*Caracal caracal*	Least Concern	Unlikely
Yellow Mongoose	*Cynictis penicillata*	Least Concern	Possible
African Wild Cat	*Felis silvestris*	Least Concern	Likely
Small Grey Mongoose	*Galerella pulverulenta*	Least Concern	Likely
Small-spotted Genet	*Genetta genetta*	Least Concern	Likely
Large-spotted Genet	*Genetta tigrina*	Least Concern	Likely
Large Grey Mongoose	*Herpestes ichneumon*	Least Concern	Likely
Striped Polecat	*Ictonyx striatus*	Least Concern	Possible
Honey Badger	*Mellivora capensis*	Near Threatened	Unlikely
Bat-eared Fox	*Otocyon megalotis*	Least Concern	Likely

Leopard	*Panthera pardus*	Least Concern	No
African Weasel	*Poecilogale albinucha*	Data deficient	Unlikely
Aardwolf	*Proteles cristatus*	Least Concern	Unlikely
Cape Fox	*Vulpes chama*	Least Concern	Unlikely
Red Hartebeest	*Alcelaphus buselaphus*	Least Concern	No
Springbok	*Antidorcas marsupialis*	Least Concern	No
Black Rhinoceros	*Diceros bicornis bicornis*	Critically Endangered	No
Cape Mountain Zebra	*Equus zebra zebra*	Vulnerable	No
Klipspringer	*Oreotragus oreotragus*	Least Concern	No
Grey Rhebok	*Pelea capreolus*	Least Concern	No
Steenbok	*Raphicerus campestris*	Least Concern	Likely
Eland	*Taurotragus oryx*	Least Concern	No
Kudu	*Tragelaphus strepsiceros*	Least Concern	No
Reddish-grey Musk Shrew	*Crocidura cyanea*	Data Deficient	Unlikely
Least Dwarf Shrew	*Suncus infinitesimus*	Dara deficient	Unlikely
Cape Hare	*Lepus capensis*	Least Concern	Unlikely
Scrub Hare	*Lepus saxatilis*	Least Concern	Possible
Hewitt's Red Rock Rabbit	*Pronolagus saundersiae*	Least Concern	Unlikely
Chacma Baboon	*Papio ursinus*	Least Concern	Possible
Cape Spiny Mouse	*Acomys subspinosus*	Least Threatened	Unlikely
Namaqua Rock Mouse	*Aethomys namaquensis*	Least Threatened	Unlikely
Common Mole Rat	*Cryptomys hottentotus*	Least Concern	Unlikely
Water Rat	*Dasymys incorntus*	Near Threatened	Unlikely
Grey Climbing Mouse	*Dendromus melanotis*	Least Concern	Possible
Brant's Climbing Mouse	*Dendromus mesomelas*	Least Concern	Unlikely
Short-tailed Gerbil	*Desmodillus auricularis*	Least Concern	Unlikely
Cape Mole Rat	*Georychus capensis*	Least Concern	Unlikely
Hairy Footed Gerbil	*Gerbillurus paeba*	Least Concern	Unlikely
Spectacled Dormouse	*Graphiurus ocularis*	Least Concern	Possible
Porcupine	*Hystrix africaeaustralis*	Least Concern	Likely
Large-eared Mouse	*Malacothrix typica*	Least Concern	Unlikely
Multimammate Mouse	*Mastornys coucha*	Least Concern	Unlikely
Pygmy Mouse	*Mus minutoides*	Least Concern	Unlikely
Verreaux's Mouse	*Myomyscus verreauxi*	Least Concern	Unlikely
Vlei Rat	*Otomys irroratus*	Least Concern	Likely
Laminate Vlei Rat	*Otomys laminatus*	Least Concern	Likely
Saunders Vlei Rat	*Otomys saundersiae*	Least Concern	Likely
Karoo Bush Rat	*Otomys unisulcatus*	Least Concern	Likely
Brant's Whistling Rat	*Parotomys brantsii*	Least Concern	Likely
Springhare	*Pedetes capensis*	Least Concern	Possible
Striped Mouse	*Rhabdomys pumilio*	Least Concern	Likely
Pouched Mouse	*Saccostomus campestris*	Least Concern	Unlikely
Krebs' Fat Mouse	*Steatomys krebsii*	Least Concern	Unlikely
Cape Rock Elephant-shrew	*Elephantulus edwardii*	Least Concern	Unlikely
Aardvark	*Orycteropus afer*	Least Concern	Unlikely

Observations and Findings:

(High 70-100% confident): No rare mammal species as listed were observed during the site survey.

