



**A screening of the vegetation and faunal habitats on  
Portions of the farm Waterval 150 IR, Meyerton,  
Gauteng**

August 2015

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Portions of the farm Waterval 150 IR, Meyerton,  
Gauteng**

Commissioned by

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## DECLARATION OF INDEPENDENCE

I, George Johannes Bredenkamp, Id 4602105019086, declare that I:

- Hold a DSc in biological sciences, am registered with SACNASP (Reg No 400086/83) as a professional ecological scientist which sanctions me to function independently as a specialist consultant
- Declare that, as per prerequisites of the Natural Scientific Professions Act No. 27 of 2003, this project was my work from its inception, reflects exclusively my observations and unbiased scientific interpretations, and was executed to the best of my ability
- abide by the Code of Ethics of the SACNASP
- Am the owner of Eco-Agent CC, CK 95/37116/23
- Act as an independent specialist consultant in the field of ecology, vegetation science, botany and wetlands
- Am committed to biodiversity conservation but concomitantly recognize the need for economic development
- Am appointed as specialist consultant by Eon Consulting for the proposed project “A screening of the vegetation and faunal habitats on Portions of the farm Waterval 150 IR, Meyerton, Gauteng” 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 my 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, I recognise that written consent from the client(s) will be required for me to release any part of this report to third parties.



GJ Bredenkamp

## **SUMMARY**

A screening for vegetation and faunal habitats was done for a site located on Portions of the Farm Waterval 150IR. Although this assignment is basically in accordance with the EIA Regulations [(No. R982-985, Department of Environmental Affairs and Tourism, 4 December 2014), it should be emphasized that the field survey was done during the winter (August 2015), and is therefore considered as an ecological screening only, and does not contain a detailed biodiversity assessment. Although plant communities could be mapped, and ecological sensitivity assigned to the plant communities, no detailed plant or faunal species survey could be done.

Seven plant communities (mapping units) were identified.

The vegetation of most of the site is degraded / transformed, with low plant species richness and with no red data plant species present, and development can be supported. However, the Klip River and associated flood plain wetland vegetation represent sensitive ecosystems, protected by legislation (National Water Act (NWA), Act 36 of 1998, National Environmental Management Act (NEMA), Act 107 of 1998, Government Notice Regulation 982, 983, 984 and 985 of 4 December 2014 (NEMA) and regulation (GDARD 2014) and this area, including the 32 m buffer zone, should be conserved. This implies that the entire area east of the currently maize cultivated area should be conserved.

No detailed field survey was done of the fauna of the site, though the suitability of the faunal habitats was assessed. Data of previous faunal surveys on or in the vicinity of the site were used. It is concluded that the proposed development will have a low impact on possible fauna species that could occur on the site.

It is suggested that the proposed development can be supported.



## 1. ASSIGNMENT

EcoAgent CC Ecology and Biodiversity Consultants was appointed by Eon Consulting to undertake an independent assessment of the vegetation and flora of Portions of the Farm Waterval 150IR, Meyerton, Gauteng.

In accordance with The Natural Scientific Professions Act (Act 27 of 2003) only a person registered with the South African Council for Natural Scientific Professions may practice in a consulting capacity. Prof GJ Bredenkamp, registered as an Ecological Scientist, (SACNASP Reg No 400086/83) undertook an independent assessment of the vegetation and wetlands on the site. A field survey was conducted during August 2015.

Although this assignment is basically 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], it should be emphasized that the field survey was done during the winter (August 2015), and is therefore considered as an ecological screening only, and does not contain a detailed biodiversity assessment (GDARD 2014). Although plant communities could be mapped, and ecological sensitivity assigned to the plant communities, no detailed plant or faunal species survey could be done. Information from reports on part of the property (Enviroguard Ecological services 2007 and Cook 2007, for Seaton Thomson & Associates), was used in this current report.

The assignment is interpreted as follows:

- Do an ecological screening of the vegetation of the relevant site, classify and map the vegetation and assess the ecological sensitivity of the plant communities on the site;
- Assess the suitability of the ecosystems identified, for faunal species;
- Detailed assessment of the flora and fauna in terms of NEMA, NEMBA and other relevant legislation could not be done due to the relevant minimum requirements of GDARD (2014) in terms of seasonality.

The field survey was done in August 2015, during the winter months. However, it was expected that the vegetation on most of the site would be totally degraded, rather transformed, as most of the area was previously ploughed, or intensively utilised, or is currently used for maize production. Should the vegetation be in a fair condition and the plant species composition indicate a fair species richness and possibility of presence of species of conservation concern, this would be a serious limitation for the winter survey and a summer survey would be necessary.

Authoritative legislation that lists impacts and activities on biodiversity and wetlands and riparian areas that requires authorisation includes (Armstrong, 2009):

- National Environmental Management Act, 1998 (Act No. 107 of 1998);
- National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- 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).

