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Mammal Habitat Assessment

of the

KYALAMI PIPELINE

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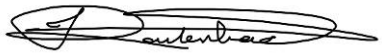
Declaration of Independence: I, Ignatius Lourens Rautenbach (421201 5012 00 5) declare that I:

- am committed to biodiversity conservation but concomitantly recognize the need for economic development. Whereas I appreciate the opportunity to also 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 proposed project "Mammal Habitat Assessment of the Kyalami Pipeline group" 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 the 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 2006



I.L. Rautenbach

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1. INTRODUCTION

Galago Environmental CC. was appointed to undertake, amongst others, a mammal habitat survey for the proposed Kyalami storm water pipeline route.

This report focuses on the reigning status of threatened and sensitive mammals likely to occur on the proposed development site. Special attention was paid to the qualitative and quantitative habitat conditions for Red Data species deemed present on the site. The secondary objective of the investigation was to gauge which mammals might still reside on the site and compile a complete list of mammal diversity of the study area.

2. SCOPE AND OBJECTIVES OF THE STUDY

- To qualitatively and quantitatively assess the significance of the mammal habitat components and current general conservation status of the property;
- Comments on ecological sensitive areas;
- Comments on connectivity with natural vegetation and habitats on adjacent sites;
- To provide a list of mammals which occur or might occur, and to identify species of conservation importance;
- To highlight potential impacts of the proposed development on the mammals 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

The proposed stormwater pipeline (study site) is intended to drain stormwater from the hard surfaces of a proposed new shopping centre on the corner of the R55 and Main Road (M71), Kyalami and will probably also drain runoff water from the R55 itself.

The major portion of the stormwater pipeline will run along existing servitudes and in road enclosures and will thus not cause any inconvenience or damage on any of the adjacent private properties. Only towards the terminal portion of the line is it scheduled to run through established smallholdings.

The start of the pipeline will be on the corner of Main Road and Hawthorne Road which leads to the security access control of the Beauliea Estate (25º 58.863'S; 28º 04.208'). The pipeline will run in a servitude in a WNW direction, initially along the Beauliea (Witpoort) Bird Sanctuary and after that along the Kyalami Golf Range. At 25º 58.719'S; 28º 03.319'E the route extends outside the Beauliea Estate and veers WSW along Rena Road, which becomes MacInnes Road once it crosses Zinnia Street. At 25º 59.188'S; 28º 02.475' the route veers WSW to traverse smallholdings such as Holdings 21 (Rem. of 20), 22, 25 and 27. The last portion of the route again runs in a road servitude (McIntyre Street), before it enters the only undeveloped portion of undeveloped grassland (25º 59.144'S; 28º 02.094') adjacent to a large dam where the stormwater will be discharged.

Nominally the site falls in the Egoli Granite Grassland veld type (Mucina and Rutherford, 2006), but that it is of academic interest since, apart from the terminal portion in the undeveloped grassland along the dam, the 500 meters along the study site is entirely transformed into residential suburbs.

The overflow of the dam which will serve as a receptacle for the stormwater runs into another dam, and the overflow of these eventually drains into the Jukskei River.

The topography of the site is typical undulating plains typical of the Highveld Grasslands of the interior.