Red Data Listed or species listed under TOPS regulation (Avifauna)

The avifauna species of special significance likely to occur within the area are:

- Black Harrier *Circus maurus* (Near Threatened)
- Lanner Falcon *Falco biarmicus* (Near Threatened)
- Blue Crane *Anthropoides paradiseus* (Vulnerable)
- Denham's Bustard *Neotis denhami* (Vulnerable)
- Martial Eagle *Polemaetus bellicosus* (Vulnerable) Barnes 2000
- African Fish Eagle *Haliaeetus vocifer* (Vulnerable)
- African Marsh Harrier *Circus ranivorous* (Vulnerable)
- Lesser Kestrel *Falco naumunni* (Vulnerable)
- Peregrine Falcon *Falco peregrinus* (Near Threatened)
- Agulhas Long-billed Lark *Certhilauda brevirostris* (Near Threatened).

Observations and Findings:

(High 70-100% confident): None of the above species were observed on or near site during the survey and are more likely to occasionally visit the site and do not breed there.

7.4. Other pattern issues-

Any significant landscape features or rare or important vegetation/faunal associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity:

All potential impacts as associated with freshwater features present on the site was assessed in a freshwater impact assessment done by freshwater specialist and will therefore not be discussed in this report.

The site vegetation remaining on site is characterised as Breede Shale Renosterveld (Least Threatened). The overall state of indigenous vegetation on site is significantly degraded, transformed and with limited diversity. No species of conservation concern were recorded on the site. The overall terrestrial botanical sensitivity of the site is rated as low.

7.5. The extent of alien plant cover on the site:

None on site recorded, only weedy grass species as associated with overgrazed land.

7.6. The condition of the site in terms of current or previous land uses:

The terrestrial ecology is in poor conservation condition and degraded as result of grazing impacts by livestock; and previous and ongoing developments.

7.7. In terms of biodiversity process, identify or describe:

7.7.1. The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.

None.

7.7.2. Environmental gradients (e.g. upland-lowland), biome boundaries, soil interfaces or sand movement corridors on the site or in its vicinity.

None.

7.7.3. Any possible changes in key processes e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.

None.

7.7.4. The condition and functioning of rivers and wetlands (if present) in terms of possible changes to the channel, flow regime and naturally-occurring riparian vegetation.

All potential impacts as associated with freshwater features present on the site was assessed in a freshwater impact assessment done by a freshwater specialist and will therefore not be discussed in this report.

7.7.5. Would the conservation of the site lead to greater viability of the adjacent ecosystem by securing any of the functional factors listed?

No.

7.7.6. Does the site or neighbouring properties potentially contribute to meeting regional conservation targets for both biodiversity pattern and ecological processes?

No.

7.7.7. Is this a potential candidate site for conservation stewardship?

No.

7.8. Recommend actions that should be taken:

7.8.1. To prevent or, if prevention is not feasible, to mitigate impacts and restore disturbed vegetation or ecological processes.

The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions and only proceed under supervision of a competent and diligent Environmental Control Officer during the construction phase.

Any no-go sites relating to freshwater ecological features as identified in the freshwater impact assessment report must be clearly demarcated, and activities must be controlled and kept inside the approved expansion areas.

If any recreational park areas are to be created as part of the proposed cemetery expansion only indigenous vegetation may be used for landscaping and rehabilitation of impacted areas. A botanical specialist/or landscaper familiar with indigenous vegetation of the areas must be consulted to provide a list of indigenous vegetation species to be used should landscaping etc. be proposed.

Storm water runoff from the site must be controlled in order to prevent erosion and leaching into the surrounding area.