In summary:

- Vegetation, Flora and ecosystems are protected by National Environmental Management Act, 1998 (Act No. 107 of 1998) and the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- Wetlands and other watercourses are protected water resources in the National Water Act (NWA), Act 36 of 1998.



- Development or transformation of a watercourse is regarded as a water use, which can only be allowed through an approved Water Use License, irrespective of the condition of the affected watercourse.
- The NWA defines water use in a watercourse specifically related to wetlands and riparian areas as broad impacts that include the following:
  - impeding or diverting the flow of water in a watercourse (Section 21 c); and
  - altering the bed, banks, course or characteristics of a watercourse (Section 21 i);
- A recent DWA stipulation published in Government Gazette No 32805 on 18 December 2009 also require that a Water Use License should be applied for when any wetlands are present within a 500 m radius of water use activities as defined by section 21 (c) and section 21 (i) of the NWA.
- Wetlands are also protected in other environmental legislation, such as the National Environmental Management Act (NEMA), Act 107 of 1998. The act lists several activities that require authorisation before they can be implemented.
- NEMA lists various activities that require authorisation, when the activity is located within 32 m or less from the edge of a wetland or other watercourse.

In order to evaluate the vegetation of the site, it is necessary to make an inventory of the ecosystems (plant communities) on the site. This inventory should then serve as a scientific and ecological basis for the planning exercises.

**1. Initial preparations:**

- Obtain all relevant maps, aerial photographs and information on the natural environment of the concerned area. This includes a red data species list for the Flora.

**2. Vegetation and habitat survey: In each vegetation type / plant community on site:**

- Determine relatively homogeneous potential ecological units / plant communities / ecosystems on aerial photographs.
- As far as feasible during a winter survey, list the plant species (trees, shrubs, grasses and herbaceous species of special interest) present in each ecological unit.



- Identify **potential** red data plant species, protected plant species, possible encroacher species and exotic plant species that are or could be present on the site.

### 3. Plant community delimitation and description

- Prepare a vegetation map of the area if more than one plant community is present.
- Prepare an ecosystem sensitivity map for the planning of the development.
- Describe the habitat and vegetation as far as feasible

### 4. General

- Identify and describe ecologically sensitive areas.
- Identify problem areas in need of special treatment or management, e.g. bush encroachment, erosion, degraded areas, reclamation areas.
- Make recommendations on aspects that should be monitored during development.

## 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 (NEMBA). (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 and wetland habitats, it is necessary to make an inventory of the ecosystems on the site. This inventory should then serve as a scientific and ecological basis for the planning exercises.

### **3. STUDY AREA**

#### **3.1 Location**

The site is located on Portions of the Farm Waterval 150IR, situated on both sides of the R59 and the railway line (Figures 1 & 2) and both sides of the Vereeniging Road, stretching to the Klip River that form the eastern boundary of the site. However, the area currently proposed for the development is located between the R59 (and the railway line) and the Vereeniging Road, at least 500 m west of the Klip River. The site falls within the Midvaal Local Municipality and Emfuleni Local Municipality.

The following applies:

- The site does not fall within a conservancy.
- The site does not fall within a protected area.
- The Klip River and associated flood plains form the eastern boundary of the site
- No natural ridges occur on the site.

#### **3.2 Physical Environment**

##### **Regional climate**

The site falls in the summer rainfall region (annual mean 660 mm) with daily and seasonal temperature extremes, including winter frost and hot summer days.

