



**A vegetation assessment of the site proposed for  
development of the Emdeni Public transport Facility in  
Soweto.**

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development of the Emdeni Public transport Facility in  
Soweto**

by

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## TABLE OF CONTENTS

DECLARATION OF INDEPENDENCE: .....	4
SUMMARY .....	5
<b>1. ASSIGNMENT</b> .....	7
<b>2. RATIONALE</b> .....	8
Definitions and Legal Framework.....	9
<b>3. STUDY AREA</b> .....	10
<b>3.1 Location and the receiving environment</b> .....	10
<b>3.2 Physical Environment</b> .....	12
<b>4. METHODS</b> .....	12
<b>4.1 Initial preparations:</b> .....	12
<b>4.2 Vegetation survey</b> .....	12
<b>5. RESULTS: VEGETATION</b> .....	16
5.1 Classification of Vegetation.....	16
5.2 Description of the Plant Communities (mapping units) .....	19
5.2.1. Weed vegetation on filled-in area.....	19
5.2.2. Informal vegetable garden .....	21
5.2.3. Wetland vegetation.....	22
5.3 Species of Conservation Concern, Red Data Species NEMBA species, Protected Trees .....	26
5.4 Medicinal Plants.....	26
5.5 Alien Plants.....	26
5.6 Vegetation Importance and Sensitivity .....	27
<b>4 National Environmental Screening Tool: Site sensitivity Verification</b> .....	29
<b>6. IMPACT ASSESSMENT</b> .....	30
6.1 Methods.....	30
6.2 Results: Impacts on the terrestrial vegetation and flora.....	34
6.2.1 Impacts on natural terrestrial vegetation preferred alternative .....	34
6.2.2 Impacts on natural terrestrial vegetation alternative 2 .....	35
<b>7. CONCLUSION</b> .....	36
<b>8. REFERENCES</b> .....	37
ABRIDGED CURRICULUM VITAE: GEORGE JOHANNES BREDEKAMP .....	39
ABRIDGED CURRICULUM VITAE: CATHARINA E VENTER .....	43

## **DECLARATION OF INDEPENDENCE:**

We, George Johannes Bredekamp, Id 4602105019086, and Catharina Elizabeth Venter Id 7912290014082

- Declare that GJ Bredekamp holds a DSc and CE Venter a MSc in biological sciences, are registered with SACNASP as professional scientists which sanctions us to function independently as a specialist consultants.
- As per prerequisites of the Natural Scientific Professions Act No. 27 of 2003, this project was our work from its inception, reflects exclusively our observations and unbiased scientific interpretations, and was executed to the best of our ability.
- abide by the Code of Ethics of the SACNASP.
- Act as independent specialist consultants in the field of ecology, vegetation science, and wetlands.
- Are committed to nature conservation but concomitantly recognize the need for economic development.
- Are assigned as specialist consultants by Pierre Joubert Landscape Architect and Environmental Planner for the proposed project “A vegetation assessment of the site proposed for development of the Emdeni Public transport Facility in Soweto” described in this report.
- Do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work performed.
- Have or will not have any vested interest in the proposed activity proceeding.
- Have no and will not engage in conflicting interests in the undertaking of the activity.
- Undertake to disclose to the client and the competent authority any material information that have or may have the potential to influence the decision of the competent authority required in terms of the Environmental Impact Assessment Regulations 2014.
- Will provide the client and competent authority with access to all information at my disposal, regarding this project, whether favourable or not.
- Reserve the right to only transfer our intellectual property contained in this report to the client(s), (party or company that commissioned the work) on full payment of the contract fee. Upon transfer of the intellectual property, we recognise that written consent from the client(s) will be required for us to release any part of this report to third parties.



GJ Bredekamp



CE Venter

## SUMMARY

During December 2019 EcoAgent CC reported on the vegetation and wetlands that were then present on a site that had been proposed to develop the Emdeni informal public transport facility in Soweto. Due to alteration of the originally proposed area, the original report had to be updated. EcoAgent CC was appointed by Pierre Joubert Landscape Architect and Landscape Planner to revise the vegetation present on the current site. This report includes a description and map of the vegetation that occurs on the site. The detailed wetland report was presented in a separate report.

The vegetation (and wetland) surveys were done by Prof George Bredenkamp and Ms Ina Venter on 4 November 2019. Standard vegetation survey methods were used, in accordance with the relevant legislation and minimum requirements of GDARD. The 2019 vegetation report was reviewed in January 2021.

Two totally transformed terrestrial plant communities were identified on the site, while a wetland is present on the eastern extreme of the site.

The vegetation of the three mapping units is described in terms of plant species composition, including dominant species, species of conservation concern, alien species and weeds and medicinal plants. Each plant community is also evaluated in terms of conservation value and ecological sensitivity.

The terrestrial vegetation on the site is currently totally transformed and represents a filled area and an informal vegetable garden. No red data listed plant species were found on the site. No NEMBA species or protected trees occur on the site. Weeds predominate over the entire area.

The impacts of the development on the **terrestrial vegetation** for both alternatives will be negligible, as the current terrestrial vegetation is already totally transformed.

It is important to note that all rivers and wetlands in South Africa are considered to be ecological sensitive systems and enjoy legal protection (National Water Act 1998, National Environmental Management Act, 1998). For Alternative 2, the proposed taxi rank is located **outside** the wetland unit, but the proposed storm water attenuation system and a very small portion of the parking is located **in the buffer zone** for the wetland. The preferred alternative takes place outside the wetland unit and its buffer zone. If the mitigations measures included in this report is adhered to and the stormwater plan is implemented no negative impacts are anticipated and the PES class of the wetland will remain the same. This development is supported.

The area is suitable for the proposed development of a public transport facility and associated infrastructure, though some conditions are stated in the separate wetland report.

## 1. ASSIGNMENT

During December 2019 EcoAgent CC reported on the vegetation that were present on a site that had been proposed to develop the Emdeni informal public transport facility in Soweto. Due to alteration of the originally proposed area, the original report had to be updated to include the changed area. EcoAgent CC was appointed by Pierre Joubert Landscape Architect and Landscape Planner to assess the vegetation currently present on the enlarged site. This report includes a description and map of the vegetation that occurs on the site and comments on the results of the screening tool of the Department of Environmental Affairs in terms of biodiversity and plants. The newly proposed development on the site will particularly have increased impacts on the wetland, therefore the results of a detailed wetland assessment are presented in a separate report.

The site of about 1 ha is located near intersection of Maholwane & Jabavu/ Mtshunyana Streets in Soweto.

Eco-Agent CC Ecological Consultants were appointed by Pierre Joubert Landscape Architect and Environmental Planner to assess the vegetation and flora diversity as part of the EIA process.

This investigation is in accordance with the EIA Regulations No. R982-985, Department of Environmental Affairs and Tourism, 4 December 2014 emanating from Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as well as the National Water Act 1998 (Act 36 of 1998) and other relevant legislation. Where relevant the NEMA protocols of 2019, 2020a and 2020b are included in this investigation.

### Scope

The assignment for this investigation is interpreted as follows: Compile a study on the vegetation and flora diversity, with emphasis on red data plant species that occur or may occur on the site. Comments on the results of the screening tool of the Department of Environmental Affairs in terms of biodiversity and plants. Assess the impacts of two alternative lay-out plans that the development will have on the vegetation. In order to compile this, the following had to be done:

#### 1. Initial preparations:

Obtain all relevant maps and information on the natural environment of the concerned area. These include:

- Information on **Red Data** listed plant species and other plant species of conservation concern that may occur in the area.
- Results of the **National Environmental Screening Tool** with relevance to biodiversity, plant species and animal species, (NEMA 2019 and 2020) and where relevant of aquatic systems.

- Delimit the various **plant communities** that can be recognised on aerial photographs / Google Earth images of the site.
- 2. Vegetation and habitat survey:**
- List the plant species (trees, shrubs, grasses and herbaceous species) present for plant community and ecosystem delimitation.
  - Identify potential red data plant species, alien plant species, and medicinal plants.
- 3. Plant community delimitation and description**
- Process data (vegetation and habitat classification) to determine vegetation types (= plant communities, mapping units) on an ecological basis.
  - Describe the habitat and vegetation.
  - Determine the sensitivity of the site on basis of biodiversity, veld condition and presence of rare or protected species.
  - Prepare a vegetation map of the area.
  - Prepare a sensitivity map of the plant communities present.
  - Prepare a Site Sensitivity Verification Statement as required by NEMA Government Notice 648 (2019) and NEMA Government Notice 655 (2020),
  - Make recommendations on aspects that should be monitored during development.
- 4. General**
- Identify and describe particular ecologically sensitive areas.
  - Identify transformed areas in need of special treatment or management, e.g. alien plant species, bush encroachment, erosion, degraded areas, reclamation areas.
  - Make recommendations on aspects that should be monitored during development.
- 5. Do an impact assessment.**
- Compile prescribed impact assessment tables and associated descriptions of impacts on vegetation and flora of two alternative lay-out plans and suggest possible mitigation measures.

### **Assumptions and Limitations**

The site is covered by more than 2m of infill, partly covering the edge of the wetland. The boundary of the historical wetland vegetation could therefore not be accurately determined. The terrestrial vegetation is totally transformed.

## **2. RATIONALE**

It is widely recognised that it is of utmost importance to conserve natural resources in order to maintain ecological processes and life support systems for plants, animals



and humans. To ensure that sustainable development takes place, it is therefore important that the environment is considered before relevant authorities approve any development. This led to legislation protecting the natural environment. The Environmental Conservation Act (Act 73 of 1989), the National Environmental Management Act, 1998 (NEMA) (Act 107 of 1998), the National Environmental Management Biodiversity Act, 2004. (Act 10 Of 2004) and the National Water Act 1998 (Act 36 of 1998) ensure the protection of ecological processes, natural systems and natural beauty as well as the preservation of water resources and biotic diversity in the natural environment. It also ensures the protection of the environment against disturbance, deterioration, defacement or destruction as a result of man-made structures, installations, processes or products or human activities. A draft list of Threatened Ecosystems was published (Government Gazette 2009) as part of the National Environmental Management Biodiversity Act, 2004. (Act 10 Of 2004). Details of these Threatened Ecosystems have been described by SANBI & DEAT (2009) and a list of Threatened or Protected Species (TOPS) regulations is also available (NEMBA Notice 388 of 2013). International and national Red Data lists have also been produced for various threatened plant and animal taxa.

