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OLIPHANTS ESTATE RESIDENTIAL DEVELOPMENT
AVIFAUNAL IMPACT ASSESSMENT REPORT

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PROFESSIONAL EXPERIENCE

Ms. Megan Diamond Megan completed a Bachelor of Science degree in Environmental Management from the University of South Africa and has been involved in conservation for 20 years. She has 16 years' worth of experience in the field of bird interactions with electrical infrastructure and during this time has completed impact assessments for over 140 projects. During her tenure at the Endangered Wildlife Trust's Wildlife & Energy Programme and the Programme's primary project (i.e. the Eskom-EWT Strategic Partnership) from 2006 to 2013, Megan was responsible for assisting the energy industry and the national utility in minimising the negative impacts, associated with the construction and operation of electrical infrastructure, on wildlife through the provision of strategic guidance, risk and impact assessments, training and research. Megan (SACNASP Environmental Science Registration number 300022/14) currently owns and manages *Feathers Environmental Services* and is tasked with providing guidance to industry through the development of best practice procedures and avifaunal specialist studies for various developments including renewable energy facilities, power lines, power stations and substation infrastructure in addition to railway infrastructure and residential developments within South Africa and elsewhere within Africa. Megan has attended and presented at several conferences and facilitated workshops, as a subject expert, since 2007. Megan has authored and co-authored several academic papers, research reports and energy industry related guidelines, including the *BirdLife South Africa/Endangered Wildlife Trust best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa* and the *Avian Wind Farm Sensitivity Map for South Africa* (2015), and played an instrumental role in facilitating the endorsement of these two products by the South African Wind Energy Association (SAWEA), IAIA (International Association for Impact Assessment South Africa) and Eskom. She chaired the Birds and Wind Energy Specialist Group in South Africa (2011/2012) and the IUCN/SSC Crane Specialist Group's Crane and Power line Network (2013-2015), a working group comprised of subject matter experts from across the world, working in partnership to share lessons, develop capacity, pool resources, and accelerate collective learning towards finding innovative solutions to mitigate this impact on threatened crane populations. She is currently a member of the IUCN Stork, Ibis and Spoonbill Specialist Group and the Eskom-EWT Strategic Partnership Ludwig's Bustard Working Group.

DECLARATION OF INDEPENDENCE

I, Megan Diamond, in my capacity as a specialist consultant, hereby declare that I:

- * Act as an independent specialist to *Envirovolution Consulting (Pty) Ltd* for this project.
- * 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 Amendment to Environmental Impact Assessment Regulations, 2017.
- * Will not be affected by the outcome of the environmental process, of which this report forms part of.
- * Do not have any influence over the decisions made by the governing authorities.
- * Do not object to or endorse the proposed development, but aim to present facts and our best scientific and professional opinion with regard to the impacts of the development.
- * 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 Amendment to Environmental Impact Assessment Regulations, 2017.

INDEMNITY

- * This avifaunal impact assessment report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken.
- * This report is based on a desktop investigation using the available information and data related to the site to be affected and site visits to the project area conducted from 4-6 August 2022. No long-term investigation or monitoring has been conducted.
- * The Precautionary Principle has been applied throughout this assessment.
- * 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 at the time of study.
- * 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 reserves the right to modify 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, 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.



19 September 2022

EXECUTIVE SUMMARY

The Sol Plaatje Municipality is the largest urban formation in the Northern Cape, housing 20% of the population of the province (Integrated Development Plan (IDP), 2017-2022). In the last twenty years, there has been a steady increase in informal dwellings in the city, with the demand for both low cost and middle income housing surpassing supply. In order to assist the municipality in meeting their spatial transformation objective, of developing sustainable human settlements of varying densities (IDP, 2017-2022), Oliphants Housing Estate (Pty) Ltd is proposing the construction of the Oliphants Estate mixed use residential development.

The Environmental Impact Assessment (EIA) process for the proposed Oliphant Estate residential development commenced in early 2018 (Reference Number: NC/EIA/05/FB/SOL/KIM2/2019). This application has subsequently lapsed in accordance with Regulation 45 of the EIA Regulations 2014, due to time constraints associated with unresolved land ownership issues. A new EIA process was initiated with the final *Scoping Report and Plan of Study for EIA* submitted to the competent authority *Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform* (DAERL) for acceptance in January 2022 (Envirolution, 13 January 2022). The final *Scoping Report and Plan of Study for EIA* concluded that the identified potential impacts associated with the construction of the residential development are localised and restricted to the project footprint, with operational impacts likely to be more far-reaching. Relevant to avifaunal component, the loss of avifaunal habitat and displacement of waterbird species as a result of disturbance associated with construction and operational activities were highlighted as significant impacts. Despite the obvious presence of a significantly sensitive habitat and the associated species complements within the proposed project's area of influence, the final *Scoping Report and Plan of Study for EIA* further concluded that there are no fatal flaws associated with the proposed residential development. During the Public Participation Process, *BLSA* and *Ekapa* challenged this premise in their comments dated 14 December 2021 and 11 January 2022 respectively. Both Interested and Affected Parties (I&APs) are seeking resolution to a great number of concerns raised with regards to this development.

The aim of this report is to consider the aforementioned comments received from *BLSA* and *Ekapa* in addition to the information, findings and recommendations presented in the 2018 and 2022 biodiversity and wetland impact assessment study completed by *Eco Agent CC* and the terrestrial fauna assessment study completed by *Dr. Barbara Kasl* compiled in March 2018 and January 2022 respectively; consolidate the primary datasets collected during the 2018 and 2022 site surveys; collate the available secondary datasets for the proposed development area; identify, assess the significance of and rank the potential impacts associated with the proposed residential development; and provide a reasoned opinion as to whether the proposed development should be authorised; as well as Impact management actions/recommendations proposed for inclusion in the Environmental Management Programme (EMPr).

The proposed Oliphant Estate mixed-use residential development envelope is situated on a single land parcel i.e. the remainder of Portion 18 (spare camp) of the farm Roode Pan No. 70. The site is bounded by the Transnet Railway line and the Midlands Road to the east and west respectively. To the south the site is restricted by an unnamed stream that discharges into the Kamfers Dam. The proposed development area is approximately 10km north of the Kimberley Central Business District (CBD), within the Sol Plaatje Local Municipality, in the Frances Baard District Municipality of the Northern Cape Province.

No site alternatives have been identified and provided for assessment. The proposed site has been identified by Oliphants Housing Estate (Pty) Ltd as being highly desirable for a mixed-use development in terms of land availability, site access, current 'agricultural' zoning and geology. In addition, the applicant is proposing that the mixed-use residential project is expected to have a development footprint of approximately 60ha of the total 150ha area earmarked for the proposed development. It is proposed that this smaller footprint will permit the optimal positioning of the housing units and associated infrastructure within the broader 150ha site, thereby avoiding areas of sensitivity and allowing for the identification of an appropriate layout design and site-specific alternatives. This avifaunal impact assessment report considers the 'No Go' or 'No Project' alternative.

The proposed Oliphant Estate mixed-use residential development involves the construction of 2886 housing units on Portion 18 of the farm Roode Pan No. 70, consisting of 175 freehold units (i.e. Single Residential Node, constituting approximately 10% of the proposed development footprint) and 2711 sectional title units (Medium and High Density Residential Nodes accounting for approximately 25% and 50% of the development site respectively) in addition to a Business Node

A screening report for the proposed residential development area and PAOI was generated on 28 July 2022. The majority of the proposed PAOI is considered to have a HIGH Animal Species Theme Sensitivity, based on the possible occurrence of African Marsh Harrier *Circus ranivorus*, Burchell's Courser *Cursorius rufus*, Caspian Tern *Hydroprogne caspia*, Ludwig's Bustard *Neotis ludwigii*, Lanner Falcon *Falco biarmicus*, Lappet-faced Vulture *Torgos tracheliotos*, Secretarybird *Sagittarius serpentarius*, Tawny Eagle *Aquila rapax*, White-backed Vulture *Gyps africanus* and Yellow-billed Stork *Mycteria ibis*. Although these species were not observed during the most recent site verification survey in August 2022, they have been recorded within the broader nine-pentad area during the SABAP2 surveys. However, with the exception of White-backed Vulture (n=131), also observed during the 2018 biodiversity survey (*Eco Agent*, 2018) and Secretarybird (n=77), the remaining species have been recorded in low numbers (<30 individuals) over the 15-year survey period to date. It is important to note that the single pentad within which the proposed residential development is located yields a lower

species diversity and abundance with regards to the aforementioned terrestrial species, which is a likely indication of the current significant level of disturbance that exists within the PAOI. Most notably, is the omission of Lesser Flamingo, in addition to other water and wetland dependent SCC (i.e. Greater Flamingo *Phoeniconaias roseus* and Maccua Duck *Oxyura maccoa*) from the avian *Sensitivity Features* list, as a result of the LOW sensitivity assigned to Kamfers Dam within the *Animal Species Theme*. This is in direct contrast to the HIGH sensitivity assigned to Kamfers Dam within the *Aquatic Biodiversity Theme* – a decidedly more accurate reflection of the sensitivity of this water habitat and the species its supports.

A total of 308 bird species have been recorded within the relevant pentads during the SABAP2 atlassing period to date. The presence of these species in the broader area provides an indication of the diversity of species that could potentially occur within the areas earmarked for the proposed residential development, particularly where pockets of natural vegetation/habitats persist. Of the 308 species, 26 of these are considered to be regional SCC. White Stork *Ciconia ciconia*, which is not listed as a SCC, but is protected internationally under the *Bonn Convention on Migratory Species* has also been recorded in the study area. It is important to note that with the exception of Lesser Flamingo (n=103), Greater Flamingo (n=95), White-backed Vulture (n=131) and Secretarybird (n=77) the remaining SCC species have been recorded in low numbers, with less than 30 individual birds being recorded over the fifteen-year survey period. The significant individual numbers of White-backed Vulture and Secretarybird can be attributed to the number of observations/surveys conducted within the 2835_2445 and 2840_2445 pentads which contain the Dronfield Nature Reserve, a stronghold for these species. Although this report focuses on SCC, since the impacts associated with the construction and operation of the proposed residential development is likely to be more biologically significant for these species, the impact on non-SCC avifauna is also assessed, albeit in less detail. Furthermore, SCC can often be used as surrogate species for the others in terms of impacts and the necessary mitigation. Lesser Flamingo is the flagship species relevant to this project. The non-SCC priority species that have been considered for this assessment include korhaan, harriers, kestrels, falcons, herons, geese, ibis and many water dependent species that feature prominently in the PAOI.

A meeting was held with representatives of *BLSA* on 23 March 2022, where it was determined that a number of robust datasets exist for the Kamfers Dam area and that a short site sensitivity verification and field survey would be sufficient to inform the EIA phase of the project. This survey would comprise of incidental counts conducted at various points and at variable times within the PAOI, as well as a driven transect, that are indicative of the habitat types found in the development footprint and its immediate surrounds. The survey was conducted on 4-6 August 2022. An assessment of the avian micro habitats and the species observed both during the aforementioned survey and as part of the datasets discussed above, confirm the high sensitivity rating assigned to the PAOI. The survey produced a combined list of 55 bird species. Lesser Flamingo and Greater Flamingo were the only SCC observed during this site survey. Kamfers Dam was full at the time of the site survey, with no visibly exposed mudflats. Discussions with both *BLSA* and *Ekapa* representatives confirmed

that Lesser Flamingo did not breed at the Dam during the 2021 season. All of the observed species have the potential to be displaced by the proposed residential development as a result of habitat transformation and disturbance.

The proposed residential development footprint and the PAOI are located within a single primary vegetation division namely the Savanna Biome, specifically Kimberley Thornveld and Vaalbos Rocky Shrubland. The savanna/woodland biome contains a large variety of bird species (it is the most species-rich community in southern Africa) but very few bird species are restricted to this biome. Savanna is particularly rich in large raptors and forms the stronghold for White-backed Vulture, Tawny Eagle *Aquila rapax* and Lanner Falcon *Falco biarmicus*. Apart from SCC, it also supports a multitude of non-SCC raptor species, such as the Amur Falcon *Falco amurensis*, Black-chested Snake-Eagle *Circaetus pectoralis*, Brown Snake-Eagle *Circaetus cinereus*, Black-winged Kite *Elanus caeruleus*, the migratory Common Buzzard *Buteo vulpinus*, Gabar Goshawk *Micronisus gabar*, Greater Kestrel *Falco rupicoloides* and Spotted Eagle-Owl *Bubo africanus*. Apart from raptors, open woodland in its undisturbed state is also suitable for a wide range of non-raptorial SCC, including Secretarybird, Kori Bustard, Marabou Stork and Abdim's Stork. In addition to providing foraging and roosting habitat for the other development sensitive species i.e. Northern Black Korhaan, Red-crested Korhaan, Helmeted Guineafowl *Numida meleagris* and Western Cattle Egret *Bubulcus ibis*, a large diversity of passerine species (i.e. small perching birds) recorded in the area are also supported.

The area that has been earmarked for the proposed Oliphants Estate residential development has experienced significant levels of disturbance and transformation as a result of urbanisation and its associated activities that dominate the PAOI landscape. Significant levels of disturbance persist in the form of vehicle and pedestrian traffic, pastoral activities and mining operations in the immediate surrounds. SABAP2 reporting rates for SCC potentially occurring in this habitat in the study area are very low and the absence of these SCC within the proposed residential development footprint is an indication of the significant levels of human activity and disturbance. Therefore, the potential displacement impacts as a result of habitat loss and disturbance associated with the construction and operation of the proposed Oliphants Estate residential development are likely to be low for woodland dependent species.

A prominent and noteworthy feature of the proposed development area and broader PAOI is Kamfers Dam - a privately owned waterbody. Originally, as ephemeral endorheic pan, receiving its water from rainfall and occasional flooding, this waterbody would attract a diversity and abundance of waterbirds, while large raptors and vultures would utilise them for bathing and drinking. When dry, the grass covered pan would be attractive to several large terrestrial species for foraging, roosting and breeding.

The pan's permanence has been established with the constant input of storm water runoff and partially treated sewage effluent emanating from the neighbouring settlements and the Homevale Waste Water Treatment Works (HWWTW). The sewerage effluent is important - the phosphates and nitrates increase the growth of the blue-green algae *Arthrospira fusiformis*, which is the major food item of Lesser Flamingos. However, increased and unacceptable high levels phosphates and nitrates stemming from untreated or poorly treated sewage results in eutrophication and the growth of toxic cyanobacteria. Flooding of this waterbody reduces the availability of shoreline habitat but also reduces the salinity of the water in the dam, thereby stimulating the growth of green algae. Maintaining the quality and the level of water within the Dam is a critical management requirement to ensure the sustainability of this water source that so many species have become reliant on. The southern margin of Kamfers Dam is exposed to fairly significant levels of disturbance. The species complement along this margin is representative of this disturbance with only the more common waterfowl species present on the open water and within the reedbeds and shoreline birds virtually absent. In contrast, the relatively inaccessible northern reaches of the Dam and minimal existing disturbance experienced in this area are attractive to SCC and a diversity and abundance of waterfowl and shoreline species. This dichotomous nature of species occurrence and abundance in the northern and southern parts of the Dam respectively is indicative of the urban pressures imposed on this globally important IBA, and Critical Biodiversity Area. Unlike the woodland habitat contained within the development footprint, the displacement impacts as a result of habitat loss and disturbance, associated with the construction and operation of the proposed Oliphants Estate residential development will be far more marked and significant for the water dependent and shoreline species occupying Kamfers Dam.

The effects of any development on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and diversity of species present. With so many variables involved, the impacts of each development must be assessed individually. The principal areas of concern for SCC and non-SCC development-sensitive species related to the proposed residential development are described below:

- * Displacement as a result of habitat loss or transformation within the physical development footprint
Displacement as a result of off-site habitat transformation (rise or fall in Kamfers Dam's water level)
- * Displacement as a result of disturbance
- * Direct mortality/ill health as a result of sewage and contaminated storm water inflow
- * Direct mortality as a result of construction activities
- * Mortality due to collisions with the existing power line infrastructure as a result of light pollution
- * Mortality as a result of hunting/poaching and egg removal
- * Indiscriminate and/or Incorrect waste disposal and inadequate service delivery with regards to waste removal
- * Impacts on avitourism

Sensitive features present within the PAOI include the waterbodies and their associated wetland areas, particularly Kamfers Dam as a designated IBA and Critical Biodiversity Area (CBA). Assigning an appropriate buffer to these areas is essential for the protection of these key habitats and will act as a barrier between the identified impacts (human activities) and the sensitive waterbody features. It is important to note that while buffers provide protection, they do not address all water related problems. They need to be implemented in conjunction with a variety of complementary mitigation and management measures. Impacts associated with hydrological changes i.e. the inflow of storm water as well as point source discharges such as sewage outflows would be better managed by targeting these areas and impacts through source-directed management and treatment. The recommended buffers in this assessment have been assigned to the project area to ensure the basic aquatic processes, to reduce the impact on water resources from anthropological activities and to secure habitat for aquatic, semi-aquatic and terrestrial species. Biodiversity that is dependent on water for some parts of its life cycle but also require terrestrial habitats adjacent to the water to meet the rest of its life cycle needs benefit from the implementation of a buffer that protect not only the species and core habitats of conservation concern but also the corridors that make it possible to sustain a viable population. In the case of residential projects like this, buffers should not be viewed as restrictive, but rather as an opportunity that will lead to increased property values because of the aesthetic and tourism related activities that can benefit the local community.

The 500m buffer assigned to Kamfers Dam in the 2018 Biodiversity Impact Assessment cannot be viewed as a mitigatory measure, it is a requirement of the *regulated area of a watercourse* as defined by DWS and for the protection of breeding sites as per the new species guidelines (SANBI, 2020). This 500m buffer must be viewed as a no-go area. An additional avian buffer needs to be assigned as a means to not only prevent and protect, but rather to enhance the habitat and ensure the sustainability of Kamfers Dam as a Key Biodiversity Area. This assessment concurs with the assigned 1000m buffer assigned to Kamfers Dam in the Terrestrial Fauna Biodiversity and Animal Species Summary (Kasl, 2022) as an adequate mitigation measure to secure Kamfers Dam and its associated wetland and reedbed habitats. Although somewhat disturbed and degraded currently, the terrestrial habitat within the 1000m buffer would under optimal conditions provide the necessary foraging habitat for African Marsh Harrier. Securing this habitat and minimising the human-induced disturbance impacts associated with the residential development, will ensure the enhancement of the terrestrial habitat resulting in the probable return of this SCC to and regular use of the Kamfers Dam area.

This assessment is encouraged by the steps taken by the applicant to avoid the identified environmental sensitivities within the proposed development area, by excluding AREA 3 and most of AREA 4 from the development footprint. It is the recommendation of this assessment that all forms of development be excluded from Area 4 entirely and that Single Residential or Medium Density Nodes be developed in favour of a High-Density Node in Areas 1 and 2. It is further recommended that development within the 1000m buffer in Areas 1 and 2 be subject to the establishment of a partnership between the applicant and the *custodians* of Kamfers

Dam and its primary stakeholders (i.e. *BLSA, Ekapa, HWWTW and the Sol Plaatjie Municipality*) and the drafting of an integrated management plan to ensure the appropriate management of the residential estate and the greater PAOI in terms of the establishment and ongoing maintenance of appropriate and effective sewage, storm water and waste management strategies.

One of the objectives of this study is to consider the proposed project layout in addition to the 'No Go' or 'No Project' alternative and determine which of these poses the least impact to the avifaunal community, particularly the sensitive SCC present within the PAOI. The no-go alternative will result in the current status quo being maintained within the proposed development area and broader PAOI as far as the avifauna is concerned. The no-go option would result in no additional impacts on priority SCC avifauna which would be beneficial to the avifauna currently occurring within the PAOI. Given the anticipated impacts on Kamfers Dam and the species it supports and significant level of commitment required from the applicant, municipality and the residents of the proposed residential estate – commitment that would be difficult to enforce, the no-go option is preferred from an avifaunal perspective.

Should the proposed residential estate be authorised, strict adherence to the buffers and recommendations contained within this report is required.

In conclusion, the habitat within which the proposed development area is located is MODERATELY sensitive from a potential bird impact perspective. In recent years, anthropogenic impacts, mostly in the form of mining and urbanisation have largely transformed the landscape resulting in a negative impact on avifaunal diversity and abundance with the study area. This is reflected in the low reporting rates for priority species, which may also indicate that levels of disturbance are high. The construction of the proposed residential estate will result in impacts of HIGH to MODERATE significance to birds that are supported by Kamfers Dam. In the absence of a suitable alternative location for assessment and stringent and well-thought out management plans and infrastructure developments to facilitate sewage and storm water inflows into Kamfers Dam, among other significant impacts, the no-go alternative presents itself as most preferred alternative. However, should this development proceed through to construction, the anticipated impacts can be reduced through the commitment to and application of adaptive mitigation measures that will need to be implemented throughout the project's life span:

- * No development within the delineated 500m buffer as a minimum requirement.;
- * No development within Area 4 of the proposed 150ha residential estate footprint;
- * Single Resident and Medium-Density Nodes to be constructed within the 1000m buffer;
- * It is further recommended that development within the 1000m buffer in Areas 1 and 2 be subject to the establishment of a partnership between the applicant and the *custodians* of Kamfers Dam and its

primary stakeholders and the drafting of an integrated management plan to ensure the appropriate management of the residential estate and the greater PAOI in terms of:

- the establishment and ongoing maintenance of appropriate and effective sewage, storm water and waste management strategies,
 - the construction of a fence to secure Kamfers Dam and its resident species from hunting, poaching and egg removal
 - policies to address and mitigate noise and light pollution and the keeping of pets;
- * Conduct a pre-construction inspection (avifaunal walk-through) of the final residential development layout, to identify any species that may be breeding on the authorised development site or within the immediate surrounds to ensure that any impacts likely to affect breeding species (if any) are adequately managed;
 - * Avoid removal of sensitive vegetation types. The recommendations of the botanical study must be strictly implemented, especially as far as limitation of the construction footprint and rehabilitation of disturbed areas is concerned;
 - * Construction activity should be restricted to the immediate footprint of the infrastructure;
 - * All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment;
 - * All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction;
 - * No stormwater, pollutants, sewerage or other waste must pollute the area or enter Kamfers Dam during the construction or operational phases;
 - * Storm water and sewer reticulation must make use of a bulk outfall system and must be transported away from Kamfers Dam - the development must not make use of the storm water and sewage systems at Kamfers Dam which are currently unable to process the current storm water and sewage yields;
 - * A management and monitoring system must be implemented to carefully monitor the water quality and water levels of the Kamfers Dam to benefit the ecological and habitat requirements of the waterbirds, in particular Lesser Flamingo;
 - * Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum;
 - * Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species; and
 - * Measures to control noise associated with construction activities should be applied according to current best practice in the industry.

