Proposed continuous disposal of ash at the MAJUBA power station

SPECIALIST AVIFAUNAL IMPACT ASSESMENT

SCOPING REPORT
September 2012

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EXECUTIVE SUMMARY

Eskom Holdings SOC (Ltd) is proposing to continue disposing of ash at the Majuba Power Station ash disposal facilities. Lidwala Consulting Engineers were appointed by Eskom Holdings SOC Ltd to undertake an Environmental Impact Assessment and Waste Management Licencing for the proposed project and the Endangered Wildlife Trust (EWT) was subsequently appointed as an avifaunal specialist.

In general, the site has moderate to high sensitivity in terms of Avifauna. Of the 17 red listed species identified in the SABAP 1 data, only 7 species have again been recorded in the SABAP 2 data for the pentads examined. To date, the most important species identified that may be impacted upon are Blue Korhaan, Blue Crane, Southern Bald Ibis, Greater Flamingo, Secretary Bird, White Stork, Lesser Kestrel, Botha's Lark and Rudd's Lark. The greatest impact of the proposed project is likely to be that of habitat destruction, while leachate from fly ash, into water systems used by avifauna is also of concern. Possible impacts of associated infrastructure (e.g. roads, power lines, conveyors, pollution control dams, pipelines and pump stations) will be assessed upon completion of the scoping phase, however collisions are expected to be the largest impact of associated power lines. Sensitive areas have been mapped, within which the above mentioned collision mitigation must be implemented.

It was concluded that the project has no fatal flaws in terms of avifauna at this stage, and the EIA phase may commence. Recommendations and actions for the EIA study include a detailed site visit, updating of SABAP2 data, a rating of impacts, and the sensitivity map will be "fine tuned" and revised if necessary.

DECLARATION OF INDEPENDANCE

Specialist Investigator

Andrew Pearson is employed by the Endangered Wildlife Trust's Wildlife and Energy Programme as a specialist investigator for conducting avifaunal specific specialist reports. Andrew has a Four Year BSc in Conservation Ecology, certificates in Environmental Law, as well as five years experience in the environmental management field. The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information.

Declaration of Independence

All specialist investigators specified above declare that:

- We act as independent specialists for this project.
- We consider ourselves bound by the rules and ethics of the South African Council for Natural Scientific Professions.
- We do not have any personal or financial interest in the project except for financial compensation for specialist investigations completed in a professional capacity as specified by the Environmental Impact Assessment Regulations, 2010.
- We will not be affected by the outcome of the environmental process, of which this report forms part of.
- We do not have any influence over the decisions made by the governing authorities.
- We do not object to or endorse the proposed developments, but aim to present facts and our best scientific and professional opinion with regard to the impacts of the development.
- We undertake to disclose to the relevant authorities any information that has or may have the potential to influence its decision or the objectivity of any report, plan, or document required in terms of the Environmental Impact Assessment Regulations, 2010.
- Should we consider ourselves to be in conflict with any of the above declarations, we shall formally submit a Notice of Withdrawal to all relevant parties and formally register as an Interested and Affected Party.

Terms and Liabilities

- This report is based on a short term investigation using the available information and data related to the site to be affected. No long term investigation or monitoring was conducted.
- The Precautionary Principle has been applied throughout this investigation.
- The specialist investigator, and the Endangered Wildlife Trust, for whom he/she works, does not accept any responsibility for the conclusions, suggestions, limitations and recommendations made in good faith, based on the information presented to them, obtained from these assessments or requests made to them for the purposes of this assessment.
- Additional information may become known or available during a later stage of the process for which no allowance could have been made at the time of this report.
- The specialist investigator withholds the right to amend this report, recommendations and conclusions at any stage should additional information become available.
- Information, recommendations and conclusions in this report cannot be applied to any other area without proper investigation.
- This report and all of the information contained herein remain the intellectual property of the Endangered Wildlife Trust.
- This report, in its entirety or any portion thereof, may not be altered in any manner or form or for any purpose without the specific and written consent of the specialist investigator as specified above.
- Acceptance of this report, in any physical or digital form, serves to confirm acknowledgment of these terms and liabilities.

Signed on the 28th September 2012 by Andrew Pearson in his capacity as specialist investigator for the Endangered Wildlife Trust's Wildlife and Energy Programme.

INTRODUCTION

Background

Eskom Holdings SOC (Ltd) is proposing to continue disposing of ash at the Majuba Power Station ash disposal facilities. Lidwala Consulting Engineers were appointed to undertake an Environmental Impact Assessment for the proposed project and the Endangered Wildlife Trust (EWT) was subsequently appointed as an avifaunal specialist. For this scoping phase a short, high level site visit to the general study area was conducted on the 26th July 2012. This avifaunal study used a set methodology (discussed elsewhere) as well as various data sets. The focal species for the study were determined, and then, by looking at the focal species which could occur in the area, as well as assessing the availability of bird micro habitats, the possible impacts of the development were then assessed. In general terms, the impacts that could be associated with a project of this nature include habitat destruction, disturbance of sensitive bird species, and the contamination of water sources used by birds. Associated infrastructure such as powerlines may also pose collision and electrocution risks to avifauna.

Terms of reference

No specific terms were provided, and therefore the following standard EWT terms of reference were utilized for this study:

- Describe the current state of avifauna in the study area, outlining important characteristics which may be influenced by the proposed infrastructure or which may influence the proposed infrastructure during construction and operation.
- Identify Red Data species potentially affected by the proposed power lines and substation.
- Identify potential impacts (positive and negative, including cumulative impacts if relevant) of the proposed development on avifauna during construction and operation.
- Identify mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks.
- Identify and address any other aspects related to avifauna in the study area that should be incorporated into the reports.