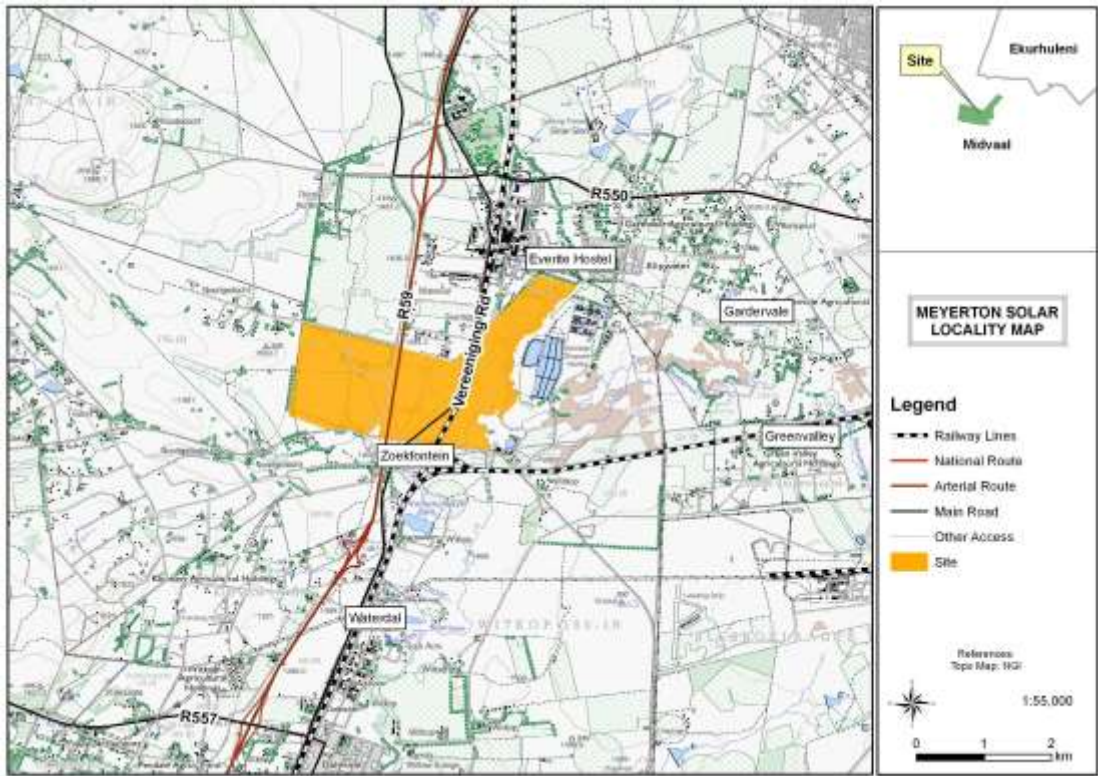


Figure 1: The locality of the site



Figure 2: The specific locality of the site on an aerial photo.



## **Topography and drainage**

The site is located on a flat plain. The Klip River is present about 500+ m east of the site.

## **Land-use**

Land use in the general broader area is agriculture, with some industrial and residential developments also present (Figure 2).

## **Vegetation Types**

The site is situated in Bankenveld, as described by Acocks (1988). Low & Rebelo (1996) described the vegetation of the area as Rocky Highveld Grassland. In the new vegetation map of South Africa (Mucina & Rutherford 2006) the area falls within the Carleton Dolomite Grassland (Gh 15, Mucina & Rutherford 2006).

Most of the site is old field or current agriculture (Figure 2). Some of these old fields are quite old, currently covered with secondary grassland containing many pioneer and early successional plant species. The only remaining significant natural vegetation area is the Klip River area and adjacent flood plain areas. There is, however, no plan to develop within or close to the River or the flood plain wetlands.

## **4. METHODS**

### **4.1 Vegetation and Flora**

The site was visited during August 2015 by Prof GJ Bredenkamp. The vegetation was dormant and in winter condition.

The various plant communities (ecosystems) present on the site were delineated on an aerial image (Google Earth June 2015). Each of these units were visited and an assessment made of its vegetation and ecological sensitivity. The dominant plant species were noted. Total floristic composition (Mueller-Dombois & Ellenberg 1974; Westhoff & Van der Maarel 1978) could not be assessed, due to the dormant, winter vegetation (GDARD 2014). Notes were additionally made of any other features that might have an ecological influence.



The identified systems were evaluated in terms of the potential habitat for red data plant species.

A Red data plant species list for the area was obtained from the SANBI data bases, with updated threatened status, (Raimondo *et al* 2009). This list was 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.

Medicinal plants are indicated according to Van Wyk, Van Oudthoorn & Gericke (1997).

The field observations were supplemented by literature studies from the area (Bredenkamp & Brown 2003, Grobler *et al.* 2006).

#### **4.2 Conservation Priority**

**High:** Area with high plant species richness; presence of viable populations of red data plant species or suitable habitat for such species; presence of or potential habitat for red data faunal species, represent a particular special habitat; high connectivity to other natural areas; less than 5% pioneer weedy or alien woody plant species present. These areas are ecologically valuable and important for ecosystem functioning. This land should be conserved and development should generally not be supported.

**Medium-high:** An area with moderately high plant species richness, a relatively natural species composition; not a threatened or unique ecosystem; moderate species and habitat diversity; between 5-20% pioneer/alien plant species present; that would need moderate to major financial input to rehabilitate to an improved condition; and where low density development could be considered under exceptional conditions with limited impact on the vegetation / ecosystem. It is recommended that certain sections of the vegetation are maintained.



**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.

**Low-medium:** Area with relatively natural vegetation, though a common vegetation type; moderate to low species and habitat diversity; previously or currently degraded or in secondary successional phase; between 20-50% pioneer and/or alien plant species; low ecosystem functioning; low rehabilitation potential.

**Low:** A totally degraded and transformed area with a low habitat diversity and ecosystem functioning; no viable populations of indigenous plants; >50% pioneer and/or alien plant species present; very low habitat uniqueness; whose recovery potential is extremely low; and on which development could be supported with little to no impact on the natural vegetation / ecosystem.

### 4.3 Sensitivity

According to the GDARD minimum requirement only High and Low sensitivity must be indicated. No development will be allowed on High sensitive areas.