7.8.2. Indicate how preventative and remedial actions will be scheduled to ensure long-term protection, management and restoration of affected ecosystems and biodiversity.

On-going storm water management in order to manage impacts on the surrounding area.

7.9. Indicate limitations and assumptions, particularly in relation to seasonality:

None. Although this survey was conducted during late summer it is believed that due to the current significantly degraded and transformed state of the site that sufficient species identification could be done to classify the terrestrial botanical sensitivity of the site.

8. Impact Assessment

Two layout alternatives has been provided thus far, see below. And potential impacts on terrestrial ecological features were assessed for Layout Alternative 1, Layout Alternative 2 and the No Development option.

Figure 5: Cemetery expansion layout alternative 1 as assessed.

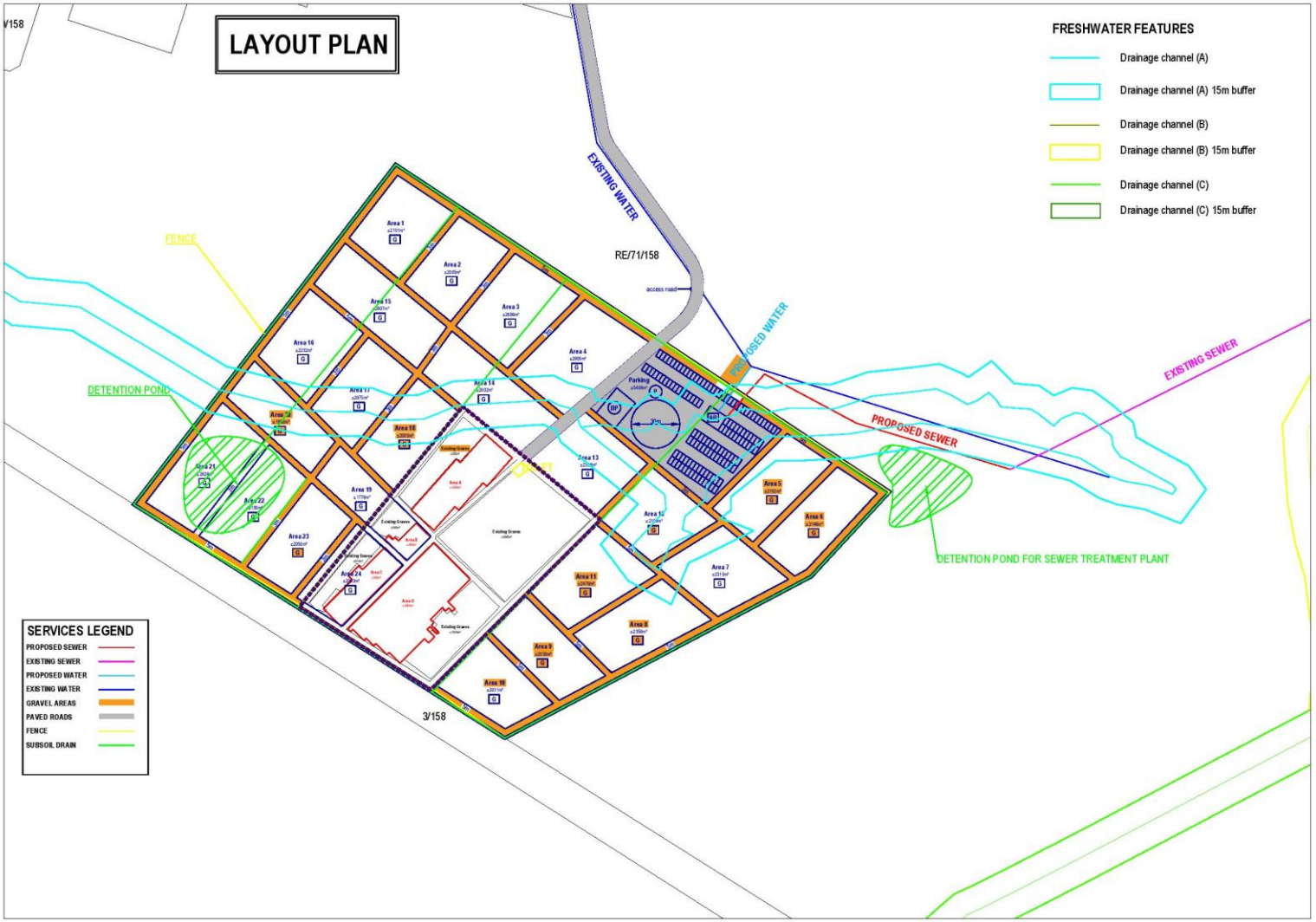


Figure 6: Cemetery expansion layout alternative 2 as assessed.

