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## ***Herpetofaunal Habitat Assessment***

***of***

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**Magagula Heights on the Remainder  
of Portion 52 of the farm  
TAMBOEKIESFONTEIN 173 IR**

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**May 2017**

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## Declaration of Independence:

I, Jacobus Casparus Petrus van Wyk (68080450410845) declare that I:

- hold an MSc in the Biological Sciences, which allows registration by SACNASP (SA Council for National Scientific Professions) as a Professional Zoologist and sanctions me to function independently as a specialist scientific consultant
- as per prerequisite of the Natural Scientific Professions Act No. 27 of 2003, present this project as my work from inception and reflects exclusively my observations and unbiased scientific interpretations, executed to the best of my ability
- abide by the Code of Ethics of the SACNASP
- am committed to biodiversity conservation but concomitantly recognise the need for economic development. Even though I appreciate the opportunity to learn through the processes of constructive criticism and debate, I reserve the right to form and hold my own opinions and therefore will not willingly submit to the interests of other parties or change my statements to appease them
- abide by the Code of Ethics of the S.A. Council for Natural Scientific Professions
- act as an independent specialist consultant in the field of Zoology
- am subcontracted as specialist consultant by Galago Environmental CC for the project "Herpetofauna Habitat Assessment of Magagula Heights, Gauteng Province" described in this report
- have no financial interest in the proposed development other than remuneration for work performed
- have or will not have any vested or conflicting interests in the proposed development
- undertake to disclose to Galago Environmental CC and its client as well as 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, 2017
- Our intellectual property in this report will only be transferred to the client (the party/ company that commissioned the work) on full payment of the contract fee. Upon transfer of the intellectual property, we recognise that written consent of the client will be required for release of any part of this report to third parties.



J.C.P. van Wyk

# 1. INTRODUCTION

Galago Environmental CC. was appointed to undertake a Herpetofaunal Habitat Assessment on the Remainder of Portion 52 of the farm TAMBOEKIESFONTEIN 1731R, also known as Magagula Heights, scheduled for the establishment of a Residential Development.

This report focuses on the reigning status of threatened and sensitive reptiles and amphibians (herpetofauna) likely to occur on the proposed development site and whose conservation status should be considered in the decision-making process. Special attention was paid to the qualitative and quantitative habitat conditions for Red Data species deemed present on the site, and mitigation measures to ameliorate the effect of the proposed development. The secondary objective of the investigation was to gauge which herpetofauna might still reside on the site and comment on the herpetofauna diversity of the study area.

This assignment is in accordance with the 2017 EIA Regulations emanating from Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

## 2. SCOPE AND OBJECTIVES OF THE STUDY

- To qualitatively and quantitatively assess the significance of the Herpetofaunal habitat components and current general conservation status of the property;
- Identify and comment on ecological sensitive areas;
- Comments on connectivity with natural vegetation and habitats on adjacent sites;
- To provide a list of herpetofauna which occur or might occur, and to identify species of conservation importance;
- To highlight potential impacts of the proposed development on the herpetofauna of the study site, and
- To provide management recommendations to mitigate negative and enhance positive impacts should the proposed development be approved.

## 3. STUDY AREA

This study site is situated in the quarter degree grid cell 2628AC (Alberton) just north of the R550 Klipriver Drive and bordering the D817 to the east. The entire area is 12.1351 hectares in extent and is spatially more accurately defined by 26°25'40.544"S; 28°11'42.1424"E. North and west of the study site lies the first development of the Magagula Heights Township. South-west of the site is a railway line and further to the south-west of the study site lies the Suikerbosrand Nature Reserve (Figure 1).