In terms of sensitivity the following criteria applies:

**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.

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

P = Protected trees species

D = Dominant

p = provincially protected species

d = subdominant

RD = Red data listed plant

G = Garden or Garden Escape

W = weed

M = Medicinal plant species



#### 4.4 Fauna

No detailed field survey of the fauna of the site was done, though the suitability of the faunal habitats was briefly assessed during the field survey of the vegetation and ecosystems. Although plant communities could be mapped, faunal habitats assessed and ecological sensitivity assigned to the plant communities, no detailed plant or faunal species survey could be done, due to the winter season (GDARD 2014). Information from reports on part of the property (Enviroguard Ecological services 2007 and Cook 2007, for Seaton Thomson & Associates), was used in this current report.

The probability of occurrences of **fauna** species was based on their respective geographical distributional ranges and the suitability of on-site habitats:

- **High probability** would be applicable to a species with a distributional range overlying the study site as well as the presence of prime habitat occurring on the study site. Another consideration for inclusion in this category is the inclination of a species to be common, i.e. normally occurring at high population densities.
- **Medium probability** pertains to a mammal species with its distributional range peripherally overlapping the study site, or required habitat on the site being sub-optimal. The size of the site as it relates to its likelihood to sustain a viable breeding population, as well as its geographical isolation is also taken into consideration. Species categorized as *medium* normally do not occur at high population numbers, but cannot be deemed as rare.
- **Low probability** of occurrence will mean that the species' distributional range is peripheral to the study site and habitat is sub-optimal. Furthermore, some mammals categorized as *low* are generally deemed to be rare.

#### Limitations

- The visit was made in winter, after Palaearctic and intra-African migrant bird species had departed.
- During this period herpetofauna are hibernating and mostly inactive.





## 5. RESULTS: VEGETATION AND FLORA

### 5.1 Vegetation Classification

Seven mapping units were identified (Figure 3):

Mapping Unit	Sensitivity
1. Informal settlements	Low
2. Highly disturbed and alien vegetation	Low
3. Old Fields	Low
4. Current agriculture	Low
5. Degraded Grassland	Low
6. Klip River	High
7. Riparian zone and adjacent wetland mosaic	High

Most of the vegetation (mapping units 1-5) is highly disturbed / totally transformed, with no primary vegetation present. The Klip River and its flood plain wetlands (mapping units 6 & 7) consist of natural indigenous vegetation and are regarded to have a high ecological sensitivity.

#### Mapping Unit 1: Informal settlements

These are areas with many informal (or formal) residential houses (Figure 3) and many people are living here. The vegetation is totally destroyed and these areas have no (nature) conservation value and have a low sensitivity.

#### Mapping Unit 2: Highly disturbed and alien vegetation

Alien vegetation occurs in patches scattered over the site (Figure 3):

- On the southern boundary is an old quarrie, with alien trees e.g. *Acacia mearnsii* and the herbaceous vegetation is mostly weeds.
- On the western boundary is an alley of *Eucalyptus*
- On both sides of the Vereeniging Road is highly disturbed vegetation
- Small patches of transformed vegetation with scattered individuals of *Eucalyptus* and further dominated by the grass species *Eragrostis curvula* and *Cynodon dactylon* and the weeds *Tagetes minuta* and *Bidens* sp occur scattered over the

central parts of the site (between the R59 and Vereeniging Road). On parts of the site some invasive shrubs of *Asparagus larycinus* are prominent.

These areas have no (nature) conservation value and have a low sensitivity.

### Mapping unit 3: Old Fields

The vegetation of large western part of the site is secondary. This vegetation developed on old agricultural fields. Some of these old fields are quite old, dominated by *Hyparrhenia hirta*, *Eragrostis curvula* and *Cynodon dactylon*, with several weedy species still present.

The following plant species were recorded from this plant community:

#### Trees and Shrubs

*Asparagus larycinus*

*Stoebe vulgaris*

#### Grasses

*Aristida congesta*

W

*Hyparrhenia hirta*

*Cynodon dactylon*

Wd

*Themeda triandra*

*Eragrostis curvula*

d

#### Forbs

*Conyza bonariensis*

W

*Pseudognaphaleum lutea-album* MW

*Felicia muricata*

M

*Schkuhria pinnata* MW

*Guilleminea densa*

W

*Tagetes minuta* MW

*Pentarrhinum insipidum*

WM

*Solanum incanum* W

### Mapping unit 4: Current agriculture

The area between the Vereeniging Road and the Klip River is currently used for agriculture (maize production)(Figure 3). This area has no plant species of interest, the conservation value and ecological sensitivity are both regarded as being low.

### Mapping unit 5: Degraded grassland

An area with degraded grassland occurs west of the R59.



The vegetation is dominated by the anthropogenic grass *Hyparrhenia hirta*, while the forbs *Conyza bonariensis* and *Bidens* sp are prominent locally. Other species present include the grasses *Trachypogon spicatus*, *Elionurus muticus*, *Brachiaria serrata* and the forb. *Rhynchosia totta*.