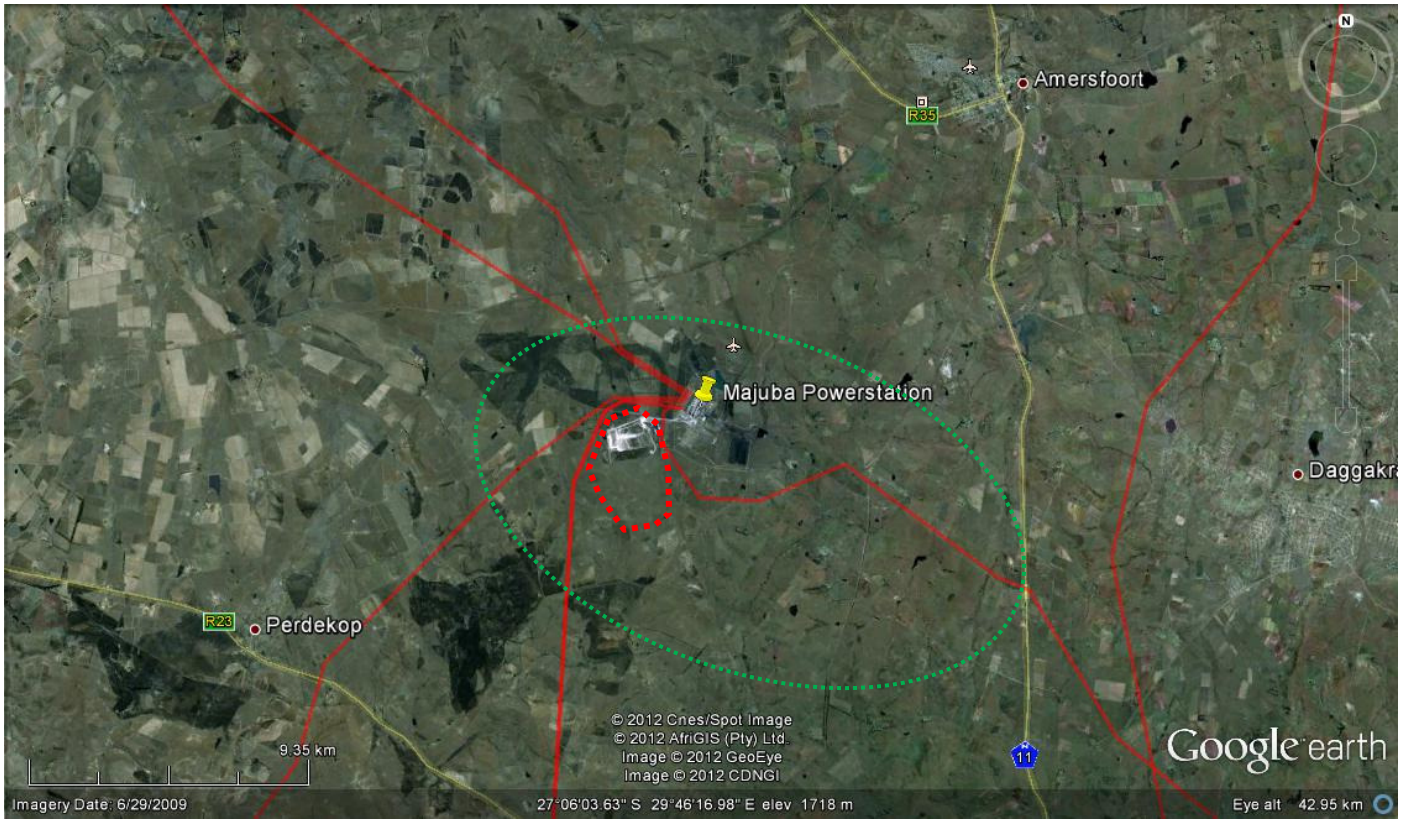

Figure 1: Google Earth image showing the approximate location of the proposed ash disposal facility extension (circled in red), as well as the broader study area (circled in green) within which the scoping site visit took place. Major roads and towns are also shown.

METHODS

Methodology

The methodology used to predict impacts in the current study was as follows:

- The various data sets discussed below under "sources of information" were collected and examined.
- The data was examined to determine the location and abundance of power line sensitive Red Data species as well as non-Red Data power line sensitive species in the study area.
- The general study area was visited to obtain a first-hand perspective of the proposed route and birdlife, and to determine which bird micro-habitats are present and relevant to the study. This involved driving the study area, taking photographs, and walking certain accessible areas. The properties, on which

the proposed ash disposal facility is to be extended, were not accessible at this stage.

- 4 Observation Points (OP) were randomly chosen, all in the near vicinity of the proposed project. A 30 minute point count was conducted at each OP, recording all species seen or heard, as well as the numbers thereof.
- A desk top examination, using Google Earth imagery was done to assist in the identification of possible sensitive areas.
- The impacts of the proposed development on birds were predicted.
- Recommended mitigation measures for significant impacts were proposed.

Sources of information

The study made use of the following data sources:

- Bird distribution data of the Southern African Bird Atlas Project (SABAP – Harrison, Allan, Underhill, Herremans, Tree, Parker & Brown, 1997) obtained from the Avian Demography Unit of the University of Cape Town, in order to ascertain which species occur in the study area.
- The conservation status of all bird species occurring in the aforementioned degree squares was then determined with the use of The Eskom Red Data book of birds of South Africa, Lesotho and Swaziland (Barnes, 2000).
- The Southern African Bird Atlas Project 2 data for certain pentads in the study area was examined.
- Data from the Co-ordinated Waterbird Count (CWAC) project was also consulted to determine whether any CWAC sites exist in the study area (Taylor, Navarro, Wren- Sargent, Harrison & Kieswetter, 1999). Updated CWAC data were obtained from the Animal Demography Unit, University of Cape Town.
- The Important Bird Areas of southern Africa (IBA) project data (Barnes 1998) was consulted to determine its relevance to this project.
- A classification of the vegetation types in the study area was obtained from Mucina and Rutherford (2006).
- Land Cover 2009 (CSIR) data was mapped, in order to assist in identifying the dominant forms of land use in the area.
- Information on the micro-habitat level was obtained through visiting the area and obtaining a firsthand perspective.
- Electronic 1:50 000 maps were obtained from the Surveyor General.
- Satellite Imagery of the area was studied using Google Earth ©2012.

Limitations & assumptions

This study made the assumption that the above sources of information are reliable. The following factors may potentially detract from the accuracy of the predicted results:

- The SABAP-1 data covers the period 1986-1997. Bird distribution patterns fluctuate continuously according to availability of food and nesting substrate. (For a full discussion of potential inaccuracies in ASAB data, see Harrison, Allan, Underhill, Herremans, Tree, Parker & Brown, 1997).
- The site visit was conducted in late winter, over which time various species may not have been present in the study area
- During the site visit, it was not yet possible to access the actual proposed Ash disposal facility extension site.
- Google Earth Imagery may not always reflect the true situation on the ground, as some images may be outdated.
- Predictions in this study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can not be reduced to formulas that will hold true under all circumstances. However, power line impacts can be predicted with a fair amount of certainty, based on experience gained by the EWT through the investigation of hundreds of localities in southern Africa where birds have interacted with Eskom infrastructure since 1996.