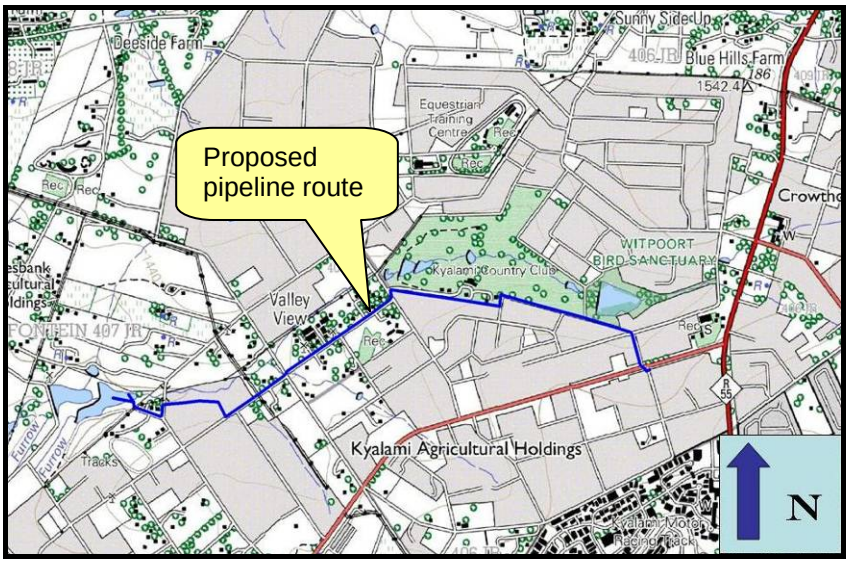

Figure 1: Locality map of the study area

4. METHODS

An eight hour site visit was conducted on 19 February 2011. During this visit the observed and derived presence of mammals associated with the recognized habitat types of the study site, were recorded. This was done with due regard to the well recorded known distributions of Southern African mammals, coupled to the qualitative and quantitative nature of recognized habitats.

The 500 meters of adjoining properties was scanned for important fauna habitats.

4.1 Field Surveys

During the site visit mammals were identified by visual sightings through random transect walks. No trapping or mist netting was conducted, as the terms of reference did not require such intensive work. In addition, mammals were also identified by means of spoor, droppings, burrows or roosting sites. Locals were interviewed to confirm occurrences or absences of species.

Three criteria were used to gauge the probability of occurrence of mammals on the study site. These include known distribution range, habitat preference and the qualitative and quantitative presence of suitable habitat.

4.2 Desktop Surveys

As the majority of mammals are secretive, nocturnal, hibernators and/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 occurrences of **mammal** species was based on their respective geographical distributional ranges and the suitability of on-site habitat. 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, 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 categorised as *medium* normally do not occur at high population numbers, but cannot be deemed as rare. A *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 categorised as *low* are generally deemed rare.

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4.3 Specific Requirements

During the visit the site was surveyed and assessed for the potential occurrence of Red Data and/or ridge and wetland-associated species such as:

Juliana's golden mole (*Neamblosomus juliana*), highveld golden mole (*Amblysomus septentrionalis*), rough-haired golden mole (*Chrysospalax villosus*), African marsh rat (*Dasymys incomtus*), Angoni vlei rat (*Otomys angoniensis*), vlei rat (*Otomys irroratus*), white-tailed rat (*Mystromys albicaudatus*), rock dormouse (*Graphiurus murinus*), forest shrew (*Myosorex varius*), other shrew species, short-eared trident bat (*Cloeotis percivali*), other cave-dwelling bats, African clawless otter (*Aonyx capensis*), spotted-necked otter (*Lutra maculicollis*), marsh mongoose (*Atilax paludinosus*).

5. RESULTS

The local occurrences of mammals are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupiculous (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of mammal species by evaluating the habitat types within the context of known distribution ranges. Sight records and information from residents or knowledgeable locals audit such deductions.

Mammal Habitat Assessment

Only two of the major habitats mentioned above, are present on the study site. These are terrestrial and to a lesser extent wetlands. The wetland consists of farrows on the smallholdings affected by the terminal end of the planned route, and the dam which will serve as a receptacle for the stormwater.

Although the Urbana of Johannesburg is now one of the largest man-made forests in the world, the trees and shrubs are mostly exotic and unsuitable for arboreal mammals (with the exception of the SA galago). The study site furthermore contains no ridges and rocky outcrops for rupiculous species.

More than 95% of the study site has been entirely transformed into a residential area complete with upmarket houses and spacious manicured gardens, a golf estate, horse paddocks and security arrangements. Two small semi-natural enclaves exists, namely around the dam on the Beauliea Bird Sanctuary and the second the large dam at the end of the route for the pipeline. The owners of the smallholdings which will temporarily be affected be the laying of the pipeline, argue that the development will affect the 'natural' areas on their properties, especially along the furrow. Considering the disturbed condition and dense stands of invader plants, this argument does not carry much weight.

