Report on the floristic and ecological assessment of the proposed chicken abattoir on Portion 5 of the Farm Groot Genoeg 2662, Bloemfontein.

September 2012

Prepared by:
Darius van Rensburg

H2ON Environmental Specialists
21 Dromedaris Street • Dan Pienaar • Bloemfontein
Suite 158 • Private Bag X01 • Brandhof • 9324
darius@h2on.co.za
Tel: 051 4444 700 • Fax: 086 6976 132

Prepared for:
MDA Environmental Consultants
9 Barnes Street
Westdene

9301

Table of contents

Vegetation and ecological assessment.

1. Introduction 3

2. Scope and limitations 3
2.1 Vegetation
2.2 Fauna
2.3 Limitations

3. Methodology 4
3.1 Desktop study
3.2 Survey
3.3 Criteria used to assess sites
3.4 Biodiversity sensitivity rating (BSR)

4. Ecological overview of the site 8
4.1 Overview of vegetation
4.2 Overview of fauna

5. Site specific results 9

6. Biodiversity sensitivity rating (BSR) interpretation 11

7. Discussion and conclusions 11

8. Recommendations 12

9. References 12

Annexure A: Maps and Site photos 13

Vegetation and ecological assessment.

1. Introduction

Natural vegetation is an important component of ecosystems. Some of the vegetation units in a region can be more sensitive than others, usually as a result of a variety of environmental factors and species composition.

Though vegetation may seem to be uniform and low in diversity it may still contain species that are rare and endangered. The occurrence of such a species may render the development unviable. Should such a species be encountered the development should be moved to another location or cease altogether.

Around the borders of large cities development is inevitable due to the demands of housing, feeding and managing the waste of the large population they house. The areas around cities are often already disturbed due to increased activities by a more dense population compared to rural areas. Though this may be the case in most situations there may still be areas that consist of sensitive habitats such as water courses, wetlands or rare vegetation types that need to be conserved. These areas may also contain endangered fauna and flora.

It is inevitable that developments like a chicken abattoir will occur around large cities as the opportunity exists to provide food to the large population these areas house. Where such developments occur in the rural periphery of cities the site should be chosen so that areas of higher disturbance are preferred over pristine natural vegetation.

For the above reasons it is necessary to conduct a vegetation and ecological assessment of an area proposed for development.

The proposed chicken abattoir will be constructed on Portion 5 of the farm Groot Genoeg 2662, Bloemfontein. The farm can be reached by taking the S1066 gravel road turning off from the R700 Provincial Road. The farm is located an approximate distance of 2.6km from the R700 turnoff.

The report together with its recommendations and mitigation measures should be used to minimise the impact of the proposed development.

2. Scope and limitations

- To evaluate the present state of the vegetation and ecological functioning of the site proposed for development.
- To identify possible negative impacts that could be caused by the proposed chicken abattoir.

2.1 Vegetation

Aspects of the vegetation that will be assessed include:

- The vegetation types of the region with their relevance to the proposed site.
- The overall status of the vegetation on site.

- Species composition with the emphasis on dominant-, rare- and endangered species.

The amount of disturbance present on the site assessed according to:

- The amount of grazing impacts.
- Disturbance caused by human impacts.
- Other disturbances.

2.2 Fauna

Aspects of the fauna that will be assessed include:

- A basic survey of the fauna occurring in the region using visual observations of species as well as evidence of their occurrence in the region (burrows, excavations, animal tracks, etc.).
- The overall condition of the habitat.
- A list of species that may occur in the region (desktop study).

2.3 Limitations

Some of the bulbous species may have been overlooked. Many species have a spring/summer flowering period.
Some species may have been overlooked due to an annual cycle.
Some animal species may not have been observed as a result of their nocturnal and/or shy habits.

3. Methodology

3.1 Several literature works were used for additional information.

Vegetation:
Red Data List (Raymondo *et al.* 2009)
Vegetation types (Mucina & Rutherford 2006)
Field guides used for species identification (Bromilow 1995, Van Wyk & Malan 1998, Van Oudtshoorn 2004, Manning 2009)

Terrestrial fauna:
Field guides for species identification (Smithers 1986).

3.2 Survey

The site was assessed by means of transects and sample plots.