In accordance with the outcomes of the impact assessment, in conjunction with the baseline conditions and the impact management measures, the proposed residential estate is very likely to impact negatively on the species complements that are supported by Kamfers Dam. It is this specialist's opinion that the construction

and operation of the proposed residential estate can only occur with acceptable levels of impact on the resident avifauna subject to the development of a robust integrated management plan and partnership with key stakeholders, to address the multitude of human-induced impacts, for the entire projected life span of the residential development . Commitment to this process is critical to the survival of the SCC within the PAOI and the sustainability of Kamfers Dam as an IBA, CBA and premier tourist attraction.

TABLE OF CONTENTS

PROFESSIONAL EXPERIENCE	2
DECLARATION OF INDEPENDENCE	3
INDEMNITY	3
EXECUTIVE SUMMARY	4
1. INTRODUCTION	16
2. PROJECT LOCATION	19
3. PROJECT OVERVIEW	20
3.1 Layout Alternatives.....	20
3.2 Project Description	20
4. THIS REPORT	21
4.1 Scope of Work	21
4.2 Structure of this report.....	22
5. APPROACH AND METHODOLOGY	26
5.1 Methodology.....	26
5.2 Data sources used	27
6. APPLICABLE LEGISLATION, POLICIES AND GUIDELINES	30
6.1 The Convention on Biological Diversity	30
6.2 The Convention on the Conservation of Migratory Species of Wild Animals	31
6.3 The Agreement on the Conservation of African-Eurasian Migratory Water Birds.....	31
6.4 The National Environmental Management Act 107 of 1998 (NEMA)	33
6.5 The National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) and the Threatened or Protected Species Regulations, February 2007 (TOPS Regulations).....	33
6.6 The National Environmental Management: Protected Areas Act 57 of 2003	34
6.7 The National Environmental Management Act 107 of 1998 (NEMA) Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal and or Avifaunal Species	34
6.8 Gauteng Biodiversity Conservation Plan, Version 3.3	Error! Bookmark not defined.
6.9 Gauteng Department of Agriculture and Rural Development (GDARD) Requirements for Biodiversity Assessments Version 3, March 2014.....	Error! Bookmark not defined.
6.10 Best Practice Guidelines: Birds and Solar Energy	Error! Bookmark not defined.

6.11	International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability.....	Error! Bookmark not defined.
7.	DESCRIPTION OF THE BASELINE CONDITIONS.....	35
7.1	Site Sensitivity Verification	35
7.2	Relevant Bird Populations.....	39
7.2.1.	<i>Important Bird Areas</i>	39
7.2.2.	<i>Protected Areas</i>	41
7.2.3.	<i>Coordinated Avifaunal Roadcount (CAR) Routes</i>	Error! Bookmark not defined.
7.2.5.	<i>South African Bird Atlas Project 2 Data (SABAP2)</i>	43
7.2.6.	<i>Primary Data Collection</i>	44
7.2.7.	<i>Interested and Affected Party Comments and Local Knowledge</i>	Error! Bookmark not defined.
7.3	Avifaunal Habitats.....	47
7.3.1.	<i>Grassland</i>	47
7.3.2.	<i>Rivers, Wetlands and Surface Waterbodies</i>	49
7.3.3.	<i>Exotic Tress Stands</i>	Error! Bookmark not defined.
7.3.4.	<i>Built-up Areas and Infrastructure</i>	50
8.	GENERAL DESCRIPTION OF BIRD INTERACTIONS WITH ELECTRICITY GENERATION INFRASTRUCTURE.....	51
8.1	Construction Phase	Error! Bookmark not defined.
8.1.1.	<i>Displacement as a result of habitat loss or transformation</i>	51
8.1.2.	<i>Displacement as a result of disturbance</i>	52
8.1.3.	<i>Direct mortality as a result of construction activities</i>	53
8.2	Operational Phase	Error! Bookmark not defined.
8.2.1.	<i>Mortality due to collisions with the PV panels</i>	53
8.2.2.	<i>Displacement due to habitat loss associated with altered run-off and chemical pollutants</i>	53
8.2.3.	<i>Nesting</i>	54
8.3	Decommissioning & Closure Phases.....	Error! Bookmark not defined.
8.3.1.	<i>Displacement as a result of disturbance</i>	Error! Bookmark not defined.
9.	SENSITIVITY MAPPING.....	55
10.	IDENTIFICATION OF A PREFERRED LAYOUT ALTERNATIVE.....	60
11.	ASSESSMENT OF EXPECTED IMPACTS.....	60
12.	CUMULATIVE IMPACT.....	64

10.1	Cumulative Impact Statement	Error! Bookmark not defined.
13.	PROPOSED IMPACT MITIGATION ACTIONS.....	65
14.	PROPOSED MONITORING ACTIONS.....	Error! Bookmark not defined.
15.	ENVIRONMENTAL IMPACT STATEMENT	66
15.1	Conditions to be included in the Environmental Authorisation	66
15.2	Specialist Opinion	67
16.	ASSUMPTIONS, UNCERTAINTIES & GAPS IN KNOWLEDGE	67
17.	REFERENCES	68
	APPENDIX 1: SOUTH AFRICAN BIRD ATLAS PROJECT DATA (SABAP2) FOR THE 40MW SOLAR ENERGY FACILITY.....	70
	APPENDIX 2: AVIFAUNAL HABITAT OBSERVED WITHIN THE DEVELOPMENT AREA AND BROADER PAOI	77
	APPENDIX 3: METHOD OF ASSESSING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS	80
	APPENDIX 4: CURRICULUM VITAE.....	82

1. INTRODUCTION

The Sol Plaatje Municipality is the largest urban formation in the Northern Cape, housing 20% of the population of the province (Integrated Development Plan (IDP), 2017-2022). In the last twenty years, there has been a steady increase in informal dwellings in the city, with the demand for both low cost and middle income housing surpassing supply. The biggest challenge confronting many municipalities in South Africa, including the Sol Plaatje Municipality, is addressing housing backlogs by unlocking parcels of land, in particular current informal settlements to create economic opportunities and livable human settlements. In order to assist the municipality in meeting their spatial transformation objective, of developing sustainable human settlements of varying densities (IDP, 2017-2022), Oliphants Housing Estate (Pty) Ltd is proposing the construction of the Oliphants Estate mixed use residential development.

The National Environmental Management Act (NEMA) (Act 107 of 1998) requires that an impact assessment be conducted for any development which could have a significant effect on the environment, with the objective to identify, predict and evaluate the actual and potential impacts of these activities on ecological systems; identify alternatives; and provide recommendations for mitigation to minimize the negative impacts. In order to meet the Scoping and Environmental Impact Reporting (S&EIR) requirements as outlined in the 2014 National Environmental Management Act (No 107 of 1998) Regulations GNR 983, GNR 984 and GNR 985, as amended in 2017, Oliphants Housing Estate (Pty) Ltd require detailed specialist studies that will document any potential fatal flaws, the impacts of the project and recommend measures to manage (maximise positive and minimise negative) and monitor those impacts. The Environmental Impact Assessment (EIA) process for the proposed Oliphant Estate residential development commenced in early 2018 (Reference Number: NC/EIA/05/FB/SOL/KIM2/2019). This application has subsequently lapsed in accordance with Regulation 45 of the EIA Regulations 2014, due to time constraints associated with unresolved land ownership issues. A new EIA process was initiated with the final *Scoping Report and Plan of Study for EIA* submitted to the competent authority *Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform* (DAERL) for acceptance in January 2022 (Envirolution, 13 January 2022).

The final *Scoping Report and Plan of Study for EIA* concluded that the identified potential impacts associated with the construction of the residential development are localised and restricted to the project footprint, with operational impacts likely to be more far-reaching. Relevant to avifaunal component, the loss of avifaunal habitat and displacement of waterbird species as a result of disturbance associated with construction and operational activities were highlighted as significant impacts that require further study in the EIA phase of the project impact assessment process. A preliminary sensitivity map delineating areas of sensitivity identified through the various specialist scoping studies was included in the report and provides the basis for the required additional assessment during this EIA phase. Despite the obvious presence of a significantly sensitive habitat and the associated species complements within the proposed project's area of influence, the final *Scoping*

Report and Plan of Study for EIA further concluded that there are no fatal flaws associated with the proposed residential development. Further investigation during the EIA phase, and the avoidance and mitigation recommendations stemming from the detailed impact assessment, will result in a sustainable development with relatively low impacts on the receiving environment. During the Public Participation Process, *BLSA* and *Ekapa* challenged this premise in their comments dated 14 December 2021 and 11 January 2022 respectively. Both Interested and Affected Parties (I&APs) are seeking resolution to a great number of concerns raised with regards to this development, as summarized below:

1.1 BirdLife South Africa Comments

- i. The locality of the site adjacent to Kamfers Dam: South Africa, as a contracting party to the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA), to take all necessary measures to conserve Lesser Flamingo, through the conservation of its habitat, assessment of impacts and the limitation of the displacement impact. The vulnerability of Kamfers Dam to anthropogenic impacts, particularly with regards to dam (water) level management and sewage treatment. *BLSA* further highlighted the importance of Lesser Flamingo to Kimberley's tourism industry.
- ii. Amendment of the Spatial Development Framework (SDF): The Sol Plaatje Spatial Development Framework (SDF), Integrated Development Plan (IDP) and Environmental Management Framework (EMF) recognize and underpin Kamfers Dam as a global Key Biodiversity Area (KBA). The decision to include Roode Pan within the urban edge boundary raises significant concern as it is likely to result in dire consequences for the sustainability of the dam and the threatened species it supports.
- iii. The localised and restricted nature of the anticipated impacts: *BLSA* noted their disagreement with the assumptions made by the EIA team that the impacts associated with the construction of the proposed residential estate will be restricted to the development footprint and immediate local area. Impact avoidance is highlighted as critical to this process, in addition to the evaluation of the impacts both pre- and post-mitigation and the level of confidence in the proposed mitigation measures.
- iv. Apprehension of bias: *BLSA* detailed the responsibility of the Environmental Assessment Practitioner (EAP) with reference to the Environmental Assessment Practitioners Association of South Africa's (EAPASA) code of ethics and the importance of observance to this code.
- v. Lack of consideration for project alternatives: *BLSA* raised concerns with regards to the lack of alternatives assessed in the scoping phase of the project. The exclusion of Kamfers Dam and its immediate surrounds from the SDF and its categorisation as a conservation area rendered it not suited to urban development. The uniqueness of Kamfers Dam should be the factor that determines the desirability of this project in terms of the sustainable management of the environment. *BLSA* further describes the *Very High* and *High* sensitivity categorisations assigned to the development area and that this classification further negates the "highly desirable" nature of the site in terms of development.

- vi. Demarcation of no-go areas: *BLSA* do not endorse the proposed 500m buffer as a mitigation measure to address the displacement impact as a result of habitat transformation and disturbance. The 500m buffer from the delineated boundary of a wetland or pan is a requirement of the *regulated area of a watercourse* as defined by the Department of Water and Sanitation (DWS). Given this developments proximity to Kamfers Dam, disturbance prevention is simply not sufficient. A concerted effort with regards to the protection and enhancement of Kamfers Dam needs to be made as it is vital to the sustainability of this Key Biodiversity Area.
- vii. Threat to Kamfers Dam: Poorly managed and treated sewage will directly impact Kamfers Dam. This aspect will determine the viability of this project. The organisation strongly disagrees with the operational status of the Homevale Wastewater Treatment works as described in the Scoping Report. Its persistent mismanagement has had (and will continue to have) a detrimental impact on the dam and the species it supports. A feasible alternative to sewage treatment must be sought.
- viii. Other potential impacts: *BLSA* listed noise pollution, light pollution, potential power line collisions and the increased in polluted storm water runoff and flood waters entering Kamfers Dam as potential additional impacts.
- ix. Fatal Flaws: Noise pollution during construction and other disturbances during operation, could cause abandonment of flamingo breeding activities or failure to breed. The evaluation of the site during the scoping phase highlighted the potentially dire consequences that the avifaunal community will be subjected to, should this development proceed.
- x. Compliance with the Screening Report and Species Protocol: *BLSA* notes that the Draft Scoping Report and Plan of Study do not take the results of the online screening tool or species protocols into consideration. It also notes the omission of the Site Sensitivity Verification Report from the Draft Scoping Report.

1.2 Ekapa Group Comments

- i. *Ekapa* noted their involvement to date with regards to the conservation of Kamfers Dam and the Lesser Flamingo *Phoeniconaias minor* population that breed on the island (constructed by *Ekapa*) within the dam. *Ekapa* acknowledges the successful partnership between themselves and *BLSA* with regards to ongoing species monitoring.
- ii. The locality of the site adjacent to Kamfers Dam: Concerns were raised with regards to the proximity (within 500m) of the proposed residential development in relation to the breeding colony and the resultant disturbance impacts that will occur as a result of the development. *Ekapa* also details the Lesser Flamingos' contribution to Kimberley's tourism industry. Direct impacts affecting the species ability to breed at Kamfers Dam, will undoubtedly impact avitourism within the province.
- iii. Threat to Kamfers Dam. In 2021, significant bird deaths were recorded at the Dam, due to compromised immune systems as a result of high levels of iron in the water. The inflow of sewage is a likely and plausible

cause for the high levels of heavy metals within the Dam. The proposed residential development will see the construction of 2886 housing units which will severely compound the sewage levels within the Dam. Kamfers Dam is situated within a depression/low point in the topography, with storm water flowing into the pan during the rainy season. The residential area is situated directly within the area where rain water is channeled upon entry into Kamfers Dam. It is vitally important that the residential development does not impede or promote the delivery of storm water needed to maintain the natural biodiversity to support the diversity of species breeding at this location. Hunting is listed as another key threat to species utilising the pan.

The aim of this report is to consider the aforementioned comments received from *BLSA* and *Ekapa* in addition to the information, findings and recommendations presented in the 2018 and 2022 biodiversity and wetland impact assessment study completed by *Eco Agent CC* and the terrestrial fauna assessment study completed by *Dr. Barbara Kasl* compiled in March 2018 and January 2022 respectively; consolidate the primary datasets collected during the 2018 and 2022 site surveys; collate the available secondary datasets for the proposed development area; identify, assess the significance of and rank the potential impacts associated with the proposed residential development; and provide a reasoned opinion as to whether the proposed development should be authorised; as well as Impact management actions/recommendations proposed for inclusion in the Environmental Management Programme (EMPr).

2. PROJECT LOCATION

The proposed Oliphant Estate mixed-use residential development envelope is situated on a single land parcel i.e. the remainder of Portion 18 (spare camp) of the farm Roode Pan No. 70. The site is bounded by the Transnet Railway line and the Midlands Road to the east and west respectively. To the south the site is restricted by an unnamed stream that discharges into the Kamfers Dam. The proposed development area is approximately 10km north of the Kimberley Central Business District (CBD), within the Sol Plaatje Local Municipality, in the Frances Baard District Municipality of the Northern Cape Province (FIGURE 1).

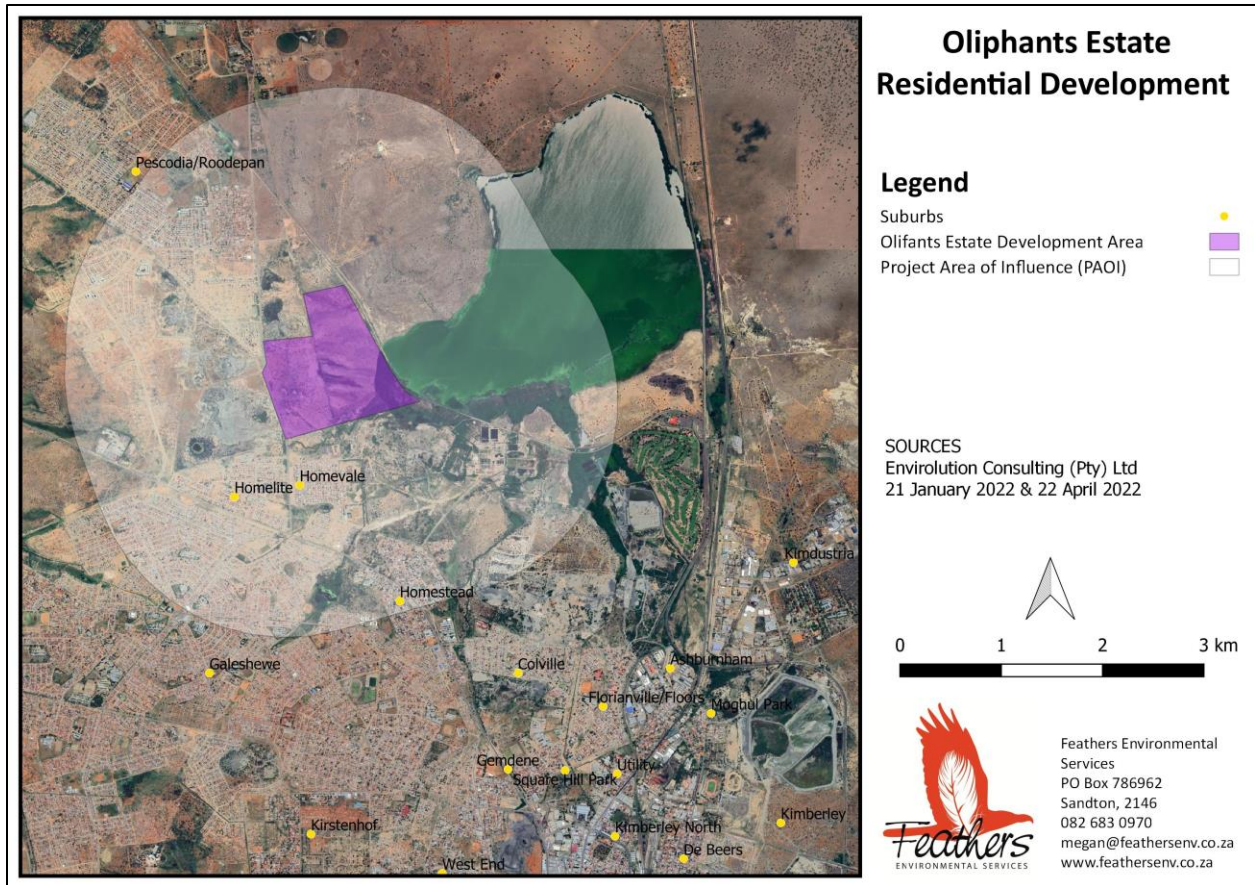


FIGURE 1: Regional map detailing the location of the proposed Oliphants Estate residential development located within the Sol Plaatje Local Municipality, in the Frances Baard District Municipality of the Northern Cape Province

3. PROJECT OVERVIEW

3.1 Site Alternatives

No site alternatives have been identified and provided for assessment. The proposed site has been identified by Oliphants Housing Estate (Pty) Ltd as being highly desirable for a mixed-use development in terms of land availability, site access, current 'agricultural' zoning and geology. In addition, the applicant is proposing that the mixed-use residential project is expected to have a development footprint of approximately 60ha of the total 150ha area earmarked for the proposed development. It is proposed that this smaller footprint will permit the optimal positioning of the housing units and associated infrastructure within the broader 150ha site, thereby avoiding areas of sensitivity and allowing for the identification of an appropriate layout design and site-specific alternatives.

This avifaunal impact assessment report considers the 'No Go' or 'No Project' alternative.

3.2 Project Description

The proposed Oliphant Estate mixed-use residential development involves the construction of 2886 housing units on Portion 18 of the farm Roode Pan No. 70, consisting of 175 freehold units (i.e. Single Residential Node, constituting approximately 10% of the proposed development footprint) and 2711 sectional title units (Medium and High Density Residential Nodes accounting for approximately 25% and 50% of the development site respectively) in addition to a Business Node.

The housing units will be provided with surfaced access roads, a metered water supply and waterborne sewerage. The following infrastructure will be constructed to provide basic services to the development:

- * Internal access roads to serve the entire development;
- * Metered water supply;
- * Waterborne sewage system;
- * Public open spaces;
- * Storm water management systems; and
- * The existing road that provides direct access to the proposed development site will be utilised and upgraded where required.

4. THIS REPORT

4.1 Scope of Work

Oliphants Housing Estate (Pty) Ltd has appointed *Envirovolution Consulting (Pty) Ltd* (hereafter referred to as *Envirovolution*) as independent environmental assessment practitioners to manage the Environmental Impact Assessment (EIA) process for the proposed Oliphants Estate Residential Development. *Feathers Environmental Services CC* (hereafter referred to as *Feathers*) was appointed to compile the avifaunal component of the Environmental Impact Report (EIR) in response to comments received Interested & Affect Parties (I&APs) on the draft Scoping Report, using a set methodology and various data sets to determine which avian species regularly occur within the study area, the availability of bird micro habitats (i.e. avifaunal sensitive areas), the impacts of the proposed development and their significance in addition to the provision of recommendations for the avoidance and or mitigation of the anticipated impacts.