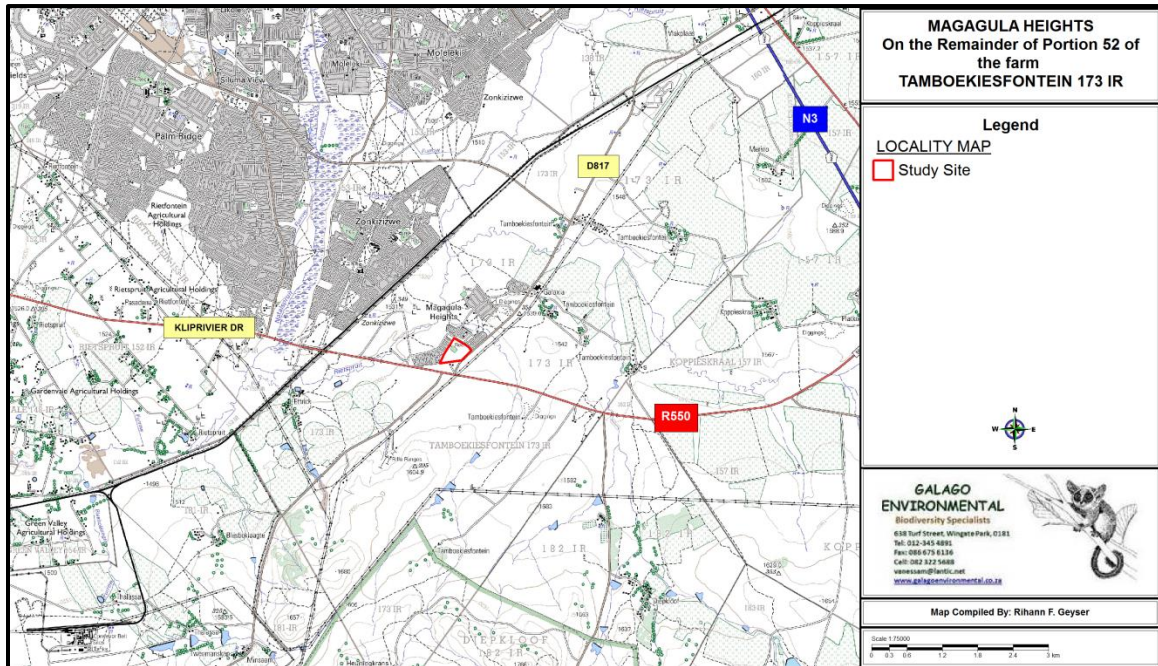
No really important topographical features are found on the study site, but two large drainages occur in the 500 metre surrounding area near the site, namely the Rietspruit and a tributary of the Rietspruit. Most of the study site slopes gently towards these drainage lines.

The site has been altered by dumping of builder's rubble and rubbish. Most of the terrestrial habitat is currently used for grazing by herds of cattle, flocks of sheep and goats. Invasive plants grow in many areas. The site has also been disturbed in some

parts by veld fires, gravel roads, vegetable gardens (Figure 2), a soccer field (Figure 3), footpaths and pedestrian thoroughfare between townships and the freeway and other roads, which cross the study site and are in constant use. A few diggings and hunting dogs have also been observed on the study site.

The study site lies inside the Tsakane Clay Grassland (Gm 9) vegetation type (Mucina & Rutherford, 2006).

Exotic plants such as tall khaki weed, castor-oil plant and giant reed grow on the site. The substrate is mostly sandy red soil.



**Figure 1: Locality map of the study area**



**Figure 2: A southerly view of the study site. Note the vegetable garden.**



**Figure 3: A southerly view of the study site showing the soccer field.**

## **4. METHOD**

The site visit was conducted on 20 May 2017. During this visit the observed and derived presence of reptiles and amphibians associated with the recognised habitat types of the study site was recorded. This was done with due regard to the well-recorded global distributions of Southern African herpetofauna, coupled with the qualitative and quantitative nature of recognised habitats.

The 500 metres of adjoining properties were scanned for important fauna habitats.

### **4.1 Field Surveys**

During the site visits, reptiles and amphibians were identified by visual sightings through random transect walks. Amphibian diversity was also established by means of acoustic identification. No trapping was conducted, as the terms of reference did not require such intensive work.

### **4.2 Desktop Surveys**

As the majority of reptiles and amphibians are secretive, nocturnal and/or poikilothermic or seasonal, distributional ranges and the presence of suitable habitats were used to deduce the presence or absence of these species based on authoritative tomes, scientific literature, field guides, atlases and databases. This can be done irrespective of season.