Noted species include rare and dominant species.
The broad vegetation types present on the site were determined.
The state of the environment was assessed in terms of condition, grazing impacts, disturbance by humans, erosion and presence of invader and exotic species.

Animal species were also noted as well as the probability of other species occurring on or near the site according to their distribution areas and habitat requirements.

The state of the habitat was also assessed.

3.3 Criteria used to assess sites

Several criteria were used to assess the site and determine the overall status of the environment.

Vegetation characteristics

Characteristics of the vegetation in its current state. The diversity of species, sensitivity of habitats and importance of the ecology as a whole.

Habitat diversity and species richness: normally a function of locality, habitat diversity and climatic conditions.
Scoring: Wide variety of species occupying a variety of niches – 1, Variety of species occupying a single nich – 2, Single species dominance over a large area containing a low diversity of species – 3.

Presence of rare and endangered species: The actual occurrence or potential occurrence of rare or endangered species on a proposed site plays a large role on the feasibility of a development. Depending on the status and provincial conservation policy, presence of a Red Data species can potentially be a fatal flaw.
Scoring: Occurrence actual or highly likely – 1, Occurrence possible – 2, Occurrence highly unlikely – 3.

Ecological function: All plant communities play a role in the ecosystem. The ecological importance of all areas though, can vary significantly e.g. wetlands, drainage lines, ecotones, etc.
Scoring: Ecological function critical for greater system – 1, Ecological function of medium importance – 2, No special ecological function (system will not fail if absent) – 3.

Degree of rarity/conservation value:
Scoring: Very rare and/or in pristine condition – 1, Fair to good condition and/or relatively rare – 2, Not rare, degraded and/or poorly conserved – 3.

Vegetation condition

The sites are compared to a benchmark site in a good to excellent condition. Vegetation management practises (e.g. grazing regime, fire, management, etc.) can have a marked impact on the condition of the vegetation.

Percentage ground cover: Ground cover is under normal and natural conditions a function of climate and biophysical characteristics. Under poor grazing management, ground cover is one of the first signs of vegetation degradation.
Scoring: Good to excellent – 1, Fair – 2, Poor – 3.

Vegetation structure: This is the ratio between tree, shrub, sub-shrubs and grass layers. The ratio could be affected by grazing and browsing by animals.
Scoring: All layers still intact and showing specimens of all age classes – 1, Sub-shrubs and/or grass layers highly grazed while tree layer still fairly intact (bush partly opened up) – 2, Mono-layered structure often dominated by a few unpalatable species (presence of barren patches notable) – 3.

Infestation with exotic weeds and invader plants or encroachers:
Scoring: No or very slight infestation levels by weeds and invaders – 1, Medium infestation by one or more species – 2, Several weed and invader species present and high occurrence of one or more species – 3.

Degree of grazing/browsing impact:
Scoring: No or very slight notable signs of browsing and/or grazing – 1, Some browse lines evident, shrubs shows signs of browsing, grass layer grazed though still intact – 2, Clear browse line on trees, shrubs heavily pruned and grass layer almost absent – 3.

Signs of erosion: The formation of erosion scars can often give an indication of the severity and/or duration of vegetation degradation.
Scoring: No or very little signs of soil erosion – 1, Small erosion gullies present and/or evidence of slight sheet erosion – 2, Gully erosion well developed (medium to large dongas) and/or sheet erosion removed the topsoil over large areas – 3.

Faunal characteristics

Presence of rare and endangered species: The actual occurrence or potential occurrence of rare or endangered species on a proposed site plays a large role on the feasibility of a development. Depending on the status and provincial conservation policy, presence of a Red Data species or very unique and sensitive habitats can potentially be a fatal flaw.
Scoring: Occurrence actual or highly likely – 1, Occurrence possible – 2, Occurrence highly unlikely.