DESCRIPTION OF AFFECTED ENVIRONMENT

Study area vegetation and Land use

While this report is an avifaunal specialist report, vegetation and micro habitats are very important in determining avifaunal abundances and likelihood of occurrences. As such, a map has been produced below (Figure 2) showing the vegetation classification of the broader area (Mucina & Rutherford, 2006). The dominant vegetation type in the study area is "Amersfoort Highveld Clay Grassland", within which the entire site falls. This vegetation type falls within the Mesic Highveld Grassland Bioregion and forms part of the greater Grassland Biome. It extends in a north-south band from just south of Ermelo, down through Amersfoort to the Memel area at altitudes of 1 580–1 860 m. Other prominent vegetation types in the broader study area include "Soweto Highveld Grassland", "Bloemfontein Karroid

Shrubland" and "Wakkerstroom Montane Grassland", all of which also fall within the greater Grassland Biome. It is widely accepted in ornithological circles that vegetation structure is more important in determining bird species abundance than vegetation species composition (in Harrison et al, 1997). Thus the land use (Figure 3) and microhabitats were considered to determine what species may occur and where they are likely to occur.

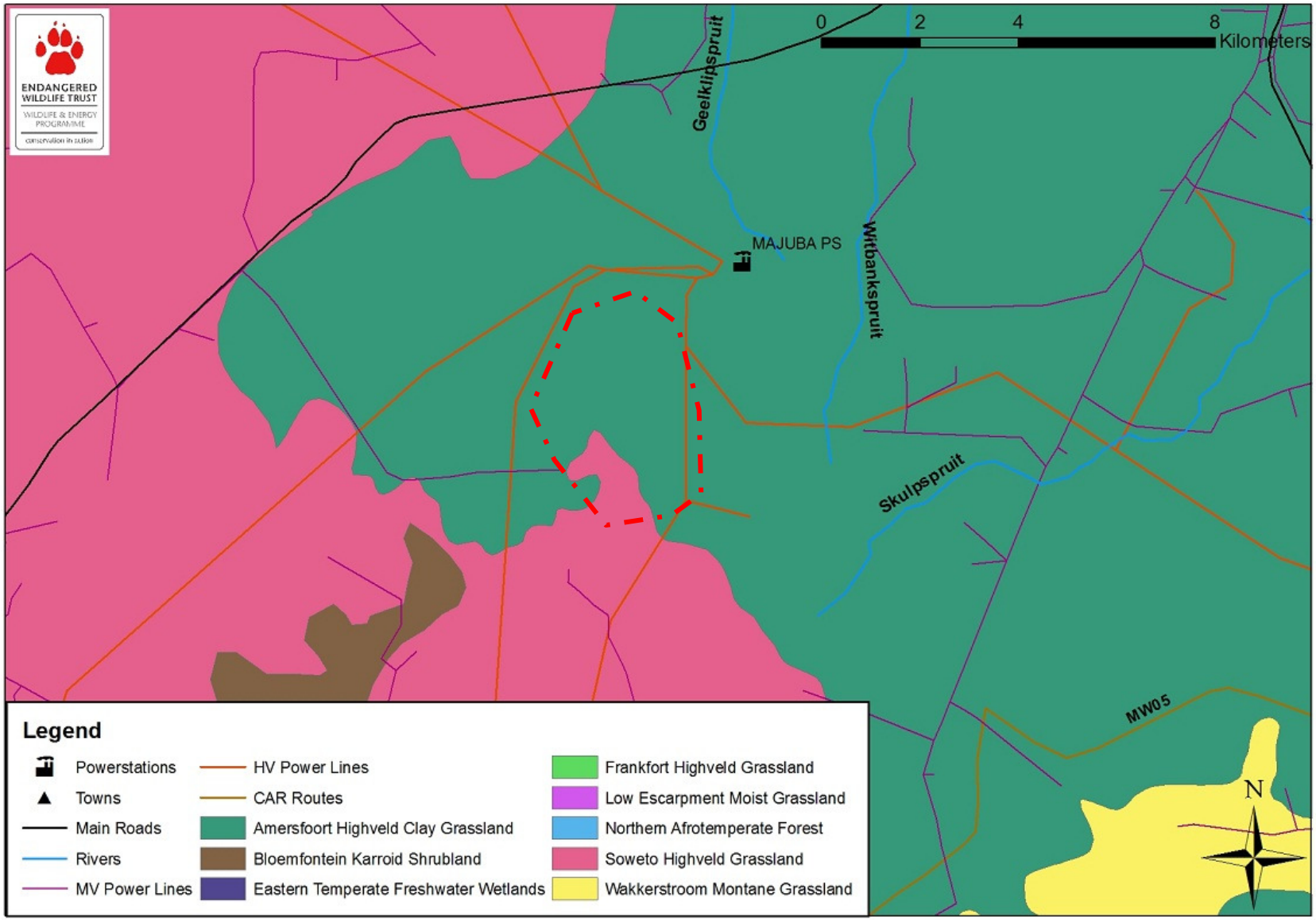

Figure 2: Vegetation classification (Mucina & Rutherford 2006), as well as existing electrical infrastructure, CAR routes, Rivers and Main Roads. Red polygon indicates the approximate position of the proposed project.