All components of the ecosystems (physical environment, including water resources, vegetation, animals) of a site are interrelated and interdependent. A holistic approach is therefore imperative to effectively include the development, utilisation and where necessary conservation of the given natural resources in an integrated development plan, which will address all the needs of the modern human population (Bredenkamp & Brown 2001).

In order to evaluate the vegetation habitats, it is necessary to make a thorough inventory of the ecosystems (= vegetation type + habitat type) on the site. This inventory should then serve as a scientific and ecological basis for the planning exercises.

## **Definitions and Legal Framework**

- National Environmental Management Act, 1998 (Act No. 107 of 1998)(including all later amendments and additions);
- National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)(including all later amendments and additions);
- The older Environment Conservation Act, 1989 (Act 73 of 1989);
- Conservation of Agriculture Resources Act, 1983 (Act 43 of 1983);
- National Water Act, 1998 (Act 36 of 1998);
- National Forests Act, 1998 (Act 84 of 1998);
- National Environmental Management: Protected Areas Act 2003 (Act 57 Of 2003) (as Amendment Act 31 of 2004 and Amendment Act 15 of 2009)
- Government Notice Regulation 1182 and 1183 of 5 September 1997, as amended (ECA);

- Government Notice Regulation 385, 386 and 387 of 21 April 2006 (NEMA);
- Government Notice Regulation 392, 393, 394 and 396 of 4 May 2007 (NEMA);
- Government Notice Regulation 398 of 24 March 2004 (NEMA); and
- Government Notice Regulation 544, 545 and 546 of 18 June 2010 (NEMA)
- Government Notice Regulation 982, 983, 984 and 985 of 4 December 2014 (NEMA).
- Government Gazette 34809 Threatened Terrestrial Ecosystems of South Africa 9 December 2011 (NEMBA)
- Government Notice 655 Government Gazette 42946, 10 January 2020 (Screening of Plants and Animals)(NEMA).
- Government Notice 648 Government Gazette 45421, 10 May 2019 (Screening of Biodiversity)(NEMA).

In summary: The Scope and objectives of this study is therefore:

- To identify describe and map the vegetation (ecosystems) that occur on the site;
- To assess the ecological sensitivity of these ecosystems and comment on ecologically sensitive areas, in terms of their plant diversity and where needed ecosystem function;
- To provide a list of plant species that do occur on site and that may be affected by the development;
- To identify species of conservation concern that may occur on the site;
- Confirm or dispute the environmental sensitivity as identified by the National web-based environmental screening tool;
- To highlight potential impacts of the proposed development on the vegetation and plant species that occur on the site in relation to the general area of the study site;
- If relevant, provide management recommendations that might mitigate negative and enhance positive impacts, should the proposed development be approved.

### 3. STUDY AREA

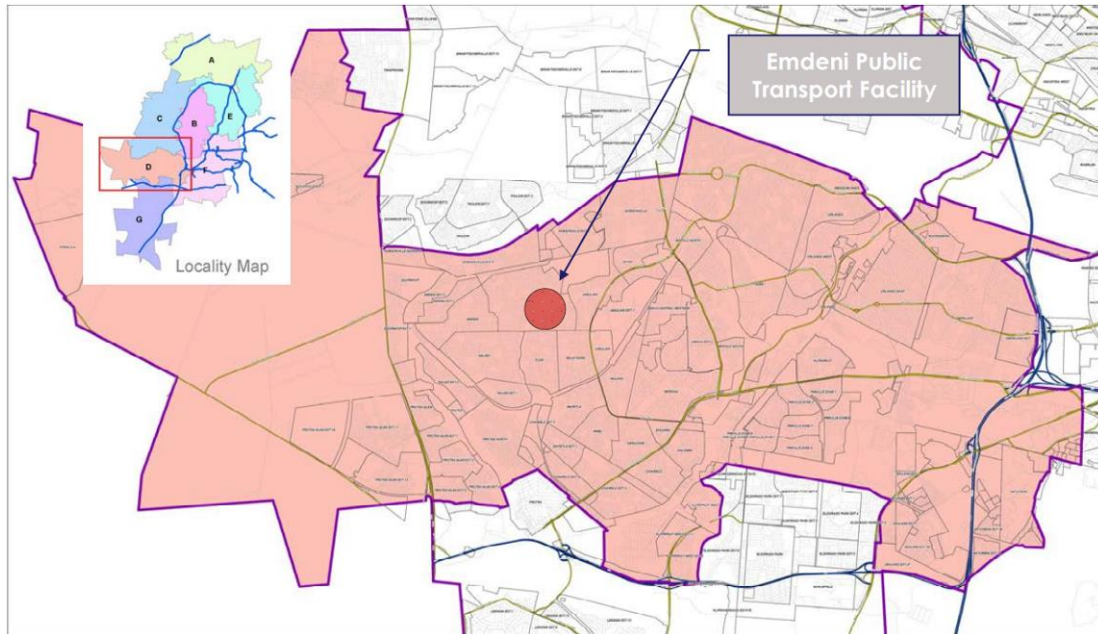
#### 3.1 Location and the receiving environment

The site is located in Region D of Soweto, Johannesburg. The general area of Region D is already developed as residential and business areas (Figure 1 & Figure 2). The site of approximately 0.8 ha is located near the intersection of Maholwane & Jabavu / Mtshunyana Streets.

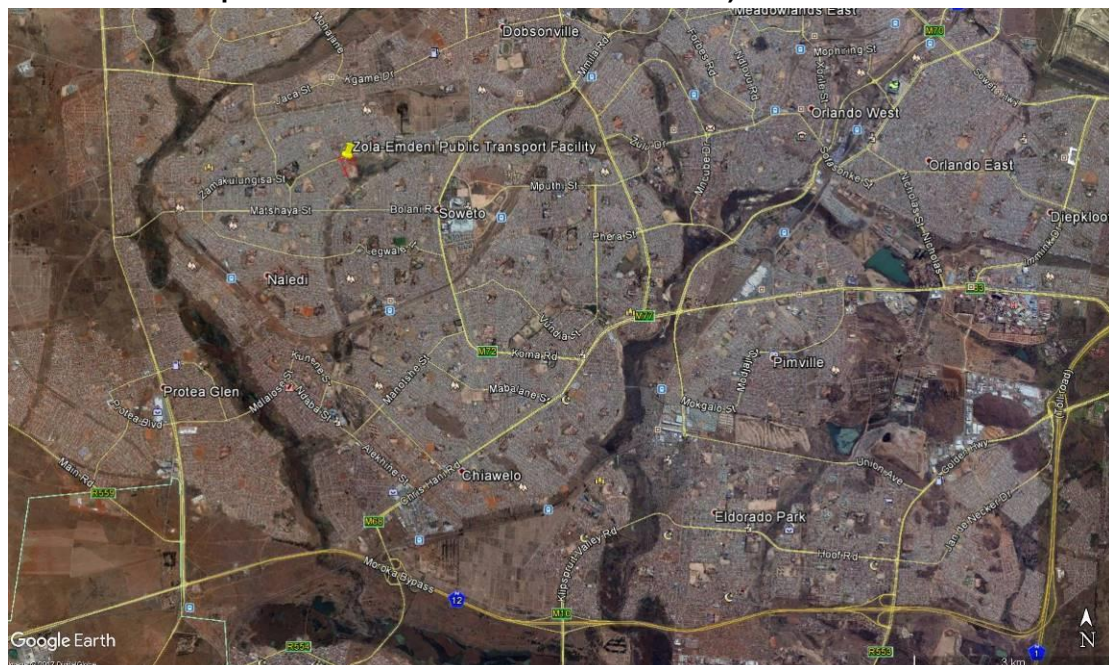
The following applies:

- The site falls within a developed town area.
- The site does not fall within a protected area or a conservancy.

- A wetland system is present at the eastern boundary of the site, but within and close to the site area the wetland was covered by rubble filling (to level an adjacent soccer field).
- The site is currently totally transformed and covered by weeds with a small part used as an informal vegetable garden.



**Figure 1: The locality the Emdeni Public Transport Facility (map provided by Pierre Joubert Landscape Architect and Environmental Planner)**



**Figure 2: A Google Earth image showing the regional locality of the site in relation to developed areas, roads and wetlands.**

## **3.2 Physical Environment**

### **Regional Climate**

Summer rainfall has a mean annual precipitation of 600-700 mm and dry winters with frequent frost. The climate is cool temperate, with extreme differences between summer maximum and winter minimum temperatures.

### **Geology and soil**

Most of the area is underlain by shale sandstone or mudstone of the Madzaringwe formation of the Karoo Supergroup.

### **Topography and drainage**

The site is located on a slightly east-facing slope within a broad slightly undulating plain. A wetland is present at the eastern boundary of the site. Soils on the specific site are partly covered by rubble filling that was done for the levelling of an adjacent soccer field.

### **Land-use**

The general broader area is residential and small business.

### **Vegetation Types**

The site is located within the Soweto Highveld Grassland (Gm 8) (Mucina & Rutherford 2006) that is an endangered ecosystem, though the site is totally transformed within the Soweto town, and no original natural vegetation currently occur here.

## **4. METHODS**

### **4.1 Initial preparations:**

For background information, the relevant maps, aerial photographs and other information on the natural environment of the concerned area were obtained.