The probability of the occurrence of reptile and amphibian species was based on their respective geographical distributional ranges and the suitability of on-site habitats. In other words, *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 to the area, i.e. normally occurring at high population densities.

*Medium* probability pertains to a herpetofaunal 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 taken into consideration. Species categorised as *medium* normally do not occur at high population numbers, but cannot be deemed as rare.

A *low* probability of occurrence would imply that the species' distributional range is peripheral to the study site and habitat is sub-optimal. Furthermore, some reptiles and amphibians categorised as low are generally deemed to be rare.

A list of species which may occur on the site was compiled, based on the impressions gathered during the site visit, as well as publications such as FitzSimons' Snakes of Southern Africa (Broadley, 1990), Field Guide to Snakes and other Reptiles of Southern Africa (Branch, 1998), A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007), Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (Bates, Branch, Bauer, Burger, Marais, Alexander & De Villiers, 2014), Amphibians of Central and Southern Africa (Channing 2001), Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland (Minter, Burger, Harrison, Braack, Bishop & Kloepfer, 2004, 2004) and A Complete Guide to the Frogs of Southern Africa (Du Preez & Carruthers, 2009). The latest taxonomic nomenclature was used. The vegetation type was defined according to the standard handbook by Mucina and Rutherford (eds) (2006).

### 4.3 Specific Requirements

During the visit the site was surveyed and assessed for the potential occurrence of Red Data species in Gauteng (Alexander & Marais, 2007; Minter, *et al*, 2004, Du Preez & Carruthers, 2009 and Bates, *et al*, 2014) such as:

- Giant Bullfrogs (*Pyxicephalus adspersus*);
- Nile Crocodile (*Crocodylus niloticus*)
- Coppery Grass Lizard (*Chamaeasaura aenea*);
- Striped Harlequin Snake (*Homoroselaps dorsalis*);
- The Southern African Python (*Python natalensis*).

## 5. RESULTS

The vegetation types of the site were analysed according to Mucina and Rutherford (2006).

### ***Herpetofauna Habitat Assessment:***

The local occurrences of reptiles and amphibians are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of reptile and amphibian species by evaluating the habitat types within the context of global distribution ranges. From a herpetological habitat

perspective, it was established that mainly one of the four major habitats is naturally present on the actual study site, namely terrestrial (Figure 4).



**Figure 4: A south-westerly view of the study site showing the good grass cover and the Suikerbosrand in the background**

Most of the study site consists of transformed grassland. The natural grasslands were first transformed for agricultural purposes and later by anthropogenic influences such as footpaths, veld fires, dumping, invasive plants, diggings, vegetable gardens and a soccer field. The study site is thus ecologically disturbed in many parts. Very few moribund termitaria were recorded on the study site (Figure 5). These structures are good indicators of the occurrence of small herpetofauna. Accordingly, it is estimated that the reptile and amphibian population density for the study site is slightly higher. At the time of the site visit the basal cover was poor to fair and would not provide adequate cover for small terrestrial herpetofauna.



**Figure 5: A moribund termitarium on the study site.**



There are no natural rupicolous habitats on the study site, but good manmade rupicolous habitat exists in the form of dumped building rubble (Figure 6). Due to the absence of natural rupicolous habitat, some species such as yellow-throated plated lizard, common girdled lizard and rock agama were omitted from the species list in Table 1. Good natural rupicolous habitats occur in the surrounding area north of the Rietspruit (Figure 7), but connectivity from the study site to this area is poor due to an existing residential development.



**Figure 6: Manmade rupicolous habitat.**



**Figure 7: Natural rupicolous habitat in the buffer area north of the Rietspruit.**

There are no trees to provide arboreal habitat and there are no dead logs, which could have provided shelter and food for some herpetofauna. Due to the absence of natural arboreal habitat, some species such as flap-neck chameleons were omitted from the species list in Table 1.

No permanent or temporary water sources occur on the actual study site. Two large drainage lines occur in the surrounding area, namely the Rietspruit (Figure 8) and a

tributary of the Rietspruit. Connectivity from the study site to the drainages lines is poor due to an existing residential development.