Layout Alternative 1:

Layout Alternative 1	**Terrestrial Botanical Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Nature of impact:	**Clearance of indigenous vegetation**
Consequence of impact or risk:	**Loss of indigenous vegetation and habitat leading to disruption in ecological processes**
Cumulative impact prior to mitigation:	**Displacement of fauna and avifauna inhabiting the site and surrounds. Erosion of the site and surrounds due to site clearance.**
Extent and duration of impact:	**Extent 1 (On site or within 100 m of the site) & Duration 5 (permanent – will not cease)**
Magnitude:	**6 (processes continuing but in a modified way)**
Probability of occurrence:	**5 (impact will occur regardless of any prevention measures)**
Significance rating of impact prior to mitigation	**(1+5+6) x 5 = 60 High Negative**
Degree to which the impact can be reversed:	**Completely reversible but decommissioning and rehabilitation is highly unlikely. Mitigation measures included can however reduce the impact on the ecological process outside the proposed cemetery expansion areas.**
Degree to which the impact may cause irreplaceable loss of resources:	**Resource will be partly lost**
Degree to which the impact can be avoided:	**Unavoidable**
Degree to which the impact can be mitigated:	**Partly mitigatable**
Proposed mitigation:	**The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions and only proceed under supervision of a competent and diligent Environmental Control Officer during the construction phase.** **Clearly demarcate proposed development area before site clearance commences and remain within demarcated development footprint area throughout construction and operational phases** **Landscaping of the site must be done with indigenous trees and vegetation under the supervision of a qualified botanical**

	specialist/or landscaper familiar with indigenous vegetation of the areas. **Storm water runoff from the site must be controlled in order to prevent erosion and leaching into the surrounding area.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low Negative**

Layout Alternative 1	**Terrestrial Botanical Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Nature of impact:	**Impacts on terrestrial Critical Biodiversity Areas and/or Ecological Support Areas**
Consequence of impact or risk:	**Loss of areas mapped as terrestrial CBA or ESA leading to disruption in ecological processes**
Cumulative impact prior to mitigation:	**Loss of undeveloped terrestrial habitat leading to disruption and/or destruction of ecological processes.**
Extent and duration of impact:	**Extent 1 (On site or within 100 m of the site) & Duration 5 (permanent – will not cease)**
Magnitude:	**6 (processes continuing but in a modified way)**
Probability of occurrence:	**5 (impact will occur regardless of any prevention measures)**
Significance rating of impact prior to mitigation	**(1+5+6) x 5 = 60 High Negative**
Degree to which the impact can be reversed:	**Completely reversible but decommissioning and rehabilitation is highly unlikely. Mitigation measures included can however reduce the impact on the ecological process outside the proposed cemetery expansion areas.**
Degree to which the impact may cause irreplaceable loss of resources:	**Resource will be partly lost**
Degree to which the impact can be avoided:	**Unavoidable**
Degree to which the impact can be mitigated:	**Partly mitigatable**
Proposed mitigation:	**The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions and only proceed under supervision of a competent and diligent Environmental Control Officer during the construction phase.**

	Clearly demarcate proposed development area before site clearance commences and remain within demarcated development footprint area throughout construction and operational phases. **Landscaping of the site must be done with indigenous trees and vegetation under the supervision of a qualified botanical specialist/or landscaper familiar with indigenous vegetation of the areas.** **Storm water runoff from the site must be controlled in order to prevent erosion and leaching into the surrounding area.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low Negative**

Layout Alternative 2:

Layout Alternative 2	**Terrestrial Botanical Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Nature of impact:	**Clearance of indigenous vegetation**
Consequence of impact or risk:	**Loss of indigenous vegetation and habitat leading to disruption in ecological processes**
Cumulative impact prior to mitigation:	**Displacement of fauna and avifauna inhabiting the site and surrounds. Erosion of the site and surrounds due to site clearance.**
Extent and duration of impact:	**Extent 1 (On site or within 100 m of the site) & Duration 5 (permanent – will not cease)**
Magnitude:	**6 (processes continuing but in a modified way)**
Probability of occurrence:	**5 (impact will occur regardless of any prevention measures)**
Significance rating of impact prior to mitigation	**(1+5+6) x 5 = 60 High Negative**
Degree to which the impact can be reversed:	**Completely reversible but decommissioning and rehabilitation is highly unlikely. Mitigation measures included can however reduce the impact on the ecological process outside the proposed cemetery expansion areas.**
Degree to which the impact may cause irreplaceable loss of resources:	**Resource will be partly lost**

Degree to which the impact can be avoided:	**Unavoidable**
Degree to which the impact can be mitigated:	**Partly mitigatable**
Proposed mitigation:	**The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions and only proceed under supervision of a competent and diligent Environmental Control Officer during the construction phase.** **Clearly demarcate proposed development area before site clearance commences and remain within demarcated development footprint area throughout construction and operational phases** **Landscaping of the site must be done with indigenous trees and vegetation under the supervision of a qualified botanical specialist/or landscaper familiar with indigenous vegetation of the areas.** **Storm water runoff from the site must be controlled in order to prevent erosion and leaching into the surrounding area.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low Negative**

Layout Alternative 2	**Terrestrial Botanical Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Nature of impact:	**Impacts on terrestrial Critical Biodiversity Areas and/or Ecological Support Areas**
Consequence of impact or risk:	**Loss of areas mapped as terrestrial CBA or ESA leading to disruption in ecological processes**
Cumulative impact prior to mitigation:	**Loss of undeveloped terrestrial habitat leading to disruption and/or destruction of ecological processes.**
Extent and duration of impact:	**Extent 1 (On site or within 100 m of the site) & Duration 5 (permanent – will not cease)**
Magnitude:	**6 (processes continuing but in a modified way)**
Probability of occurrence:	**5 (impact will occur regardless of any prevention measures)**
Significance rating of impact prior to mitigation	**(1+5+6) x 5 = 60 High Negative**

Degree to which the impact can be reversed:	**Completely reversible but decommissioning and rehabilitation is highly unlikely. Mitigation measures included can however reduce the impact on the ecological process outside the proposed cemetery expansion areas.**
Degree to which the impact may cause irreplaceable loss of resources:	**Resource will be partly lost**
Degree to which the impact can be avoided:	**Unavoidable**
Degree to which the impact can be mitigated:	**Partly mitigatable**
Proposed mitigation:	**The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions and only proceed under supervision of a competent and diligent Environmental Control Officer during the construction phase.** **Clearly demarcate proposed development area before site clearance commences and remain within demarcated development footprint area throughout construction and operational phases.** **Landscaping of the site must be done with indigenous trees and vegetation under the supervision of a qualified botanical specialist/or landscaper familiar with indigenous vegetation of the areas.** **Storm water runoff from the site must be controlled in order to prevent erosion and leaching into the surrounding area.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low Negative**

No Development Alternative:

No Development Alternative	**Terrestrial Botanical Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Nature of impact:	**Site remain as is with ongoing environmental degradation due to pollution from effluent plant overflow and grazing from livestock**