Feathers has conducted this avifaunal impact assessment according to the following terms of reference, in accordance with the minimum report requirements listed in the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (Government Gazette No 43855, 30 October 2020):

- * Conduct a site sensitivity verification through the use of a desk top analysis, using satellite imagery and other available and relevant information, in addition to an on-site inspection;

- * Assess various avifaunal datasets, including but not limited to Important Bird Areas (IBAs) and describe the avifaunal communities (particularly with reference to Species of Conservation Concern (SCC) most likely to be impacted on by the residential development;
- * Identify and confirm avifaunal microhabitats within the proposed residential development layout and assess these for their suitability to support SCC and non-SCC priority (development-sensitive) species, in terms of breeding, roosting and foraging;
- * Describe the avifaunal communities (both SCC and non-SCC priority species) most likely to be impacted, based on primary occurrence data collected during the site survey in addition to secondary datasets;
- * Provide a detailed description of the impacts associated with the construction and operation of the residential estate;
- * Assess the significance (rated according to a pre-determined set of criteria of the identified direct, indirect and cumulative impacts, during the construction and operation phases of the residential estate, based on primary data collected in-field and secondary data sources;
- * Consider the proposed layout and advise possible changes to this layout (if necessary);
- * Recommend practical mitigation measures for the management of the identified impacts, at each stage of the development process, for inclusion in the draft Environmental Management Programme (EMPr);
- * Propose a monitoring programme for the sensitive areas, species or receptors (if necessary); and
- * Describe the gaps in baseline data and an indication of the confidence levels. The best available data sources will be used to predict the impacts.

4.2 Structure of this report

In terms of the NEMA 2014 EIA Regulations contained in GN R982 of 04 December 2014 (as amended) all specialist studies must comply with Appendix 6 of the NEMA 2014 EIA Regulations GN R982 of 04 December 2014 (TABLE 1) and in accordance with the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (Government Gazette No 43855, 30 October 2020) (TABLE 2).

TABLE 1: Information to be included in specialist reports

Legal Requirement		Relevant Section in Specialist study
(1)	A specialist report prepared in terms of these Regulations must contain-	

Legal Requirement		Relevant Section in Specialist study
	details of-	
(a)	(i) the specialist who prepared the report; and	Professional Experience and Appendix 5
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Professional Experience and Appendix 4
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Declaration of Independence
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 5
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 5
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 5, 7 and 16
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 5
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 9
(g)	an identification of any areas to be avoided, including buffers;	Section 9 & 10
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 9 & 10
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 16
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 7
(k)	any mitigation measures for inclusion in the EMPr;	Section 13
(l)	any conditions for inclusion in the environmental authorisation;	Section 13, 14, and 15
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 14
(n)	a reasoned opinion	Section 15
	whether the proposed activity, activities or portions thereof should be authorised;	Section 15

Legal Requirement		Relevant Section in Specialist study
	regarding the acceptability of the proposed activity or activities; and	Section 15
	if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 15
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 7
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 7
(q)	any other information requested by the competent authority.	Not Applicable
(2)	Where a government notice <i>gazetted</i> by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Section 5, TABLE 2, Section 5 and Section 7

TABLE 2: Minimum report requirements listed in the protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020)

HIGH SENSITIVITY RATING FOR TERRESTRIAL ANIMAL SPECIES	
SITE SENSITIVITY VERIFICATION	
The site sensitivity verification must be undertaken by an environmental assessment practitioner or specialist.	Professional Experience and Appendix 4
The site sensitivity verification must be undertaken through the use of: (a) a desk top analysis, using satellite imagery; (b) a preliminary on-site inspection; and (c) any other available and relevant information.	Section 5 & 7
The outcome of the site sensitivity verification must be recorded in the form of a report that: (a) confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;; (b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and (c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations	Section 7
SPECIALIST ASSESSMENT & MINIMUM REPORT CONTENT REQUIREMENTS	

Contact details and relevant experience as well as the SACNASP Registration number of the specialist preparing the assessment including a curriculum vitae;	Professional Experience and Appendix 4
A signed statement of independence by the specialist;	Declaration of Independence
A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 5 & 16
A description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	Section 5
A description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Section 7
A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 16
details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Section 7
the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the PAOI;	N/A
The location of areas not suitable for development and to be avoided during construction where relevant;	Section 9 and 10
a discussion on the cumulative impacts;	Section 12
Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 13
A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	Section 14
A motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having "low" or "medium" terrestrial animal species sensitivity and were not considered. appropriate.	N/A

5. APPROACH AND METHODOLOGY

5.1 Methodology

The following methods were employed to compile this avifaunal impact assessment report:

- * The focus of this assessment is primarily on the potential impacts of the residential development on priority species. Priority species are defined as those species which could potentially be impacted by displacement through habitat transformation and/or disturbance. These include both Species of Conservation Concern (SCC) as defined by the *Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa (2020)* i.e. those species listed on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered, Vulnerable, Near Threatened and Data Deficient, as well as certain other impact susceptible species.
- * By virtue of their mobility, the identification of bird presence and abundance cannot be confined to the housing development area, therefore the Project Area of Influence (PAOI) is defined as a 2km zone around the proposed development area. Avifaunal sensitivity has been defined for this PAOI.
- * The proposed residential development area is located within a single South African Bird Atlas Project 2 (SABAP2) pentad grid cell (i.e. 2840_2440), however a larger area is necessary to obtain a dataset that is large enough (encompassing nine pentad grid cells) to ensure that reasonable conclusions about species diversity and densities, in a particular habitat type, can be drawn. A total of 586 full protocol lists and 509 ad hoc protocol lists have been completed. The SABAP2 data is regarded as a reliable reflection of the avifauna which could potentially occur in the PAOI. The relevant pentads within the study area include: 2835_2435; 2835_2440; 2835_2445; 2840_2435; 2840_2440; 2840_2445; 2845_2435; 2845_2440 and 2845_2445 (FIGURE 2)
- * Collected and examined various avifaunal data sets (detailed in section 5.2) to determine the presence of species, that may be vulnerable to the impacts associated with the construction and operation of the residential development;
- * Suitable avifaunal habitats and sensitive areas within the development area, where impacts are likely to occur, were identified using various Geographic Information System (GIS) layers and Google Earth imagery and confirmed based on personal observations made during the site visit on 4-6 August 2022;
- * Primary avifaunal occurrence data collected during an austral winter site visit, conducted on 4-6 August 2022, to the proposed residential development area and the PAOI. Data was collected by means of incidental counts to ground truth the information gleaned from secondary data sources and to collect primary bird occurrence data within the proposed development area and the immediate surrounds;
- * The potential impacts, associated with the construction and operation of the residential development on the avifaunal community and their significance were predicted and assessed according to quantitative criteria (APPENDIX 3); and

- * Recommendations pertaining to the avoidance of avian sensitive habitat and for the management and mitigation of impacts, related to the construction and operation of the housing development are provided in Section 9 for inclusion in the draft EMPr.

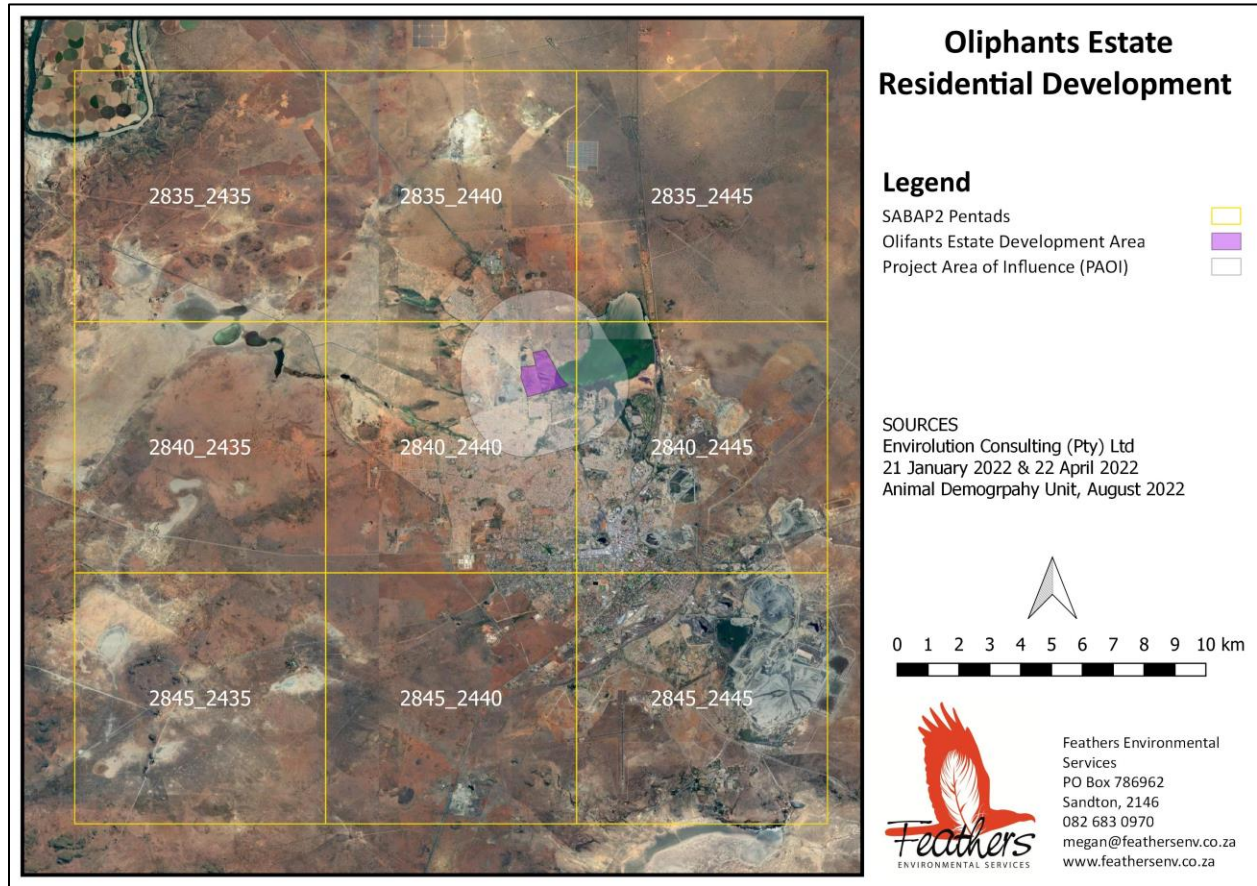


FIGURE 2: Location of the nine South African Bird Atlas Project 2 (SABAP2) pentad grid cells that were considered for the proposed Oliphants Estate residential development

5.2 Data sources used

The following legislated guidelines, data sources and project related reports were used in varying levels of detail for this study:

- * Procedures for the Assessment and Minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of NEMA when applying for Environmental Authorisation (Gazetted October 2020);
- * Guidelines for the Implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for EIAs in South Africa produced by the South African National Biodiversity Institute on behalf of the Department of Environment, Forestry and Fisheries (2020) were consulted to determine the applicable protocol to be used;

- * Screening Reports for an Environmental Authorisation as required by the 2014 EIA Regulations - Proposed Site Environmental Sensitivity: DRD Gold PV Facility, compiled by *Feathers* on 28 July 2022;
- * *Buffer Zone Guidelines for Rivers, Wetlands and Estuaries: Part 1 Technical Manual* compiled by Douglas Macfarlane and Ian Bredin, May 2017
- * The scoping report compiled by *Envirovolution* in January 2022, titled *Final Scoping Report & Plan of Study: The Proposed Oliphant Estate Township Development in Kimberley, Northern Cape Province*;
- * The biodiversity and wetland impact assessment study completed by *Eco Agent CC* in March 2018, titled *A biodiversity and wetland assessment of the proposed development on Portion 18 of the Farm Roodepan 70, Kimberley, Northern Cape*;
- * The terrestrial fauna assessment study completed by *Dr. Barbara Kasl* in January 2022, titled *Oliphant Estate Township Development, Kimberley, Northern Cape: Summary of the Terrestrial Fauna Biodiversity and Animal Species*;
- * Geotechnical report completed by *Flamanko Consulting* titled, *Geotechnical Investigation for Oliphants Estate Development*;
- * Hydrology report completed by *SD Hydrological Services (Pty) Ltd* in March 2022 titled, *Stormwater Management Plan – Proposed Oliphants Estate Township Development, Northern Cape*;
- * Flood line report completed by *African Environmental Development* on 18 April 2018 titled, *100-Year flood lines for the unnamed streams at the proposed township development on Portion 7 & 18 of the Farm Roodepan 70, Kimberley, Sol Plaatje Municipality, Northern Cape Province, RSA*;
- * Water quality report specific to Kamfers Dam completed by *Kwezi V3 Engineers* and the *Centre for Environmental Management* in January 2006 titled, *Kamfers Dam: Water Quality and Quantity Impact Study, Northern Cape*;
- * Civil Infrastructure report completed by *Malankane Consulting Engineers (Pty) Ltd* on 29 March 2022 titled *Kimberley: Oliphant Housing Estate Civil Infrastructure Outline Scheme Report*;
- * Comments received from *BirdLife South Africa* (hereinafter referred to as *BLSA*) on 14 December 2021 on the Draft Scoping Report: Proposed Oliphant Estate Township Development on the Remainder of Portion 18 of The Farm Roode Pan 70, Kimberley, Northern Cape;
- * Response letter received from *BLSA* on 13 January 2022 providing additional comments related to *Envirovolution's* reply to *BLSA's* comments on the Draft Scoping Report;
- * Objection notice and comments received from *Ekapa Group* (hereinafter referred to as *Ekapa*) on 11 January 2022 on the Draft Scoping Report: Proposed Oliphant Estate Township Development on the Remainder of Portion 18 of The Farm Roode Pan 70, Kimberley, Northern Cape;
- * Record of Decision (REJECTION) in respect of the rezoning of Portion 18 of the Farm Roodepan 70, Midlands Road, Kimberly held on 25 June 2019;
- * Record of Decision (APPROVAL) regarding the proposed inclusion of Portion 18 of the Farm Roodepan into the Sol Plaatje Municipality Urban Edge, dated 19 December 2017;

- * The South African National Biodiversity BGIS map viewer was used to determine the locality of the study area relative to National Protected Areas, National Protected Areas Expansion Strategy (NPEAS) focus areas and Critical Biodiversity Areas in the Northern Cape Province;
- * Bird distribution data of the South African Bird Atlas Project 2 (SABAP 2) curated by the Animal Demography Unit and accessed on 28 July 2022;
- * The Important Bird Areas (IBAs) report (Marnewick et al. 2015). The Kamfers Dam (SA032), Dronfield (SA031) and Benfontein (SA033) IBAs are relevant to this assessment;
- * Co-ordinated Waterbird Count Database (CWAC – Taylor et al. 1999). Kamfers Dam, Platfontein Pans, Marrick Pan, Du Toit’s Pan, Rooifontein Pan, Benfontein Pan and Benfontein Dam CWAC sites are located within 20km of the study area are relevant to this study;
- * The global and regional conservation status and endemism information of all bird species (Taylor et al. 2015) and the latest (2022-1) IUCN Red List of Threatened Species (<http://www.iucnredlist.org>);
- * The latest vegetation classification described in the Vegetation Map of South Africa (South African National Biodiversity Institute, 2012 and Mucina & Rutherford, 2006);
- * High-resolution Google Earth ©2022 imagery was used to examine the microhabitats within the PAOI;
- * .KMZ shapefiles and .PDF maps detailing the location and layout of the proposed residential development, provided by *Envirovolution* on 21 January 2022 and 22 April 2022 respectively; and
- * A three-day austral winter survey to the proposed development area conducted on 4-6 August 2022, to form a first-hand impression of avifaunal species presence and micro-habitat occurring within the larger PAOI surrounding the residential development area (FIGURE 3). This information, together with the SABAP2 and CWAC datasets, was used to compile a comprehensive list of species that could occur in the PAOI.

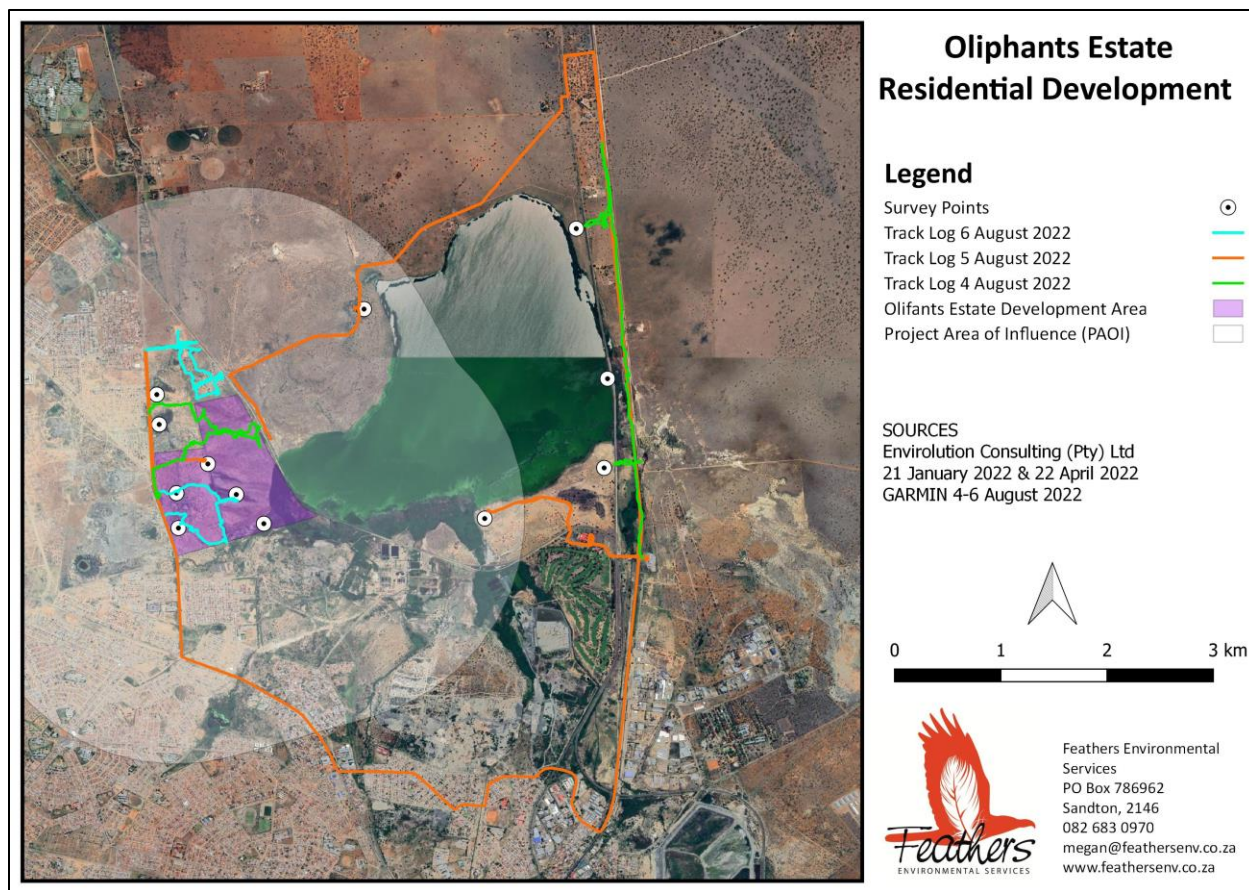


FIGURE 3: Regional map detailing the location of the survey points and transects surveyed during the site surveys of the PAOI, conducted on 4-6 August 2022

6. APPLICABLE LEGISLATION, POLICIES AND GUIDELINES

The following pieces of legislation are applicable to this assessment:

6.1 The Convention on Biological Diversity

The Convention on Biological Diversity (CBD) is an international convention (to which South Africa is a signatory) and represents a commitment to sustainable development. The Convention has three main objectives: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources (<http://www.cbd.int/convention/guide/>). The convention makes provision (in a general policy guideline) for keeping and restoring biodiversity. In addition to this the CBD is an ardent supporter of thorough assessment procedures (Strategic Environmental Assessments (SEAs) and EIAs and requires that Parties apply these processes when planning activities that will have a biodiversity impact. An important principle encompassed by the CBD is the precautionary principle which essentially states that where serious threats to the environment exist, lack of full scientific certainty should not be used as a reason for delaying management of these risks. The burden of proof that the impact will *not*

occur lies with the proponent of the activity posing the threat. In addition, the Aichi Biodiversity Targets (CBD 2011) address several priority issues i.e. the loss of biodiversity and its causes; reducing direct pressure on biodiversity; safeguarding ecosystems, species and genetic diversity and participatory planning to enhance implementation of biodiversity conservation. Each of these is relevant to this residential development through all project phases from planning to the implementation of mitigation measures for existing developments.

6.2 The Convention on the Conservation of Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) is an intergovernmental treaty and is the most appropriate instrument to deal with the conservation of terrestrial, aquatic and avian migratory species. The convention includes policy and guidelines with regards to the impacts associated with man-made infrastructure. CMS requires that Parties (South Africa is a signatory) take measures to avoid migratory species from becoming endangered (Art II, par. 1 and 2) and to make every effort to prevent the adverse effects of activities and obstacles that seriously impede or prevent the migration of migratory species (Art III, par. 4b and 4c). At CMS/CoP7 (2002) Res. 7.2 on Impact Assessment and Migratory Species was accepted, requesting Parties to apply appropriate SEA and EIA procedures for all proposed developments. Lesser Flamingo is listed on Appendix II of the CMS, as a species which is Near Threatened and in need of international co-operation for its conservation and management. In addition, the thirteenth meeting of the CMS Conference of the Parties (February 2020) affirmed that a commitment to maintaining and restoring ecological connectivity is one of the top priorities for CMS. Kamfers Dam plays a vital connectivity role for Lesser Flamingo in Southern Africa.