3.4 Biodiversity sensitivity rating (BSR)

The total scores for the criteria above were used to determine the biodiversity sensitivity ranking for the sites. On a scale of 0 – 30, six different classes are described to assess the suitability of the sites to be developed. The different classes are described in the table below:

Table 1: Biodiversity sensitivity ranking

BSR	BSR general floral description	Floral score equating to BSR class
Ideal (5)	Vegetation is totally transformed or in a highly degraded state, generally has a low level of species diversity, no species of concern and/or has a high level of invasive plants. The area has lost its inherent ecological function. The area has no conservation value and potential for successful rehabilitation is very low. The site is ideal for the proposed development.	29 – 30
Preferred (4)	Vegetation is in an advanced state of degradation, has a low level of species diversity, no species of concern and/or has a high level of invasive plants. The area's ecological function is seriously hampered, has a very low conservation value and the potential for successful rehabilitation is low. The area is preferred for the proposed development.	26 – 28
Acceptable (3)	Vegetation is notably degraded, has a medium level of species diversity although no species of concern are present. Invasive plants are present but are still controllable. The area's ecological function is still intact but may be hampered by the current levels of degradation. Successful rehabilitation of the area is possible. The conservation value is regarded as low. The area is acceptable for the proposed development.	21 – 25
Not preferred (2)	The area is in a good condition although signs of disturbance are present. Species diversity is high and species of concern may be present. The ecological function is intact and very little rehabilitation is needed. The area is of medium conservation importance. The area is not preferred for the proposed development.	11 – 20
Sensitive (1)	The vegetation is in a pristine or near pristine condition. Very little signs of disturbance other than those needed for successful management are present. The species diversity is very high with several species of concern known to be present. Ecological functioning is intact and the conservation importance is high. The area is regarded as sensitive and not suitable for the proposed development.	0 - 10

4. Ecological overview of the site

4.1 Overview of ecology and vegetation types (Mucina & Ruterford 2006)

The vegetation in the area consists of Bloemfontein Dry Grassland (Gh 5). This grassland type is regarded as Endangered as a result of transformation for crop cultivation and urban development. Farming activities around the site consist of extensive dryland crop cultivation. Due to this the natural vegetation of the area is fragmented and large areas of natural grassland are rare.

The site where the proposed abattoir will be constructed consists of a recently ploughed field. It is estimated that the field was ploughed for dryland crop cultivation within the last five years. As a result the vegetation is still in an early stage of succession and percentage vegetation cover is still relatively low. Pioneer species are common but natural climax species has become established. Given time the area may rehabilitate itself to a grassland that closely resembles the natural vegetation. However, once large scale disturbance such as ploughing has taken place it is highly unlikely that a grassland would return to its original condition and some elements of disturbance such as a difference in the dominant grass species and the presence of unpalatable species often occurs.

The site is dominated by grasses including *Eragrostis curvula, Cynodon dactylon* and *Setaria sphacelata*. *Eragrostis curvula* and *Cynodon dactylon* are both pioneer grasses and indicators of disturbance or vegetation removal. *Setaria sphacelata* is a climax grass species and this species indicates that the area is progressing in succession and left unaltered the area should rehabilitate successfully. Isolated clumps of the climax grass, *Themda triandra*, was also found on the site. This species substantiates the progressive succession of the vegetation on the site.

Several dwarf shrubs also occur in high densities on the site. These include *Ruschia puterillii, Selago albida, Chrysocoma ciliata, Felicia muricata, Hertia pallens* and *Gnidia polycephala*. Several of these species indicate disturbance as caused by the previous ploughing of the site.

The site contains abundant pioneer weeds, including the following species: *Senecio sp., Salvia verbenaca* and *Nidorella resedifolia*. These species are indigenous but are indicators of disturbance.

The site does not contain any watercourses, wetlands, drainage lines or wetlands. Due to previous ploughing of the site the vegetation is not considered as being in a good condition. The vegetation on the site is in a relatively early stage of succession. No rare, protected or endangered species could be identified on the site. It is also considered highly unlikely that any species of concern would occur within this area.

The alternative to this site would be to establish the abattoir in an area of undisturbed vegetation. This would entail a much higher ecological impact. Therefore it is preferred that the development occur on the proposed site.

4.2 Overview of terrestrial mammals (actual & possible)

No rare or endangered mammals could be identified on the site.

The site contains signs of two mammal species occurring within or near the site. Soil mounds as a result of burrowing activities of the Common Molerat (*Cryptomys hottentotus*) occur on the site. This species is widespread and common and is well adapted to residential and built-up areas. It is not of a large concern to the development. Droppings of a Yellow Mongoose (*Cynictis penicillata*) were also noted on the site. This species is widespread and common and is well adapted to disturbed environments. It is not of a large concern to the development.