**Figure 8: The Rietspruit in the surrounding area**

Due to the busy Klipriver Drive (R550) south of the site, the D817 Road, as well as the railway line and the first phase of the Magagula Heights Townships, connectivity is poor to fair.

Sight records were also used to compile this herpetofaunal report.

***Threatened and Red listed Reptile and Amphibian Species:***

The study site falls outside the natural range of the Southern African python and Nile crocodile and these species should not occur on the study site.

The striped harlequin snake has been recorded on this quarter degree square (TVL Museum Records or Ditsong Museum of Natural History), and a few moribund termitaria, where this species is most likely to be found, are present on the study site. The species has been collected south of the study site in the Suikerbosrand Nature Reserve (Koen, 2007). It is very difficult to confirm whether this cryptic snake is present on any site, but there is a small chance this species could occur on this particular study site.

The coppery grass lizard has not been recorded on this quarter degree square (TVL Museum Records or Ditsong Museum of Natural History), and there is no pristine grassveld on the study site. This species should therefore not occur on the study site.

The study site contains no temporary dams, which are potential breeding places for giant bullfrogs. This species should not occur on the study site

It is important to note that in the latest literature (Measey (ed.) 2011 and Carruthers & Du Preez 2011); the giant bullfrog's status has changed officially from Near Threatened (Minter *et al*, 2004) to Least Concern in South Africa.

**Expected and Observed Herpetofauna Species Richness:**

Of the 36 reptile species which may occur on the study site (Table 1), two were confirmed during the site visit (Table 2) and of the 12 amphibian species which may possibly occur on the study site (Table 1), none were confirmed during the site visit (Table 2).

Table 1 lists the reptiles & amphibians which were observed on or deduced to occupy the site.

The American red-eared terrapin (*Trachemys scripta elegans*) and the Brahminy blind snake (*Ramphotyphlops braminus*) are the only two feral reptile or amphibian species known to occur in South Africa (De Moor and Bruton, 1988; Picker and Griffiths, 2011), but with only a few populations, they are not expected to occur on this particular site.

The species assemblage is typical of what can be expected of habitat that is severely disturbed, but with sufficient habitat to sustain populations. Most of the species of the resident diversity (Table 1) are fairly common and widespread (viz. common house snake, mole snake, cross-marked grass snake, rinkhals, speckled rock skink, Cape skink, Wahlberg's snake-eyed skink, ground agama, Cape gecko, guttural toad and Boettger's caco).

The species richness is poor due to the fact that only one habitat type occurs on the study site and as a result of the small size of the site.

**Table 1: The Reptile and Amphibian species observed on or deduced to occupy the site**

	SCIENTIFIC NAME	ENGLISH NAME
	<b>CLASS: REPTILIA</b>	<b>REPTILES</b>
	<b>Order: TESTUDINES</b>	<b>TORTOISES &amp; TERRAPINS</b>
	<b>Family: Pelomedusidae</b>	<b>Side-necked Terrapins</b>
?	<i>Pelomedusa subrufa</i>	Marsh Terrapin
	<b>Order: SQUAMATA</b>	<b>SCALE-BEARING REPTILES</b>
	<b>Suborder: LACERTILIA</b>	<b>LIZARDS</b>
	<b>Family: Gekkonidae</b>	<b>Geckos</b>
?	<i>Lygodactylus capensis</i>	Common Dwarf Gecko
?	<i>Pachydactylus affinis</i>	Transvaal Gecko
*	<i>Pachydactylus capensis</i>	Cape Gecko
	<b>Family: Lacertidae</b>	<b>Old World Lizards or Lacertids</b>
?	<i>Nucras lalandii</i>	Delalande's Sandveld Lizard
	<b>Family: Gerrhosauridae</b>	<b>Plated Lizards</b>
?	<i>Gerhinosaurus flavigularis</i>	Yellow-throated Plated Lizard
	<b>Family: Scincidae</b>	<b>Skinks</b>
?	<i>Acontias gracilicauda</i>	Thin-tailed Legless Skink
√	<i>Afroablepharus wahlbergii</i>	Wahlberg's Snake-Eyed Skink
√	<i>Trachylepis capensis</i>	Cape Skink
√	<i>Trachylepis punctatissima</i>	Speckled Rock Skink
?	<i>Trachylepis varia</i>	Variable Skink
	<b>Family: Agamidae</b>	<b>Agamas</b>
√	<i>Agama aculeata</i>	Ground Agama