Consequence of impact or risk:	**Environmental pollution and habitat degradation**
Cumulative impact prior to mitigation:	**Ongoing pollution and livestock grazing leading to disruption and/or destruction of ecological processes.**
Extent and duration of impact:	**Extent 2 (On site or within 100 m of the site) & Duration 5 (permanent – will not cease)**
Magnitude:	**6 (processes continuing but in a modified way)**
Probability of occurrence:	**5 (impact will occur regardless of any prevention measures)**
Significance rating of impact prior to mitigation	**(2+5+6) x 5 = 65 High Negative**
Degree to which the impact can be reversed:	**Completely reversible but rehabilitation of the site is highly unlikely, as funding for rehabilitation of the site is note available.**
Degree to which the impact may cause irreplaceable loss of resources:	**Resource will be partly lost**
Degree to which the impact can be avoided:	**Completely avoidable**
Degree to which the impact can be mitigated:	**Completely mitigatable**
Proposed mitigation:	**Wastewater treatment works overflow must be stopped and effluent must be treated to an acceptable level before discharging into the environment. Impacted area must be rehabilitated with local indigenous vegetation.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low Negative**

9. Concluding Remarks and Further Recommendations

The small sections (less than 10%/7ha) of the overall site which falls within the vegetation areas delineated as critically endangered Muscadel Riviere (northwestern corner) and endangered Breede Alluvium Renosterveld (southern border) does not show any characteristics of these vegetation types and no plant species of conservation concern were recorded within these areas. The Muschadel Riviere area has also been isolated by existing industrial developments and the railway line, similarly the Breede Alluvium Renosterveld area has been isolated by the railway line not allowing feasible ecological connectivity between the site and any adjacent natural habitats. Most of the site is mapped as Breede Shale Renosterveld (Least Threatened). Due to the limited indigenous terrestrial vegetation diversity; low ecological connectivity; previous and ongoing impacts i.e. livestock overgrazing and

developments and current significantly degraded and transformed state of the ±70ha site the overall terrestrial botanical sensitivity of the site is rated as low.

The terrestrial vegetation remaining on the proposed development site is characterised as Breede Shale Renosterveld (Least Threatened). The overall state of indigenous vegetation on these areas is significantly degraded, transformed and with limited diversity. No species of conservation concern were recorded on the site. The overall terrestrial botanical sensitivity of the site and surrounds is therefore rated as low.

The two layout alternatives as assessed overlaps and is mainly mapped as terrestrial ESA with a very small section of layout alternative 1 mapped as terrestrial CBA along the western border, however the proposed development site is surrounded by developments which will in future expand and isolate the site even further from feasible ecological connectivity therefore if the proposed mitigation measures are implemented the significance rating of potential impacts on terrestrial features of the site and surrounds is rated as **low negative.**

There are also areas on site and surrounding the wastewater treatment works identified as Aquatic Critical Biodiversity Areas, but freshwater features of the site has been assessed in a separate freshwater impact assessment.

If strict adherence is kept to the recommendations as set out in this report, as well as the Freshwater Ecology Assessment report and an EMP, the proposed development will not have a significant impact on any listed species or sensitive environments.

No significant breeding, roosting or habitat on the site will be impacted upon. Most species will move out of the area into similar adjacent habitats.

Recommended mitigation measures:

- The storm water runoff must be accommodated in designed and constructed storm water systems which must link into the downstream systems to prevent erosion.
- Existing access roads must be used.
- The project implementation process should be fully subject to regular and up to requisite standard Environmental Management Programme prescripts and conditions, inclusive of regular competent ECO supervision.
- Clearly demarcate proposed development area before site clearance commences and remain within demarcated development footprint area throughout construction and operational phases.
- Landscaping of the site must be done with indigenous trees and vegetation under the supervision of a qualified botanical specialist/or landscaper familiar with indigenous vegetation of the areas.

Eco Impact is of the opinion, and based on the survey and desk study done, that the cemetery expansion; if designed and implemented according to the recommendations will not impact significantly on the biodiversity, or adversely affect the ecological functioning of the area.

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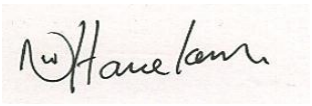
APPENDIX 1: Declaration of Independence

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

I **Nicolaas Willem Hanekom**, 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, 2010 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, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) 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 71 of GN No. R. 543.

Eco Impact is independent and does not have an interest in the business nor receive any payment other than fair remuneration for services rendered as required in terms of regulations.