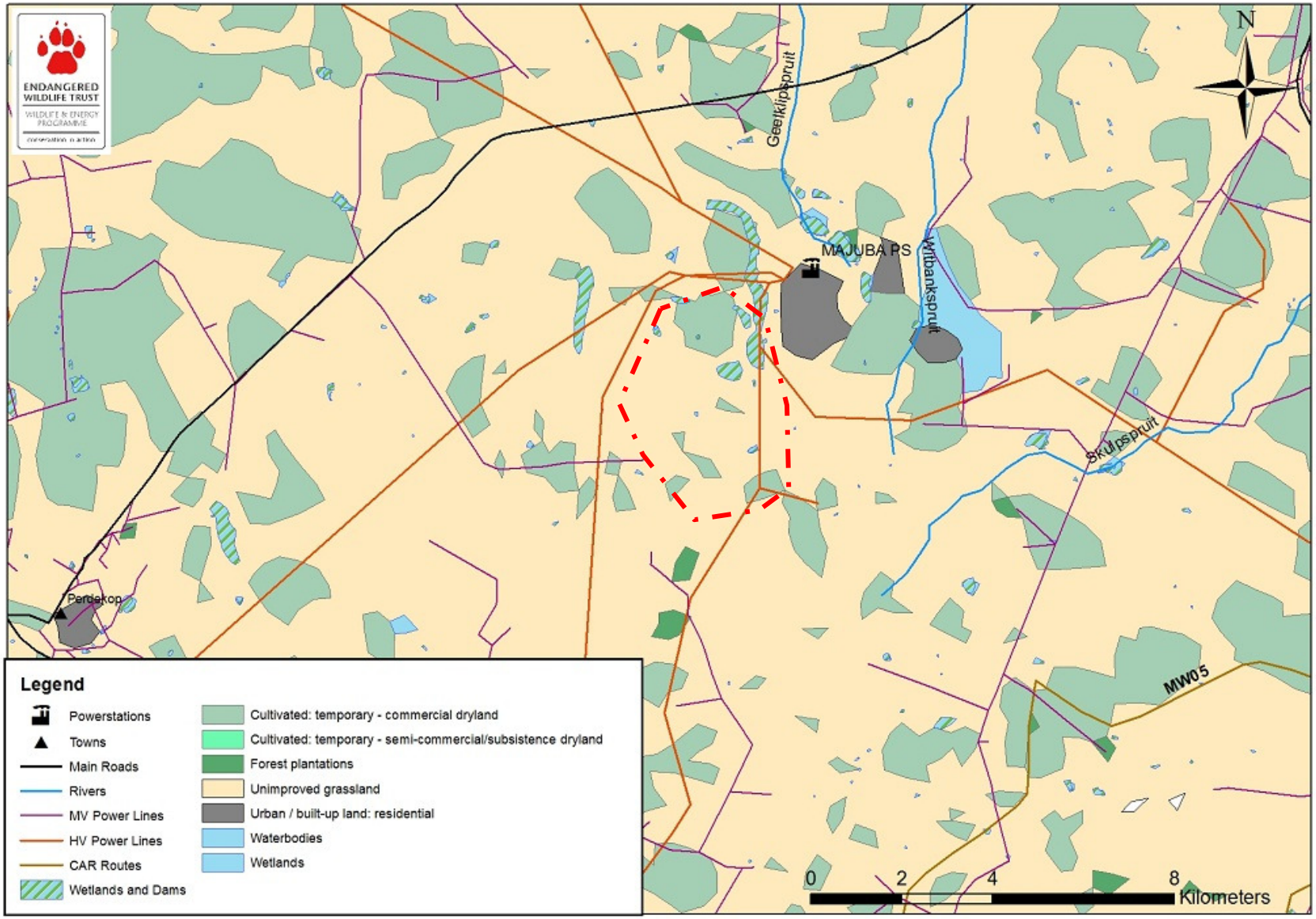

Figure 3: Wetlands and dams as well as Land Cover (CSIR2009) in the broader study area. Red polygon indicates the approximate position of the proposed project.

Bird micro habitats

In addition to the description of vegetation, it is important to understand the habitats available to birds at a smaller spatial scale, i.e. micro habitats. Micro habitats are shaped by factors other than vegetation, such as topography, land use, food sources and man-made factors. Investigation of this study area revealed the following bird micro habitats.

Arable and/or cultivated lands

Arable or cultivated lands can represent significant feeding areas for many bird species in any landscape for the following reasons: through opening up the soil surface, land preparation makes many insects, seeds, bulbs and other food sources readily accessible to birds and other predators; the crop or pasture plants cultivated are often eaten themselves by birds, or attract insects which are in turn eaten by birds; during the dry season arable lands often represent the only green or attractive food sources in an otherwise dry landscape. Relevant bird species that may be attracted to these areas include most importantly the Blue Crane, Grey Crowned Crane, Southern Bald Ibis, Blue Korhaan and White Stork.

Figure 4: Agricultural lands.

Open Grasslands:

As can be seen from the earlier discussion regarding vegetation types, the major vegetation types present all fall within the greater Grasslands Biome. It was not surprising, therefore, that the most extensive bird microhabitat available on this site, is that of Grassland (see figure 5). Grasslands represent a significant foraging and/or hunting area for many bird species. Grassland may attract the Blue Crane, Grey Crowned Crane, Southern Bald Ibis, Blue Korhaan, White-bellied Korhaan, Secretarybird, Denham's Bustard, Black-winged Pratincole, and White Stork, although most of these species would tend to avoid grassland patches in close proximity to human disturbance. Pristine patches of grassland, near to water, may provide breeding habitat for the African Grass Owl. The grassland patches are also a favourite foraging area for game birds such as francolins and Helmeted Guineafowl, as well as being hunting habitat for raptors such as African Marsh Harrier, Lanner Falcon, Lesser Kestrel, Amur Falcon and Black-shouldered kite. Important to this study is that two sensitive species, Rudd's Lark (Critically Endangered) and Botha's Lark (Endangered), have been recorded in the quarter degree squares (SABAP1 data) examined and both species are grassland species (Figures 8 and 9).

Figure 5: Relatively undisturbed grassland observed in the broader study area.

Dams:

Dams have become important attractants to various bird species in the South African landscape. Various waterfowl, such as Spur-winged geese, Egyptian geese, and numerous duck species, may frequent these areas and are vulnerable to collision with power lines, where the dams are in close proximity or on-route to dams. More importantly, Blue Cranes use dams to roost in communally, and Flamingos may use these areas as stop over points while moving between larger water bodies. Various Storks may also frequent these water bodies. Numerous dams were observed in the study area, of varying sizes, and varying importance to avifauna. A pair of Blue Cranes as well as a flock of 40 Greater Flamingos were observed at a particular dam (27^0 06' 05.8"S 29^0 41' 33.1" E) in the study area during the site visit (see figure 6).

Figure 6: A dam in the study area where both Greater Flamingos and Blue Cranes were observed.

Wetlands and Rivers or drainage lines:

Wetlands and rivers can be very attractive micro habitats for birds as well as habitats for water birds etc. In this area species such as Greater Flamingo, Lesser Flamingo, Yellow-billed Stork and Caspian Tern are attracted to water. The Blue Crane and Grey-Crowned Crane are also known to occur near vleis, pans and inland water sources. Non Red Data species may also occur in these areas for example herons.

Rivers in their true form represent important habitat for many species, including Black Stork and a variety of other water birds, while the wooded riparian habitat along a river may provide habitat for various species such as the Hamerkop, African Darter, various cormorants, kingfishers, bee-eaters, robin-chats and numerous smaller species.

Small rivers are represented in the study area by the Geelklipspruit, Witbankspruit and Skulpspruit (Figureig 2). Numerous smaller drainage lines, some of which do not always carry water are also present in the broader area. An unnamed "spruit" and associated wetland is present on the eastern side of the proposed disposal facility continuation. Drainage lines, as well as all of the Rivers/"Spruite" discussed above, may serve as flight paths for several bird species.