It is highly likely that a number of other mammal species also occurs on the site. However, due to the level of disturbance on the site due to previous ploughing and the proximity to the dirt road it is considered highly unlikely that any species of concern would occur on the site. Due to previous disturbance it is also considered unlikely that the site would sustain a large mammal population.

List of some Red Data terrestrial mammals that could occur in the region:

South African Hedgehog	*Atelerix frontalis*
Aardwolf	*Proteles cristatus*
Bat-Eared Fox	*Otocyon megalotis*
Striped Weasel	*Poecilogale albinucha*
Small Spotted Cat	*Felis negripes*
Antbear	*Orycteropus afer*

The likelihood that one or several of these endangered species may occur in this area is highly unlikely.

5. Site specific results

Habitat diversity and species richness:
Habitat diversity on the site is low. The habitat on the site consists of grassland in an early stage of succession. The natural habitat has been degraded and the vegetation has been altered. Species diversity is low.

Presence of rare and endangered species:
No species of concern could be identified on the site. Due to the degraded condition of the vegetation due to previous ploughing the likelihood of any rare or endangered species occurring is low.

Ecological function:
The ecological function of the area has been disturbed and is currently not considered to be true to the natural ecological function of the area. The ecological function of the site is also not vital to the surrounding area.

Degree of rarity/conservation value:

The vegetation type on the site is regarded as Endangered as a result of transformation for crop cultivation and urban development. Farming activities around the site consist of extensive dryland crop cultivation. Due to this the natural vegetation of the area is fragmented and large areas of natural grassland are rare. Due to previous ploughing of the area the vegetation has been transformed and does no longer constitute this endangered grassland type. Through rehabilitation of the area the vegetation may return to a near natural condition. However, due to the surrounding cultivation it would not be advantages to conserve this area.

Percentage ground cover:
Percentage ground cover is relatively low. This is due to the previous ploughing of the site.

Vegetation structure:
The vegetation structure consists of a single grassland layer. This is natural to the vegetation of the area but is transformed due to previous ploughing.

Infestation with exotic weeds and invader plants:
The site contains numerous pioneer weeds. The area has been previously ploughed and is currently in an early stage of succession. These pioneer weeds are characteristic of areas that are undergoing succession. The weeds aid in stabilising the soil surface and lays the foundation for the establishment of climax species.

Degree of grazing/browsing impact:
Grazing by domestic stock on the site is relatively low.

Signs of erosion:
No signs of erosion could be identified on the site.

Terrestrial animals:
Due to the degraded state of the site it is not able to sustain a healthy mammal population. No mammals of concern could be identified on the site and it also highly unlikely that any species of concern should occur.

Table 2: Biodiversity Sensitivity Rating for the proposed chicken abattoir.

	Low (3)	Medium (2)	High (1)
Vegetation characteristics			
Habitat diversity & Species richness	3		
Presence of rare and endangered species	3		
Ecological function	3		
Uniqueness/conservation value		2	
Vegetation condition			
Percentage ground cover	3		
Vegetation structure		2	
Infestation with exotic weeds and invader plants or encroachers	3		
Degree of grazing/browsing impact		2	
Signs of erosion		2	
Terrestrial animal characteristics			
Presence of rare and endangered species	3		
Sub total	18	8	0
Total		26	

6. Biodiversity sensitivity rating (BSR) interpretation

Table 3: Interpretation of Biodiversity Sensitivity Rating.

Site	Score	Site Preference Rating	Value
Chicken abattoir	26	Preferred	4

7. Discussion and conclusions

The site has been rated as being Preferred for the proposed development.

The vegetation in the area consists of Bloemfontein Dry Grassland (Gh 5). This grassland type is regarded as Endangered as a result of transformation for crop cultivation and urban development. Farming activities around the site consist of extensive dryland crop cultivation. Due to this the natural vegetation of the area is fragmented and large areas of natural grassland are rare. The vegetation on the site has been transformed due to previous ploughing of the site. As a result this Endangered grassland type has been transformed. Through time the area may rehabilitate to a condition near its original state. However, due to the extensive surrounding cultivation this area does not form part of a large natural area and it is not considered to be an important conservation area.