	SCIENTIFIC NAME	ENGLISH NAME
	<b>Suborder: SERPENTES</b>	<b>SNAKES</b>
	<b>Family: Typhlopidae</b>	<b>Blind Snakes</b>
?	<i>Afrotyphlops bibronii</i>	Bibron's Blind Snake
?	<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake
	<b>Family: Leptotyphlopidae</b>	<b>Thread Snakes</b>
*	<i>Leptotyphlops scutifrons</i>	Peter's Thread Snake
	<b>Family: Viperidae</b>	<b>Adders</b>
?	<i>Bitis arietans arietans</i>	Puff Adder
*	<i>Causus rhombeatus</i>	Rhombic Night Adder
	<b>Family: Lamprophiidae</b>	
?	<i>Aparallactus capensis</i>	Black-headed Centipede Eater
?	<i>Atractapis bibronii</i>	Bibron's Stiletto Snake
NT?	<i>Homoroselaps dorsalis</i>	Striped Harlequin Snake
√	<i>Boaedon capensis</i>	Common House Snake
?	<i>Lamprophis aurora</i>	Aurora House Snake
?	<i>Lycodonomorphus inornatus</i>	Olive Ground Snake
?	<i>Lycodonomorphus rufulus</i>	Brown Water Snake
?	<i>Lycophidion capense</i>	Cape Wolf Snake
√	<i>Psammophis brevirostris</i>	Short-snouted Grass Snake
√	<i>Psammophis crucifer</i>	Cross-Marked Grass Snake
*	<i>Psammophylax rhombeatus</i>	Spotted Grass Snake
?	<i>Psammophylax tritaeniatus</i>	Striped Grass Snake
?	<i>Duberria lutrix</i>	Common Slug Eater
?	<i>Prosymna sundevallii</i>	Sundevall's Shovel-snout
√	<i>Pseudaspis cana</i>	Mole Snake
	<b>Family: Elapidae</b>	<b>Cobras, Mambas and Others</b>
?	<i>Elapsoidea sunderwallii</i>	Sundevall's Garter Snake
√	<i>Hemachatus haemachatus</i>	Rinkhals
	<b>Family: Colubridae</b>	
√	<i>Crotaphopeltis hotamboeia</i>	Red-Lipped Snake
√	<i>Dasypeltis scabra</i>	Rhombic Egg Eater
	<b>CLASS: AMPHIBIA</b>	<b>AMPHIBIANS</b>
	<b>Order: ANURA</b>	<b>FROGS</b>
	<b>Family: Pipidae</b>	<b>Clawed Frogs</b>
?	<i>Xenopus laevis</i>	Common Platanna
	<b>Family: Bufonidae</b>	<b>Toads</b>
√	<i>Amietaophrynus gutturalis</i>	Guttural Toad
?	<i>Amietaophrynus rangeri</i>	Raucous Toad
√	<i>Schismaderma carens</i>	Red Toad
	<b>Family: Hyperoliidae</b>	<b>Reed Frogs</b>
?	<i>Kassina senegalesis</i>	Bubbling Kassina
	<b>Family: Phrynobatrachidae</b>	<b>Puddle Frog</b>
?	<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog
	<b>Family: Pyxicephalidae</b>	
?	<i>Amietia angolensis</i>	Common River Frog
?	<i>Amietia fuscigula</i>	Cape River Frog

	SCIENTIFIC NAME	ENGLISH NAME
?	<i>Strongylopus fasciatus</i>	Striped Stream Frog
√	<i>Cocosternum boettgeri</i>	Boettger's Caco
*	<i>Tomopterna cryptotis</i>	Tremolo Sand Frog
*	<i>Tomopterna natalensis</i>	Natal Sand Frog

Systematic arrangement and nomenclature according to Branch (1998), Alexander & Marais (2007), Minter, *et.al* (2004), Du Preez & Carruthers (2009) and Bates, *et.al* 2014.