The following plant species were recorded from this plant community:

#### Trees and Shrubs

*Asparagus laricinus*

*Stoebe vulgaris*

#### Grasses

*Aristida congesta* W

*Eragrostis curvula* d

*Brachiaria serrata*

*Hyparrhenia hirta* D

*Cynodon dactylon* Wd

*Themeda triandra*

*Elionurus muticus*

*Trachypogon spicatus*

#### Forbs

*Bidens* sp

*Pseudognaphaleum lutea-album* MW

*Conyza bonariensis* W

*Rhynchosia totta*

*Felicia muricata* M

*Tagetes minuta* MW

*Pentarrhinum insipidum* WM

*Solanum incanum* W

This vegetation unit degraded due to previous agricultural practices and the current influence of humans on the area (roads, foot paths, grazing). The area has a low species richness and ecosystem functioning. The area is regarded as having a low conservation value and ecological sensitivity.

#### Mapping Unit 6: Klip River

The Klip River forms the eastern boundary of the site (Figure 3). Grassland and/or flood plain wetland occur up to the edge of the River. No specific survey was done of the River as no development is planned within 500 m of the River edge. All river systems within South Africa are regarded as ecologically sensitive (Figure 4).



### **Mapping Unit 7: Riparian zone and adjacent wetland mosaic**

This flood plain wetland is located along the Klip River (Figure 3). No specific survey was done of the River as no development is planned within 500 m of the wetland edge. All wetland systems within South Africa are regarded as ecologically sensitive (Figure 4).