### **4.2 Vegetation survey**

The original vegetation survey was done on 4 December 2017 by Prof George Bredenkamp and Ms Ina Venter, accompanied by a delegation of Mr Marco Alexandre and Ms Megan Gomez (Ecotone Freshwater Consultants), as well as Mr Pierre Joubert (Pierre Joubert Landscape Architect Environmental Planner and a representative of the developer. The new vegetation (and wetland) surveys were done on 4 November 2019 by Prof George Bredenkamp, Ms Ina Venter and Mr Retief Grobler.

The vegetation (ecosystems) was mapped into homogenous units based on recent Google Earth aerial images of the area. At several plots a description of the dominant and characteristic species identified within each of the homogenous units was made. These descriptions were based on total floristic composition of each unit, following

established vegetation survey techniques (Mueller-Dombois & Ellenberg 1974; Westhoff & Van der Maarel 1978). Data recorded included a list of the plant species present, including trees, shrubs, grasses, forbs, geophytes and succulents was therefore derived for each plant community / ecosystem present on the site. These vegetation survey methods have been used as the basis of a national vegetation survey of South Africa (Mucina *et al.* 2000) and are considered to be an efficient method of describing vegetation and capturing species information. Notes were additionally made of any other features that might have an ecological influence.

The identified systems are described in terms of their plant species composition and evaluated in terms of the potential habitat for red data plant and fauna species.

Threatened Ecosystems are identified in accordance with SANBI & DEAT (2009, NEMA 2011).

Critically Endangered, Endangered, Vulnerable and Protected Species (NEMBA species, TOPS species) are evaluated against the list published in Department of Environmental Affairs and Tourism Notice No. 2007 (National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)).

Protected trees are identified in accordance with the list of nationally protected trees published in Government Notice No. 29062 3 (2006) (National Forests Act, 1998 (Act No. 84 Of 1998), as Amended (Department of Water Affairs Notice No 897, 2006).

Red data plant species for the area were obtained from the SANBI updated data bases, with updated threatened status (based on Raimondo *et al.* 2009) for the map grid 2528CC. These lists were then evaluated in terms of habitat available on the site, and also in terms of the present development and presence of man in the area.

Alien invasive species, according to the Conservation of Agricultural Resources Act (Act No.43 of 1983) as listed in Henderson (2001), are indicated.

The field observations were supplemented by literature studies from the area. (Bredenkamp & Brown 2003), Bredenkamp, Brown & Pfab 2007).

#### **4.3 Conservation Value**

The following **conservation value** categories were used for assessing the study site:  
**High:** Ecologically sensitive and valuable land with high species richness and/or sensitive ecosystems or red data species that should be conserved and no developed allowed.

**Medium-high:** Land where sections are disturbed but which is in general ecologically sensitive to development/disturbances.

**Medium:** Land on which low impact development with limited impact on the vegetation / ecosystem could be considered for development. It is recommended that certain portions of the natural vegetation be maintained as open space.

**Medium-low:** Land of which small sections could be considered to conserve but where the area in general has little conservation value.

**Low:** Land that has little conservation value and that could be considered for developed with little to no impact on the vegetation.

#### 4.4 Ecological Sensitivity

It has been clearly demonstrated that vegetation not only forms the basis of the trophic pyramid in an ecosystem, but also plays a crucial role in providing the physical habitat within which organisms complete their life cycles (Kent & Coker 1992). Therefore, the vegetation of an area will largely determine the ecological sensitivity thereof.

The vegetation sensitivity assessment aims to identify whether the vegetation within the study area is of conservation concern and thus sensitive to development:

In order to determine the sensitivity of the vegetation (ecosystem) on the site, weighting scores are calculated per plant community. The following six criteria are applied, and each allocated a value of 0-3.

- Conservation status of a regional vegetation unit;
- Listed ecosystem (e.g. wetlands, hills and ridges etc)
- Legislative protection (e.g. threatened ecosystems, SANBI & DEAT 2009)
- Plant species of conservation concern (e.g. red listed, nationally or provincially protected plant species, habitat or potential habitat to plants species of conservation concern, protected plants or protected trees);
- Situated within ecologically functionally important features (e.g. wetlands or riparian areas; important habitat for rare fauna species)
- Conservation importance (e.g. untransformed and un-fragmented natural vegetation, high plant species richness, important habitat for rare fauna species).

Sensitivity is calculated as the sum the values of the criteria. The vegetation with the lowest score represents the vegetation that has the least / limited sensitivity). A maximum score of 18 can be obtained, a score of 15-18 indicated high sensitivity. The sensitivity scores are as follows (Table 4.1):

**Table 4.1: Sensitivity Weighting scores for vegetation.**

<b>Scoring</b>	15-18	12-14	9-11	6-8	0-5
<b>Sensitivity</b>	High	Medium-High	Medium	Medium-Low	Low

Development on vegetation that has High sensitivity will normally not be supported, except that specific circumstances may still lead to support of the proposed

development. Portions of vegetation with Medium-High or Medium sensitivity should be conserved. Development may be supported on vegetation considered to have Medium-Low or Low sensitivity.

**GDARD requirements** include that sensitivity should include only High and Low sensitivity. The categories are as follows:

**High:** High and Medium-High conservation priority categories mentioned above are considered to have a High sensitivity and development should not be supported.

**Low:** Medium, Medium-Low and Low conservation priority categories mentioned above are considered to have a Low sensitivity and development may be supported. Portions of vegetation with a Medium conservation priority should be conserved.

**National Environmental Screening Tool** (DEA 2019) indicated the sensitivity of animal species and plant species (NEMA Government Gazette January 2020) and terrestrial biodiversity and aquatic systems (NEMA Government Gazettes May 2019 & March 2020). To confirm or dispute these sensitivities values, they were evaluated against the current observations, real time field data and the analyses of this data from the site.

#### 4.5 Plant Species Status

Plant species recorded in each plant community with an indication of the status of the species by using the following symbols:

- |                                    |                            |
|------------------------------------|----------------------------|
| A = Alien woody species            | RD = Red data listed plant |
| D = Dominant                       | W = weed                   |
| d = subdominant                    | W-1a Invader category 1a   |
| G = Garden or Garden Escape        | W-1b Invader category 1b   |
| M = Medicinal plant species        | W-2 Invader category 2     |
| P = Protected trees species        | W-3 Invader category 3     |
| p = provincially protected species |                            |

#### 4.6 Species Richness

Species Richness is interpreted as follows: Number of indigenous species recorded in the sample plots representing the plant community (Table 1). Alien woody species and weeds are not included.

**Table 1: Species richness categories.**

No of species	Category
1-24	Low
25-39	Medium
40-59	High
60+	Very High

## 5. RESULTS: VEGETATION

### 5.1 Classification of Vegetation

Two terrestrial and one wetland plant communities / mapping units were identified. Within the study site is also a totally bare parking lot for taxis.).

The following two plant communities were identified:

<b>Vegetation type / Plant Community</b>	<b>Sensitivity (GDARD)</b>
1 Weed vegetation on filled-in area	Low
2 Informal vegetable garden	Low
3 Wetland	High



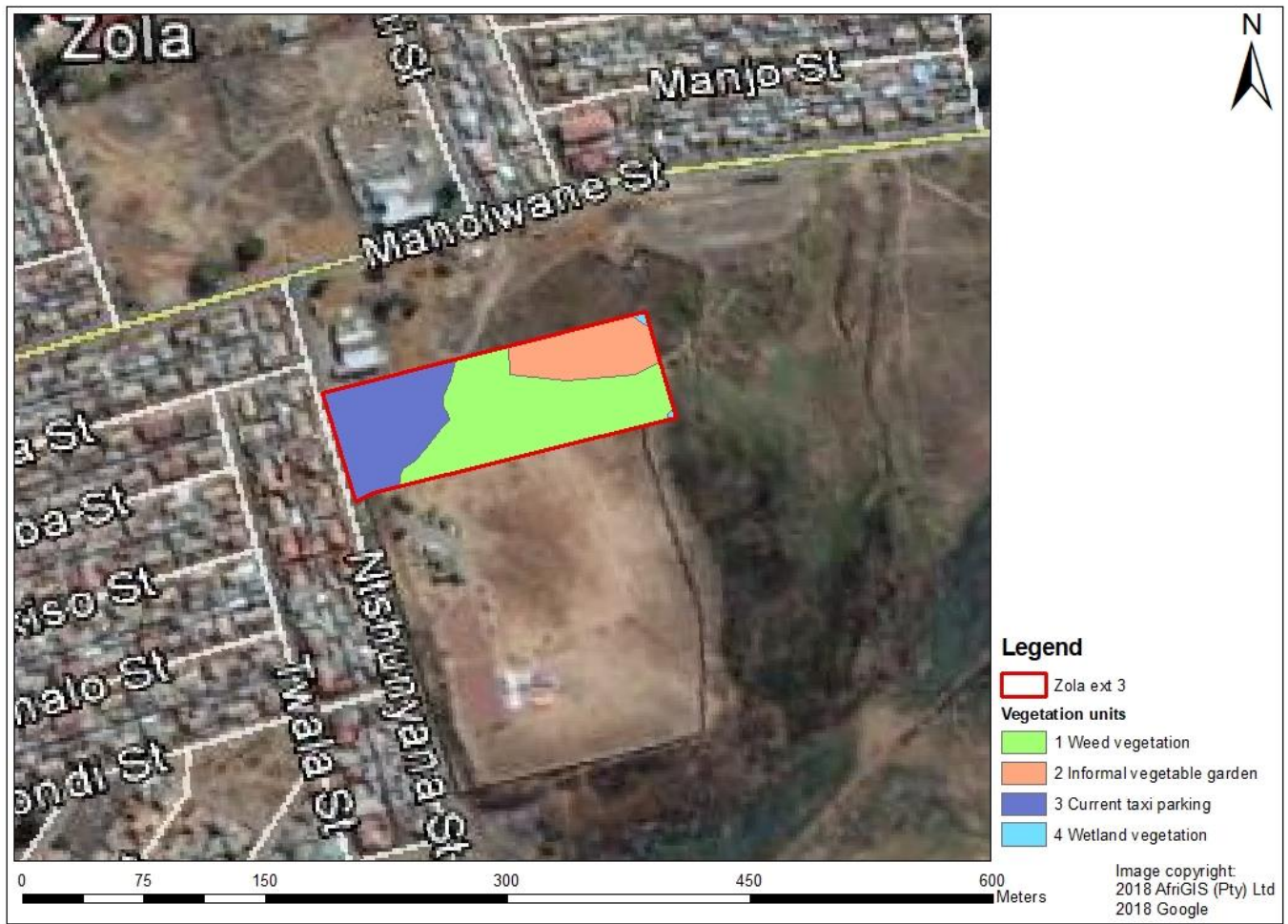


Figure 3: Vegetation / ecosystem map of the site.