Red Data species rankings as defined in Branch, 'The Conservation Status of South Africa's threatened Reptiles': 89 – 103. In: G.H. Verdoorn & J. le Roux (editors), 'The State of Southern Africa's Species (2002) and Minter, *et.al*, Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland (2004) are indicated in the first column: **CR**= Critically Endangered, **En** = Endangered, **Vu** = Vulnerable, **NT** = Near Threatened, **DD** = Data Deficient. All other species are deemed of **Least Concern**.

**Table 2: Reptile and Amphibian species positively confirmed on the study site, observed indicators and habitat**

SCIENTIFIC NAME	ENGLISH NAME	OBSERVATION INDICATOR	HABITAT
<i>Trachylepis punctatissima</i>	Speckled Rock Skink	Sight record of a few adults	Manmade rupicolous habitat
<i>Agama aculeata</i>	Ground Agama	Sight record of a juvenile	Under stone in terrestrial habitat

The speckled rock skink and ground agama (Figure 9) listed in Table 2, should be abundant or common on the study site and elsewhere in its range.



**Figure 9: A ground agama found on the study site.**

## 6. FINDINGS AND POTENTIAL IMPLICATIONS

The study site has no really important topographical features, but two drainage lines occur near the site, (the Rietspruit and a tributary of the Rietspruit). The study site contains one natural herpetofaunal habitat, namely terrestrial.

Species richness: Due to the presence of only one of the four habitat types and the severely altered nature of the site, the study site should have a poor number of species. It must be emphasised that the species richness is for the general area and NOT for the study site itself.

Endangered species: The possibility exists that at least some individuals of the striped harlequin snake occur on the study site.

Sensitive species and/or areas (Conservation ranking): The study site has no important sensitive ecological systems. The two drainage lines, which occur near the site (Rietspruit and a tributary of the Rietspruit), are very sensitive areas. The study site falls in the Tsakane Clay Grassland (Gm 9) vegetation type, which is considered endangered (Mucina and Rutherford, 2006), but the site is too disturbed and too small to have any important conservation value.

Habitat(s) quality and extent: The terrestrial habitat quality has been jeopardised by the dumping of building rubble and rubbish. Most of the terrestrial habitat is currently used for grazing by herds of cattle, flocks of sheep and goats. Invasive plants grow in many areas. The site has also been disturbed in some parts by veld fires, gravel roads, a soccer field, vegetable gardens, footpaths and pedestrian thoroughfare between townships and the freeway and other roads, which cross the study site and are in constant use. A few diggings have also taken place on the study site and dogs were observed on the site.

Impact on species richness and conservation: The proposed development will have a significant and lasting effect on species richness and conservation, because of the construction of buildings and new roads carrying more vehicles. These structures, buildings and roads will form an even larger barrier for herpetofaunal movement and it will result in a decrease in connectivity.

If the development should go ahead, a very important indirect effect would be the likely impact that the proposed development might have on the water quality of the drainage lines (Rietspruit and a tributary of the Rietspruit) due to surface water runoff. This could have a negative impact on the herpetofauna.

Connectivity: Due to the busy Klipriver Drive (R550) south of the site, the D817 Road, as well as the railway line and the first phase of the Magagula Heights Townships, connectivity is poor to fair.

Management recommendation: Measures will have to be taken to stop water pollution of the drainage lines (Rietspruit and a tributary of the Rietspruit). The removal of exotic plants and rubble will increase the quality of the habitat.

General: The integrity of the drainage lines should not be jeopardised in any way by the proposed development. The unique ambience of the nearby Suikerbosrand Nature Reserve must not be affected at all.

## **7. LIMITATIONS, ASSUMPTIONS AND GAPS IN KNOWLEDGE**

Galago Biodiversity and Aquatic Specialists are committed to the conservation of biodiversity but concomitantly recognise the need for economic development. Even though we appreciate the opportunity to learn through the processes of constructive criticism and debate, we reserve the right to form and hold our own opinions and therefore will not willingly submit to the interest of other parties or change statements to appease them.