Pri.Sci.Nat (Ecological Science) 400274/11

Signature of the specialist:

Eco Impact Legal Consulting (Pty) Ltd

Name of company:

25 March 2019

Date:

APPENDIX 2: Impact Assessment Methodology

Criteria	Description		
Nature	a description of what causes the effect, what will be affected, and how it will be affected.		
	Type	**Score**	**Description**
Extent (E)	None (No)	1	Footprint
	Site (S)	2	On site or within 100 m of the site
	Local (L)	3	Within a 20 km radius of the centre of the site
	Regional (R)	4	Beyond a 20 km radius of the site
	National (Na)	5	Crossing provincial boundaries or on a national / land wide scale
Duration (D)	Short term (S)	1	0 – 1 years
	Short to medium (S-M)	2	2 – 5 years
	Medium term (M)	3	5 – 15 years
	Long term (L)	4	> 15 years
	Permanent(P)	5	Will not cease
Magnitude (M)	Small (S)	0	will have no effect on the environment
	Minor (Mi)	2	will not result in an impact on processes
	Low (L)	4	will cause a slight impact on processes
	Moderate (Mo)	6	processes continuing but in a modified way
	High (H)	8	processes are altered to the extent that they temporarily cease
	Very high (VH)	10	results in complete destruction of patterns and permanent cessation of processes.
Probability (P) the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned	Very improbable (VP)	1	probably will not happen
	Improbable (I)	2	some possibility, but low likelihood
	Probable (P)	3	distinct possibility
	Highly probable (HP)	4	most likely
	Definite (D)	5	impact will occur regardless of any prevention measures
Significance (S)	Determined through a synthesis of the characteristics described above: **S = (E+D+M) x P** Significance can be assessed as low, medium or high		
Low: < 30 points:	The impact would not have a direct influence on the decision to develop in the area		
Medium: 30 – 60 points:	The impact could influence the decision to develop in the area unless it is effectively mitigated		
High: > 60 points:	The impact must have an influence on the decision process to develop in the area		
No significance	When no impact will occur or the impact will not affect the environment		
Status	Positive (+)		Negative (-)
The degree to which the impact can be reversed	Completely reversible (R)		The impact can be mostly to completely reversed with the implementation of the correct mitigation and rehabilitation measures.
	Partly reversible (PR)		The impact can be partly reversed providing that mitigation measures as stipulated in the EMP are implemented and rehabilitation measures are undertaken
	Irreversible (IR)		The impact cannot be reversed, regardless of the mitigation or rehabilitation measures taking place
The degree to which the impact may cause irreplaceable loss of resources	Resource will not be lost (R)		The resource will not be lost or destroyed provided that mitigation and rehabilitation measures as stipulated in the EMP are implemented
	Resource may be partly destroyed (PR)		Partial loss or destruction of the resources will occur even though all management and mitigation measures as stipulated in the EMP are implemented
	Resource cannot be replaced (IR)		The resource cannot be replaced no matter which management or mitigation measures are implemented.
The degree to which the impact can be avoided	Completely avoidable (CA)		The impact can be mostly to completely be avoided with the implementation of the correct mitigation and rehabilitation measures.
	Partly avoidable (PA)		The impact can be partly avoided providing that mitigation measures as stipulated in the EMP are implemented and rehabilitation measures are undertaken
	Unavoidable (UA)		The impact cannot be avoided, regardless of the mitigation or rehabilitation measures taking place
The degree to which the impact can be mitigated	Completely mitigatable (CM)		The impact can be completely mitigated providing that all management and mitigation measures as stipulated in the EMP are implemented
	Partly mitigatable (PM)		The impact cannot be completely mitigated even though all management and mitigation measures as stipulated in the EMP

		are implemented. Implementation of these measures will provide a measure of mitigatibility
	Un-mitigatable (UM)	The impact cannot be mitigated no matter which management or mitigation measures are implemented.
Proposed mitigation	List of mitigation and/or rehabilitation measures to be implemented to decrease significance of impact/s if possible.	
Significance rating of impact after mitigation	Low	The impact would not have a direct influence on the decision to develop in the area
	Medium	The impact could influence the decision to develop in the area unless it is effectively mitigated
	High	The impact must have an influence on the decision process to develop in the area
	No Significance	When no impact will occur or the impact will not affect the environment