6.3 The Agreement on the Conservation of African-Eurasian Migratory Water Birds

An agreement developed in the framework of CMS, in force since November 1999, brings the 119 Range States of the Africa Eurasian Waterbird Agreement (AEWA) region together in a common policy to protect migratory waterbirds that use the flyway from the Arctic to southern Africa and their habitats across Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle, including many species of divers, grebes, pelicans, cormorants, herons, storks, rails, ibises, spoonbills, flamingos, ducks, swans, geese, cranes, waders, gulls, terns, tropic birds, auks, frigate birds and even the South African penguin. The core activities carried out under AEWA are described in its Action Plan, which is legally binding for all countries that have joined the Agreement. The AEWA Action Plan details the various measures to be undertaken by Contracting Parties (South Africa included) to guarantee the conservation of migratory waterbirds within their national boundaries. These include species and habitat protection, and the management of human activities, as well as legal and emergency measures. The AEWA Plan of Action for Africa (PoAA) is the operational guideline for implementation of the AEWA Strategic Plan in Africa and identifies five key objectives, requiring action, to ensure the conservation of migratory waterbirds and their habitats within Africa. These objectives include:

- i. To strengthen species conservation and recovery and reduce causes of unnecessary mortality;
- ii. To ensure that any use and management of migratory waterbird populations is sustainable across their flyways;
- iii. To establish and sustain a coherent and comprehensive flyway network of protected areas and other sites, managed to maintain – and where necessary restore – their national and international importance for migratory waterbird populations;
- iv. To ensure there is sufficient quantity and quality of habitat in the wider environment for achieving and maintaining favourable conservation status for migratory waterbird populations; and
- v. To ensure and strengthen the knowledge, capacity, recognition, awareness and resources required for the Agreement to achieve its conservation objectives.

6.4 The International Single Species Action Plan for the Conservation of Lesser Flamingo, December 2008

The aim of this action plan is to improve the conservation status of the Lesser Flamingo from a *Near Threatened* species to a species of *Least Concern* globally and in each of its four regional populations i.e. South Asia, East Africa, southern Africa and West Africa, by stabilising the size and distribution of the regional populations at current levels by 2020. This aim will be achieved by:

- i. Ensuring that all key breeding and feeding sites are designated as protected areas, Ramsar sites, BirdLife IBAs, and where appropriate, World Heritage Sites.
- ii. Ensuring that all key breeding and feeding sites are protected and maintained in good ecological condition by:
 - * Identifying the management needs of Lesser Flamingo habitat at key sites and implementing necessary management actions; and
 - * Maintaining, and restoring where necessary, favourable hydrological conditions and water quality.
- iii. Ensuring that breeding colonies are not disturbed by:
 - * Preventing disturbance through legislation, planning, zoning, and through enforcement of these rules as appropriate;
 - * Raising awareness about the conservation needs of the species at national and local level; and
 - * Helping local communities to develop alternative livelihood practices to reduce disturbance.
- iv. Reducing the effects of poisoning, particularly from cyanobacterial toxins, botulinus toxins, agricultural chemicals, industrial and domestic wastes, and infectious diseases, particularly avian influenza, avian cholera, salmonellosis and pseudomoniasis by:
 - * Establishing an integrated flamingo health surveillance programme to assess the effect of mass die-offs on the Lesser Flamingo populations;
 - * Ensuring that pollution guidelines and legislation are developed and enforced;

- * Ensuring that pollution guidelines and legislation at all key sites reflect the sensitivity of the species, particularly to industrial chemicals and heavy metals; and
 - * Raising awareness among decision makers and industry about the risk of pollution to Lesser Flamingo.
- v. Ensuring that harvesting, particularly egg harvesting and the trade in live specimens has no effect on Lesser Flamingo populations by:
- * Maintaining the ban on Lesser Flamingo trade where it is already in place; and
 - * Regulating and enforcing stringent licensing mechanisms at the national level. The licensing process should be based on an assessment of the effect of trade, in combination with other factors, on the regional populations.
- vi. Ensuring that collisions with man-made structures, particularly power lines, telephone lines, fences, light masts and guide wires are minimised.
- vii. Ensuring that human disturbance, particularly disturbance from boating, fishing, hunting other species, tourists, planes/helicopters, birdwatchers, photographers and military patrol/exercises, at non-breeding sites is minimised.

The majority of these activities have relevance to the proposed impacts associated with the construction and operation of the residential development.

6.5 The National Environmental Management Act 107 of 1998 (NEMA)

The National Environmental Management Act 107 of 1998 (NEMA) creates the legislative framework for environmental protection in South Africa and is aimed at giving effect to the environmental right in the Constitution. It sets out a number of guiding principles that apply to the actions of all organs of state that may significantly affect the environment. Sustainable development (socially, environmentally and economically) is one of the key principles, and internationally accepted principles of environmental management, such as the precautionary principle and the polluter pays principle, are also incorporated. NEMA also provides that a wide variety of listed developmental activities, which may significantly affect the environment, may be performed only after an environmental impact assessment has been done and authorization has been obtained from the relevant authority.

6.6 The National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) and the Threatened or Protected Species Regulations, February 2007 (TOPS Regulations)

The National Environmental Management: Biodiversity Act (No. 10 of 2004), (NEMBA) regulations on Threatened and Protected Species (TOPS) provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. The national Act provides for among other things, the management and

conservation of South Africa's biodiversity; protection of species and ecosystems that necessitate national protection and the sustainable use of indigenous biological resources.

6.7 The National Environmental Management: Protected Areas Act 57 of 2003

The National Environmental Management: Protected Areas Act (No. 57 of 2003), as amended in 2014, provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. The Act also provides for the establishment of a national register of all national, provincial and local protected areas that are managed in accordance with national norms and standards; and to endure intergovernmental co-operation and public consultation in matters concerning protected areas. Protected areas are declared in order to regulate the area as a buffer zone for protection of a special nature reserve, world heritage site or nature reserve; to enable owners of land to take collective action to conserve biodiversity on their land and to seek legal recognition therefor; to protect the area if the area is sensitive to development due to its- (i) biological diversity; (ii) natural characteristics; (iii) scientific, cultural, historical, archaeological or geological value; (iv) scenic and landscape value; or (v) provision of environmental goods and services; to protect a specific ecosystem outside of a special nature reserve, world heritage site or nature reserve; to ensure that the use of natural resources in the area is sustainable. This Act explicitly states that no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority.

6.8 The National Environmental Management Act 107 of 1998 (NEMA) Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal and or Avifaunal Species

This protocol provides the criteria for the specialist assessment and minimum report content requirements for impacts on terrestrial animal and/or avifaunal species for activities requiring environmental authorisation. This protocol replaces the requirements of Appendix 6 of the Environmental Impact Assessment Regulations. The assessment and reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool) for terrestrial animal species. The relevant terrestrial animal species data in the screening tool has been provided by the South African National Biodiversity Institute (SANBI).

6.9 The Species Environmental Assessment Guideline

The *Species Environmental Assessment Guideline* provides background and context to the assessment and minimum reporting criteria contained within the Terrestrial Animal and Plant Species Protocols; as well as to provide guidance on sampling and data collection methodologies for the different taxonomic groups that are represented in the respective protocols. This guideline is intended for specialist studies undertaken for activities that have triggered a listed and specified activity in terms of the National Environmental

Management Act, 1998 (No. 107 of 1998) (NEMA), as identified by the EIA Regulations, 2014 (as amended) and Listing Notices 1-3.

6.10 The Northern Cape Nature Conservation Act No. 9 of 2009

The current legislation applicable to the conservation of fauna and flora in the Northern Cape is the Northern Cape Nature Conservation Act No 9 of 2009. It provides for the sustainable utilisation of wild animals, aquatic biota and plants; the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; describes offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; provides for the issuing of permits and other authorisations; and provides for matters connected therewith.

7. DESCRIPTION OF THE BASELINE CONDITIONS

7.1 Site Sensitivity Verification

A screening report for the proposed residential development area and PAOI was generated on 28 July 2022. The majority of the proposed PAOI is considered to have a HIGH Animal Species Theme Sensitivity, based on the possible occurrence of African Marsh Harrier *Circus ranivorus*, Burchell's Courser *Cursorius rufus*, Caspian Tern *Hydroprogne caspia*, Ludwig's Bustard *Neotis ludwigii*, Lanner Falcon *Falco biarmicus*, Lappet-faced Vulture *Torgos tracheliotos*, Secretarybird *Sagittarius serpentarius*, Tawny Eagle *Aquila rapax*, White-backed Vulture *Gyps africanus* and Yellow-billed Stork *Mycteria ibis*. Although these species were not observed during the most recent site verification survey in August 2022, they have been recorded within the broader nine-pentad area during the SABAP2 surveys. However, with the exception of White-backed Vulture (n=131), also observed during the 2018 biodiversity survey (*Eco Agent*, 2018) and Secretarybird (n=77), the remaining species have been recorded in low numbers (<30 individuals) over the 15-year survey period to date. It is important to note that the single pentad within which the proposed residential development is located yields a lower species diversity and abundance with regards to the aforementioned terrestrial species, which is a likely indication of the current significant level of disturbance that exists within the PAOI. TABLE 3 below details the species on which the site sensitivity is based, their habitat preference, reported occurrence within the PAOI and the likelihood of regular occurrence within the PAOI.

Species Name	Red List Status	Habitat Preference	Reported Occurrence			Likelihood of Occurrence in PAOI
			SABAP 2	CWAC	SURVEYS	
African Marsh Harrier <i>Circus ranivorus</i>	EN	Require expansive (>100ha) permanent wetlands that contain reedbeds, within which to breed (Tarboton & Allen, 1984), but may forage in smaller wetlands (Taylor <i>et al.</i> , 2015). Relevant to the proposed development area, the reedbeds located on the southern margin of Kamfers Dam may provide suitable breeding habitat for the species.	0.9	1.33 (Kamfers) 1.00 (Benfontein)	-	Possible
Burchell's Courser <i>Cursorius rufus</i>	VU	Typically inhabits heavily grazed, burnt grassland, stony or gravelly plains, stubby sandveld, dry riverbeds and the edges of saline pans. The change in Kamfers Dam from an ephemeral pan to a permanent waterbody may preclude this species from occurring regularly within the PAOI.	1.2	-	-	Possible
Caspian Tern <i>Hydroprogne caspia</i>	VU	Occurs along the coast within sheltered bays and estuaries. Inland the species occurs at large water bodies with a preference for saline pans. Intolerant of any form of disturbance while breeding, including egg collecting and predation by domestic dogs (Taylor <i>et al.</i> , 2015). Extreme weather events (heavy rainfall & drought) also negatively impact breeding events. The significant levels of disturbance at Kamfers Dam are a likely cause of the displacement of this species from a habitat that would under less extreme circumstances support the species.	0.3	-	-	Unlikely
Ludwig's Bustard <i>Neotis ludwigii</i>	EN	A nomadic species that is tolerant of a variety of habitats but largely dependent on rainfall. More likely to occur in the protected areas to the east and south (i.e. Benfontein) of the proposed development area, where anthropogenic disturbance is less significant	2.6	-	-	Unlikely
Lanner Falcon <i>Falco biarmicus</i>	VU	Favour open grassland, cleared woodlands and agricultural lands. Prefers mountainous habitats/mining pits/quarries for breeding. As a species that hunts feral pigeons and free-ranging poultry, the PAOI may provide suitable foraging habitat for the species, with breeding potentially occurring at the mine located to the west of the development area.	4.1	-	2018	Very Likely
Lappet-faced Vulture <i>Torgos tracheliotos</i>	EN	Dry woodland habitat (Taylor <i>et al.</i> , 2015). More likely to occur (breed and forage) in the protected areas to the east and south of the proposed development area, however should a carcass become available this species will harness the opportunity to feed. Also, predate on flamingo chicks (McCulloch, 2008) making Kamfers Dam an attractive foraging area during the	2.7	-	-	Possible

Species Name	Red List Status	Habitat Preference	Reported Occurrence			Likelihood of Occurrence in PAOI
			SABAP 2	CWAC	SURVEYS	
		flamingo breeding season. Like other vultures, this species drinks and bathes regularly (Mundy, 1997) and may utilise Kamfers Dam for this purpose.				
Secretarybird <i>Sagittarius serpentarius</i>	VU	This species prefers open grassland and scrub, with scattered trees that are utilised for breeding (Taylor et al, 2015). Potentially a regular foraging visitor to open woodland areas bordering Kamfers Dam (e.g. Dronfield). Human-induced activities and pedestrians utilising the development footprint will invariably deter these species from the grassland habitat within the proposed development envelope.	13.1	-	-	Possible
Tawny Eagle <i>Aquila rapax</i>	EN	Found in lightly wooded savannah and thornveld. Outside of protected areas, this species has disappeared from large parts of its range (Taylor et al, 2015). Resident and breeding with Dronfield Nature Reserve. This species has a high sensitivity to land transformation and is largely dependent on conservation areas. The highly transformed nature of the development footprint and its immediate surrounds are likely to deter this species from regularly foraging and/or breeding within the PAOI.	4.4	-	-	Unlikely
White-backed Vulture <i>Gyps africanus</i>	CR	Favours woodland regions, relying on large carcasses for feeding. Typically roost in trees or on power line infrastructure. Likely to be an occasional foraging visitor within the PAOI, soaring overhead. Nearest roosting and breeding sites occur on Dronfield Nature Reserve. Similarly to Lappet-faced Vulture, this species drink and bathes regularly and may utilise Kamfers Dam for this purpose.	22.4	-	2018	Very Likely
Yellow-billed Stork <i>Mycteria ibis</i>	EN	Utilises wetlands, pans and flooded grassland for its breeding and foraging needs. Favours shallow water that is free of vegetation (del Hoyo et al. 1992 and Hancock et al. 2010).	1.2	4.00 (Kamfers) 1.00 (Platfontein)	-	Probable

Most notably, is the omission of Lesser Flamingo, in addition to other water and wetland dependent SCC (i.e. Greater Flamingo *Phoeniconaias roseus* and Maccoa Duck *Oxyura maccoa*) from the avian *Sensitivity Features* list, as a result of the LOW sensitivity assigned to Kamfers Dam within the *Animal Species Theme*. This is in direct contrast to the HIGH sensitivity assigned to Kamfers Dam within the *Aquatic Biodiversity Theme* – a decidedly more accurate reflection of the sensitivity of this water habitat and the species its supports.

Lesser Flamingo (Near Threatened) is an itinerant species that is highly susceptible to changes in its local environment and is therefore dependent on a network of suitable sites for its breeding and foraging needs. Breeding epochs are unpredictable and are largely dependent on seasonal rains, but most breeding occurs between November in southern Africa. During breeding, Lesser Flamingos congregate frequently in large mixed breeding colonies with Greater Flamingos. When not breeding, Lesser Flamingo are constantly on the move between feeding sites, often several hundred kilometres apart. These movements occur mostly at night (Childress et al. 2008), often during full moon conditions. Relevant to the proposed residential development, this nocturnal behavioural characteristic is critically important when considering the potential light pollution impact of the residential estate. Lesser Flamingo have very specific breeding requirements 1) the location must be inaccessible to terrestrial disturbance from humans or animal predators; 2) subject to seasonal flooding that is sufficiently shallow to enable the construction of the conical mud nests without them being washed away, but sufficiently deep and long-lasting to prohibit terrestrial predators from reaching the nesting colony; and 3) within easy flying distance (i.e. 120-180 km) of a good feeding site for the parents. In term of feeding, the correct water chemistry permitting the growth of cyanobacteria is vital to adequately support this species. Changes in the hydrology of their breeding habitats, particularly with regards to water levels and inflow poor quality water and human induced disturbance are key threats. Other threats include, the disruption of nesting colonies by predators, harvesting of eggs, poisoning and disease (Childress et al. 2008). With up to 50 000 individual birds occurring at Kamfers Dam, this colony is the most important permanent population of and the only breeding locality for this species in South Africa. Successful breeding seasons took place during 2007/2008 and again 2017/2018, resulting in Kamfers Dam becoming the fourth breeding locality in the Africa.

Greater Flamingo (Near Threatened) are decidedly nomadic, making their occurrence highly unpredictable. They are however a regular and semi-permanent foraging visitor to Kamfers Dam, with numbers between 250 and up to 9 0000 individuals (Ecotone, 2018). Approximately 100 chicks were produced in 2009/2010, on a purpose-built S-shaped island constructed within Kamfers Dam. Similarly to Lesser Flamingo, water quality and fluctuations in water levels reduce food resources and increase predation risk, leading to mass mortality as well as the failure of breeding attempts (Berry 1972, Fox et al. 1997, Simmons 2005).

Maccoa Duck (Near Threatened) is a relatively scarce species confined to Africa, with populations in the north and south of the continent (Berruti et al, 2007). South Africa has the largest national population of this species, however, there is some evidence that the South African populations are declining. Maccoa Duck feeds mainly

on benthic invertebrates, making the species an ideal indicator of pollution and wetland quality. This species nests over deep water in emergent vegetation, usually Typha or sedges and may be a possible breeder at Kamfers Dam. Rapid changes in water levels disrupt breeding and feeding conditions. Other key threats to this species include; disturbance resulting from activities of subsistence living of local communities around wetlands; improved treatment of sewage water reducing the food supply; botulism; increased pollutants, predation and poaching (Berutti et al., 2005).

Observations of Lesser Flamingo and Greater Flamingo (in addition to a diversity of the more common water dependent species) during the most recent field survey conducted on 4-6 August 2022, the 2018 biodiversity survey and species abundance data collected for the years 1991 to February 2022 at Kamfers Dam (*unpublished data* curated by Tania Anderson, 2022) further demonstrates the utilisation of the PAOI by these SCC. While parts of the PAOI are subject to fairly significant levels of disturbance, Kamfers Dam provides the only suitable avifaunal habitat that is capable of supporting the water dependent SCC listed above within the PAOI. The desktop analysis of secondary data sets and the observations emanating from the on-site field surveys, confirms the HIGH sensitivity assigned to the PAOI.

7.2 Relevant Bird Populations

7.2.1 Important Bird Areas

Some sites are exceptionally important for maintaining the taxa dependent upon the habitats and ecosystems in which they occur. Vigorous protection of the most critical sites is one important approach to conservation. Many species may be effectively conserved by this means. Patterns of bird distribution are such that, in most cases, it is possible to select sites that support many species. These sites, carefully identified on the basis of the bird numbers and species complements they hold (i.e. globally threatened, range restricted and or migratory or congregatory species) are termed Important Bird Areas (IBAs). IBAs are selected such that, taken together, they form a network throughout the species' biogeographic distributions. IBAs are key sites for conservation – small enough to be conserved in their entirety and often already part of a protected-area network. The proposed residential development is located directly adjacent to the Kamfers Dam (SA032) IBA, with the Dronfield (SA031) and Benfontein (SA033) IBAs occurring within a 20km radius of the proposed residential development area (FIGURE 4).

Kamfers Dam forms part of the Highveld Salt Pans system. It is an ephemeral, endorheic (having no outflow) pan of approximately 500ha in extent, receiving its water from its catchment, constant runoff as well as partially treated sewage effluent from the burgeoning city of Kimberley (Marnewick, 2015). As a result, this once natural pan has transformed from an ephemeral pan to a permanent, mineral-rich eutrophic wetland. The inflow of effluent has given rise to the establishment of extensive reedbeds and sedges and more importantly resulted in the growth of several species of phytoplankton, of which the blue-green algae *Arthrospira fusiformis* and diatoms *Cyclotella spp.* are most abundant. In this semi-arid environment, Kamfers Dam has become a vital

refuge for waterbird species, regularly supporting more than 20 000 individuals. It is particularly significant for supporting the largest permanent population of Lesser Flamingo in southern Africa and the only breeding site in South Africa. At least 63 waterbird species are regularly recorded at Kamfers Dam with at least 243 species reported during SABAP2. Sixteen years ago, saw the highest number of individuals recorded at this location (n=84 919) of which more than 95% of this total was comprised of Lesser Flamingo (n=81 664). Greater Flamingo, Chestnut-banded Plover *Charadrius pallidus*, Burchell's Sandgrouse *Pterocles burchelli*, Kalahari Scrub Robin *Erythropgia paena*, Sociable Weaver *Philetairus socius*, Black-necked Grebe *Podiceps nigricollis*, South African Shelduck *Tadorna cana* and Egyptian Goose *Alopochen aegyptiaca* all feature prominently within the IBA (Marnewick, 2015).

Dronfield Nature Reserve's savanna habitat supports several terrestrial breeding species i.e. White-backed Vulture, Lappet-faced Vulture, Secretarybird, Kori Bustard *Ardeotis kori*, Martial Eagle *Polemaetus bellicosus* and Tawny Eagle. Lesser Flamingo occurs on the pan when it is seasonally flooded. Each of these species are far ranging and although not likely to regularly occur within the proposed development area, they may present as aerial foraging visitors. Similarly, Benfontein Nature Reserve supports small numbers of breeding White-backed Vulture, Blue Crane *Anthropoides paradiseus* and Blue Korhaan *Eupodotis caerulescens*, including the congregatory Lesser Flamingo, Greater Flamingo and Ludwig's Bustard, utilising the plains (Marnewick, 2015). Observations at the Benfontein Pan have revealed high levels of fluctuation in waterbird diversity and abundances both seasonally and annually. This fluctuation correlates with the ephemeral nature of the pan which only holds water for several months during above-average rainfall years. More than 1 700 individuals are present during years of high rainfall with a total of 65 waterbird species recorded on the pan. Of these, 44 species are regularly present. Dominant species in terms of numbers and duration of presence are Black-winged Stilt *Himantopus himantopus*, Cape Shoveler *Anas smithii* and South African Shelduck *Tadorna cana* (Herrmann et al. 2004). Species groups that occur in limited numbers, or for short periods, include herons, grebes, flamingos, ibises and storks. The temporary nature of these pans within in the neighbouring IBAs highlight the importance of Kamfers Dam as a permanent and prominent foraging, roosting and breeding habitat for water dependent species within the province.