The habitat on the site has been altered and fauna and flora diversity is relatively low. The area does not contain any rare or endangered species and it is considered highly unlikely that any species of concern would occur on the site.

No reasons could be found to prevent the establishment of a chicken abattoir on this site. Being a degraded area the proposed chicken abattoir would also have a lower impact in contrast to a development occurring on natural vegetation in a good condition.

8. Recommendations

- Management of any waste produced by the facility should be managed so that no pollution of the surrounding area or groundwater occurs.

- The site should be monitored for any signs of erosion during and after construction. Any erosion that occurs on the site or immediate surrounding should be contained and erosion measures implemented.

- No animals may be captured, hunted or harmed in any way during construction or operation of the facility.

9. References

Bromilow, C. 1995. Problem Plants of South Africa. Briza Publications CC, Cape Town.

Germishuizen, G. & Meyer, N.L. (eds) 2003. Plants of Southern Africa: an annotated checklist. *Strelitzia* 14. National Botanical Institute, Pretoria.

Government of South Africa. 2008. National Protected Area Expansion Strategy for South Africa 2008: Priorities for expanding the protected area network for ecological sustainability and climate change adaptation. Government of South Africa, Pretoria.

Manning, J. 2009. Field Guide to Wild Flowers. Struik Nature, Cape Town.

Mucina, L. & Rutherford, M.C. (eds.) 2006. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19.South African National Biodiversity Institute, Pretoria.

Raymondo, D. Van Staden, L. Foden, W. Victor, J.E. Helme, N.A. Turner, R.C. Kamundi, D.A. Manyama, P.A. (eds.) 2009. Red List of South African Plants. *Strelitzia* 25. South African National Biodiversity Institute, Pretoria.

Smithers, R.H.N. 1986. Land Mammals of Southern Africa. Macmillan, Johannesburg.

Van Oudtshoorn, F. 2004. Gids tot Grasse van Suider-Afrika. Briza Publications, Pretoria.

Van Wyk, B. & Malan, S. 1998. Field Guide to the Wild Flowers of the Highveld. Struik, Cape Town.

Annexure A: Maps and Site photos

Locality map for the proposed establishment of a chicken abattoir on the farm Groot Genoeg 2662.

Preparred for:
MDA Environmental Consultants
9 Barnes Street
Westdene
9301

Legend:

- **R700 Provincial Road**
- **S1066 Gravel Road**
- **Proposed site**

Map Information

Spheroid: WGS 84
Topo Cadastre Sheet: T2926AA
Scale:

0 265 530 795
Scale (m)

Environmental Consultant
H2ON Environmental Specialists
Contact Darius van Rensburg at:
darius@h2on.co.za
Suite 158, P/Bag X01, Brandhof, 9324
Tel: 051 4444 700
Fax: 086 6976 132

Map 1: Location of the Proposed chicken abattoir. The R700 Provincial Road and S1066 Gravel Road is indicated. Note the extensive dryland crop cultivation on the western side of the map.

Layout map for the proposed establishment of a chicken abattoir on the farm Groot Genoeg 2662.

Preparred for:
MDA Environmental Consultants
9 Barnes Street
Westdene
9301

Legend:

S1066 Gravel Road

Proposed site

Map Information

Spheroid: WGS 84
Topo Cadastre Sheet: T2926AA
Scale:

0 42 84 126
Scale (m)

Environmental Consultant
H2ON Environmental Specialists
Contact Darius van Rensburg at:
darius@h2on.co.za
Suite 158, P/Bag X01, Brandhof, 9324
Tel: 051 4444 700
Fax: 086 6976 132

Map 2: Layout of the proposed chicken abattoir. The S1066 Gravel Road is indicated. Note the low percentage vegetation cover on the site. The furrows as caused by previous ploughing are also visible.

Figure 1: Panorama of the site as viewed from the north. Note the low percentage vegetation cover.

Figure 2: Panorama of the site as viewed from the east.

Figure 3: Droppings of a Yellow Mongoose (*Cynictis penicilata*). The species is widespread, common and well adapted to disturbed environments. Consequently it is not of large concern to the development.

Figure 4: Excavated soil mounds of a Common Molerat (*Cryptomys hottentotus*). The species is widespread, common and well adapted to residential areas. Consequently it is not of large concern to the development.