Even though every care is taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time and budget. To some extent, conclusions are drawn and proposed mitigation measures suggested based on reasonable and informed assumptions built on *bone fide* information sources, as well as deductive reasoning. Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions and migrations. Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage. Galago Biodiversity and Aquatic Specialists can therefore not accept responsibility for conclusions drawn and mitigation measures suggested in good faith based on own databases or on the information provided at the time of the directive. This report should therefore be viewed and acted upon with these limitations in mind.

## **8. RECOMMENDED MITIGATION MEASURES**

### **Protection of the drainage lines near the study site (Rietspruit and a tributary of the Rietspruit).**

- Every effort should be made to retain the linear integrity, flow dynamics and water quality of the drainage lines.

The following mitigation measures are proposed by the specialist:

- If the striped harlequin snake or any herpetological species are encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity.
- The contractor must ensure that no herpetofauna species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- Alien and invasive plants must be removed.
- During the construction phase there will be increased surface runoff and a decreased water quality (with increased silt load and pollution). Completing construction during the winter months would mitigate the environmental impact.

## **9. CONCLUSION**

The drainage lines near the study site (Rietspruit and a tributary of the Rietspruit), as well as their buffer zones should be considered as ecologically sensitive.

The possibility exists that at least some individuals of the striped harlequin snake occur on the study site.

The removal of exotic plants and rubble will increase the quality of the habitat.

If the development should go ahead, a very important indirect effect would be the likely impact that the proposed development might have on the water quality of the drainage lines due to surface water runoff. This could have a negative impact on the herpetofauna if not mitigated.

The study site has a low sensitivity in terms of herpetofauna.

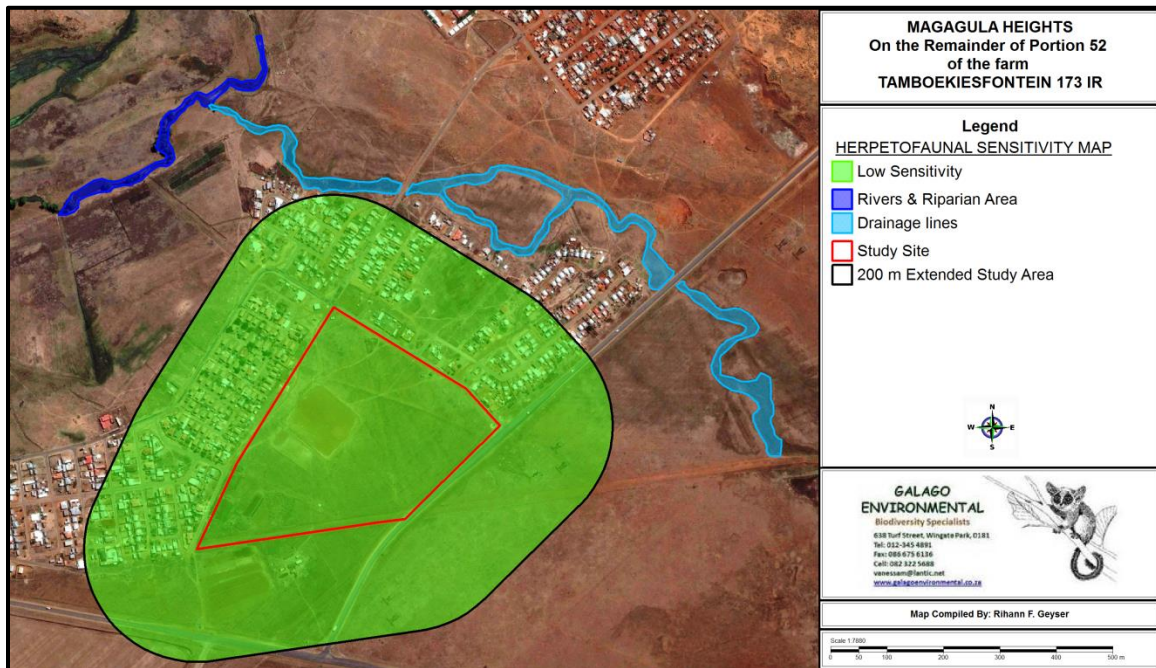


Figure 10: Herpetofaunal Sensitivity Map

## 10. LITERATURE SOURCES

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