Stands of Alien vegetation:

Patches of alien trees were observed throughout the study area, often associated with a farm stead, or along farm roads. These areas will mostly be important to physically smaller bird species. These also provid perching, roosting and nesting habitats for various raptor species and larger birds such as francolins, Guineafowl, Herons and Hadeda Ibises.

Figure 7: A stand of Alien Trees associated with a farm access road in the study area.

Table 1 below shows the micro habitats that each Red Data bird species typically frequents in the study area. It must be stressed that birds can and will, by virtue of their mobility, utilise almost any areas in a landscape from time to time. However, the analysis in Table 1 represents each species' most preferred or normal habitats. These locations are where most

of the birds of that species will spend most of their time – so logically that is where impacts on those species will be most significant.

Relevant bird populations

The relevant bird populations that have been reported by the South African Bird Atlas Project (1 and 2) can be found below in Tables 1 & 2. In addition the preferred habitat as well as likelihood of occurrence can be seen in the last two columns of Table 1. This likelihood of occurrence is done with precaution at this initial scoping stage, and will be updated once the specialist has accessed the site, during the EIA phase. Report rates are essentially an expression of the number of times a species was recorded in a either a pentad or a quarter degree square, as a percentage of the number of times that square was counted. A report rate of 0 means that the species was recorded in the square, but at a very low frequency. It is important to note that these species could have been recorded anywhere in the square, and not necessarily in the exact study area.

Table 1: Red Data species report rates for the two quarter degree squares which cover the study area-SABAP 1 (Harrison *et al*, 1997)

Total Cards		42	62		
Total Species		165	162		
Total Breeding Species		19	31		
Name	**Conservation status**	**2729BA**	**2729BB**	**Habitat**	**Likelihood of occurrence**
Rudd's Lark	CR		5	High-altitude and montane grassveld above about 1700 m, usually on crowns and ridges without rocks and with dense grass cover up to 50 cm tall	Possible
Botha's Lark	EN		6	Heavily grazed grassy uplands in sour grassveld (avoids valley bottoms, vleis, pastures, cultivated lands and rocky areas).	Possible
Southern Bald (Bald) Ibis	VU	14	24	High grassveld (especially after burning), heavily grazed pastures, cultivated lands; breeds in mountainous or highly dissected country	Possible
African Marsh-Harrier	VU	10	5	Marsh, vlei, grassland (usually near water); may hunt over grassland, cultivated lands and open savanna	Possible
Lesser Kestrel	VU	2	3	Open grassveld, mainly on highveld, usually near towns or farms	Possible
Blue Crane	VU	2	13	Midland and highland grassveld, edge of karoo, cultivated land, edges of vleis	Possible
Grey Crowned- (Crowned) Crane	VU	2	3	Marshes, vleis, moist grasslands, cultivated fields	Possible
White-bellied Korhaan	VU	2	2	Open grassland; sometimes in sparse *Acacia* thornveld	Possible
Denham's (Stanley's) Bustard	VU		2	Montane and highland grassveld, savanna, karoo scrub	Possible
Yellow-billed Stork	NT	5		Mainly inland waters; rivers, dams, pans, floodplains, marshes; less often estuaries	Possible
Greater Flamingo	NT	7	3	Large bodies of shallow water, both inland and coastal; saline and brackish waters preferred	Possible
Lesser Flamingo	NT	2		Larger brackish or saline inland and coastal waters	Possible
Secretarybird	NT	2	5	Semidesert, grassland, savanna, open woodland, farmland, mountain slopes	Possible
Blue Korhaan	NT	21	52	Open grassveld, karoo scrub, cultivated lands	Likely
Black-winged Pratincole	NT	2	3	Open grassland	Possible
Caspian Tern	NT	2		Estuaries, marine shores, larger inland dams and pans	Possible
Lanner Falcon	NT		3	Mountains or open country from semidesert to woodland and agricultural land; also cities (Durban, Harare).	Possible
White Stork	Bonn	7	6	Highveld grasslands, mountain meadows, cultivated lands, marshes, karoo	Likely

CR = Critically Endangered; EN = Endangered; V = Vulnerable; NT = Near-threatened; Bonn = Protected Internationally under the Bonn Convention on Migratory Species.

Southern African Bird Atlas Project 2

SABAP 2 data for the pentads (2705_2940 and 2705_2945) in the study area was examined, and in general the area is poorly counted. Pentads 2700_2945, 2700_2940 and 2700_2950 were also considered due to their close proximity to the site. Table 2 below shows report rates, based on the number of cards submitted, for the Red Data species identified during SABAP2 counts. Interestingly, of the 17 red listed species identified in the SABAP 1 data, only 7 species have again been recorded in the SABAP 2 data for the pentads examined. This however, does not necessarily mean that these species do not occur here, or that they have moved from the area, post SABAP1, but may merely be due to the low counting effort of the pentadsor selective micro habitat counting by the SABAP2 field counters. White Stork, protected through the Bonn Convention, was recorded in both data sets. Rudd's Lark was not recorded in the pentads examined, while Botha's Lark was recorded in one of the five pentads, with only one record from that pentad (which in fact does not incorporate the site). Blue Korhaan was recorded in four pentads, and was observed in the area during the site visit.

Table 2: Report rates from Southern African Bird Atlas Project 2 (SABAP2) as of 22/08/2012.

Species	**Cons. status**	**Pentad Report Rate (%)**				
		2705_2945	2705_2940	2700_2945	2700_2940	2700_2950
No Cards		*2*	*2*	*3*	*1*	*4*
Total Species		*68*	*51*	*70*	*35*	*80*
Botha's Lark	EN	-	-	33.3	-	-
Lesser Kestrel	VU	50	-	-	100	-
Southern Bald Ibis	VU	-	-	-	-	25
Blue Crane	VU	-	-	-	-	25
Secretarybird	NT	50	-	-	incidental	-
Blue Korhaan	NT	50	50	100	-	75
White Stork	Bonn	-	-	33.3	-	25

CR = Critically Endangered; EN = Endangered; V = Vulnerable; NT = Near-threatened; Bonn = Protected Internationally under the Bonn Convention on Migratory Species.