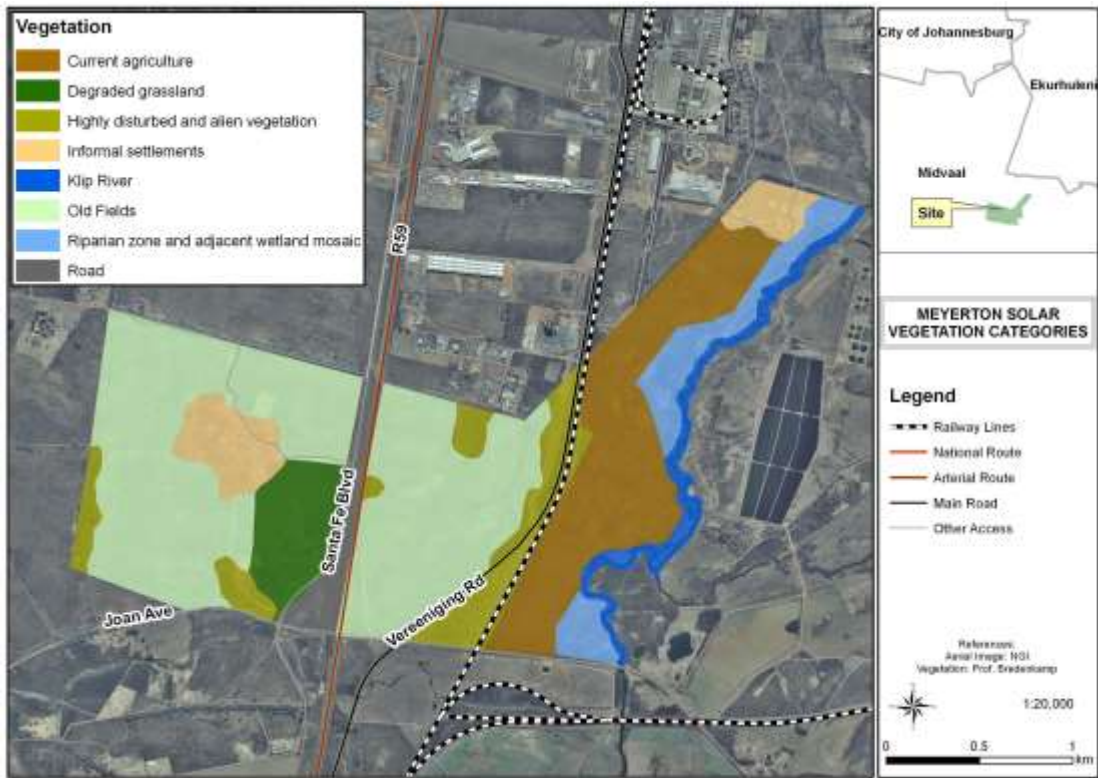


Figure 3: A vegetation map of the site

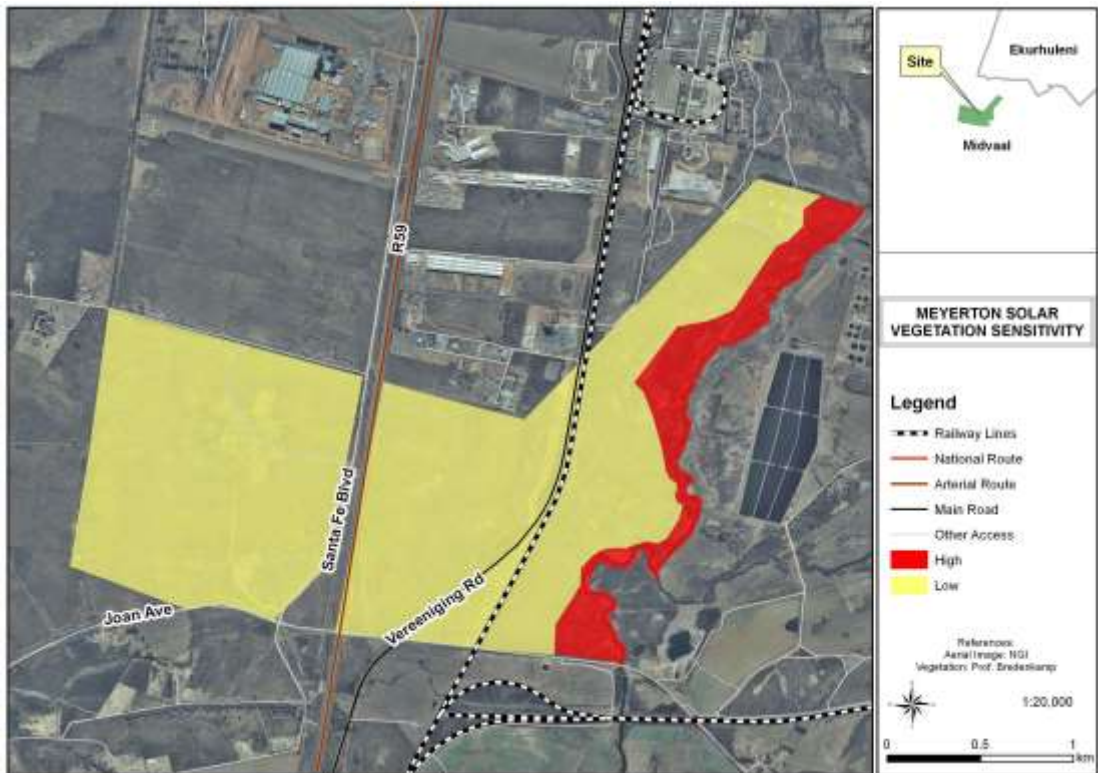


Figure 4: A sensitivity map of the site.





Figure 5: The Transformed Grassland vegetation on the site

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

A Threatened species and Species of Conservation Concern list for the Grid 2628AC was obtained from the POSA database on the SANBI website. Threatened species are those that are facing high risk of extinction, indicated by the categories Critically Endangered, Endangered and Vulnerable. Species of Conservation Concern include the Threatened Species, but additionally have the categories Near Threatened, Data

Deficient, Critically Rare, Rare and Declining. This is in accordance with the new Red List for South African Plants (Raimondo *et al.* 2009).

The following species of conservation concern were previously recorded from the Grid 2628AC (SANBI, POSA website):

Family	Species	Status	Habitat on site
Apocynaceae	<i>Stenostelma umbelluliferum</i> (Schltr.) S.P.Bester & Nicholas	NT	No
Asphodelaceae	<i>Trachyandra erythrorrhiza</i> (Conrath) Oberm.	NT	No
Mesembryanthemaceae	<i>Lithops lesliei</i> (N.E.Br.) N.E.Br. subsp. <i>lesliei</i>	NT	No
Orchidaceae	<i>Habenaria bicolor</i> Conrath & Kraenzl.	NT	No
Asteraceae	<i>Cineraria longipes</i> S.Moore	VU	No
Apiaceae	<i>Alepidea peduncularis</i> A.Rich.	DDT	No

The habitat at this site (excluding the Klip River flood plain wetland) is not suitable for any of these species, as it is too degraded and totally transformed

No NEMBA plant species or Nationally protected trees occur on the area.

### 5.3 Medicinal plants

According to the description provided in Van Wyk, Van Oudthoorn & Gericke (1997), and Pooley (1998) medicinal plants found on the site are the following:

*Felicia muricata*

*Schkuhria pinnata*

*Pentarrhinum insipidum*

*Tagetes minuta*

*Pseudognaphaleum lutea-album*

### 5.4 Woody Alien species

The only woody alien species that occurs on the site are *Acacia mearnsii* and *Eucalyptus*, occurring scattered over the site (Figure 3). Any woody alien species should be removed and controlled (The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). Some annual weeds do occur on the site, these are listed in the description of the plant communities.

## 5.6 Conclusion

The vegetation of most of the site is degraded / transformed, with low plant species richness and with no red data plant species present, and development can be supported.

However, the Klip River and associated flood plain wetland vegetation represent sensitive ecosystems, protected by legislation (National Water Act (NWA), Act 36 of 1998, National Environmental Management Act (NEMA), Act 107 of 1998, Government Notice Regulation 982, 983, 984 and 985 of 4 December 2014 (NEMA) and regulation (GDARD 2014) and this area, including the 32 m buffer zone, should be conserved. This implies that the entire area east of the currently maize cultivated area should be conserved.