The 500 meters of adjoining properties consists of more suburbs and smallholdings.

Figure 2: An easterly view over the entrance to the Beauliea Bird Sanctuary.
Note the manicured lawns. The pipeline is planned to run along the road to the outside of the sanctuary.

Figure 3: The gardens of the Beauliea Bird Sanctuary.

Figure 4: The dam which will serve as receptacle for the stormwater, with a typical equestrian centre in the foreground.

Figure 5: The only small portion of undeveloped grassland along the shores of the dam.

Expected and Observed Mammal Species Richness

The study site is either entirely transformed, or severely disturbed smallholdings. Species narrowly reliant on rupiculous or arboreal habitats were *a priori* omitted from the list of possible occurrences. These conditions are reflected in a low species diversity and population densities.

Of the 29 mammal species expected to occur on the study site (Table 1), only three were confirmed during the site visit (Table 2). It should be noted that potential occurrences are interpreted as to be possible over a period of time as result of expansion and contractions of population densities and ranges which stimulate migration.

Table 1 lists the mammals which were observed or deduced to occupy the site, or to be occasional visitors. All feral mammal species expected to occur on the study site (e.g. house mice, house rats, dogs and cats) were omitted from the assessment since these species normally associate with human settlements.

Most of the species of the resident diversity (Table 2) are common and widespread.

Apart from the bats listed few, if any, terrestrial mammals can be expected to occur in the gardens of built-up areas, and if they do it will mostly be regarded as unwelcome invaders of households. The shrews listed are often found in gardens where they nest in compost heaps.

The three vespertilionid bat species are common and widespread. They extended their respective distribution ranges by benefitting from daytime roosts provided by manmade structures such as roofs. During dusk these bats can be expected to benefit from feeding patches over water surfaces and from around outside lights attracting aerial insects.

The mammal diversity portrayed in Table 1 is due to the good refuge offered by the high grassland along the dam, and the semi-aquatic vegetation along the banks of the dam. This area will also offer refuge for the small carnivores listed, all of whom have reticent habits and thus often occur undetected in peri-urban areas.

Low diversity is due to low habitat diversity and especially the transformed state of the site and the 500 meters of adjoining properties.

Threatened and Red Listed Mammal Species

It is a remote possibility that the African marsh rat occurs along the banks of the dam. This rodent may migrate to and from this dam along the dispersal corridor formed by the dam on the study site and those downstream of it via drainage lines.

The listed shrews are not necessarily endangered. They have not been adequately studied to provide quantitative field data to accurately assign a conservation ranking, and are as a precaution thus considered as ‘Data Deficient’. The shrews operate at the apex of the food pyramid, which means that their population numbers are significantly lower than that of their prey species. Because of their diet, they are furthermore not readily trapped with conventional bait or traps, which may mean that their numbers are under-estimated.

Vlei rats are not considered as threatened, but as a result of their specialised habitat requirements are treated as ‘sensitive’. The effect of the proposed development where the drainage pipes will discharge stormwater will be temporary, and the scale of the disturbance relative to the extent of suitable habitat along the dam banks, will be negligible.

No other Red Data or sensitive species are deemed present on the study site, either since the site is too disturbed, falls outside the distributional ranges of some species, or does not offer suitable habitat(s).