High connectivity (i.e. the unimpeded movement of species and the flow of natural processes) and functional ecological corridors exist between the three IBAs, particularly with regards to Lesser Flamingo. Ecological connectivity is endorsed by the Convention on Migratory Species (CMS, 2020) and emphasizes the urgency of protecting areas that ensure connectivity and its various elements i.e. dispersal, seasonal migration and river (fluvial) and wetland processes. Fragmentation caused by human activities continues to disrupt habitats, threatening biodiversity - this is evident within the PAOI. The need to both maintain and restore ecological connectivity is critical to the conservation of biological diversity, particularly the population of Lesser Flamingo supported by Kamfers Dam and its contemporaries in the neighbouring IBAs.

7.2.2. Protected Areas

Four protected areas are located within a 20km radius of the PAOI (FIGURE 4) with Dronfield and Benfontein Nature Reserves being most noteworthy. These areas are protected by law and managed for biodiversity conservation, providing much needed habitat to support a diversity and abundance of avifaunal species within the province. One hundred and forty bird species regularly occur within the Dronfield Nature Reserve. The reserve supports a breeding colony of White-backed Vulture. Twelve lark species and five species of pipit are amongst the 260 avian species recorded on the Benfontein Nature Reserve property. Several SCC reside within the reserve i.e. several SCC i.e. White-backed Vulture, Tawny Eagle, Martial Eagle, Secretarybird, Greater Kestrel *Falco rupicoloides*, Verreaux's Eagle-Owl *Bubo lacteus*, Blue Crane, Ludwig's Bustard, Kori Bustard and Blue Korhaan. The reserve boasts over 40 Sociable Weaver colonies in camel thorn trees. The reserve also hosts two groups of Lesser Flamingos. Tarentaalrand Safari Lodge and Chanbe Game Lodge occur to the north east of the proposed development area. A paucity of bird related information exists for these two smaller reserves, but it is assumed that the diversity and abundance of avifauna within these reserves will be similar to the surrounding area. Similarly to IBAs protected areas may provide an indication of the avifaunal species that are likely to occur in similar habitats found within the PAOI.

7.2.3. Coordinated Waterbird Count (CWAC) Sites

Seven CWAC sites occur within 20km of the proposed residential development, the closest and most noteworthy of which being Kamfers Dam. Others include Du Toit's Pan, Benfontein Pan, Benfontein Dam, Rooifontein Pan, Platfontein Pans and Marrick Pan (FIGURE 4). As discussed above, Kamfers Dam provides excellent habitat for waterbirds in a large pan with its *Phragmites* reedbeds, mudflats, and emergent grass. Its well-established permanence within the landscape means that it supports a diversity and abundance of breeding species including Chestnut-banded Plover. Globally significant counts of Black-necked Grebe, nationally large numbers of Little Grebe and Greater Flamingo with significant numbers of Lesser Flamingo. Glossy Ibis *Plegadis falcinellus*, South African Shelduck, Cape Teal *Anas capensis* and Hottentot Teal, Cape Shoveller *Anas smithii*, Blacksmith Lapwing *Vanellus armatus*, Black-winged Stilt and Grey-headed Gull *Chroicocephalus cirrocephalus* peaking in summer. In winter, peak numbers of Yellow-billed Duck *Anas undulata*, Red-billed Teal *Anas erythrorhyncha*, Egyptian and Spur-winged Geese, Moorhen, Red-knobbed Coot, and Whiskered Tern occur.

Du Toit's Pan is located approximately 10km south of Kamfers Dam within a mining area near Kimberley. The pan receives water from the neighbouring mines and a sewage farm. It is comprised of two pans separated by *Phragmites* reedbeds; one has open water and reeds, the other is largely mudflats when the water level is low. Since 1996, 40 waterbird species have been recorded at this CWAC site. Summer surveys yield observations of all the Palearctic shorebirds and also Black-winged Stilt, White-winged Tern, Yellow-billed Duck, Cape and Red-billed Teal, and Cape Shoveller. Numbers of Little Grebe *Tachybaptus ruficollis*, Reed Cormorant *Microcarbo africanus*, Darter *Anhinga rufa*, Common Moorhen *Gallinula chloropus* and Red-knobbed Coot

Fulica cristata peak in winter, and the only record of Lesser Flamingo (n=289) was in winter 1996. Bird movements occur between this pan and other wetlands in the Kimberley area, including Kamfers Dam.

Six ephemeral pans, collectively known as Platfontein Pans, are rarely flooded and are comprised of open shorelines with mud and short vegetation. Sixty-five species have been recorded at the pans to date with summer and winter counts in 1997 producing an impressive 42 waterbird species list. Nationally significant numbers of Greater Flamingo, South African Shelduck, Southern Pochard *Netta erythrophthalma* and Black-winged Stilt occurred in summer as well as good numbers of Black-necked Grebe *Podiceps nigricollis*, Little Grebe, Glossy Ibis, Red-billed Teal, Cape Shoveller and Red-knobbed Coot (breeding), high counts of Palearctic shorebirds (particularly Marsh Sandpiper *Tringa stagnatilis* and Ruff *Calidris pugnax*), an exceptional abundance of Avocet (n=530) in addition to good numbers of Grey-headed Gull and White-winged Tern *Chlidonias leucopterus*. The winter count produced large totals of White-faced and Yellow-billed Ducks, increased numbers of Red-billed Teal and Cape Shoveller, large counts of Kittlitz's Plover *Charadrius pecuarius* and Blacksmith Lapwing, Curlew Sandpiper *Calidris ferruginea*, and reasonable counts of Pied Avocet *Recurvirostra avosetta* and Black-winged Stilt.

Benfontein Pan is an open, ephemeral pan, with little vegetation. Counts indicate that it sometimes has foraging habitat for shorebirds. When flooded it is capable of supporting a diversity and abundance of species. The summer months yield good numbers of Palearctic waders such as Greenshank, Curlew Sandpiper and Little Stint *Calidris minuta*, and smaller numbers of other shorebirds. Egyptian Goose *Alopochen aegyptiaca* and Red-knobbed Coot are common. Similarly, Benfontein Dam has no vegetation, an open shoreline and a rock wall along 30-40% of its perimeter. This CWAC site has a very small species list, with only 17 species recorded here. Waterfowl were almost absent during the summer survey. Common species include Western Cattle Egret *Bubulcus ibis* and Red-knobbed Coot, Yellow-billed Duck and Spur-winged Goose *Plectropterus gambensis* with smaller densities of shorebird species.

Little to no information is available for the Marrick and Rooifontein pans. However, given their proximity (in bird terms) to the aforementioned CWAC sites, it is likely the similar species complements will occur at these locations. Forty-three and thirty-six species have been observed at the Marrick Pan and Rooifontein Pan respectively.

Similar to the IBAs within the broader area, high connectivity exists between these CWAC sites. The permanence and variable habitat of Kamfers Dam makes this CWAC site particularly important. Although many of the species recorded at these sites are common to waterbody and wetland habitats, their presence is indicative of a functioning ecosystem. Therefore, the displacement impacts associated with the construction and operation of the residential estate cannot be discounted or downplayed for these *more common* species. This is particularly true for Kamfers Dam. While many species are relatively tolerant of the current levels of

disturbance at this site, any additional loss of habitat and disturbance may tip the scales resulting in an abandonment of this site altogether. The construction of the high-density residential estate, particularly with regards to loss of habitat and displacement as a result of disturbance, and the resultant human-induced impacts (e.g. improper sewage and waste disposal, noise pollution) that will follow must be carefully considered, as these are not easily mitigated.

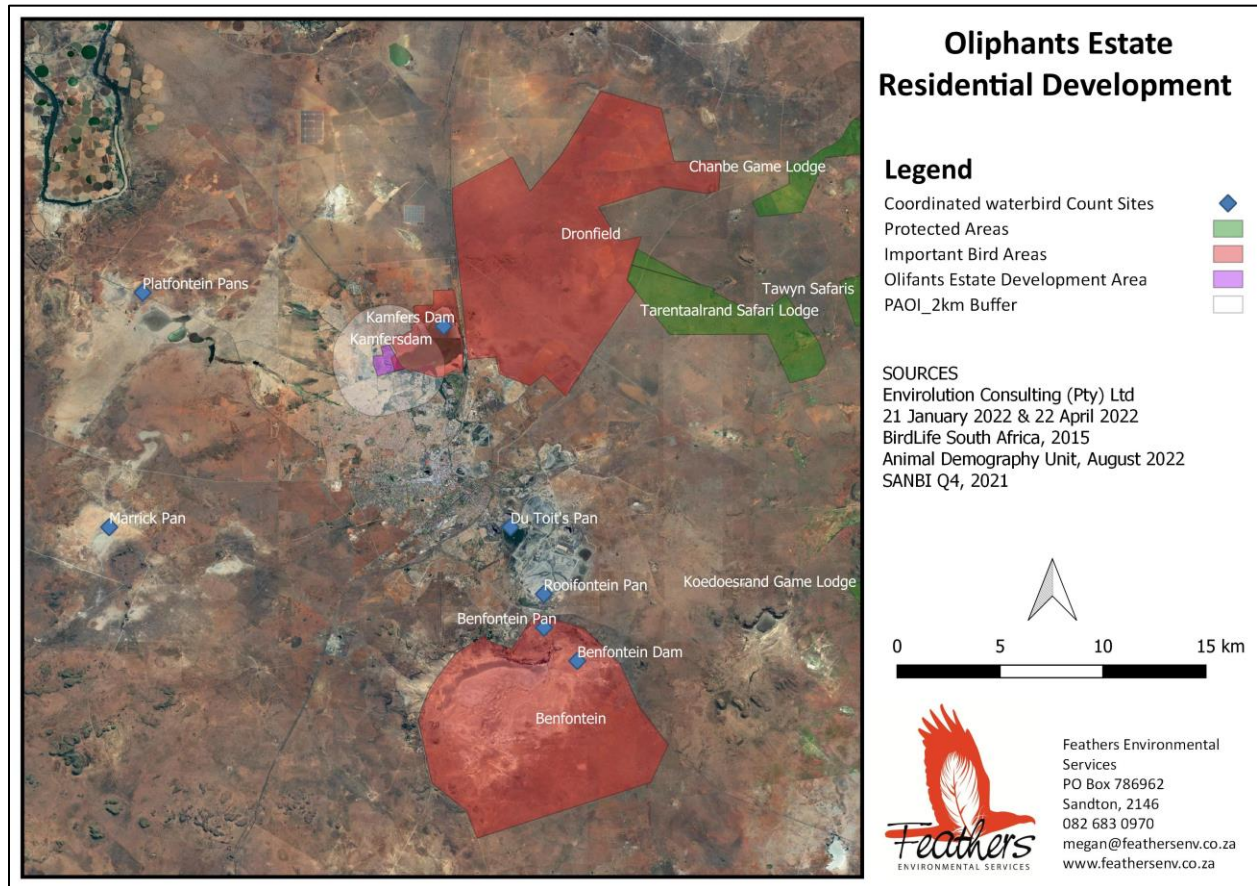


FIGURE 4: Regional map detailing the location of the proposed residential estate development area in relation to Protected Areas, IBAs and CWAC sites

7.2.4. South African Bird Atlas Project 2 Data (SABAP2)

A total of 308 bird species have been recorded within the relevant pentads during the SABAP2 atlassing period to date (APPENDIX 1). The presence of these species in the broader area provides an indication of the diversity of species that could potentially occur within the areas earmarked for the proposed residential development, particularly where pockets of natural vegetation/habitats persist. Of the 308 species, 26 of these are considered to be regional SCC (Taylor et al, 2015). White Stork *Ciconia ciconia*, which is not listed as a SCC, but is protected internationally under the *Bonn Convention on Migratory Species* has also been recorded in the study area. It is important to note that with the exception of Lesser Flamingo (n=103), Greater Flamingo (n=95), White-backed Vulture (n=131) and Secretarybird (n=77) the remaining SCC species have been recorded in low

numbers, with less than 30 individual birds being recorded over the fifteen-year survey period. Also, Lesser Flamingo counts are knowingly underreported by SABAP2. Dedicated counts as part of the CWAC project as well as *BLSA* and other citizen science projects all indicate individual numbers of between 300 and 82 000. The significant individual numbers of White-backed Vulture and Secretarybird can be attributed to the number of observations/surveys conducted within the 2835_2445 and 2840_2445 pentads which contain the Dronfield Nature Reserve, a stronghold for these species.

Of the 26 SCC recorded across the broader nine pentad area, only eight SCC have been observed in the pentad within which the proposed residential development is located i.e. Secretarybird, Grey Crowned Crane, Maccoa Duck, Greater Flamingo, Lesser Flamingo, Yellow-billed Stork and White-backed Vulture. It is important to note, with the exception of Greater and Lesser Flamingo, these species have been recorded in exceptionally low numbers, with between one and four individual birds observed during the fifteen-year survey period to date. The CWAC data mirrors this dataset. The low report rates can be attributed to fairly high levels of disturbance and habitat loss associated with the surrounding mining practices, urban related activities and transport (road and rail) networks which have undoubtedly displaced many of the naturally occurring species, that under optimum conditions, would inhabit these areas.

Although this report focuses on SCC, since the impacts associated with the construction and operation of the proposed residential development is likely to be more biologically significant for these species, the impact on non-SCC avifauna is also assessed, albeit in less detail. Furthermore, SCC can often be used as surrogate species for the others in terms of impacts and the necessary mitigation. Lesser Flamingo is the flagship species relevant to this project. The non-SCC priority species that have been considered for this assessment include korhaan, harriers, kestrels, falcons, herons, geese, ibis and many water dependent species that feature prominently in the PAOI. Each SCC's potential for occurring in a specific habitat class is indicated in TABLE 3.

7.2.5. Primary Data Collection

A meeting was held with representatives of *BLSA* on 23 March 2022, where it was determined that a number of robust datasets exist for the Kamfers Dam area and that a short site sensitivity verification and field survey would be sufficient to inform the EIA phase of the project. This survey would comprise of incidental counts conducted at various points and at variable times within the PAOI, as well as a driven transect, that are indicative of the habitat types found in the development footprint and its immediate surrounds (FIGURE 3). The survey was conducted on 4-6 August 2022. An assessment of the avian micro habitats and the species observed both during the aforementioned survey and as part of the datasets discussed above, confirm the high sensitivity rating assigned to the PAOI. The survey produced a combined list of 55 bird species (APPENDIX 1 - highlighted in grey). Lesser Flamingo and Greater Flamingo were the only SCC observed during this site survey. Kamfers Dam was full at the time of the site survey, with no visibly exposed mudflats. Discussions with both *BLSA* and *Ekapa* representatives confirmed that Lesser Flamingo did not breed at the Dam during the 2021 season.

All of the observed species have the potential to be displaced by the proposed residential development as a result of habitat transformation and disturbance.

TABLE 4: Annotated list of regional SCC that have been recorded in the relevant SABAP2 pentads surrounding the Oliphants Estate PAOI

Name		SABAP2 Reporting Rate					Impacts						
Species name	Scientific name	Full Protocol	Ad hoc Protocol	Red List: Regional	Recorded During Surveys			Displacement: Disturbance	Displacement: Habitat Loss	Displacement: Habitat Transformation (rise/fall in dam water levels)	Mortality: Sewage and Polluted Storm Water	Mortality: Hunting & Egg Removal	Mortality: Collisions associated with Light Pollution
Abdim's Stork	<i>Ciconia abdimii</i>	0,7	0,6	NT	-								x
African Marsh Harrier	<i>Circus ranivorus</i>	0,9	0,4	EN	-		x	x	x	x	x	x	x
African Rock Pipit	<i>Anthus crenatus</i>	0,2	0,0	NT	-		x	x					
Black Stork	<i>Ciconia nigra</i>	0,2	0,0	VU	-		x		x	x			x
Blue Crane	<i>Grus paradisea</i>	4,3	1,2	NT	-		x	x		x			x
Burchell's Courser	<i>Cursorius rufus</i>	1,2	0,0	VU	-		x	x					
Cape Vulture	<i>Gyps coprotheres</i>	1,7	1,8	EN	-								x
Caspian Tern	<i>Hydroprogne caspia</i>	0,3	0,0	VU	-		x		x	x			
Chestnut-banded Plover	<i>Charadrius pallidus</i>	1,4	1,0	NT	-		x		x	x	x		
Eurasian Curlew	<i>Numenius arquata</i>	0,2	0,0	NT	-		x		x	x	x		
European Roller	<i>Coracias garrulus</i>	2,4	0,2	NT	-			x					
Greater Flamingo	<i>Phoenicopterus roseus</i>	16,2	13,6	NT	x		x		x	x	x	x	
Greater Painted-snipe	<i>Rostratula benghalensis</i>	0,3	0,0	NT	-		x		x	x	x	x	
Grey Crowned Crane	<i>Balearica regulorum</i>	0,2	0,0	EN	-		x	x	x	x	x	x	
Kori Bustard	<i>Ardeotis kori</i>	3,8	0,4	NT	-		x	x					
Lanner Falcon	<i>Falco biarmicus</i>	4,1	0,8	VU	-		x	x					
Lappet-faced Vulture	<i>Torgos tracheliotos</i>	2,7	0,4	EN	-								
Lesser Flamingo	<i>Phoeniconaias minor</i>	17,6	20,4	NT	x		x		x	x	x	x	
Ludwig's Bustard	<i>Neotis ludwigii</i>	2,6	0,2	EN	-		x	x					
Maccoa Duck	<i>Oxyura maccoa</i>	3,8	1,6	NT	-		x		x	x	x		
Martial Eagle	<i>Polemaetus bellicosus</i>	1,4	0,2	EN	-								
Secretarybird	<i>Sagittarius serpentarius</i>	13,1	1,8	VU	-		x	x					
Tawny Eagle	<i>Aquila rapax</i>	4,4	0,0	EN	-								
Verreaux's Eagle	<i>Aquila verreauxii</i>	0,2	0,2	VU	-								
White-backed Vulture	<i>Gyps africanus</i>	22,4	7,9	CR	-								
Yellow-billed Stork	<i>Mycteria ibis</i>	1,2	0,0	EN	-		x		x	x	x	x	x

7.3 Avifaunal Habitats

Vegetation is one of the primary factors determining bird species distribution and abundance in an area. It is widely accepted within ornithological circles that vegetation structure is more important in determining which bird species will occur there. The classification of vegetation types is from Mucina & Rutherford (2006 and 2012), while from an avifaunal perspective, the Atlas of southern African Birds (SABAP1) recognises six primary vegetation divisions or biomes within South Africa, namely (1) Fynbos (2) Succulent Karoo (3) Nama Karoo (4) Grassland (5) Savanna and (6) Forest (Harrison et al. 1997). Whilst much of the distribution and abundance of bird species can be attributed to the broad vegetation types present in an area, it is the smaller spatial scale habitats (micro habitats) that support the requirements of a particular bird species that need to be examined in greater detail. Micro habitats are shaped by factors other than vegetation, such as topography, land use, food availability, and various anthropogenic factors all of which will either attract or deter birds and are critically important in mapping the site in terms of avifaunal sensitivity and ultimately informing mitigation requirements. Assessment of the PAOI revealed three broadly described avifaunal micro habitats i.e. thornveld, surface waterbodies and their associated wetlands and urban/industrial areas (FIGURE 6). APPENDIX 2 provides a photographic record of the bird habitats.

7.3.1 Thornveld & Shrubland

The proposed residential development footprint and the PAOI are located within a single primary vegetation division namely the Savanna Biome, specifically Kimberley Thornveld and Vaalbos Rocky Shrubland (South African National Biodiversity Institute, 2012 and Mucina & Rutherford, 2006) see FIGURE 5.

The Kimberley Thornveld vegetation unit is confined to the western parts of the proposed development footprint and is widely distributed in the Kimberley, Hartswater, Bloemhof and Hoopstad districts. The thornveld is partly open savanna, comprising camel thorn *Vachellia* (formerly *Acacia*) *erioloba* trees in tall, tufted grasses, and semi-open to closed mixed-acacia woodland. Where untransformed thornveld persist within the PAOI, several acacia thornveld savanna species such as Kalahari Scrub Robin *Erythropygia paena*, Marico Flycatcher *Bradornis mariquensis*, Crimson-breasted Shrike *Laniarius atrococcineus*, Scaly-feathered Finch *Sporopipes squamifrons* and Violet-eared Waxbill *Uraeginthus granatinus* are present (Marnewick, 2015). Vaalbos Rocky Shrubland restricted to the hills and ridges east of the Vaal-Orange confluence, in particular near the Kimberley area. Relevant to the proposed residential development, this vegetation unit is confined to the eastern parts of the proposed development footprint. Vaalbos Rocky Shrubland is comprised of evergreen shrubby vegetation dominated by *Tarchonanthus camphorates*, *Olea europaea subsp. africana*, *Euclea crispa* and *Diospyros lycioides*. When disturbed or transformed, it is often dominated by *Prosopis* and *Vachellia tortilis*.