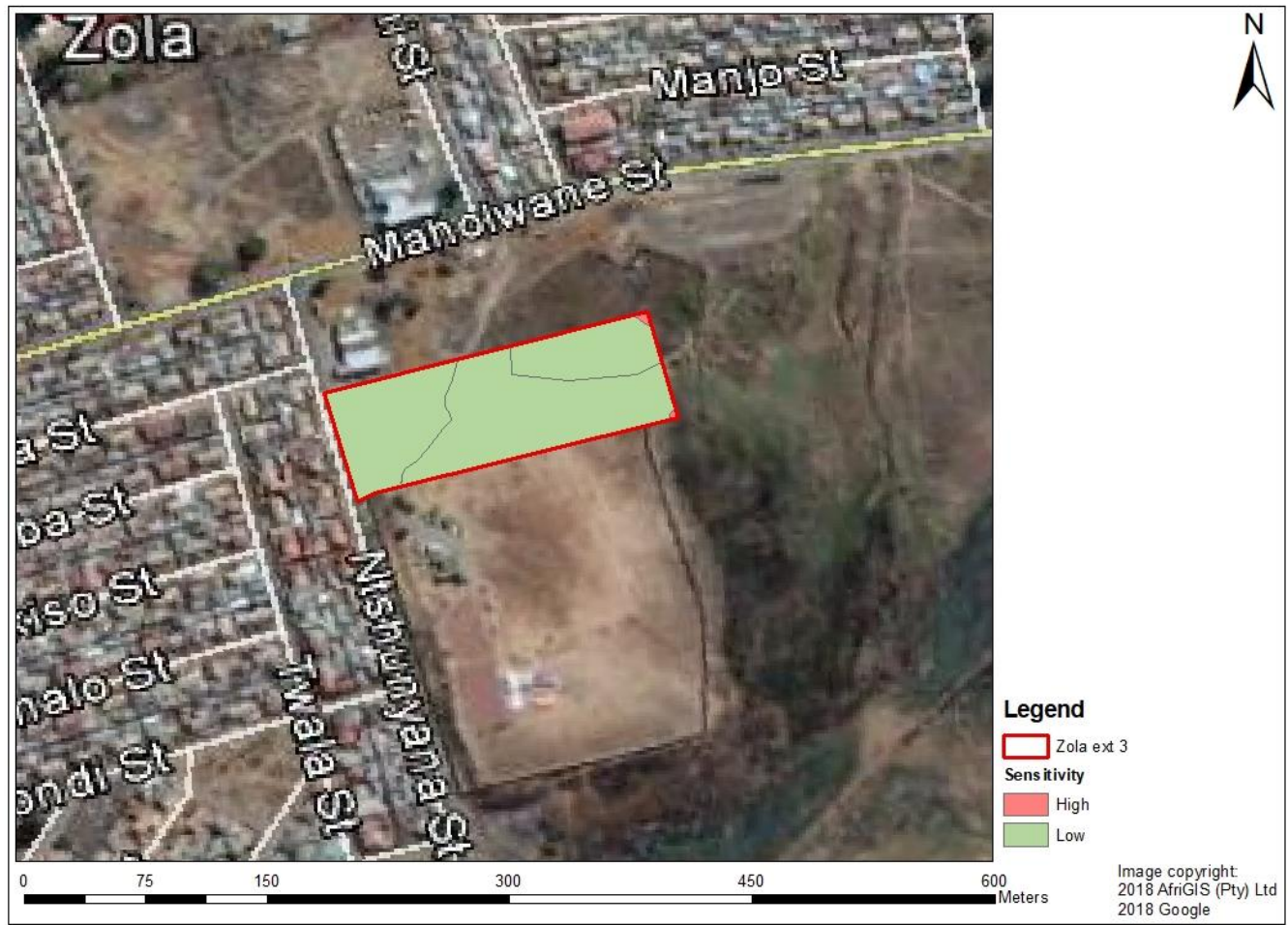


Figure 4: Ecological sensitivity of the mapping units.



## 5.2 Description of the Plant Communities (mapping units)

A vegetation map (Figure 3) indicates the distribution of the plant communities (mapping units) on the site, while the ecological sensitivity is indicated in Figure 4.

### 5.2.1. Weed vegetation on filled-in area

This area was filled-in with rubble and soil to level the adjacent soccer field (Figure 5). This area is transformed and disturbed. The plant species present are mostly weeds and most of the plant cover is by the alien grass *Pennisetum clandestinum* (Figure 6) and pioneer grass *Cynodon dactylon*.



Figure 5: Photograph from the top of the in-filled area (left) and as seen from the wetland (right) A soccer field is located behind the wall (right)



Figure 6: The vegetation on the filled-in area. Most of the grass cover is by *Pennisetum clandestinum*.

The following plant species were recorded:

#### Trees and Shrubs

*Vachellia karoo* M

### Grasses and sedges

*Cynodon dactylon*

*Eragrostis curvula*

*Eragrostis plana*

*Paspalum dilatatum*

*Pennisetum clandestinum* A

### Forbs

*Alternanthera pungens* W

*Amaranthus hybridus* W

*Bidens bipinnata* WM

*Cirsium vulgare* W-1b

*Conyza bonariensis* W

*Conyza podocephala*

*Datura stramonium* W-1b

*Flaveria bidentis* W-1b

*Gomphocarpus fruticosus* W

*Helichrysum nudifolium*

*Indigofera* sp

*Ipomoea purpurea* W-1b

*Lactuca serriola* W

*Lavatera arborea* W-1b

*Lepidium bonariense* W

*Medicago sativa* W

*Nidorella anomala*

*Plantago lanceolata* W

*Portulaca oleracea* W

*Sida cordifolia* W

*Tagetes minuta* W

*Verbena bonariensis* W

*Verbena braziliensis* W

*Xanthium spinosum* W-1b

### Number of species

	Indigenous	Aliens / Weeds	Total	Red Data	Protected	Medicinal
<b>Trees and shrubs</b>	1	0	1	0	0	1
<b>Grasses and sedges</b>	4	1	5	0	0	0
<b>Forbs</b>	4	20	24	0	0	1
<b>Total</b>	9	21	30	0	0	2

The species richness is regarded as low.

1. Weed vegetation on filled-in area summary			
<b>Status</b>	Transformed		
<b>Soil</b>	Rubble in fill	<b>Rockiness % cover</b>	0
<b>Conservation priority:</b>	Low	<b>Sensitivity</b>	Low
<b>Agricultural potential:</b>	Low	<b>Need for rehabilitation</b>	High
<b>Dominant spp.</b>	weeds		

## Discussion

This is a totally transformed area. No species of conservation concern are present. The species richness is regarded as low. The proposed development can be supported.

### 5.2.2. Informal vegetable garden

This plant community occurs in the north-eastern corner of the site (Figure 3). Some vegetables are currently planted (Figure 7) in this area and some common weeds are present.



Figure 7: The informal vegetable garden.

The following plant species were recorded from this area:

#### Trees, Shrubs and dwarf shrubs\*

*Gleditsia triacanthos* A-1b

#### Grasses and Sedges

*Cynodon dactylon*

*Pennisetum clandestinum* A

*Eragrostis curvula*

#### Forbs

*Amaranthus hybridus* W

*Medicago sativa* W

*Bidens bipinnata* WM

*Plantago lanceolata* W

*Conyza bonariensis* W

*Portulaca oleracea* W

*Datura stramonium* W-1b

*Tagetes minuta* W

*Flaveria bidentis* W-1b

*Verbena bonariensis* W

*Ipomoea purpurea* W-1b

### Number of species

	Indigenous	Aliens / Weeds	Total	Red Data	Protected	Medicinal
Trees and shrubs	0	1	1	0	0	0
Grasses and sedges	2	1	3	0	0	0
Forbs	0	11	11	0	0	0
<b>Total</b>	2	13	15	0	0	0

The species richness is regarded as low.

2. Informal vegetable garden summary			
Status	Transformed		
Soil	Dark brown loam	Rockiness % cover	0
Conservation priority:	Low	Sensitivity	Low
Agricultural potential:	Low	Need for rehabilitation	High
Dominant spp.	Weeds, garden vegetables		

### Discussion

This is a transformed area. The sensitivity is regarded as being Low. The area is suitable for the proposed development.

#### 5.2.3. Wetland vegetation

This is not a wetland assessment, it is merely a description of the vegetation ecology of the site. The wetland is situated directly east of the site (see wetland report). The topography of the site was significantly altered by deep infill over the entire site (**Error! Reference source not found.B**) and extending to the north, south and east of the site. A sports field is present directly to the south of the site and the infill extends to the area south of the sports field as well. The infill seems to peter out to the north of the site, but ends abruptly to the east of the site, where a steep incline of approximately 2m is located and the existing wetland area starts at the bottom of the incline. An artificial canal originates at small dam that appears to be a stormwater dam and passes adjacent to this steep drop, to the east of the site. Several other artificial stormwater canals are also present in the rest of the wetland unit, located further away from the site.

Most of the wetland unit is dominated by *Typha capensis*, a common wetland plant in the area (**Error! Reference source not found.A**). The drier portions of the wetland are dominated by grass and weedy species, including large patches of the alien grasses *Pennisetum clandestinum* (Kikuyu) and *Paspalum dilatatum*. It is expected that the wetland was dominated by grass and sedge species prior to development in the catchment, and that the current species composition is a result of the changes in hydrology, topography and water quality. The vegetation is however a very good indication of wetland conditions in the area and the current boundary of the wetland could be delineated based on the vegetation cover. The historical extent of the wetland could not be determined based on the current vegetation cover.