Table 1: The mammals which were observed or deduced to occupy the site
(Systematics and taxonomy as proposed by Bronner et.al [2003] and Skinner and Chimimba [2005])

	SCIENTIFIC NAME	ENGLISH NAME
√	*Lepus saxatilis*	Scrub hare
√	*Cryptomys hottentotus*	African mole rat
?	*Thryonomys swinderianus*	Greater cane rat
*	*Rhabdomys pumilio*	Four-striped grass mouse
NT?	*Dasymys incomtus*	African marsh rat
*	*Mus minutoides*	Pygmy mouse
*	*Mastomys natalensis*	Natal multimammate mouse
*	*Mastomys coucha*	Southern multimammate mouse
?	*Aethomys ineptus*	Tete veld rat
*	*Otomys angoniensis*	Angoni vlei rat
*	*Otomys irroratus*	Vlei rat
?	*Gerbilliscus brantsii*	Highveld gerbil
?	*Dendromus melanotis*	Grey pygmy climbing mouse
?	*Dendromus mesomelas*	Brants' climbing mouse
?	*Dendromus mystacalis*	Chestnut climbing mouse
?	*Galago moholi*	South African galago
DD*	*Crocidura cyanea*	Reddish-grey musk shrew
DD*	*Crocidura hirta*	Lesser red musk shrew
√	*Neoromicia capensis*	Cape serotine bat
√	*Scotophilus dinganii*	African yellow house bat
√	*Scotophilus viridis*	Greenish yellow house bat
?	*Genetta genetta*	Small-spotted genet
?	*Genetta tigrina*	SA large-spotted genet
*	*Cynictis penicillata*	Yellow mongoose
*	*Galerella sanguinea*	Slender mongoose
?	*Atilax paludinosus*	Marsh mongoose
√	*Canis mesomelas*	Black-backed jackal
√	*Aonyx capensis*	African clawless otter
?	*Ictonyx striatus*	Striped polecat

√ Definitely there or have a *high* probability to occur;
***** *Medium* probability to occur based on ecological and distributional parameters;
? *Low* probability to occur based on ecological and distributional parameters.

Red Data species rankings as defined in Friedmann and Daly's S.A. Red Data Book / IUCN (World Conservation Union) (2004) are indicated in the first column: CR= Critically Endangered, En = Endangered, Vu = Vulnerable, LR/cd = Lower risk conservation dependent, LR/nt = Lower Risk near threatened, DD = Data Deficient. All other species are deemed of Least Concern.

Table 2: Mammal species positively confirmed from the study site, observed indicators and habitat.

SCIENTIFIC NAME	ENGLISH NAME	OBSERVATION INDICATOR	HABITAT
C. hottentotus	African mole rat	Tunnel system	Universal
C. mesomelas	Black-backed jackal	Reported from the natural area around the dam	Good cover for laying up during day
A. capensis	African clawless otter	Reported along the dam and furrows	Substantial body of water supporting prey, and good semi-aquatic cover.

Rodent moles are very common and widespread in SA, and have the capacity to burrow and persist in a variety of substrates. They are difficult to control. Red-

backed jackals are wily and often manage to persevere in peri-urban conditions. It is no big surprise to learn about the presence of clawless otters in and along the dam. Fish are common in the dam as well as water-bodies and wetlands between the dam on the study site and the Jukskei River.

6. FINDINGS AND POTENTIAL IMPLICATIONS

More than 95% of the pipeline will pass through built-up areas which has entirely transformed the historical natural environment of the area. Extensive use is to be made of servitudes and road camps (i.e. public domain).

Unfortunately the last section of the route is planned to cross a few smallholdings, to the distress of the owners. It is assumed that this route is followed as result of unfavourable gradients which will not allow gravitational flow of water to the dam. If this is not the case, the planners will be wise to avoid confrontation by redirecting the pipeline further along Macinnes Road to Macintyre Road and from there to the dam. However, none of the to be affected smallholdings support any sensitive habitats or mammals which in itself would warrant reconsideration.

The proposed development will not result in a loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species.