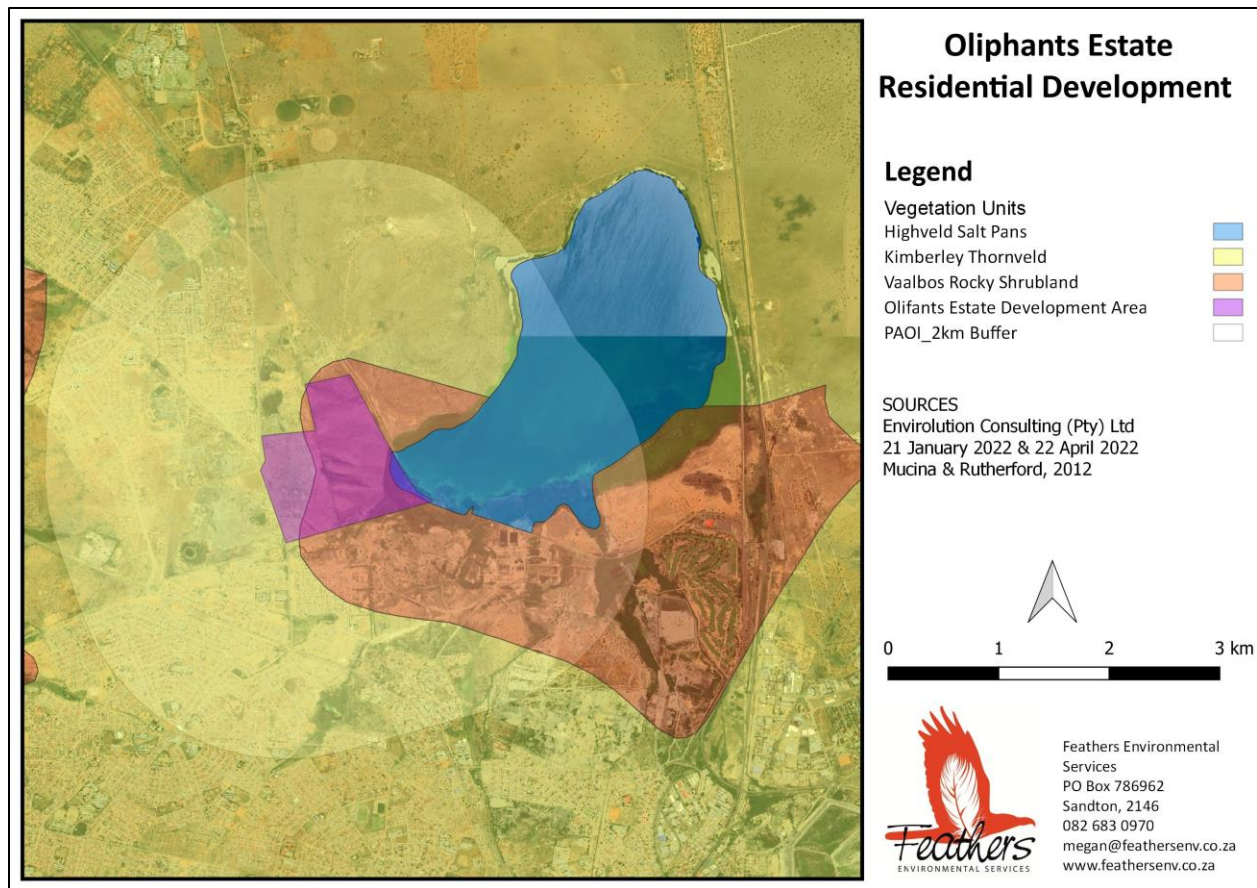


FIGURE 5: Regional map detailing the three vegetation units occurring within the proposed residential estate development area and PAOI.

The savanna/woodland biome contains a large variety of bird species (it is the most species-rich community in southern Africa) but very few bird species are restricted to this biome. Savanna is particularly rich in large raptors and forms the stronghold for White-backed Vulture, Tawny Eagle *Aquila rapax* and Lanner Falcon *Falco biarmicus*. Apart from SCC, it also supports a multitude of non-SCC raptor species, such as the Amur Falcon *Falco amurensis*, Black-chested Snake-Eagle *Circaetus pectoralis*, Brown Snake-Eagle *Circaetus cinereus*, Black-winged Kite *Elanus caeruleus*, the migratory Common Buzzard *Buteo vulpinus*, Gabar Goshawk *Micronisus gabar*, Greater Kestrel *Falco rupicoloides* and Spotted Eagle-Owl *Bubo africanus*. Apart from raptors, open woodland in its undisturbed state is also suitable for a wide range of non-raptorial SCC, including Secretarybird, Kori Bustard, Marabou Stork and Abdim's Stork. In addition to providing foraging and roosting habitat for the other development sensitive species i.e. Northern Black Korhaan, Red-crested Korhaan, Helmeted Guineafowl *Numida meleagris* and Western Cattle Egret *Bubulcus ibis*, a large diversity of passerine species (i.e. small perching birds) recorded in the area are also supported.

The area that has been earmarked for the proposed Oliphants Estate residential development has experienced significant levels of disturbance and transformation as a result of urbanisation and its associated activities that dominate the PAOI landscape. Significant levels of disturbance persist in the form of vehicle and pedestrian

traffic, pastoral activities and mining operations in the immediate surrounds. SABAP2 reporting rates for SCC potentially occurring in this habitat in the study area are very low (TABLE 3) and the absence of these SCC within the proposed residential development footprint is an indication of the significant levels of human activity and disturbance. Therefore, the potential displacement impacts as a result of habitat loss and disturbance associated with the construction and operation of the proposed Oliphants Estate residential development are likely to be low for woodland dependent species.

7.3.2. *Surface Waterbodies: Pans*

Pans are wetlands having closed drainage systems; water usually flows in from but with no outflow from the pan basins themselves. They are typical of poorly drained, relatively flat and dry regions. Water loss is mainly through evaporation, sometimes resulting in saline conditions, especially in the most arid regions. Water depth is shallow (<3m) with flooding characteristically ephemeral (Harrison *et al.* 1997). A prominent and noteworthy feature of the proposed development area and broader PAOI is Kamfers Dam - a privately owned waterbody. Originally, as ephemeral endorheic pan, receiving its water from rainfall and occasional flooding, this waterbody would attract a diversity and abundance of waterbirds, while large raptors and vultures would utilise them for bathing and drinking. When dry, the grass covered pan would be attractive to several large terrestrial species for foraging, roosting and breeding.

The pan's permanence has been established with the constant input of storm water runoff and partially treated sewage effluent emanating from the neighbouring settlements and the Homevale Waste Water Treatment Works (HWWTW). The sewerage effluent is important - the phosphates and nitrates increase the growth of the blue-green algae *Arthrospira fusiformis*, which is the major food item of Lesser Flamingos. However, increased and unacceptable high levels phosphates and nitrates stemming from untreated or poorly treated sewage results in eutrophication and the growth of toxic cyanobacteria. Flooding of this waterbody reduces the availability of shoreline habitat but also reduces the salinity of the water in the dam, thereby stimulating the growth of green algae. Maintaining the quality and the level of water within the Dam is a critical management requirement to ensure the sustainability of this water source that so many species have become reliant on. The southern margin of Kamfers Dam is exposed to fairly significant levels of disturbance. The species complement along this margin is representative of this disturbance with only the more common waterfowl species present on the open water and within the reedbeds and shoreline birds virtually absent. In contrast, the relatively inaccessible northern reaches of the Dam and minimal existing disturbance experienced in this area are attractive to SCC and a diversity and abundance of waterfowl and shoreline species. This dichotomous nature of species occurrence and abundance in the northern and southern parts of the Dam respectively is indicative of the urban pressures imposed on this globally important IBA, and Critical Biodiversity Area. Unlike the woodland habitat contained within the development footprint, the displacement impacts as a result of habitat loss and disturbance, associated with the construction and operation of the proposed

Oliphants Estate residential development will be far more marked and significant for the water dependent and shoreline species occupying Kamfers Dam.

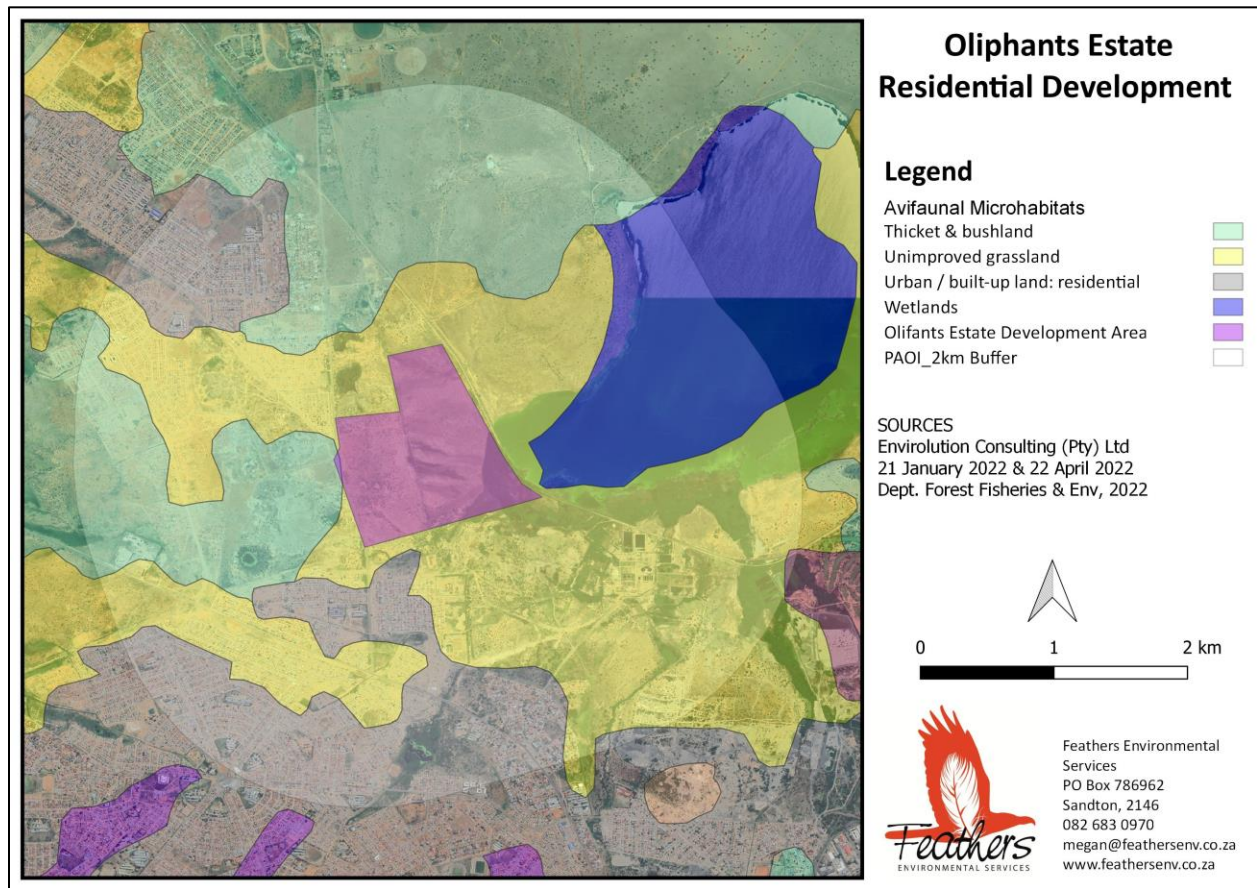


FIGURE 6: Regional map detailing the land use types occurring within the the proposed residential estate development area and PAOI.

7.3.3 Built-up Areas and Infrastructure

These areas include mines, industry, residential areas and surface infrastructure such as roads and railway networks. Built-up areas are generally of little value to SCC due to their degraded nature and the associated disturbance factor, with the possible exception of Lanner Falcon which hunt feral pigeons and free-ranging poultry. The impact of the dense human population also spills over in the adjacent habitat classes through the constant movement of pedestrians, cattle and dogs into these areas. This has implications for the avifauna (particularly the larger terrestrial species and water dependent species) that are vulnerable to disturbance. Despite the heavily transformed nature of built-up areas, they do play an important role in providing safe refuge and foraging opportunities for small passerine species that have become common in urban, peri-urban and rural environments. Again, these species are relatively tolerant of disturbance and are therefore likely to be temporarily displaced from the area during the construction phase of the residential development.

TABLE 4 details the micro habitats that each SCC (recorded by SABAP2) will typically frequent in the PAOI. 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 3 represents each species' most preferred habitats. These locations are where most of the birds of that species will spend most of their time which in turn provides an indication of where impacts on those species will be most significant.

8. GENERAL DESCRIPTION OF IMPACTS ASSOCIATED WITH THE CONSTRUCTION & OPERATION OF THE RESIDENTIAL DEVELOPMENT

The effects of any development on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and diversity of species present. With so many variables involved, the impacts of each development must be assessed individually. The principal areas of concern for SCC and non-SCC development-sensitive species related to the proposed residential development are described below:

8.1.1. *Displacement as a result of habitat loss or transformation within the physical development footprint*

This impact is dependent on various factors i.e., the location and the size of the development, the amount of habitat affected; the uniqueness of the habitat; and the sensitivity and conservation status of the bird species utilizing that habitat (Smallie, 2013). Areas of habitat will be cleared to accommodate the considerable amount of housing infrastructure required, reducing the amount of habitat available to birds for foraging, roosting and breeding. This impact is likely to have calamitous consequences for the smaller bird species with small home ranges as entire territories could be removed during construction activities. The vegetation present within the proposed residential estate footprint is subject to existing degradation and is, in parts, already heavily transformed. It is therefore unlikely to support the more sensitive woodland species listed in TABLE 4. Despite the levels of existing habitat degradation, Kamfers Dam and its associated wetland margins remain critical habitat that need to be avoided. Unfortunately, due to the nature of this impact, it cannot be mitigated to negligible levels, but it can be reduced with the construction of the residential estate outside of the imposed avian buffers (discussed in Section 9) ensuring the least risk posed to SCC and non-SCC development sensitive species. A reduction in the number of housing units will further reduce this impact. The proposed Single Residential and Medium Density Nodes need to be considered in favour of the proposed High Density Node.

8.1.2. *Displacement as a result of off-site habitat transformation (rise or fall in Kamfers Dam's water level)*

Kamfers Dam is a dynamic and discrete ecosystem, that is highly sensitive to fluctuating water levels and the intrinsic changes in its biotic components. An optimal range of conditions must occur for the composition of the algal species to flourish within the Dam. The density of Lesser Flamingo is directly correlated to the density of blue-green algae which stimulates the onset of breeding behaviours. Any changes, particularly

anthropological factors superimposed on this system will modify the prey base available to SCC and may irreversibly alter the ecological status of this vulnerable ecosystem. Kamfers Dam is situated within one of two depressions/low points in the topography, with storm water flowing into either Du Toits Pan or Kamfers Dam during the rainy season. The proposed residential area is situated directly within the area where rain water is channeled upon entry into Kamfers Dam. Storm water management is critical for the sustainability of Kamfers Dam. Currently, the management of the water levels at Kamfers Dam is severely hamstrung with limited municipal involvement due to financial constraints and non-operational pumping infrastructure. So, it is vitally important that the residential development does further comprise an already ailing management structure by impeding or exacerbating the delivery of storm water into the Dam.

8.1.3. Displacement as a result of disturbance

Construction requires a significant amount of machinery and labour to be present on site for a period of time. For most bird species, construction activities are likely to be a cause of temporary disturbance and will impact on foraging, breeding and roosting behaviors. However, for shy, sensitive species or ground nesting birds, construction activities in close proximity to breeding locations, could be a source of disturbance resulting in temporary breeding failure or even permanent abandonment of nests and displacement from the site entirely. In addition, species commuting around the area may become disorientated, avoid the site and fly longer distances than usual as a result, and for some species this may have critical energy implications (Smallie, 2013). Most notably, the day to day activities (i.e. noise pollution, light pollution, waste disposal, the keeping of pets and easy access to the dam) of the residents occupying the proposed residential estate, are likely to cause a more permanent and significant degree of disturbance to the birds residing and breeding at Kamfers Dam. The construction of the residential estate will undoubtedly displace the avifaunal community that reside both within the physical footprint of the estate, as well as have a profound impact on the species utilising Kamfers Dam. Strict adherence to the imposed avian buffers is vital to the sustainable functioning of the Dam and will reduce the significance of this impact for SCC and non-SCC development sensitive species. Again, a reduction in the number of housing units will further reduce this impact. The proposed Single Residential and Medium Density Nodes need to be considered in favour of the proposed High Density Node.

8.1.4. Direct mortality/ill health as a result of sewage and contaminated storm water inflow

Similarly to fluctuations in water levels, the quality of the water within Kamfers Dam is critical to the survival of the SCC, particularly Lesser Flamingo, Greater Flamingo and Maccoa Duck that regularly utilise the waterbody. Low water levels will reduce the food supply, resulting in episodic mortalities that are directly attributed to immunodeficiency induced malnutrition. Heavy metals (associated with industrial pollution), pesticides, algal toxicity and bacterial infection can easily find their way into Kamfers Dam either through the inflow of sewage or contaminated storm water. Kamfers Dam experienced an outbreak of Botulism in 2013 due to a sewage leak on the HWWTW infrastructure, killing hundreds of waterfowl and flamingos (BLSA, 2021). In 2021 significant mortalities were recorded again, due to a bacterial infection as a result of a suppressed immune response. An

increase in lead and iron levels within the Dam were reported to be the root cause of the mortalities. The HWWTW infrastructure is currently in disrepair and unable to process Kimberley's burgeoning sewage quantities. Sewage emanating from the Oliphants high-density residential estate cannot be fed directly into the HWWTW, unless substantial upgrades are conducted on the existing infrastructure. Domestic poultry, often associated with low income households and areas of dense human settlement are a source of avian tuberculosis – another significant threat to wild bird populations. Human-induced avian mortality is a significant impact that must be avoided at all costs

8.1.5. Direct mortality as a result of construction activities

Bird mortality as a result of construction activities is improbable because birds are incredibly mobile and able to move out of harm's way. If mortality does occur, it is likely to be confined to a localised area and restricted to immobile species e.g. nestlings occurring within the physical development footprint. The significance of this impact can be reduced with strict adherence to the recommendations that will stem from a pre-construction avifaunal walk-through, which may include delaying construction to accommodate breeding SCC, if any

8.1.6 Mortality due to collisions with the existing power line infrastructure as a result of light pollution

Collisions are the biggest single threat posed by power lines to birds in southern Africa (van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of waterbirds. These species are mostly heavy-bodied birds with limited maneuverability, 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. Quantifying this impact in terms of the likely number of birds that will be impacted, is very difficult because a number of variables play a role in determining the risk, for example weather, rainfall, wind, age, flocking behaviour, power line height, light conditions, topography, population density and so forth. A potential impact of the proposed residential development is light pollution. Lesser and Greater Flamingos have a propensity for undertaking nocturnal movements/migrations particularly on clear nights. Excessive lighting in and around the proposed residential estate may result in disorientation and unwarranted movement/flights in and out of the Kamfers Dam area. Both overhead railway and power line infrastructure occur along the boundaries of Kamfers Dam, which have in the past been the cause of a great number of collision related mortalities. In addition, artificial light alters foraging behaviour and vocal communication, often resulting in disorientation and some birds attracted to the light may fall victim to predation by feral or domestic cats.

8.1.7 Mortality as a result of hunting/poaching and egg removal

The proximity of the proposed residential estate to Kamfers Dam, allows for ease of access to the various species residing on the open water or within the reedbeds. These species may become targets for hunting and egg removal. During the 2018 survey, two snares were found as well as adults and children with catapults to shoot small mammals and birds. Domestic cats and dogs are also a likely source of predation.

8.1.8 Indiscriminate and/or Incorrect waste disposal and inadequate service delivery with regards to waste removal

The proposed high-density residential estate will in all likelihood generate a significant amount of household waste. If this waste is disposed of indiscriminately or improperly or is not stored correctly awaiting removal, this waste will disperse into the Kamfers Dam. In the wet season, waste (plastics) may be flushed into the Dam together with other surface contamination (as a result of waste water discharge). Birds become entangled in plastic, wire, and other debris. Similarly, birds can inadvertently ingest plastics, ropes and elastic bands, leading to possible medium term fatalities away from the site, sometimes through the cumulative effect of repeated ingestion.

8.1.9 Impacts on avitourism

Birding is one of the fastest growing nature-based tourism activities in the world and is experiencing similar growth in interest and popularity in South Africa. South Africa's diversity of birds and endemic species, as well as a full complement of major bird habitats, make it a premier destination for avitourism. In a Department of Trade & Industry (dti) commissioned study, the total size of South Africa's avitourism market is estimated to be between 21 000 and 40 000 avitourists annually and between 8 000 and 16 000 foreign avitourists visiting South Africa per annum (dti, 2010). Collectively, avitourists spend an estimated R927 million to R1,725 billion on birding trips, support services and equipment each year. Avitourists spend more money per visitor than those in other niche market segments. Avitourists have higher than average income levels, book longer trip lengths (a higher total of days travelling for birding purposes) and have a greater tendency to visit multiple provinces within South Africa compared to the mainstream tourism market. Avitourism generally has positive environmental and conservation impacts (dti, 2010). The presence of Lesser Flamingo in addition to other SCC and large spectacular assemblages of waterfowl are a major attraction within the Northern Cape Province, contributing significantly to regional and national economies. Any impact that results in the permanent displacement of Lesser Flamingo and other SCC from the Dam will negatively impact the tourism industry within the province.

9. SENSITIVITY MAPPING & BUFFER RECOMMENDATIONS

Sensitive features present within the PAOI include the waterbodies and their associated wetland areas (FIGURE 7), particularly Kamfers Dam as a designated IBA and Critical Biodiversity Area (CBA). Assigning an appropriate buffer to these areas is essential for the protection of these key habitats and will act as a barrier between the identified impacts (human activities) and the sensitive waterbody features. It is important to note that while buffers provide protection, they do not address all water related problems. They need to be implemented in conjunction with a variety of complementary mitigation and management measures. Impacts associated with hydrological changes i.e. the inflow of storm water as well as point source discharges such as sewage outflows would be better managed by targeting these areas and impacts through source-directed management and treatment. The recommended buffers in this assessment have been assigned to the project area to ensure the basic aquatic processes, to reduce the impact on water resources from anthropological activities and to secure habitat for aquatic, semi-aquatic and terrestrial species. Biodiversity that is dependent on water for some parts of its life cycle but also require terrestrial habitats adjacent to the water to meet the rest of its life cycle needs benefit from the implementation of a buffer that protect not only the species and core habitats of conservation concern but also the corridors that make it possible to sustain a viable population. In the case of residential projects like this, buffers should not be viewed as restrictive, but rather as an opportunity that will lead to increased property values because of the aesthetic and tourism related activities that can benefit the local community.