Although wetland soils are present to the east of the site, outside the infill area, this soil has also been disturbed. A clear layer of imported soil is present in the top 20cm of the soil profile and plastic bags and other refuse were encountered up to 40cm depth of the soil profile. The top layer of soil in the soil profile is a red-brown loam sand, similar to the infill, with red and yellow high chroma mottles starting at 10cm depth (**Error! Reference source not found.E**). The soil becomes a grey sand with red mottles at 40cm depth (**Error! Reference source not found.F**). The grey sand is likely the original wetland soil, but the infill has been in place for a sufficient time to develop mottling as well.

The following plant species were recorded from this area:

**Trees, Shrubs and dwarf shrubs\***

*Vachellia karroo* M

**Grasses and Sedges**

<i>Agrostis lachnantha</i>	<i>Paspalum dilatatum</i>	A
<i>Bromus catharticus</i>	<i>Pennisetum clandestinum</i>	A
<i>Cynodon dactylon</i>	<i>Phragmites australis</i>	
<i>Eragrostis curvula</i>	<i>Typha capensis</i>	
<i>Juncus effusus</i>		

**Forbs**

<i>Conyza bonariensis</i>	W	<i>Rumex crispus</i>	W
<i>Medicago sativa</i>	W	<i>Trifolium repens</i>	W
<i>Plantago lanceolata</i>	W	<i>Verbena bonariensis</i>	W
<i>Rorippa nasturtium-aquaticum</i>		<i>Veronica anagallis-aquatica</i>	
<i>Rorippa nudiuscula</i>			

**Number of species**

	Indigenous	Aliens / Weeds	Total	Red Data	Protected	Medicinal
<b>Trees and shrubs</b>	1	0	1	0	0	1
<b>Grasses and</b>	7	2	9	0	0	0



<b>sedges</b>						
<b>Forbs</b>	3	6	9	0	0	0
<b>Total</b>	11	8	19	0	0	1

The species richness is regarded as low.

<b>2. Wetland summary</b>			
<b>Status</b>	Transformed		
<b>Soil</b>	Dark brown clay-loam	<b>Rockiness % cover</b>	0
<b>Conservation priority:</b>	High	<b>Sensitivity</b>	High
<b>Agricultural potential:</b>	Low	<b>Need rehabilitation for</b>	High
<b>Dominant spp.</b>	<i>Pennisetum clandestinum, Typha capensis</i>		







**Figure 8: Photographs illustrating (A) the vegetation in the wetland; (B) the deep infill on site and to the south of the site; (C) the artificial stormwater canal and (D) stormwater dam; (E) the mottling in the shallow imported soil in the wetland and the (F) grey soil with mottling in the wetland unit (also see wetland report).**

### **5.3 Species of Conservation Concern, Red Data Species NEMBA species, Protected Trees**

Although some species of conservation concern have been recorded from the Soweto Highveld Grassland vegetation type, the site is located on highly transformed area within the Soweto city area and no species of conservation concern occur here. Any possible suitable habitat that may have occurred here, has been totally destroyed by urban development. This matter is therefore not discussed further.

NEMBA species are evaluated against the list published in Department of Environmental Affairs and Tourism Notice No. 2007 (National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)). No NEMBA species were found on the site.

Protected trees are identified in accordance with the list of nationally protected trees published in Government Notice No. 29062 3 (2006) (National Forests Act, 1998 (Act No. 84 Of 1998), as Amended (Department of Water Affairs Notice No 897, 2006)). No Protected trees occur on the site. No provincially protected plant species are present on the site.

### **5.4 Medicinal Plants**

Very limited medicinal plants occur on the site. Medicinal plant species are marked M in the plant species lists of each plant community. The widespread and abundant thorn tree *Vachellia karroo* and the weed *Bidens bipinnata* occur on the site, though this has no significance.

### **5.5 Alien Plants**

A single woody alien plant species, *Gleditsia triacanthos*, listed as a declared invasive plant (Henderson 2001, Bromilov 2001) that should be removed and controlled (Conservation of Agricultural Resources Act (Act 43 of 1983) occurs on the site.

The Invader Categories are basically described as follows:

Category 1: Declared weeds that are prohibited on any land or water surface in South Africa. These species must be controlled, or eradicated where possible.

Category 2: Declared invader species that are only allowed in demarcated areas under controlled conditions and prohibited within 30 m of the 1:50 year floodline of any watercourse or wetland.

Category 3: Declared invader species that may remain, but must be prevented from spreading. No further planting of these species are allowed.

Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

Category 1b: Invasive species requiring compulsory control as part of an invasive species control program. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management program. No permits will be issued.

Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.

Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

In terms of the amendments to the regulations under the Conservation of Agriculture Resources Act, 1983 (Act No. 43 of 1983) and Regulation 598, Government Gazette 37885, August 2014) (Alien and Invasive Species Regulations), landowners are legally responsible for the control of alien species on their properties.

## **5.6 Vegetation Importance and Sensitivity**

In order to determine the sensitivity of the vegetation (ecosystem) on the site, weighting scores are calculated per plant community. The following six criteria are applied, and each allocated a value of 0-3.

- Conservation status of a regional vegetation unit, should the particular site be transformed or highly degraded minus 2 or minus 1 can be applied;
- Listed ecosystem (e.g. wetlands, hills and ridges etc)
- Legislative protection (e.g. threatened ecosystems, SANBI & DEAT 2009)
- Plant species of conservation concern (e.g. red listed, nationally or provincially protected plant species, habitat or potential habitat to plants species of conservation concern, protected plants or protected trees);
- Situated within ecologically functionally important features (e.g. wetlands or riparian areas; important habitat for rare fauna species)
- Conservation importance (e.g. untransformed and un-fragmented natural vegetation, high plant species richness, important habitat for rare fauna species).

Sensitivity is calculated as the sum the values of the criteria. The vegetation with the lowest score represents the vegetation that has the least / limited sensitivity). A maximum score of 18 can be obtained, a score of 15-18 indicated high sensitivity.

The sensitivity scores are as follows (Table 6.7):

**Table: Sensitivity weighting scores for plant communities.**

<b>Scoring</b>	15-18	12-14	9-11	6-8	0-5
<b>Sensitivity</b>	High	Medium-High	Medium	Medium-Low	Low

Development on vegetation that has High sensitivity will normally not be supported, except that specific circumstances may still lead to support of the proposed development. Portions of vegetation with Medium-High or Medium sensitivity should be conserved. Development may be supported on vegetation considered to have Medium-Low or Low sensitivity. The result of the sensitivity analysis is given in Table 6.8.

**Table: Sensitivity scoring of plant communities that occur within the study area.**

Vegetation	Conservation Status of regional Vegetation unit	Listed Ecosystem	Legislated Protection	Species of conservation concern	Ecological Function	Conservation Importance	Total Score out of max of 18
1. Weed vegetation on filled area	1	0	0	0	1	0	1 Low
2. Informal vegetable garden	1	0	0	0	1	0	2 Low
3. Wetland	3	3	3	0	3	3	15 High

The result of the sensitivity assessment indicates that the wetland vegetation has High ecological sensitivity. The rest of the site has Low ecological sensitivity.

#### **4 National Environmental Screening Tool: Site sensitivity Verification**

National Environmental Screening Tool (DEA 2019) indicated the sensitivity of animal species and plant species (NEMA Government Gazette January 2020) and terrestrial biodiversity (NEMA Government Gazettes May 2019). To confirm or dispute these sensitivities values, they were evaluated against the current observations, real time field data and the analyses of this data from the site. The results obtained are the following:

- **Animal species - Medium:** This is **disputed** - it can rather be regarded as being low as the area contains only weedy vegetation on a filled area and an informal vegetable garden.
- **Plant species - Medium:** This is **disputed**. The plant species richness on the site can generally be regarded as **low**, and the above sensitivity analysis resulted in a low ecological sensitivity, mainly due to the disturbed nature of the vegetation, weedy on a filled area and a vegetable garden. No threatened plant species or species of conservation concern occur on the site.
- **Terrestrial Biodiversity - Very High:** The Very High Biodiversity sensitivity is **disputed**, it can rather be regarded as being low as the area contains only weedy vegetation on a filled area and an informal vegetable garden.

## 6. IMPACT ASSESSMENT

The development will take place on the existing infill on site, a portion of which is already used as an informal taxi rank. Two alternatives are assessed. For the preferred alternative the entire development and attenuation ponds are located outside the 30m wetland buffer. For the second alternative, majority of the development is located outside the wetland buffer, but the stormwater attenuation ponds are located inside the wetland buffer and construction will take place up to the edge of the wetland.

### 6.1 Methods

The methods and format of the impact tables used in this chapter are in accordance to the requirements of the 2014 Regulations.