Important Bird Areas (IBA's)

The site where continuous ashing is proposed falls within an Important Bird Area (IBA), namely the *Grassland Biosphere Reserve (SA020)* and while this is not a formally declared and legally protected area it is an important conservation area to birds for the following reasons: This area holds a significant portion of South Africa's population of the globally

endangered White-winged Flufftail. Corncrake, Little Bittern, Baillon's Crake, Red-chested Flufftail, African Rail, and breeding populations of African Marsh Harrier also occur in wetlands of the area. All three crane species occur in this IBA. Approximately 85 % of the global population of Rudd's Lark is thought to occur inside this IBA. Botha's Lark also occurs in this IBA and both species may occur in the grasslands that are also found in this site. The largest Bald Ibis breeding colony in the world also occurs inside this IBA. There are a host of other species that occur inside this IBA and for a full discussion of the IBA see Barnes, 1998, page 83. Furthermore, the project site also lies approximately 14km south of the southern boundary of another IBA, the *Amersfoort-bethal-carolina District (SA018)*. This IBA is known to hold a large proportion (>10%) of the global population of the endangered Botha's Lark (Barnes 1998). This species favours short dense, natural grassland found on plateaus and upper hill slopes. The Globally threatened Wattled Crane was listed as a vagrant to this IBA, while other key listed species recorded in this IBA include Southern Bald Ibis, Lesser Kestrel, Blue Crane, African Grass Owl, Lanner Falcon and Blackwinged Lapwing.

Figure 8: The Critically Endangered Rudd's Lark

Figure 9: The Endangered Botha's Lark

Coordinated Avifaunal Road-count (CAR) data

Large and conspicuous birds offer the opportunity to monitor their populations by means of a relatively simple technique known as the "road count", in which observations are made from vehicles covering fixed routes. In 2003, the Avian Demography Unit (ADU) published a major 200-page report (Big birds on farms: Mazda CAR Report 1993-2001) summarizing the information collected over the first eight years of this project. This report has accounts for 15 species and 17 precincts, and is the source of the following information:

CAR route MW05 has relevance to the study and runs to the south and east of the project area. The route falls within the Wakkerstroom Precinct. This precinct has an exceptional diversity of large terrestrial birds, including several Red Data Book species, namely all three crane species, Denham's Bustard, Blue Korhaan, White-bellied Korhaan, Black-bellied Korhaan, Southern Bald Ibis and Secretarybird. However, only the following species were recorded along route MW05: Grey-crowned Crane, White Stork, Blue Korhaan and Southern Bald Ibis.

Coordinated Waterbird count (CWAC) data

There are no CWAC sites within close proximity (i.e. within 10 km) to the site. The nearest two sites are Fickland Pan and Wim Rabe Pan (see figure 10 below) both of which are approximatey 31km from Majuba power station. These sites are briefly discussed below. Avifaunal data from these sites may be useful in providing a better understanding of the species present in the broader vicinity of the study site, however, data from these sites is quite out dated, and therefore used with precaution.

Fickland Pan

This 25 ha seasonal pan was counted only in summer 1992 and winter 1997. Good numbers of Dabchick, Black-headed Heron and Maccoa Duck were recorded during the winter count, while in summer Glossy Ibis, Yellowbilled Duck and Redbilled Teal were numerous. The most significant observation was the large number of Redknobbed Coot counted on both visits. Greater Flamingo and Grey Crowned Crane were also recorded here.

Wim Rabe Pan

Only one count is available for this pan, from summer 1992, when 22 waterbird species were recorded, including good numbers of Dabchick, Yellowbilled Duck, Redknobbed Coot and Little Stint.

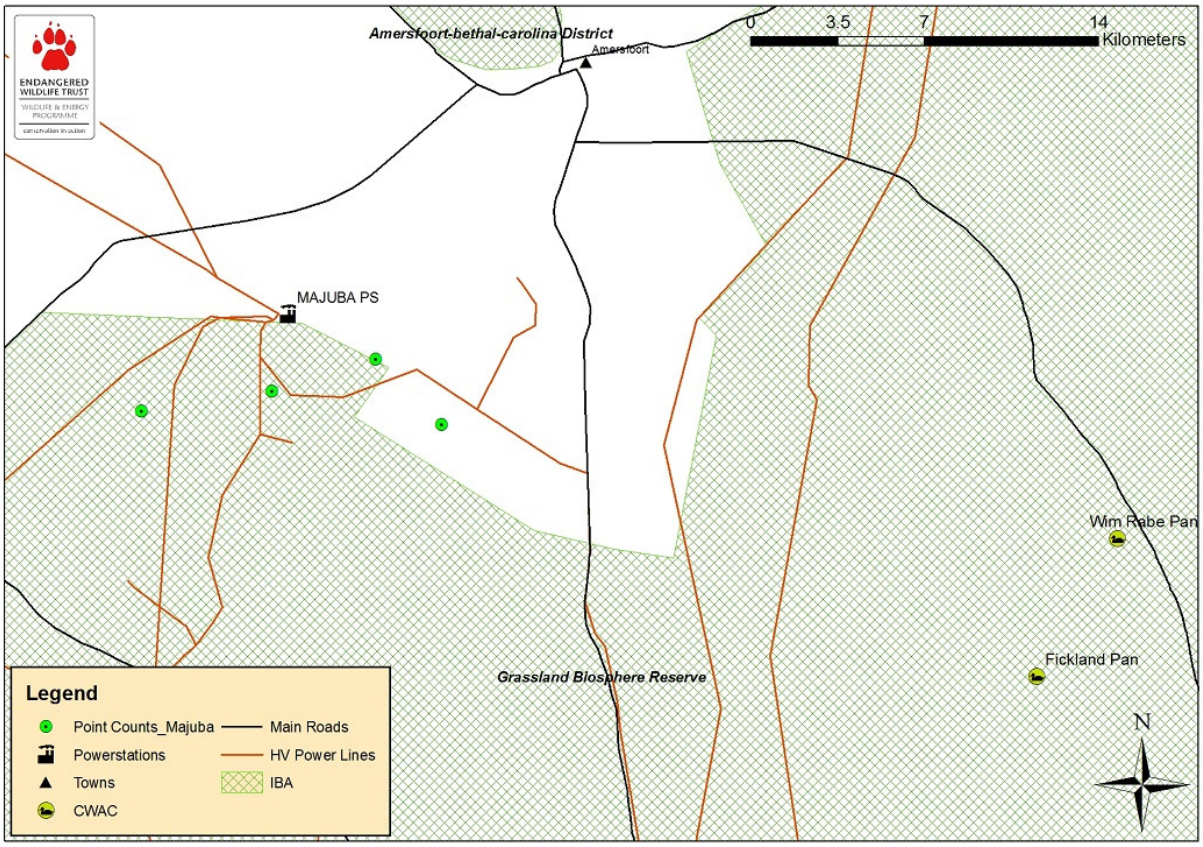

Figure 10: Map showing IBA's, CWAC sites, as well as the position of the Point Counts conducted during the site visit.