The 500m buffer assigned to Kamfers Dam in the 2018 Biodiversity Impact Assessment cannot be viewed as a mitigatory measure, it is a requirement of the *regulated area of a watercourse* as defined by DWS and for the protection of breeding sites as per the new species guidelines (SANBI, 2020). This 500m buffer must be viewed as a no-go area. An additional avian buffer needs to be assigned as a means to not only prevent and protect, but rather to enhance the habitat and ensure the sustainability of Kamfers Dam as a Key Biodiversity Area. The Terrestrial Fauna Biodiversity and Animal Species Summary (Kasl, 2022) provides a detailed description of the recommended buffer distances, as prescribed by SANBI in their *Species Environmental Assessment Guideline*:

The species assessment guidelines (SANBI, 2020) provide some guidelines on buffers for animal species. The avifauna species sensitive to disturbance is the relevant category in the guidelines in terms of the confirmed Lesser Flamingo and the potential African Marsh Harrier (included as a cautionary species). The entire Kamfers Dam and the reedy wetlands in the south are relevant receptors as breeding and foraging areas for the two species. Noise and visual impacts are listed in the guidelines. Dust and particulate impacts also need consideration, but indirect impact to habitat (water levels and water quality) through poor quality run-off and increased quantity of run-off are considered significant impacts that must be managed in terms of this proposed development.

The likely buffer sizes are determined for high intensity impact (commercial and industrial development, removal of soil or vegetation, 10dB above ambient noise levels, overall noise level higher than 50dB) and low intensity impacts (housing and urban areas, tourism and recreational activities). High intensity impacts require a buffer of 500m or more; guidelines state a minimum of a 1000m for raptor nests and large-bodied SCC, with smaller buffers for water birds (500m) and passerine nests (200m). The guidelines further stipulate that low intensity impacts may have smaller buffers, but at least 200m buffers for raptors in formally proclaimed conservation areas.

This assessment concurs with the assigned 1000m buffer assigned to Kamfers Dam in the Terrestrial Fauna Biodiversity and Animal Species Summary (Kasl, 2022) as an adequate mitigation measure to secure Kamfers Dam and its associated wetland and reedbed habitats (FIGURE 7). Although somewhat disturbed and degraded currently, the terrestrial habitat within the 1000m buffer would under optimal conditions provide the necessary foraging habitat for African Marsh Harrier. Securing this habitat and minimising the human-induced disturbance impacts associated with the residential development, will ensure the enhancement of the terrestrial habitat resulting in the probable return of this SCC to and regular use of the Kamfers Dam area.

This assessment is encouraged by the steps taken by the applicant to avoid the identified environmental sensitivities within the proposed development area, by excluding AREA 3 and most of AREA 4 from the development footprint (FIGURE 8 and FIGURE 9). It is the recommendation of this assessment that all forms of development be excluded from Area 4 entirely and that Single Residential or Medium Density Nodes be developed in favour of a High-Density Node in Areas 1 and 2. It is further recommended that development within the 1000m buffer in Areas 1 and 2 be subject to the establishment of a partnership between the applicant and the *custodians* of Kamfers Dam and its primary stakeholders (i.e. *BLSA, Ekapa, HWWTW and the Sol Plaatjie Municipality*) and the drafting of an integrated management plan to ensure the appropriate management of the residential estate and the greater PAOI in terms of the establishment and ongoing maintenance of appropriate and effective sewage, storm water and waste management strategies.

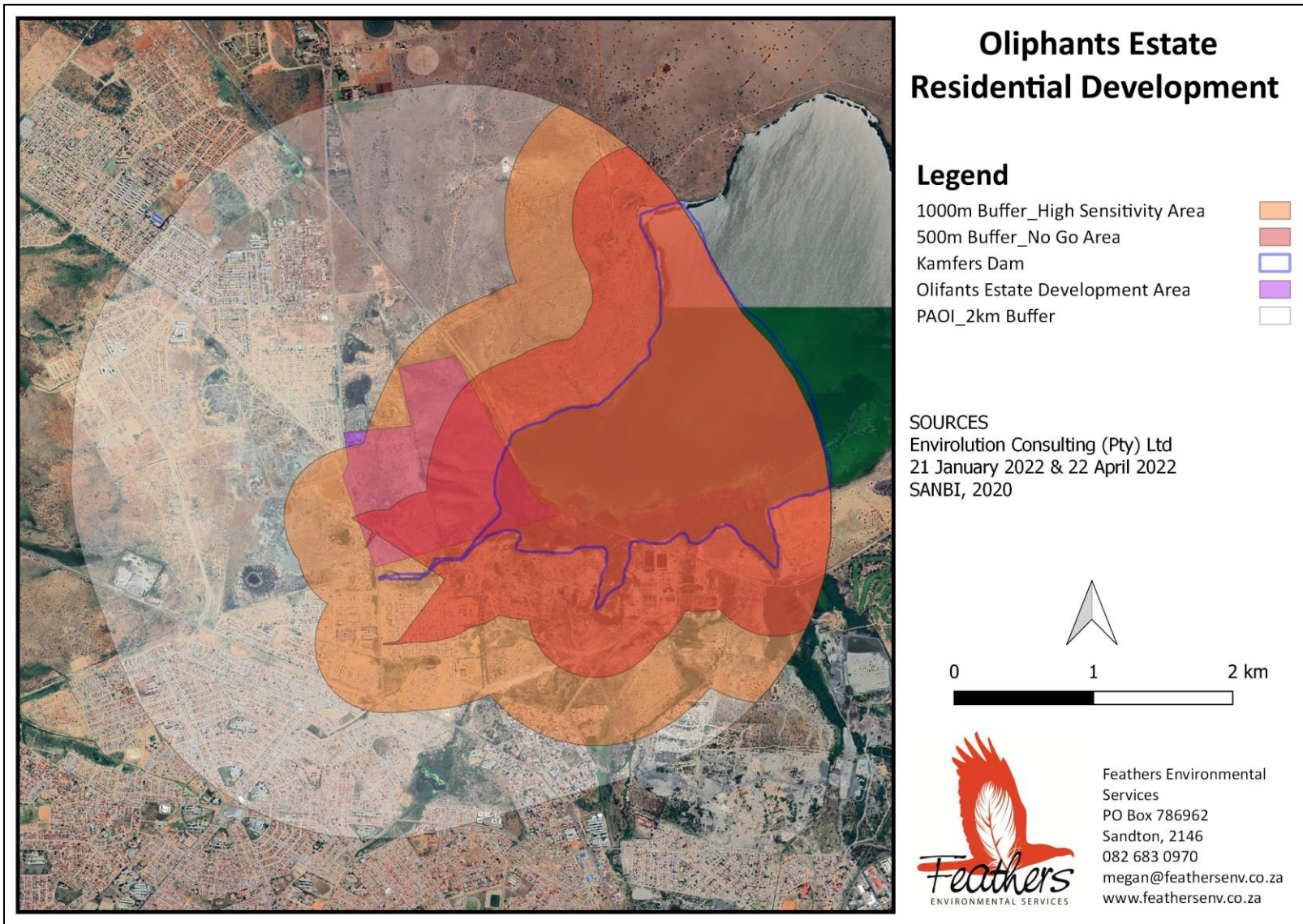


FIGURE 7: Recommended avian buffers – 500m No Go Area and 1000m High Sensitivity Area

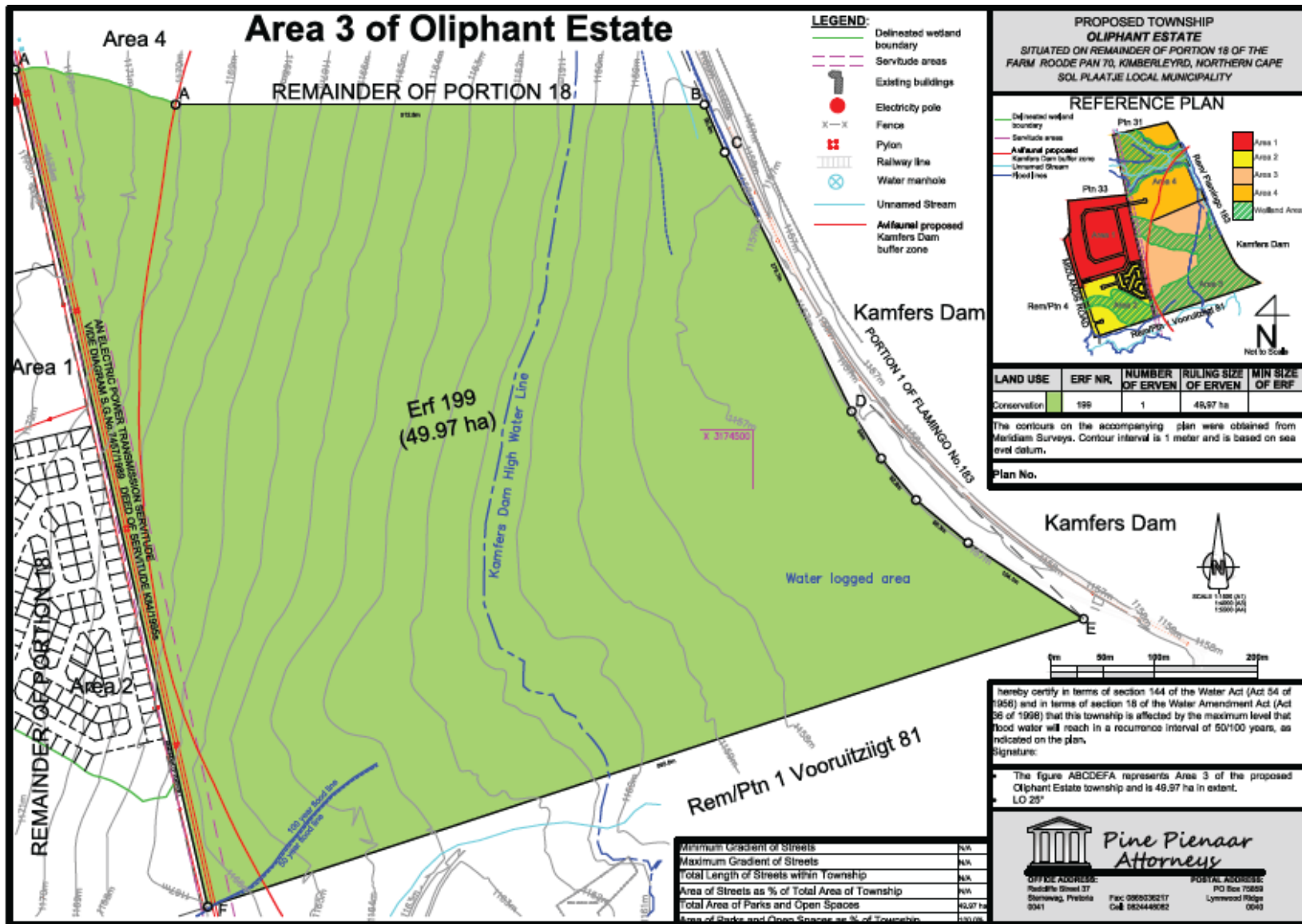


FIGURE 8: Oliphants Estate residential development – Area 3

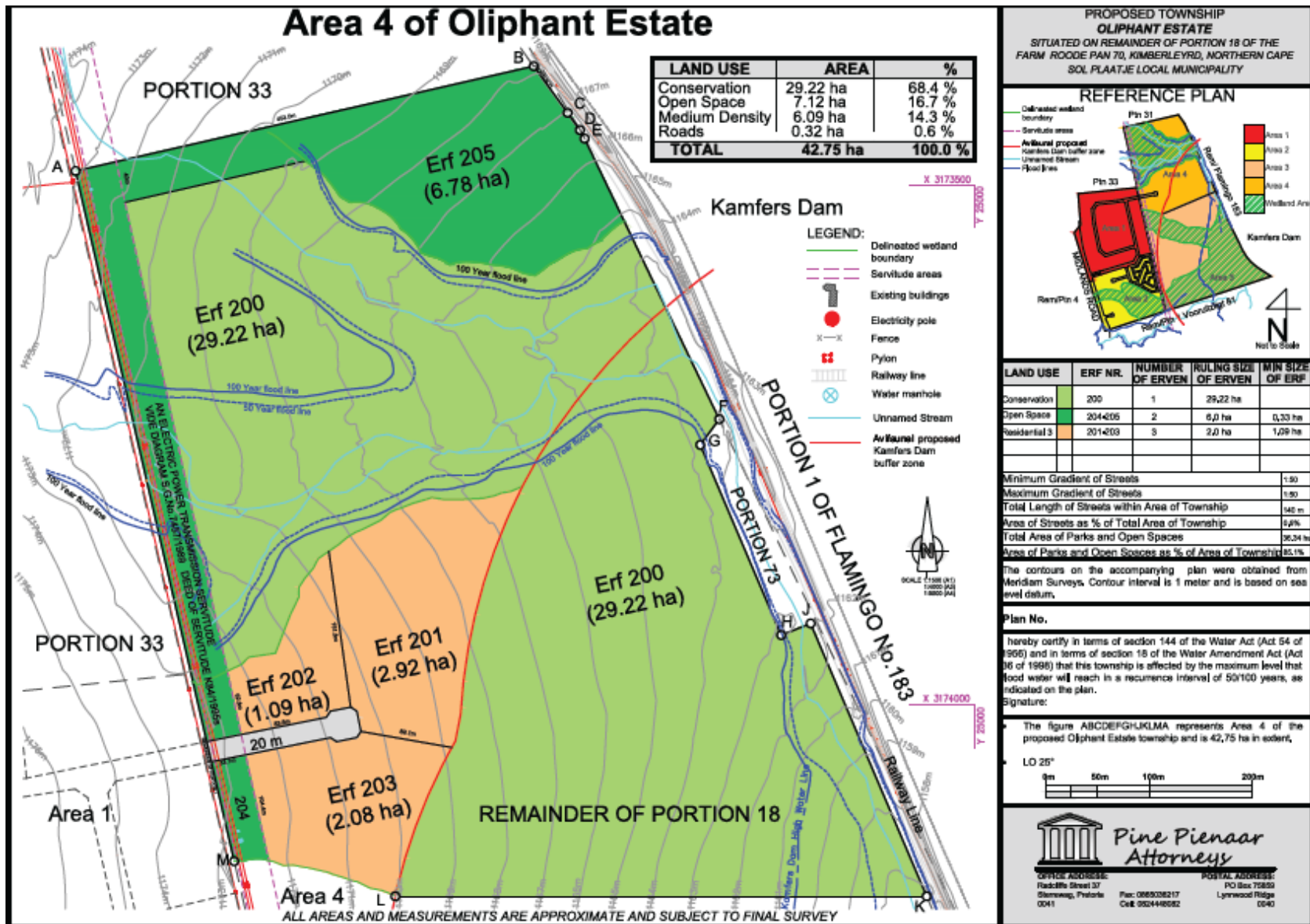


FIGURE 9: Oliphants Estate residential development – Area 4

10. IDENTIFICATION OF A PREFERRED ALTERNATIVE

No site alternatives have been identified and provided for assessment. The proposed site has been identified by the applicant as being highly desirable for a mixed-use development in terms of land availability, site access, current 'agricultural' zoning and geology. In addition, the applicant is proposing that the mixed-use residential project is expected to have a development footprint of approximately 60ha of the total 150ha area earmarked for the proposed development. It is proposed that this smaller footprint will permit the optimal positioning of the housing units and associated infrastructure within the broader 150ha site, thereby avoiding areas of sensitivity and allowing for the identification of an appropriate layout design and site-specific alternatives.

One of the objectives of this study is to consider the proposed project layout in addition to the 'No Go' or 'No Project' alternative and determine which of these poses the least impact to the avifaunal community, particularly the sensitive SCC present within the PAOI. The no-go alternative will result in the current status quo being maintained within the proposed development area and broader PAOI as far as the avifauna is concerned. The no-go option would result in no additional impacts on priority SCC avifauna which would be beneficial to the avifauna currently occurring within the PAOI. Given the anticipated impacts on Kamfers Dam and the species it supports and significant level of commitment required from the applicant, municipality and the residents of the proposed residential estate – commitment that would be difficult to enforce, the no-go option is preferred from an avifaunal perspective.

Should the proposed residential estate be authorised, strict adherence to the buffers and recommendations contained within this report is required.

11. ASSESSMENT OF EXPECTED IMPACTS

A qualitative methodology was used to describe, evaluate and rate the significance of the aforementioned impacts associated with the construction and operation of the Oliphants Estate residential development. This assessment is presented in tabular format below (TABLES 5-12) for both pre- and post-mitigation according to set criteria described in APPENDIX 3.

TABLE 5 Assessment of the displacement as a result of habitat loss or transformation within the physical development footprint

Activity:		Construction of the Oliphants Estate residential development				
Impact:		Displacement as a result of habitat loss or transformation within the physical development footprint				
Significance rating:		Duration	Extent	Magnitude	Probability	Significance
Proposed Site & Layout	Pre-Mitigation	4	1	6	4	44
	Post-Mitigation	4	1	4	3	27
Is the Impact Reversible?		Pre Mitigation - Low Post Mitigation - Medium				
Irreplaceable loss of resources?		Pre Mitigation – Moderate Post Mitigation - Moderate				
Mitigation Measures:		<ul style="list-style-type: none"> Adherence to the 500m buffer as a minimum No development within Area 4 Construction activity should be restricted to the immediate footprint of the infrastructure. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction. 				
Residual impacts:		None anticipated provided that the mitigation measures are implemented correctly.				

TABLE 6 Assessment of displacement as a result of off-site habitat transformation (rise or fall in Kamfers Dam's water level)

Activity:		Operation of the Oliphants Estate residential development				
Impact:		Displacement as a result of off-site habitat transformation (rise or fall in Kamfers Dam's water level)				
Significance rating:		Duration	Extent	Magnitude	Probability	Significance
Preferred Layout	Pre-Mitigation	4	3	10	4	68
	Post-Mitigation	4	2	6	2	24
Is the Impact Reversible?		Pre Mitigation - Low Post Mitigation - Medium				
Irreplaceable loss of resources?		Pre Mitigation - High Post Mitigation - Moderate				
Mitigation Measures:		<ul style="list-style-type: none"> Development of an integrated management plan for storm water and sewage management with key stakeholders Construction of appropriate sewage and storm water management infrastructure Ongoing maintenance of the sewage and storm water management infrastructure 				
Residual impacts:		Little anticipated provided that the mitigation measures are implemented correctly.				

TABLE 7 Assessment of displacement as a result of disturbance

Activity:	Construction and operation of the Oliphants Estate residential development				
Impact:	Displacement as a result of disturbance				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	10	4	64
Post-Mitigation	4	1	6	2	22
Is the Impact Reversible?	Pre Mitigation - Low Post Mitigation - Medium				
Irreplaceable loss of resources?	Pre Mitigation - High Post Mitigation - Low				
Mitigation Measures:	<ul style="list-style-type: none"> Develop an integrated management plan with key stakeholders to address sources of disturbance Disturbance by residents of birds breeding and foraging in the area must be minimized and controlled. Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). Construction activities should occur outside of the Lesser Flamingos breeding season. Strict adherence to the 500m buffer as a minimum. No development within Area 4. Single Residential Nodes and Medium-Density Nodes should be constructed in favour of High-Density Nodes. 				
Residual impacts:	It is envisaged that mitigation, if required, will reduce but not eliminate the disturbance impact.				

TABLE 8 Assessment of direct mortality as a result of sewage and contaminated storm water inflow into Kamfers Dam

Activity:	Operation of the Oliphants Estate residential development				
Impact:	Direct mortality/ill health as a result of sewage and contaminated storm water inflow				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	3	10	4	68
Post-Mitigation	4	2	4	2	20
Is the Impact Reversible?	Pre Mitigation - Low Post Mitigation - Medium				
Irreplaceable loss of resources?	Pre Mitigation - High Post Mitigation - Low				
Mitigation Measures:	<ul style="list-style-type: none"> Develop an integrated management plan for storm water and sewage management with key stakeholders. Measures to rapidly deal with spills or floods must be put in place before construction commences. No stormwater, pollutants, sewerage or other waste must pollute the area or enter Kamfers Dam during the construction or operational phases. Storm water and sewer reticulation must make use of a bulk outfall system and must be transported away from Kamfers Dam - the development must not make use of the storm water and sewage systems at Kamfers Dam which are currently unable to process the current storm water and sewage yields. Construction of appropriate sewage and storm water management infrastructure Ongoing maintenance of the sewage and storm water management infrastructure A management and monitoring system must be implemented to carefully monitor the water quality and water levels of the Kamfers Dam to benefit the ecological and habitat requirements of the waterbirds, in particular Lesser Flamingo. 				
Residual impacts:	Little anticipated provided that the mitigation measures are implemented correctly.				

TABLE 9 Assessment of direct mortality as a result of construction activities

Activity:	Construction of the Oliphants Estate residential development				
Impact:	Direct mortality/ill health as a result of construction activities				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	2	6	3	27
Post-Mitigation	1	1	2	1	4
Is the Impact Reversible?	Pre Mitigation - Medium Post Mitigation - High				
Irreplaceable loss of resources?	Pre Mitigation - Moderate Post Mitigation - Low				
Mitigation Measures:	<ul style="list-style-type: none"> Conduct a pre-construction inspection (avifaunal walk-through) of the final residential development layout, to identify any species that may be breeding on the authorised development site or within the immediate surrounds to ensure that any impacts likely to affect breeding species (if any) are adequately managed. 				
Residual impacts:	Little anticipated provided that the mitigation measures are implemented correctly.				