## 6. FAUNA

The current report does not include a detailed field survey of the vertebrate fauna, however based on the vegetation survey and ecosystem assessment, faunal habitats were assessed. The following account is based on the reports of Cook (2007) from a the study site and areas adjacent to the site, and also of EcoAgent (2012) from a close by site in the Meyerton area. The Klip River and associated flood plain wetland was not investigated in detail, as this area is excluded from the proposed development site and the footprint of the development is at least 500 m from the wetland edge.

### 6.1 Amphibia

EcoAgent (2012) reported that 15 amphibia species could occur within the area of the site. Frog species recorded by Cook (2007) from the site included Tremelo Sand Frog (*Tomopterna cryptotis*) Guttural Toads (*Bufo gutturalis* = *Amietaophrynus gutturalis*) and Red Toad (*Schismaderma carens*).

No breeding activity was recorded on the site. All frog specie recorded on the site are common and widespread throughout the Gauteng Province. Remaining flood plain wetland habitats along the Klip River generally represent good frog habitat.

#### Threatened species

The Giant Bullfrog (*Pyxicephalus adspersus*) is a NEMBA protected frog species whose conservation status has been revised to Lower Risk. Giant Bullfrogs would have historically occurred on the site. Due to extensive agricultural activities on and immediately surrounding the site the majority of grassland habitat has been totally transformed into current or fallow weed invaded old lands.

No Giant Bullfrogs were observed on the site or in the immediate areas surrounding the site.

No suitable breeding habitats occur on or immediately surrounding the site, as bullfrog breed in shallow temporary pools, and not in rivers or streams. There is

extremely limited foraging potential due to extensive habitat transformation (weed invaded old lands). The R59 and other roads form a road network with high volumes of traffic both during the day and at night and can be considered a migratory barrier for the majority of animal species including Giant Bullfrog.

No Giant bullfrogs are expected from the site or immediate areas surrounding the site. It is therefore considered the study area contains limited suitable foraging and migratory habitat of low conservation importance, and no suitable breeding habitat for Bullfrogs.

Destruction of the habitat provided by the study area will have an impact of low significance on the conservation status of amphibian in general within a local (Waterval) scale and a low significance within Gauteng.

## 6.2 Reptiles

Cook (2007) did not record any reptile species from the site. He mentioned that Indiscriminate killing of snake species during previous agricultural activities is likely to have resulted in the disappearance of the larger and the more sluggish snake species within the area. No threatened reptile species were recorded during this survey, but the Striped Harlequin Snake (*Homoroselaps dorsalis*), which is categorised as Rare in the Red Data List (Branch 1988) has been recorded from adjacent grid square to the east (Suikerbosrand). EcoAgent (2012) confirmed this information. According to the habitat description provided for this species by Branch (1988), this species has limited suitable habitats contained within the study area (limited large termite mounds and rock outcrops), and it is considered unlikely that the development of the study area, should it occur, will have a negative impact of more than low significance on the conservation status, both locally and within Gauteng.

EcoAgent (2012) reported that *Psammophis crucifer* (Cross-marked or Montane Grass Snake) and *Hemachatus haemachatus* (Rinkals) were observed on a close by site, but that about 37 reptile species could occur in the area.

Generally the intended development will not result in a loss of ecologically sensitive habitat, therefore the loss/displacement of reptiles will be minimal in the overall picture of the specific site.

However, maintaining (and even improving) the conservation integrity of the Klip River and flood plain wetland is important for the general conservation of amphibia and water-associated reptiles in the area.

### 6.3 Birds

Cook (2007) recorded 42 bird species on the site. Species recorded during the field survey are common, widespread and typical of fairly uniform disturbed grassland. The majority of these bird species were recorded in the surrounding residential gardens, heavily weed invaded old lands and patches of exotic trees. Cook (2007) mentions that the threatened species Lesser Kestrel, African Grass Owl and Melodious Lark could possibly occur within or in the vicinity of the study area.

Ecoagent (2012) recorded 52 species close to the site but based on the habitats present on the site, expected 180 species to visit the site. EcoAgent (2012) furthermore provided the following expected frequency of occurrence of threatened bird species on similar habitats in the vicinity of the site:

Threatened Status	Species	Probability of occurrence on site			
		Regular resident	Frequent visitor	Erratic visitor	Infrequent vagrant
Near Threatened	Blue Korhaan				X
	Greater Painted-snipe				X
	Black-winged Pratincole			X	
	Pallid Harrier			X	
	Lanner			X	
	Melodious Lark			X	
	Vulnerable	African Grass-Owl			
White-bellied Korhaan					X
Blue Crane					X
Corn Crake				X	
Cape Vulture					X
African Marsh Harrier					X
Lesser Kestrel				X	
<b>TOTALS</b>	<b>13</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>7</b>



It is not expected that the proposed development will have a great impact on the birds in the area. The Klip River and adjacent flood plain wetlands are regarded as very important habitat for birds and these habitats should be conserved.