Personal observations

Table 3 below shows the results of the point counts conducted in the study area during the site visit. Four (4) Observation Points (OP) were randomly chosen, all in the near vicinity of the proposed project. A 30-min point count was conducted at each OP, recording all species seen or heard, as well as the numbers thereof. The location of these point counts can be seen in Figure 10 above. Data from this table needs to be used with caution, as observations over such a short period, in one season, and in fairly similar weather conditions cannot be taken as a true indication of the presence of bird species in the area. In particular, the target species for this study are threatened, rare species, so the likelihood of seeing one during a point count is limited. This study has therefore attached far more weight to the secondary data sources such as the bird atlas projects (SABAP1 and SABAP2) which collected data over a far longer period, and more diverse conditions. It must be noted that many "non Red Data" bird species also occur in the study area and could be impacted on by the power line. Although this impact assessment focuses on Red Data species, the impact on non Red Data species is also assessed, albeit in less detail. Furthermore, much of the mitigation recommended for Red Data species will also protect non Red Data species in the study area.

Table 3: Results of the Point Count exercise, as well as species observed incidentally on site during the site visit.

Observation Point	**OP 1**	**OP 2**	**OP 3**	**OP 4**	**Incidental**
Predominant habitat	*Grassland and Road edge*	*Dam and drainage line; grassland*	*grassland*	*Grassland and pastures*	
Specie observed:					
Cape Turtle Dove	2	H	4		X
Helmeted Guinaefowl	H				X
African Stonechat	3	1	1	4	X
Long-tailed Widowbird	7		3		
Cape Longclaw	2	2	1	2	X
Egyptian Goose	2	4			X
Three-banded Plover		3			
Cape Wagtail		1			X
Blacksmith Lapwing		2		1	X
African Snipe		3			
Common Waxbill		10			
Common Fiscal		2	1	1	X
Cape Sparrow		2			X
Blue Korhaan		4			X
Blue Crane		H			X
Levaillant's Cisticola			1		
Ant-eating Chat				2	X
Grey Heron				1	X
Brown-throated Martin				15	
African Pipit				2	
Marsh Owl					X
Red-capped Lark					X
Black-shouldered Kite					X
White-breasted Cormorant					X
Greater Flamingo					X

The figures in the table refer to the number of individuals of that particular species recorded during the point count H = Heard and therefore number unknown. X = species recorded in study area, outside of point count time frames, but numbers not recorded.

Focal Species List

The focal species for this study, i.e. the most important species to be considered, will be updated following more detailed site investigations during the EIA phase of the project. At this stage, after examining all the above data sources, the resultant list of 'focal species' is as follows: **Blue Korhaan, Blue Crane, Southern Bald Ibis, Greater Flamingo, Secretary Bird, White Stork, Lesser Kestrel, Botha's Lark and Rudd's Lark.** In some cases, these species serve as surrogates for other similar species (as mitigation will be effective for both), examples being White Stork for Yellow-billed Stork, Greater for Lesser Flamingo, and Blue Crane for Grey-Crowned Crane. Assorted more common species will also be relevant to this study, but it is believed that the above focal species will to a large extent serve as surrogates for these in terms of impact assessment and management.

ASSESSMENT OF IMPACTS

Predicted Impacts of Ash Disposal Facilities

The greatest predicted impacts of ash disposal facilities on avifauna are the destruction of habitat and disturbance of birds during construction. During the construction phase, habitat destruction and alteration inevitably takes place. Habitat destruction is anticipated to be the most significant impact in this study area. However, this can be minimized and mitigated to some extent by avoiding more sensitive areas where possible. Similarly, the above mentioned construction and maintenance activities impact on birds through disturbance, particularly during bird breeding activities. Disturbance of birds is anticipated to be of lower significance than habitat destruction. Leachate from fly ash disposal facilities can contain heavy metals (Theism and Marley, 1979) which could result in contamination of surrounding water sources, used by water birds in the study area. Correct placing of the new disposal facility, away from wetlands, dams and water bodies, will help to mitigate this impact.

In addition to the continuous disposal of ash at the of the ash disposal facility the project will also include the expansion of the relevant infrastructure associated with the ashing system, such as pipelines, storm water trenches, seepage water collection systems, pump stations, seepage dams etc. The impacts of such associated infrastructure on avifauna are predicted to be minimal, so long as the infrastructure is within the proposed ash disposal facility footprint. Infrastructure outside of the proposed footprint will be assessed in the EIA phase of the project, upon determination of the preferred site. If any additional linear infrastructure, especially power lines, is to be constructed, the EWT will assess the impact thereof, once the routings have been made known. Below follows a brief description of impacts that may be associated with powerlines (should these be required as part of the proposed project):

General description of impacts of power lines on birds

Because of its size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in southern Africa are electrocution of birds (and other animals) and birds colliding with power lines (Ledger 1983; Verdoorn 1996; Kruger 1999; Van Rooyen 2000). Other problems are electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure, (Van Rooyen & Taylor 1999) and disturbance and habitat destruction during construction and maintenance activities.

Electrocutions

Electrocution of birds on overhead lines is an important cause of unnatural mortality of raptors and storks. It has attracted plenty of attention in Europe, USA and South Africa (APLIC 1994). Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2004). Electrocution is possible on 132kV lines or lower, depending on the exact pole structure used.

Collisions

Collisions are the biggest single threat posed by transmission lines to birds in southern Africa (van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (van Rooyen 2004, Anderson 2001). Unfortunately, many of the collision sensitive species are considered threatened in southern Africa. The Red Data species vulnerable to power line collisions are generally long living, slow reproducing species under natural conditions. Some require very specific conditions for breeding, resulting in very few successful breeding attempts, or breeding might be restricted to very small areas. These species have not evolved to cope with high adult mortality, with the results that consistent high adult mortality over an extensive period could have a serious effect on a population's ability to sustain itself in the medium term or even in the long term. Many of the anthropogenic threats to these species are non-discriminatory as far as age is concerned (e.g. habitat destruction, disturbance and power lines) and therefore contribute to adult mortality, and it is not known what the cumulative effect of these impacts could be over the long term.

Habitat destruction

During the construction phase and maintenance of substations and power lines some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, and the clearing of servitudes, as well as clearing vegetation at the substation site. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimize the risk of fire under the line which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat.