- » The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **probability (P) of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » The **duration (D)**, wherein it will be indicated whether:
  - \* the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - \* the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - \* medium-term (5–15 years) – assigned a score of 3;
  - \* long term (> 15 years) - assigned a score of 4; or
  - \* permanent - assigned a score of 5;
- » The **extent (E)**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The **magnitude (M)**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on

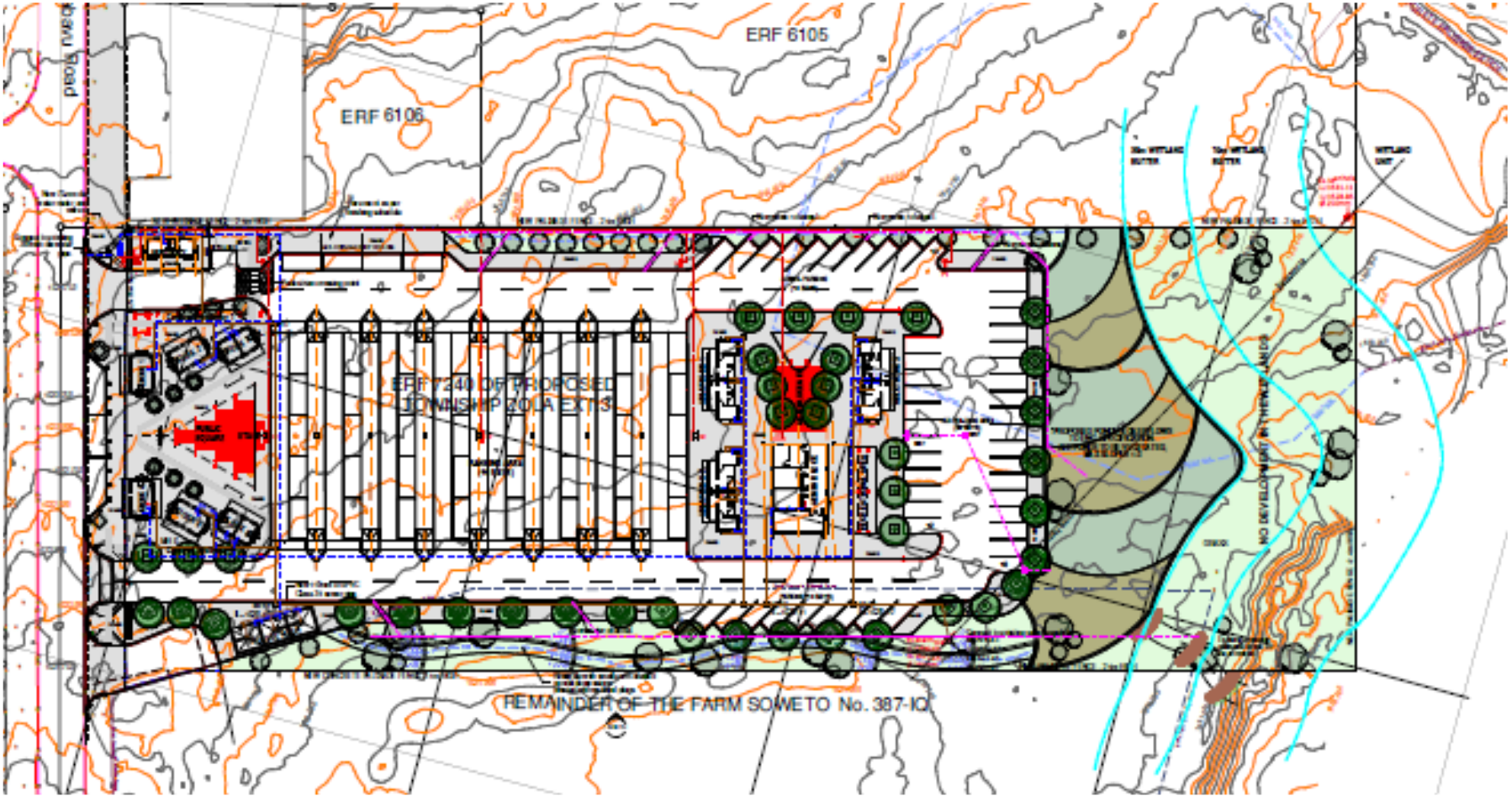


Figure 9: The preferred layout.



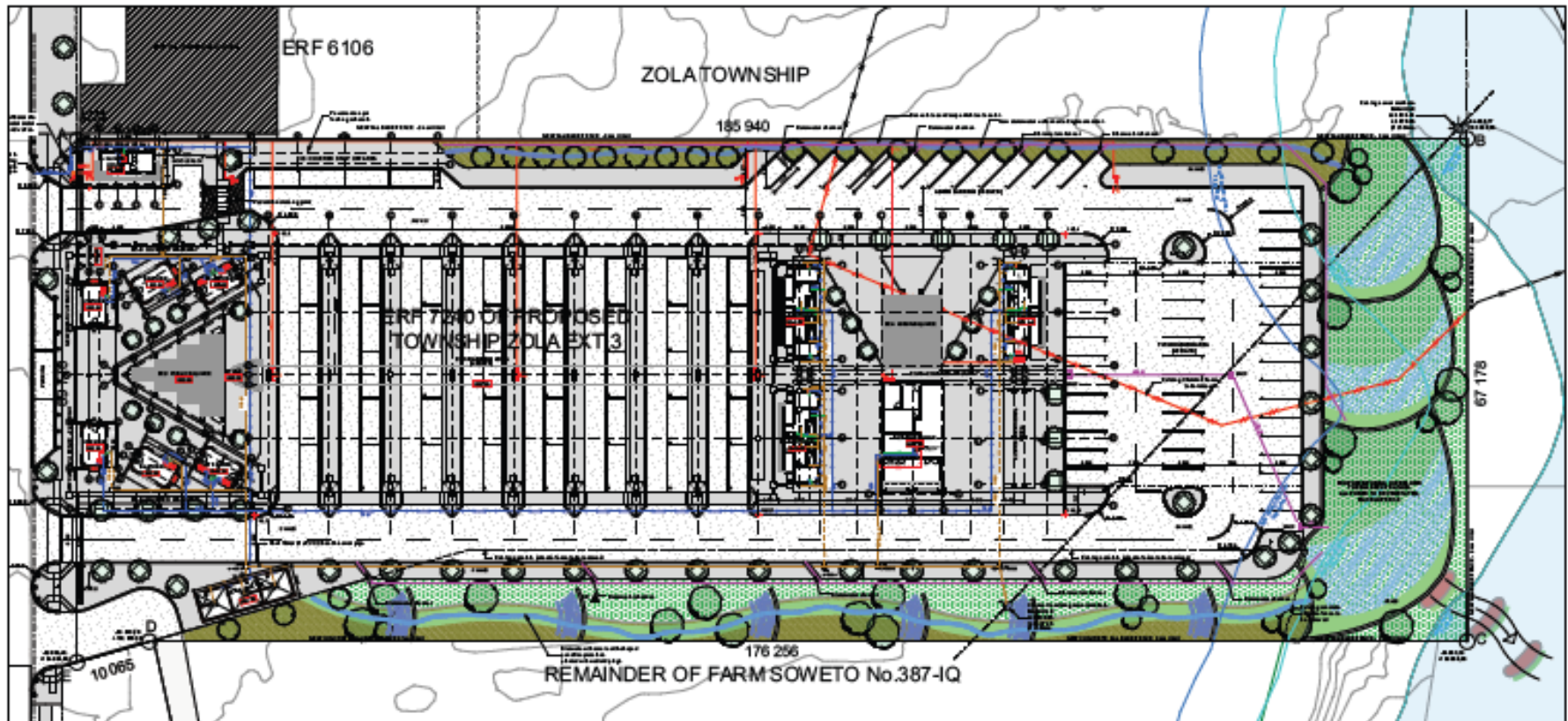


Figure 10: Alternative#1 layout



processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high

- » (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » the **significance (S)**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, moderate or high;
  - the significance rating is calculated by the following formula:

$$\mathbf{S \text{ (significance)} = (D + E + M) \times (P)}$$

- » the **status**, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.
- » the degree to which the impact may cause irreplaceable loss of resources.
- » the *degree* to which the impact can be *mitigated*.

The numerical value of the calculation is assigned to a significance category.

Table 10.1: Significance ranking of impacts

<b>SIGNIFICANCE</b>	<b>Very High</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>	<b>Minor</b>
	<b>80-100</b>	<b>60-79</b>	<b>40-59</b>	<b>20-39</b>	<b>1-19</b>

Impacts should be identified for the construction and operational phases of the proposed development. Proposed mitigation measures should be practical and feasible such that they can be realistically implemented by the applicant.

## 6.2 Results: Impacts on the terrestrial vegetation and flora

(for impacts on the wetland – see wetland report)

### 6.2.1 Impacts on natural terrestrial vegetation preferred alternative

<b>Nature:</b> The public transport facility will be constructed on totally transformed weed vegetation. The weed vegetation of the site will be destroyed. The impact on natural vegetation is therefore nullified.				
	<b>Without mitigation</b>		<b>With mitigation</b>	
<b>CONSTRUCTION PHASE</b>				
<b>Probability</b>	Definite	5	Definite	5
<b>Duration</b>	Short term	2	Short term	2
<b>Extent</b>	Local	1	Local	1
<b>Magnitude</b>	Low	0	Low	0
<b>Significance</b>	<b>Minor</b>	<b>15</b>	<b>Minor</b>	<b>15</b>
<b>Status (positive or negative)</b>	Negative		Negative	
<b>OPERATIONAL PHASE</b>				
<b>Probability</b>	Definite	5	Definite	5
<b>Duration</b>	Permanent	5	Permanent	5
<b>Extent</b>	Local	1	Local	1
<b>Magnitude</b>	Low	0	Low	0
<b>Significance</b>	<b>Low</b>	<b>30</b>	<b>Low</b>	<b>30</b>
<b>Status (positive or negative)</b>	Negative		Negative	
<b>Reversibility</b>	No		No	
<b>Irreplaceable loss of resources?</b>	No		No	
<b>Can impacts be mitigated?</b>	No			
<b>Mitigation:</b>				
<ul style="list-style-type: none"> <li>• There is no natural vegetation left on the site</li> <li>• Remove and control all alien woody plant species that may appear during construction and operational phases,</li> </ul>				
<b>Cumulative impacts:</b> Limited accumulative effects as Soweto areas are already developed.				
<b>Residual Risks:</b> None is anticipated provided that the mitigation measures are implemented correctly.				

The planned development will have no impact on natural terrestrial vegetation, as the total site is totally transformed.