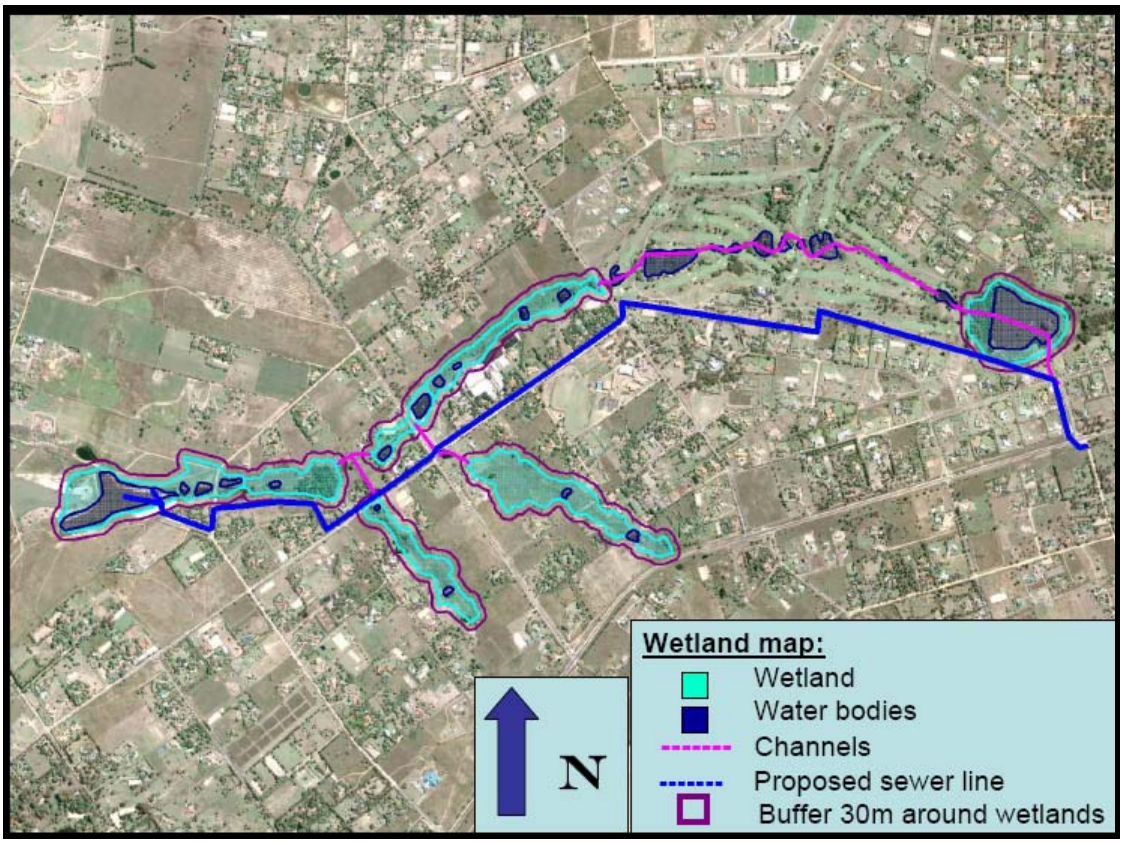

Figure 6: Habitat map showing the important wetland areas

7. LIMITATIONS, ASSUMPTIONS AND GAPS IN INFORMATION

The Galago Environmental staff is amply qualified and experienced to gauge absences or presences of species on a location such as this. The team has access to ample data bases and information resources, and has earlier conducted numerous intensive field surveys allowing the extrapolation of habitat diversity and quality into species occurrences. In this instance an intensive survey is deemed an expensive and fruitless experience with no or little chance of altering the opinion presented here.

Even though every care is taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time and budget. Discussions and proposed mitigations are to some extent made 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 Environmental can thus not accept responsibility for conclusions and mitigation measures made 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

It is recommended that the trench must be filled as soon as possible and the topsoil replaced.

The only small natural section to be affected is the grassland along the dam, and to a lesser extent the disturbed small natural areas in the small-holdings. A trench is a temporary condition, and when properly refilled and leveled, will not result in any lasting environmental damage.

9. CONCLUSION

The study area is not considered sensitive in terms of mammals. It is taken for granted that the construction of the pipeline is inevitable. The fact that most of the pipeline route follows servitudes and road camps is laudable. Some temporary damage will be caused in the to be affected smallholdings, but the state of conservation of natural areas here leaves much to be desired in any case.

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