#### **6.4 Mammals**

Cook (2007) mentioned that about 27 mammal species were previously recorded in the general area. EcoAgent (2012) expected 25 mammal species to occur on similar habitats located close to the current site, and confirmed the presence of three species, namely Scrub hare, African mole rat and Yellow mongoose. Most of the species expected to occur are common and widespread (viz. scrub hares, mole rats, grass mice, multimammate mice, gerbils, bats, genets, yellow and slender mongooses). However, others are deemed not common, i.e. the listed shrews.

The Red Data status of five listed shrews are all “Data Deficient”. This conservation ranking is no more than a precautionary measure to express conservation concern in the face of insufficient field data to express a quantitative opinion. No other Red Data or sensitive mammal species are deemed present on the site, either since the site is too disturbed, falls outside the distributional ranges of some species, or does not offer suitable habitat(s).

It is expected that the proposed development will not have a significant impact on mammals on the site.

### **7. IMPACT ASSESSMENT: IMPACTS ON VEGETATION**

#### **7.1 Methods**

The following generic criteria drawn from published literature and general South African practise will be used to describe magnitude and significance of impacts in an objective, systematic manner.

These criteria are:

- Extent or scale of the impact (what size of the area will be affected?)
- Duration (how long will the impact last?)

- Intensity (the intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself.
- Probability (how likely is it that the impact will occur?)
- Significance (how severe will the impact be?)
- Mitigatory potential and mitigation measures

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.

The impacts are given in table form. Conventions and definitions used in these tables are described below:

#### **Extent of impact**

Site: Effect confined to the development area  
 Local: Effect limited to within 3-5km of the development area  
 Regional: Effect extends beyond the borders of the development area to influence the area as a whole.

#### **Duration of impact**

Short: Effect last for a period up to five years  
 Medium: Effect continues for a period of between five and ten years  
 Long: Effect continues for a period in excess of 10 years  
 Permanent: Effect lasts permanently

#### **Intensity**

Low: Will have no or little effect on the vegetation and fauna  
 Medium: Will have some effect but parts of vegetation will remain in tact  
 High: Will destroy the vegetation or habitat for fauna completely

#### **Probability of occurrence**

Low: Less than 33% chance of occurrence  
 Medium: Between 33 and 66% chance of occurrence



High: Greater than 66% chance of occurrence

### **Significance**

Low: Where the impact will have a relatively small effect on the environment which does not need to be accommodated

Medium: Where the impact can have an influence on the environment that might require modification of the project

High: Where the impact definitely has an impact on the environment and needs mitigation

### **Status**

Positive: Impact will be beneficial to the environment

Negative: Impact will not be beneficial to the environment

Neutral: No positive or negative impact

### **Confidence**

Low: It is uncertain whether the impact will occur

Medium: It is likely that the impact will occur

High: It is relatively certain that the impact will occur



## 7.3 Results

**Impact Table**

	<b>Extent</b>	<b>Duration</b>	<b>Intensity</b>	<b>Probability</b>	<b>Significance</b>	<b>Status</b>	<b>Conf</b>
<b>Impact on Vegetation</b>	Site	Permanent	High	High	Low	Neutral	High
<b>Plant species</b>							
Indigenous species	Site	Permanent	Low	High	Low	Neutral/ Negative	High
Alien woody plant species	Site	Permanent	Low	High	High	Positive	High
<b>Impact on Fauna</b>							
Amphibia	Site	Permanent	Low	High	Low	Neutral	Medium
Reptiles	Site	Permanent	Low	High	Low	Neutral	Medium
Birds	Site	Permanent	Low	High	Low	Neutral	Medium
Mammals	Site	Permanent	Low	High	Low	Neutral	Medium

## 6.3 Discussion

- The impact on the vegetation, plant species and faunal species is of Low significance, because the area is already transformed, with very little indigenous vegetation remaining.
- As no development is planned for the area of the Klip River and associated flood plain wetland, and as the proposed development is located >500 m from the outer edge of the wetland, no impact is envisaged on this area.

## 7. GENERAL DISCUSSION AND CONCLUSION:

The vegetation of site is transformed grassland and associate fauna with low sensitivity, low species richness and with no species of conservation concern. The development on the site can be supported.

The proposed development will have a low impact on fauna of the site, and the development can be supported.

Of importance is that the Klip River and associated flood plain wetlands are at least 500 m from the footprint of the planned development. The River and wetland are ecologically sensitive and protected ecosystems and no development within these systems or the buffer zone area will be supported.

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1963 Matriculation Certificate, Kempptonpark High School

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**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)
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### **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.
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  - 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  
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  - 1975 - 1988: Member
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  - 1981 - 1982: **Chairman**, Pietersburg Centre
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  - 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.



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Visits to Italy, Germany. Switzerland, Austria, France, The Netherlands, United Kingdom.
- 1993 Travel Grant, University of Pretoria.  
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- 1994 Travel Grant FRD.  
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- 1995 Travel Grant FRD, University of Pretoria  
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### **Consultant**

Founder and owner of Ecotrust Environmental Services CC and Eco-Agent CC

Since 1988 >**250** reports as consultant on environmental matters, including:

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