### 6.2.2 Impacts on natural terrestrial vegetation alternative 2

<b>Nature:</b> The public transport facility will be constructed on totally transformed weed vegetation. The weed vegetation of the site will be destroyed. The impact on natural vegetation is therefore nullified.				
	<b>Without mitigation</b>		<b>With mitigation</b>	
<b>CONSTRUCTION PHASE</b>				
<b>Probability</b>	Definite	5	Definite	5
<b>Duration</b>	Short term	2	Short term	2
<b>Extent</b>	Local	1	Local	1
<b>Magnitude</b>	Low	0	Low	0
<b>Significance</b>	<b>Minor</b>	<b>15</b>	<b>Minor</b>	<b>15</b>
<b>Status (positive or negative)</b>	Negative		Negative	
<b>OPERATIONAL PHASE</b>				
<b>Probability</b>	Definite	5	Definite	5
<b>Duration</b>	Permanent	5	Permanent	5
<b>Extent</b>	Local	1	Local	1
<b>Magnitude</b>	Low	0	Low	0
<b>Significance</b>	<b>Low</b>	<b>30</b>	<b>Low</b>	<b>30</b>
<b>Status (positive or negative)</b>	Negative		Negative	
<b>Reversibility</b>	No		No	
<b>Irreplaceable loss of resources?</b>	No		No	
<b>Can impacts be mitigated?</b>	No			
<b>Mitigation:</b>				
<ul style="list-style-type: none"> <li>• There is no natural vegetation left on the site</li> <li>• Remove and control all alien woody plant species that may appear during construction and operational phases,</li> </ul>				
<b>Cumulative impacts:</b> Limited accumulative effects as Soweto areas are already developed.				
<b>Residual Risks:</b> None is anticipated provided that the mitigation measures are implemented correctly.				

The planned development will have no impact on natural terrestrial vegetation, as the total site is totally transformed.

It is clear that the impact of both alternatives on terrestrial vegetation is exactly the same, as the same transformed vegetation occur over the area of the development.

## **7. CONCLUSION**

The area on site where the development is planned is totally transformed area. The site is covered by deep infill and no natural terrestrial vegetation is left on this totally transformed site. Only weeds and an informal vegetable garden are present. This, together with low species richness and absence of threatened or protected plant species, low ecological sensitivity with low conservation value render the site as suitable for the proposed development.

Although the development of the proposed taxi rank will have no impact on natural terrestrial vegetation, the wetland will be somewhat affected. The results on the wetland assessment are given in a separate report.

## 8. REFERENCES

- Acocks, J.P.H. 1988. Veld types of South Africa, 3rd ed. *Memoirs of the Botanical Survey of South Africa*. 57: 1–146.
- Bredenkamp, G.J. & Brown, L.R. 2001. Vegetation – A reliable ecological basis for environmental planning. *Urban Greenfile Nov-Dec 2001*: 38-39.
- Bredenkamp, G.J. & Brown, L.R. 2003. A reappraisal of Acocks' Bankenveld: Origin and diversity of vegetation types. *South African Journal of Botany* 69(1): 7-26.
- Bredenkamp, G.J., Brown, L.R. & Pfab, M.F. 2007. Conservation value of the Egoli Granite Grassland, an endemic grassland in Gauteng, South Africa. *Koedoe* 49(2): 59-66.
- Bromilov, C. 2010. *Probleemplanten en Indringerkruiden van Suid Afrika*. Briza, Pretoria.
- CARA, 1983. *The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)*
- Department of Water Affairs and Forestry, 2005. *A practical field procedure for identification and delineation of wetlands and riparian areas*. Department of Water Affairs and Forestry. Pretoria. South Africa
- Gauteng Department of Agriculture and Rural Development. 2012. *GDARD requirements for biodiversity assessments. Version 2*.
- Gauteng Department of Agriculture, Conservation & Environment, 2009 *GDACE Minimum Requirements for Biodiversity Assessments Version 2*. Directorate Nature Conservation, Johannesburg.
- Government Notice Regulation 1182 and 1183 of 5 September 1997, as amended (ECA).
- Government Notice Regulation 385, 386 and 387 of 21 April 2006 (NEMA).
- Government Notice Regulation 392, 393, 394 and 396 of 4 May 2007 (NEMA).
- Government Notice Regulation 398 of 24 March 2004 (NEMA).
- Government Notice Regulation 544, 545 and 546 of 18 June 2010 (NEMA).
- Government Notice Regulation 598 of August 2014 (Alien and Invasive Species Regulations)
- Government Notice Regulation 982, 983, 984 and 985 of 4 December 2014 (NEMA).
- Low, A.B. & Rebelo, A.G. (eds) 1996. *Vegetation of South Africa, Lesotho and Swaziland*. Dept Environmental Affairs & Tourism, Pretoria.
- Mucina, L. & Rutherford, M.C. (Eds.) 2006. *The vegetation of South Africa, Lesotho and Swaziland*. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.
- Mueller-Dombois, D. & Ellenberg, H. 1974. *Aims and methods of vegetation ecology*. Wiley, New York.
- NEMA, 2014. *The National Environment Management Act, 1998 (Act No. 107 of 1998) and Regulations 982-985, Government Gazette 38282, December 2014, (EIA Regulations)*
- NEMBA, 2004 *The National Environmental Management Biodiversity Act, 2004. (Act 10 of 2004)*. Government Gazette RSA Vol. 467, 26436, Cape Town, June 2004.

- NEMBA, 2009. The National Environmental Management Biodiversity Act, 2004. (Act 10 of 2004). Draft List of Threatened Ecosystems. Government Gazette RSA Vol. 1477, 32689, Cape Town, 6 Nov 2009.
- NEMBA, 2014. The National Environmental Management Biodiversity Act, 2004. (Act 10 of 2004), and Regulation 598, Government Gazette 37885, August 2014)(Alien and Invasive Species Regulations).
- SANBI & DEAT. 2009. Threatened Ecosystems in South Africa: Descriptions and Maps. DRAFT for Comment. South African National Biodiversity Institute, Pretoria, South Africa.
- Westhoff, V. & Van der Maarel, E. 1978. The Braun-Blanquet approach. In: Whittaker, R.H. (ed.) Classification of plant communities. W. Junk, The Hague.
- NEMA, 2019. National Environment Management Act, 1998 (Act No. 107 of 1998). Protocols for the Assessment and Reporting of Environmental Impacts on terrestrial and aquatic biodiversity. Government Gazette 45421 Vol 648, 10 May 2019.
- NEMA, 2020. National Environment Management Act, 1998 (Act No. 107 of 1998). Protocols for the Assessment and Reporting of Environmental Impacts on terrestrial animals and plants. Government Gazette 42946 Vol 655, 10 January 2020.
- NEMA, 2020. National Environment Management Act, 1998 (Act No. 107 of 1998). Protocols for the Assessment and Reporting of Environmental Impacts on terrestrial and aquatic biodiversity. Government Gazette 43110 No 320, 20 March 2020.

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1963 Matriculation Certificate, Kemptonpark High School

1967 B.Sc. University of Pretoria, Botany and Zoology as majors,

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1969 T.H.E.D. (cum laude) Pretoria Teachers Training College.

1975 M.Sc. University of Pretoria, Plant Ecology .

1982 D.Sc. (Ph.D.) University of Pretoria, Plant Ecology.

**Theses:** (M.Sc. and D.Sc.) on plant community ecology and wildlife management in nature reserves in South African grassland and savanna.

### **Professional titles:**

- MSAIE South African Institute of Ecologists and Environmental Scientists
  - 1989-1990 Council member
- MGSSA Grassland Society of Southern Africa
  - 1986 Elected as Sub-editor for the Journal
  - 1986-1989 Serve on the Editorial Board of the Journal
  - - 1990 Organising Committee: International Conference: Meeting Rangeland challenges in Southern Africa
  - 1993 Elected as professional member
- PrSciNat. South African Council for Natural Scientific Professions **Registration Number 400086/83**
  - 1993-1997 **Chairman** of the Professional Advisory Committee: Botanical Sciences
  - 1993-1997: **Council Member**
  - 1992-1994: Publicity Committee

- 1994-1997: Professional Registration Committee

#### **Professional career:**

- Teacher in Biology 1970-1973 in Transvaal Schools
- Lecturer and senior lecturer in Botany 1974-1983 at University of the North
- Associate professor in Plant Ecology 1984-1988 at Potchefstroom University for CHE
- Professor in Plant Ecology 1988-2008 at University of Pretoria.
- 2009 – current Professor Extra-ordinary in the Dept of Plant Science, University of Pretoria
- • Founder and owner of the Professional Ecological Consultancy firms Ecotrust Environmental Services CC and Eco-Agent CC, 1988-present.

#### **Academic career:**

- Students:
  - Completed post graduate students: M.Sc. 53; Ph.D. 14.
  - Presently enrolled post-graduate students: M.Sc. 4; Ph.D. 2.
- Author of:
  - 175 scientific papers in refereed journals
  - >150 papers at national and international congresses
  - >250 scientific (unpublished) reports on environment and natural resources
  - 17 popular scientific papers.
  - 39 contributions in books
- Editorial Committee of
  - South African Journal of Botany,
  - Journal Grassland Society of Southern Africa,
  - Bulletin of the South African Institute of Ecologists.
  - Journal of Applied Vegetation Science.( Sweden)
  - Phytocoenologia (Germany)
  -
- FRD evaluation category: C2 (=leader in South Africa in the field of Vegetation Science/Plant Ecology)

#### **Membership:**

- International Association of Vegetation Science.
- British Ecological Society
- International Society for Ecology (Intecol)
- Association for the Taxonomic study of the Flora of Tropical Africa (AETFAT).
- South African Association of Botanists (SAAB)
  - 1988-1993 Elected to the **Council** of SAAB.
  - 1989-1990 Elected as **Chairman** of the Northern Transvaal Branch
  - 1990 Elected to the Executive Council as **Vice-President**
  - 1990- Sub-editor Editorial Board of the Journal
  - 1991-1992 Elected as **President** (2-year period)
  - 1993 **Vice-President** and Outgoing President



- Wildlife Management Society of Southern Africa
- Suid-Afrikaanse Akademie vir Wetenskap en Kuns  
(=South African Academy for Science and Art).
- Wildlife Society of Southern Africa
  - 1975 - 1988: Member
  - 1975 - 1983: Committee member, Pietersburg Centre
  - 1981 - 1982: **Chairman**, Pietersburg Centre
- Dendrological Society of Southern Africa
  - 1984 - present: Member
  - 1984 - 1988: Committee member, Western Transvaal Branch
  - 1986 - 1988: **Chairman**, Western Transvaal Branch
  - 1987 - 1989: Member, Central Committee (National level)
  - 1990 - 2000: Examination Committee
- Succulent Society of South Africa
  - 1987 - 2000
- Botanical Society of South Africa
  - 2000 – present: Member
  - 2001- 2008: Chairman, Pretoria Branch
  - 2002 – 2006: Chairman, Northern Region Conservation Committee
  - 2002- 2007: Member of Council

**Special committees:**

- Member of 10 special committees re ecology, botany, rangeland science in South Africa.
- Member of the International Code for Syntaxonomical Nomenclature 1993-present.