Disturbance

Similarly, the above mentioned construction and maintenance activities impact on bird through disturbance, particularly during bird breeding activities.

Identification of sensitive areas within the proposed site.

In general the site is moderate to highly sensitive in terms of avifauna, based on the occurrence of a number of listed species in the study area, as well as the various micro-habitats available to avifauna. The sensitive zones are mapped and described below.

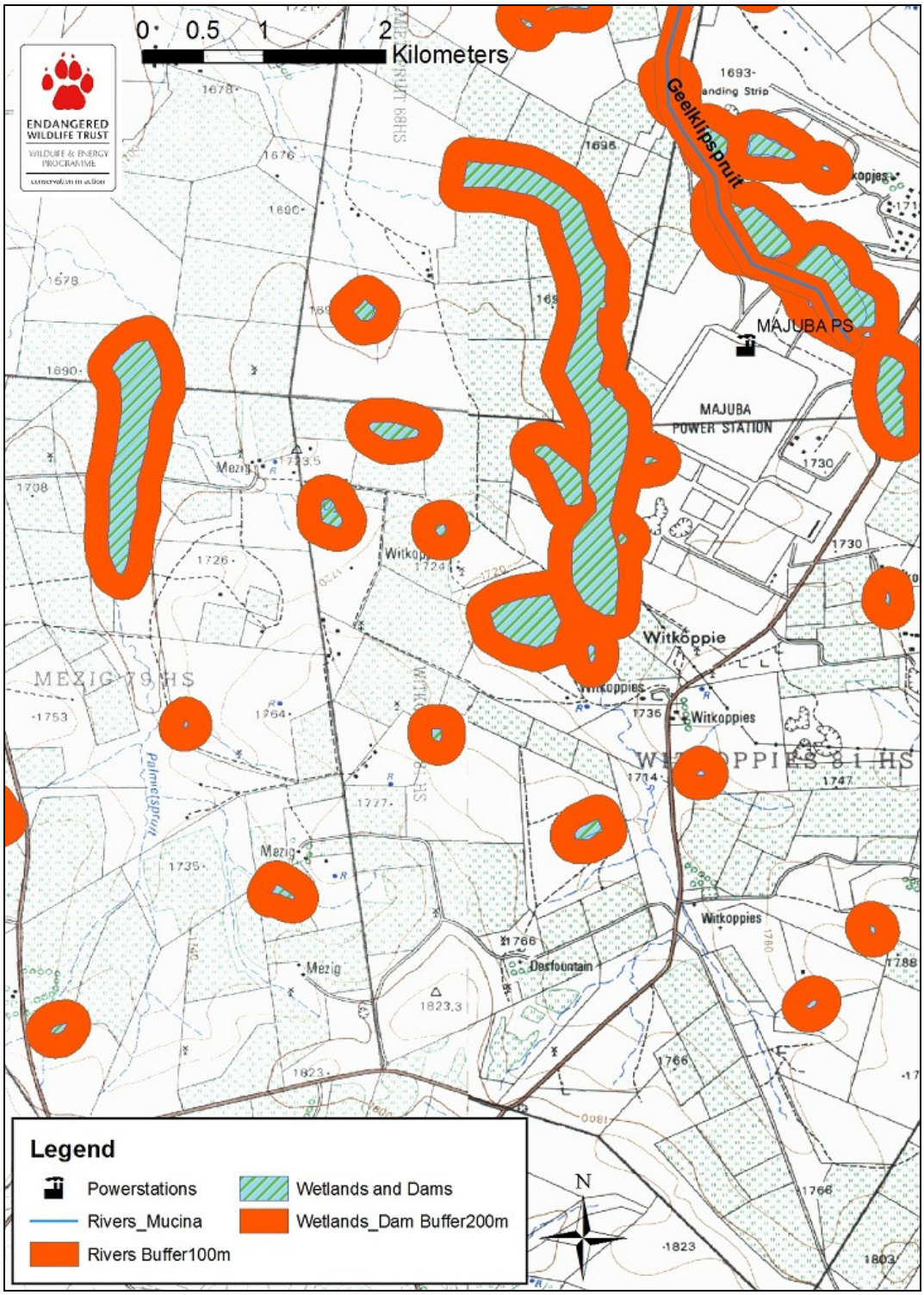

Figure 11: Preliminary avifaunal sensitivity map of the study area.

The above map (Figure 11) shows two features that have been buffered. These are the Rivers, and Wetland/dam areas. The rivers have been buffered by 100m using GIS, while the dams and wetlands have been buffered by 200m. The importance of these micro-habitats to avifauna has been discussed in earlier sections of this report. **All of these buffered zones are regarded as *Medium-High Sensitivity areas* and if possible should be avoided for construction activities.**

The remaining areas outside of these buffer zones are designated as *Low – Medium sensitivity*, although this is subject to change following the EIA phase site visit.

Note that this sensitivity analysis is subject to change, following the site visit in the EIA phase, especially as some of the GIS layers may be outdated, and may not reflect the actual situation on the ground. Also note that certain natural grassland areas, as well as other drainage lines or wetland areas may also be designated as sensitive areas, should they be identified and mapped in the EIA phase.

CONCLUSION & EIA PLAN OF STUDY

In conclusion, the proposed project can continue to the EIA phase, and no fatal flaws have been identified in terms of avifauna. In general, the site has moderate to high sensitivity.
The greatest impact of the proposed project is likely to be that of habitat destruction, while leachate from fly ash, into water systems used by avifauna is also of concern. Possible impacts of associated infrastructure (e.g. roads, power lines, pollution control dams, conveyors, pipelines and pump stations) will be assessed upon completion of the scoping phase, however collisions are expected to be the largest impact of associated power lines this project (assuming that "bird-friendly" pylon structures are used which prevent the impact of electrocution) and some line marking may be a suitable mitigation method for this. Sensitive areas have been mapped, within which the abovementioned collision mitigation must be implemented.

The following is recommended for the EIA phase of this avifaunal study:

- A detailed site visit will be conducted, and the actual affected farm portions will be traversed.
- The table showing SABAP2 data will be updated.
- All identified impacts will be rated according to a pre-determined set of criteria, as supplied by Lidwala Consulting Engineers.
- The sensitivity map will be "fine tuned" and revised if necessary.
- Details of associated infrastructure will be obtained, in order to thoroughly asses the possible impacts thereof.
- New or additional information, deemed relevant by the avifaunal specialist, will be added to the report.
- A final avifaunal EIA report will be compiled.

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