**Merit awards and research grants:**

- 1968 Post graduate merit bursary, CSIR, Pretoria.
- 1977-1979 Research Grant, Committee re Research Development, Dept. of Co-operation and Development, Pretoria.
- 1984-1989 Research Grant, Foundation for Research Development, CSIR, Pretoria.
- 1986-1987 Research Grant, Dept. of Agriculture and Water Supply, Potchefstroom.
- 1990-1997 Research Grant, Dept. of Environmental Affairs & Tourism, Pretoria.
- 1991-present Research Grant, National Research Foundation , Pretoria.
- 1991-1993 Research Grant, Water Research Commission.
- 1999-2003 Research Grant, Water Research Commission.
- 2006 South African Association of Botanists Silver Medal for outstanding contributions to South African Botany

**Abroad:**

- 1986 Travel Grant, Potchefstroom University for Christian Higher Education, Potchefstroom  
Visits to Israel, Italy, Germany, United Kingdom, Portugal.
- 1987 Travel Grant, Potchefstroom University for Christian Higher Education, Potchefstroom.  
Visits to Germany, Switzerland, Austria, The Netherlands, United Kingdom.
- 1990 Travel Grant, FRD.  
Visit to Japan, Taiwan, Hong-Kong.

- 1991 Travel Grant, FRD.  
Visits to Italy, Germany. Switzerland, Austria, France, The Netherlands, United Kingdom.
- 1993 Travel Grant, University of Pretoria.  
Visits to the USA, Costa Rica, Czech Republic, Austria.
- 1994 Travel Grant FRD.  
Visits to Switzerland, The Netherlands, Germany, Czech Republic.
- 1995 Travel Grant FRD, University of Pretoria  
Visits to the USA
- 1996 Travel Grant, University of Pretoria  
Visit to the UK.
- 1997 Travel Grant University of Pretoria, Visit Czech Republic, Bulgaria
- 1998 Travel Grant, University of Pretoria, Visit Czech Republic, Italy, Sweden
- 1999 Travel Grant, University of Pretoria, Visit Hungary, Spain, USA
- 2000 Travel Grant, University of Pretoria, Visit Poland, Italy, Greece.
- 2001 Travel Grant, NRF, Visit Brazil
- 2006 German Grant Invited lecture in Rinteln, Germany

### **Consultant**

Founder and owner of Ecotrust Environmental Services CC and Eco-Agent CC  
Since 1988 >**250** reports as consultant on environmental matters, including:

- Game Farm and Nature Reserve planning,
- Environmental Impact Assessments,
- Environmental Management Programme Reports,
- Vegetation Surveys,
- Wildlife Management,
- Veld Condition and Grazing Capacity Assessments,
- Red data analysis (plants and animals).

## ABRIDGED CURRICULUM VITAE: CATHARINA E VENTER

Name: **Catharina Elizabeth Venter** trading as Kyllinga Consulting  
Position: Senior Ecologist and Wetland Scientist  
Date of Birth: 29 December 1979  
Nationality: South African  
Languages: Afrikaans, English

### EDUCATIONAL QUALIFICATIONS

- M.Sc (Botany), University of Pretoria (2003)
- B.Sc Hons (Botany), University of Pretoria (2001)
- B.Sc (Environmental Sciences), University of Pretoria (2000). Majored in Geography and Botany
- Matriculated, Sasolburg High School (1997)

#### Additional

- Introduction to ArcGIS 1 (2006)
- Bringing your data into ArcGIS (2006)
- Introduction to ArcView 3.x (2003).

### FIELDS OF EXPERTISE

- **Ecological Assessment:**  
Ecological Assessments as part of the Environmental Impact Assessment Process
- **Wetland Assessment:**  
Wetland Assessments as part of the Environmental Impact Assessment Process and Water Use Applications, as well as rehabilitation plans for wetlands, including planning or the Working for Wetlands programme. Large scale wetland assessments (catchment scale).
- **GIS:**  
Compilation of maps for submission as part of Environmental Impact Assessment Process. Creating spatial databases and large scale wetland maps (catchment scale). Projection conversions and matching/overlying different format GIS maps.
- **Environmental Impact Assessment**  
Undertaken numerous Environmental Scoping Reports, as required by the Environment Conservation Act, 1989 (Act 73 of 1989), the National Environmental Management Act, 1998 (Act 107 of 1998), as amended and the Development Facilitation Act, 1995 (Act 67 of 1995). Project experience includes the establishment of various housing typologies, golf courses, commercial and industrial projects, infrastructure development (roads), resorts and/or game lodges as well as filling stations.
- **Public Participation:**  
Undertaken numerous public participation processes, ranging from basic to extensive, as required by relevant environmental legislation.

### MEMBERSHIP IN PROFESSIONAL SOCIETIES

- Professional Natural Scientist (Pr.Sci.Nat) in the field of Botanical Science (Reg no. 400048/08)
- Member of the Botanical Society of South Africa

### EMPLOYMENT HISTORY EXPERIENCE

#### **Kyllinga Consulting (July 2015 - present)**

Senior Ecologist responsible for wetland and ecological specialist assessments.

#### **Spatial Ecological Consulting (February 2010 – June 2015)**

Senior Ecologist responsible for wetland and ecological specialist assessments.

- Wetland Related Assessments  
More than 40 wetland assessments conducted between 2010 and 2015.
- Vegetation Assessments  
Approximately 16 vegetation assessments between 2010 and 2015.
- Management Plans  
Completed two ecological management plans.

**MSA Group Services (previously Exigent Environmental CC) (August 2004 – January 2010)**

Environmental Scientist responsible for ecological and wetland assessments and the compilation of maps. Also conducted various scoping and EIA applications and EMPRs.

- Ecological Assessments  
In excess of 50 ecological assessments conducted between 2004 and 2010, including managing the inclusion of the fauna specialist assessments.
- Wetland Assessments  
More than 60 wetland verification projects, wetland delineations and wetland assessments, completed between 2004 and 2010.
- As well as:  
Rehabilitation Projects; Fatal Flaw / Screening Assessments; National Department of Agriculture Authorisations; Mining Related Assessments; Private, Public Partnership Projects; Resource Management Plans (RMP); Environmental Management Plans; Environmental Management Programme; Environmental Exemption Processes; Basic Assessments; Environmental Impact Assessments

**Part-time employment (2002-2004)**

Tutor for botany practicals; Assisting Wildlife management students with Braun-Blanquette analysis; Researcher for a project on the vegetation communities and ecology of the Kruger National Park; Research assistant for the analysis of street trees in Tshwane urban forest; Various part time projects related to vegetation and wetlands

**COUNTRIES OF WORK EXPERIENCE**

- South Africa
- Lesotho
- Botswana
- Mozambique

**PAPERS AND PUBLICATIONS**

Co-author and data contributor to: SIEBEN, E. *et al.* The vegetation of inland wetlands with salt-tolerant vegetation in South Africa: description, classification and explanatory environmental factors, submitted to the South African Journal of Botany for review in Feb 2015.

Co-author and data contributor to: SIEBEN, E. *et al.* The herbaceous vegetation of subtropical freshwater wetlands in South Africa: description, classification and explanatory environmental factors, submitted to the South African Journal of Botany for review in Feb 2015.

Co-author and data contributor to: SIEBEN, E. *et al.* The vegetation of grass lawn wetlands of floodplains and pans in semi-arid regions of South Africa: description, classification and explanatory environmental factors, submitted to the South African Journal of Botany for review in Jan 2015.

Co-author of several vegetation descriptions in: MUCINA, L. & RUTHERFORD, M.C. (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

VENTER, C.E. & BREDEKAMP, G.J. In prep. Major plant communities on the Mfabeni swamp, St Lucia. *Bothalia*.

VENTER, C.E.; BREDEKAMP, G.J. & GRUNDLING, P-L. 2003. Plant community types, and their association with habitat factors as ecosystem driving forces, of Mfabeni swamp. Proceedings of the congress: *Environment of the St Lucia Wetland: Processes of Change*, Cape Vidal, September 4<sup>th</sup>- 7<sup>th</sup>, 2003.

VENTER, C.E.; BREDEKAMP, G.J.; GRUNDLING P-L. 2002. Vegetation change on rehabilitated peatland on Rietvlei Nature Reserve. *Kudu* 46(1):53-63.

#### **PRESENTATIONS**

Venter, C.E.; Bredenkamp, G.J. & Grundling, P-L. 2003. Plant community types, and their association with habitat factors as ecosystem driving forces, of Mfabeni Swamp. *Environment of the St Lucia Wetland: Processes of Change*, Cape Vidal, September 4<sup>th</sup>- 7<sup>th</sup>, 2003.

#### **Poster Presentations**

Venter, C.E.; Bredenkamp, G.J.; Grundling P-L. 2002. Baseline vegetation surveys of rehabilitated peatland on Rietvlei Nature Reserve. SAAB Convergence. Grahamstown.

Venter, C.E.; Bredenkamp, G.J.; Grundling P-L. 2003. Vegetation change on rehabilitated peatland on Rietvlei Nature Reserve. SAAB Convergence. Pretoria.

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