TABLE 10 Assessment of direct mortality due to collisions with powerlines as a result of light pollution

Activity:	Operation of the Oliphants Estate residential development				
Impact:	Direct mortality due to collisions with powerlines as a result of light pollution				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	3	8	3	45
Post-Mitigation	4	2	4	2	20
Is the Impact Reversible?	Pre Mitigation - Medium Post Mitigation - High				
Irreplaceable loss of resources?	Pre Mitigation - Moderate Post Mitigation - Low				
Mitigation Measures:	<ul style="list-style-type: none"> Develop an integrated management plan to address potential light pollution impacts Collision mortalities to be reported to the appropriate channels to ensure mitigation of the power line infrastructure 				
Residual impacts:	Little anticipated provided that the mitigation measures are implemented correctly.				

TABLE 11 Assessment of direct mortality as a result of hunting/poaching and egg removal

Activity:	Operation of the Oliphants Estate residential development				
Impact:	Direct mortality/ill health as a result of hunting/poaching and egg removal				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	3	42
Post-Mitigation	4	1	2	2	16
Is the Impact Reversible?	<ul style="list-style-type: none"> High reversibility - a robust water management plan will eliminate habitat loss 				
Mitigation Measures:	<ul style="list-style-type: none"> Develop an integrated management plan to address potential hunting/poaching and egg removal impacts. this may include policies with regards to pet ownership within the estate Construction of an appropriate barrier (fencing) to secure the Kamfers Dam area Commitment to the ongoing maintenance of the fence for the life span of the residential estate 				
Residual impacts:	Little anticipated provided that the mitigation measures are implemented correctly.				

TABLE 12 Assessment of indiscriminate waste disposal and inadequate service delivery with regards to waste removal

Activity:	Operation of the Oliphants Estate residential development				
Impact:	Indiscriminate waste disposal and inadequate service delivery with regards to waste removal				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	3	36
Post-Mitigation	4	1	4	2	18
Is the Impact Reversible?	<ul style="list-style-type: none"> High reversibility - a robust water management plan will eliminate habitat loss 				
Mitigation Measures:	<ul style="list-style-type: none"> Develop an integrated management plan to address potential domestic waste pollution and the appropriate removal thereof. Food and domestic waste to be stored in sealed containers Timeous waste removal services to be provided 				
Residual impacts:	Little anticipated provided that the mitigation measures are implemented correctly.				

12. CUMULATIVE IMPACT STATEMENT

Relevant to the proposed residential development, the removal of vegetation will be limited to the project footprint and will be maintained during the operational lifespan of the facility. While the smaller passerines are unlikely to be displaced permanently from the development area as a result of habitat transformation, established housing infrastructure will alter movement, breeding and foraging patterns for the SCC recorded in the PAOI i.e. African Marsh Harrier. It stands to reason that the more land is altered in this manner, the greater the impact on birds. Displacement of SCC as a result of disturbance is more difficult to quantify. However, based on the affect that urbanisation has had on the diversity and abundance of SCC species occurring in the PAOI currently, it is plausible that any additional human-induced disturbance will permanently displace SCC from the area altogether. The cumulative impact of multiple housing and other urban related developments on birds is therefore negative. The construction of multiple additional facilities will result in the overall cumulative impact being HIGH.

13. PROPOSED IMPACT MITIGATION ACTIONS

Based on the anticipated impacts described above, the following recommendations are provided regarding practical mitigation measures for potentially significant impacts to be included in the Environmental Authorisation (if granted) and the subsequent Environmental Management Programme (EMPr):

- * No development within the delineated 500m buffer as a minimum requirement;
- * No development within Area 4 of the proposed 150ha residential estate footprint;
- * Single Resident and Medium-Density Nodes to be constructed within the 1000m buffer;
- * It is further recommended that development within the 1000m buffer in Areas 1 and 2 be subject to the establishment of a partnership between the applicant and the *custodians* of Kamfers Dam and its primary stakeholders and the drafting of an integrated management plan to ensure the appropriate management of the residential estate and the greater PAOI in terms of:
 - o the establishment and ongoing maintenance of appropriate and effective sewage, storm water and waste management strategies,
 - o the construction of a fence to secure Kamfers Dam and its resident species from hunting, poaching and egg removal
 - o policies to address and mitigate noise and light pollution and the keeping of pets;
- * Conduct a pre-construction inspection (avifaunal walk-through) of the final residential development layout, to identify any species that may be breeding on the authorised development site or within the immediate surrounds to ensure that any impacts likely to affect breeding species (if any) are adequately managed;

- * Avoid removal of sensitive vegetation types. The recommendations of the botanical study must be strictly implemented, especially as far as limitation of the construction footprint and rehabilitation of disturbed areas is concerned;
- * Construction activity should be restricted to the immediate footprint of the infrastructure;
- * All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment;
- * All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction;
- * No stormwater, pollutants, sewerage or other waste must pollute the area or enter Kamfers Dam during the construction or operational phases;
- * Storm water and sewer reticulation must make use of a bulk outfall system and must be transported away from Kamfers Dam - the development must not make use of the storm water and sewage systems at Kamfers Dam which are currently unable to process the current storm water and sewage yields;
- * A management and monitoring system must be implemented to carefully monitor the water quality and water levels of the Kamfers Dam to benefit the ecological and habitat requirements of the waterbirds, in particular Lesser Flamingo;
- * Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum;
- * Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species; and
- * Measures to control noise associated with construction activities should be applied according to current best practice in the industry.

14. ENVIRONMENTAL IMPACT STATEMENT

14.1 Conditions to be included in the Environmental Authorisation

In conclusion, the habitat within which the proposed development area is located is MODERATELY sensitive from a potential bird impact perspective. In recent years, anthropogenic impacts, mostly in the form of mining and urbanisation have largely transformed the landscape resulting in a negative impact on avifaunal diversity and abundance with the study area. This is reflected in the low reporting rates for priority species, which may also indicate that levels of disturbance are high. The construction of the proposed residential estate will result in impacts of HIGH to MODERATE significance to birds that are supported by Kamfers Dam. In the absence of a suitable alternative location for assessment and stringent and well-thought out management plans and infrastructure developments to facilitate sewage and storm water inflows into Kamfers Dam, among other significant impacts, the no-go alternative presents itself as most preferred alternative. However, should this development proceed through to construction, the anticipated impacts can be reduced through the

commitment to and application of adaptive mitigation measures that will need to be implemented throughout the project's life span.

14.2 Specialist Opinion

In accordance with the outcomes of the impact assessment detailed in Section 11 and 12, in conjunction with the baseline conditions as presented in Section 7 and the impact management measures in Section 13, the proposed residential estate is very likely to impact negatively on the species complements that are supported by Kamfers Dam. It is this specialist's opinion that the construction and operation of the proposed residential estate can only occur with acceptable levels of impact on the resident avifauna subject to the development of a robust integrated management plan and partnership with key stakeholders, to address the multitude of human-induced impacts, for the entire projected life span of the residential. development Commitment to this process is critical to the survival of the SCC within the PAOI and the sustainability of Kamfers Dam as an IBA, CBA and premier tourist attraction.

15. ASSUMPTIONS, UNCERTAINTIES & GAPS IN KNOWLEDGE

The avifaunal specialist assumed that the sources of information used for this assessment are reliable. However, it must be noted that there are limiting factors and these may potentially detract from the accuracy of the predicted results.

- * The report is the result of a short-term study and is based on a single site survey of the PAOI supported by robust and comprehensive secondary datasets. Based on discussions with *BLSA*, no long-term, seasonal monitoring was conducted by the avifaunal specialist. This assessment relies upon secondary data sources with regards to bird occurrence and abundance such as the SABAP2 and IBA projects. These comprehensive datasets provide a valuable baseline against which any changes in species presence, abundance, and distribution can be monitored. However, primary information on bird habitat and avifaunal species occurrence collected during the most recent site visit coupled with the data emanating from previous biodiversity surveys and citizen science projects and together with professional judgement, based on extensive field experience since 2006, was used directly in determining which species of conservation importance are likely to occur within suitable avifaunal habitat types within the PAOI. Based on these findings, the specialist was able to identify and assess the anticipated impacts and provide recommendations for mitigation;
- * The site survey of the proposed residential estate and the resultant observations were made in the austral winter season, during which time various species may not have been present in the PAOI and therefore may not be a true indication of all bird species potentially present in the area;

- * The focus of this assessment is primarily on the potential impacts on regional SCC and non-SCC development sensitive species i.e., species that are vulnerable to the displacement and mortality impacts associated with the construction and operation of the proposed residential estate; and
- * Predictions in this study are based on experience of these and similar species in different parts of South Africa, through the authors' experience working in the avifaunal specialist field since 2006. However, bird behaviour can't be reduced to formulas that will hold true under all circumstances. It must also be noted that, it is often not possible to entirely eliminate the risk of the disturbance and displacement impacts associated with the construction and operational activities. Should this development proceed through to construction, our best possible efforts can probably not ensure zero impact on birds. Assessments such as this attempt to minimise the risk as far as possible.

The above limitations need to be stated as part of this assessment so that the reader fully understands the complexities. However, they do not detract from the confidence that this author has in the findings of this impact assessment report and subsequent recommendations for this project.

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APPENDIX 1: SOUTH AFRICAN BIRD ATLAS PROJECT DATA (SABAP2) FOR THE PROPOSED OLIPHANTS RESIDENTIAL ESTATE

Species name	Scientific name	Full Protocol	Ad hoc Protocol	Red List: Regional	Endemic (SA)	Endemic (SA) - detail
Abdim's Stork	<i>Ciconia abdimii</i>	0,7	0,6	NT		
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>	35,3	7,7	-		
African Black Duck	<i>Anas sparsa</i>	0,2	0,8	-		
African Black Swift	<i>Apus barbatus</i>	3,1	1,4	-		
African Crake	<i>Crecopsis egregia</i>	0,2	0,0	-		
African Cuckoo	<i>Cuculus gularis</i>	1,7	0,2	-		
African Darter	<i>Anhinga rufa</i>	5,3	0,6	-		
African Fish Eagle	<i>Haliaeetus vocifer</i>	9,4	2,6	-		
African Hoopoe	<i>Upupa africana</i>	49,0	13,0	-		
African Jacana	<i>Actophilornis africanus</i>	1,7	0,4	-		
African Marsh Harrier	<i>Circus ranivorus</i>	0,9	0,4	EN		
African Palm Swift	<i>Cypsiurus parvus</i>	42,2	13,6	-		
African Pied Wagtail	<i>Motacilla aguimp</i>	0,0	0,2	-		
African Pipit	<i>Anthus cinnamomeus</i>	47,3	5,7	-		
African Red-eyed Bulbul	<i>Pycnonotus nigricans</i>	56,3	19,4	-		
African Reed Warbler	<i>Acrocephalus baeticatus</i>	8,4	2,4	-		
African Rock Pipit	<i>Anthus crenatus</i>	0,2	0,0	NT	x	Endemic (SA, Lesotho, Swaziland)
African Sacred Ibis	<i>Threskiornis aethiopicus</i>	17,2	8,8	-		
African Snipe	<i>Gallinago nigripennis</i>	2,0	1,2	-		
African Spoonbill	<i>Platalea alba</i>	3,9	0,6	-		
African Stonechat	<i>Saxicola torquatus</i>	3,4	1,8	-		
African Swampphen	<i>Porphyrio madagascariensis</i>	4,8	0,8	-		
Alpine Swift	<i>Tachymarptis melba</i>	18,3	7,7	-		
Amur Falcon	<i>Falco amurensis</i>	5,1	0,8	-		
Ant-eating Chat	<i>Myrmecocichla formicivora</i>	73,5	12,8	-		
Ashy Tit	<i>Melaniparus cinerascens</i>	17,7	2,2	-		
Banded Martin	<i>Riparia cincta</i>	3,1	0,0	-		
Barn Swallow	<i>Hirundo rustica</i>	38,4	5,9	-		
Barred Wren-Warbler	<i>Calamonastes fasciolatus</i>	0,3	0,0	-		
Black Crane	<i>Zapornia flavirostra</i>	2,0	0,6	-		
Black Cuckoo	<i>Cuculus clamosus</i>	1,9	0,0	-		
Black Stork	<i>Ciconia nigra</i>	0,2	0,0	VU		
Black Tern	<i>Chlidonias niger</i>	0,2	0,0	-		
Black-chested Prinia	<i>Prinia flavicans</i>	59,0	11,2	-		
Black-chested Snake Eagle	<i>Circaetus pectoralis</i>	2,0	0,0	-		
Black-collared Barbet	<i>Lybius torquatus</i>	2,0	1,2	-		
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	4,6	1,8	-		
Black-faced Waxbill	<i>Brunhilda erythronotos</i>	12,1	1,4	-		
Black-headed Canary	<i>Serinus alario</i>	0,2	0,0	-	x	Near endemic
Black-headed Heron	<i>Ardea melanocephala</i>	12,1	3,7	-		
Black-necked Grebe	<i>Podiceps nigricollis</i>	5,8	3,1	-		
Blacksmith Lapwing	<i>Vanellus armatus</i>	36,0	11,2	-		

Species name	Scientific name	Full Protocol	Ad hoc Protocol	Red List: Regional	Endemic (SA)	Endemic (SA) - detail
Black-throated Canary	<i>Crithagra atrogularis</i>	43,9	9,6	-		
Black-winged Kite	<i>Elanus caeruleus</i>	33,1	9,2	-		
Black-winged Stilt	<i>Himantopus himantopus</i>	16,7	11,4	-		
Blue Crane	<i>Grus paradisea</i>	4,3	1,2	NT		
Blue Waxbill	<i>Uraeginthus angolensis</i>	0,3	0,2	-		
Blue-billed Teal	<i>Spatula hottentota</i>	7,7	3,7	-		
Bokmakierie	<i>Telophorus zeylonus</i>	14,3	0,4	-		
Booted Eagle	<i>Hieraaetus pennatus</i>	2,7	1,0	-		
Bradfield's Swift	<i>Apus bradfieldi</i>	15,7	10,8	-		
Brown Snake Eagle	<i>Circaetus cinereus</i>	0,2	0,0	-		
Brown-backed Honeybird	<i>Prodotiscus regulus</i>	0,2	0,0	-		
Brown-crowned Tchagra	<i>Tchagra australis</i>	13,8	2,2	-		
Brown-hooded Kingfisher	<i>Halcyon albiventris</i>	6,1	0,6	-		
Brown-throated Martin	<i>Riparia paludicola</i>	19,5	5,3	-		
Brubru	<i>Nilaus afer</i>	27,1	4,1	-		
Buffy Pipit	<i>Anthus vaalensis</i>	20,6	2,2	-		
Burchell's Courser	<i>Cursorius rufus</i>	1,2	0,0	VU		
Burchell's Sandgrouse	<i>Pterocles burchelli</i>	2,7	0,4	-		
Cape Bunting	<i>Emberiza capensis</i>	1,2	0,2	-		
Cape Canary	<i>Serinus canicollis</i>	0,0	0,2	-		
Cape Crow	<i>Corvus capensis</i>	0,2	0,0	-		
Cape Eagle-Owl	<i>Bubo capensis</i>	0,2	0,0	-		
Cape Longclaw	<i>Macronyx capensis</i>	7,2	0,2	-		
Cape Penduline Tit	<i>Anthoscopus minutus</i>	5,3	0,2	-		
Cape Robin-Chat	<i>Cossypha caffra</i>	26,5	9,0	-		
Cape Shoveler	<i>Spatula smithii</i>	18,1	5,3	-		
Cape Sparrow	<i>Passer melanurus</i>	83,3	26,7	-		
Cape Starling	<i>Lamprotornis nitens</i>	54,8	14,3	-		
Cape Teal	<i>Anas capensis</i>	17,1	7,1	-		
Cape Turtle Dove	<i>Streptopelia capicola</i>	70,0	10,6	-		
Cape Vulture	<i>Gyps coprotheres</i>	1,7	1,8	EN		
Cape Wagtail	<i>Motacilla capensis</i>	64,2	19,8	-		
Cape Weaver	<i>Ploceus capensis</i>	0,5	0,0	-	x	Near endemic
Cape White-eye	<i>Zosterops virens</i>	1,9	0,8	-	x	Near endemic
Capped Wheatear	<i>Oenanthe pileata</i>	11,4	1,2	-		
Cardinal Woodpecker	<i>Dendropicos fuscescens</i>	10,1	1,2	-		
Caspian Plover	<i>Charadrius asiaticus</i>	0,2	0,0	-		
Caspian Tern	<i>Hydroprogne caspia</i>	0,3	0,0	VU		
Chat Flycatcher	<i>Melaenornis infuscatus</i>	26,8	2,2	-		
Chestnut-backed Sparrow-Lark	<i>Eremopterix leucotis</i>	0,3	0,0	-		
Chestnut-banded Plover	<i>Charadrius pallidus</i>	1,4	1,0	NT		
Chestnut-vented Warbler	<i>Curruca subcoerulea</i>	38,4	6,5	-		
Cinnamon-breasted Bunting	<i>Emberiza tahapisi</i>	5,5	0,4	-		
Cloud Cisticola	<i>Cisticola textrix</i>	8,9	0,8	-	x	Near endemic
Common Buttonquail	<i>Turnix sylvaticus</i>	0,3	0,0	-		
Common Buzzard	<i>Buteo buteo</i>	5,3	1,2	-		

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Common Greenshank	<i>Tringa nebularia</i>	4,8	1,2	-		
Common House Martin	<i>Delichon urbicum</i>	0,5	0,0	-		
Common Moorhen	<i>Gallinula chloropus</i>	21,2	5,5	-		
Common Myna	<i>Acridotheres tristis</i>	46,8	21,2	-		
Common Ostrich	<i>Struthio camelus</i>	22,5	4,7	-		
Common Quail	<i>Coturnix coturnix</i>	1,0	0,6	-		
Common Ringed Plover	<i>Charadrius hiaticula</i>	1,5	0,4	-		
Common Sandpiper	<i>Actitis hypoleucos</i>	1,7	0,4	-		
Common Scimitarbill	<i>Rhinopomastus cyanomelas</i>	25,3	5,7	-		
Common Starling	<i>Sturnus vulgaris</i>	2,2	0,6	-		
Common Swift	<i>Apus apus</i>	2,4	0,6	-		
Common Waxbill	<i>Estrilda astrild</i>	3,8	0,8	-		
Crested Barbet	<i>Trachyphonus vaillantii</i>	26,3	10,2	-		
Crimson-breasted Shrike	<i>Laniarius atrococcineus</i>	20,5	1,0	-		
Crowned Lapwing	<i>Vanellus coronatus</i>	67,7	16,5	-		
Curlew Sandpiper	<i>Calidris ferruginea</i>	1,7	0,4	LC		
Desert Cisticola	<i>Cisticola aridulus</i>	43,0	6,5	-		
Diederik Cuckoo	<i>Chrysococcyx caprius</i>	21,7	5,7	-		
Domestic Duck	<i>Anas platyrhynchos domestica</i>	0,2	0,0	-		
Domestic Goose	<i>Anser anser domesticus</i>	0,0	0,6	-		
Double-banded Courser	<i>Rhinoptilus africanus</i>	21,2	2,6	-		
Dusky Sunbird	<i>Cinnyris fuscus</i>	2,9	5,1	-		
Eastern Clapper Lark	<i>Mirafrja fasciolata</i>	53,4	4,7	-		
Egyptian Goose	<i>Alopochen aegyptiaca</i>	27,5	7,3	-		
Eurasian Curlew	<i>Numenius arquata</i>	0,2	0,0	NT		
Eurasian Whimbrel	<i>Numenius phaeopus</i>	0,2	0,0	-		
European Bee-eater	<i>Merops apiaster</i>	39,6	10,0	-		
European Roller	<i>Coracias garrulus</i>	2,4	0,2	NT		
Fairy Flycatcher	<i>Stenostira scita</i>	6,5	0,6	-	x	Near endemic
Familiar Chat	<i>Oenanthe familiaris</i>	74,4	13,8	-		
Fawn-colored Lark	<i>Calendulauda africanoides</i>	41,0	4,7	-		
Fiscal Flycatcher	<i>Melaenornis silens</i>	58,2	12,0	-	x	Near endemic
Fork-tailed Drongo	<i>Dicrurus adsimilis</i>	46,4	0,2	-		
Fulvous Whistling Duck	<i>Dendrocygna bicolor</i>	2,6	1,2	-		
Gabar Goshawk	<i>Micronisus gabar</i>	11,4	3,5	-		
Glossy Ibis	<i>Plegadis falcinellus</i>	19,8	9,2	-		
Golden-breasted Bunting	<i>Emberiza flaviventris</i>	8,4	0,2	-		
Golden-tailed Woodpecker	<i>Campethera abingoni</i>	15,5	2,4	-		
Goliath Heron	<i>Ardea goliath</i>	1,7	0,2	-		
Great Crested Grebe	<i>Podiceps cristatus</i>	0,5	0,0	-		
Great Egret	<i>Ardea alba</i>	1,7	0,2	-		
Great Reed Warbler	<i>Acrocephalus arundinaceus</i>	0,2	0,2	-		
Great Sparrow	<i>Passer motitensis</i>	0,9	0,2	-		
Greater Flamingo	<i>Phoenicopterus roseus</i>	16,2	13,6	NT		
Greater Honeyguide	<i>Indicator indicator</i>	0,5	0,2	-		
Greater Kestrel	<i>Falco rupicoloides</i>	10,1	1,6	-		

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Greater Painted-snipe	<i>Rostratula benghalensis</i>	0,3	0,0	NT		
Greater Striped Swallow	<i>Cecropis cucullata</i>	55,8	12,2	-		
Green Wood Hoopoe	<i>Phoeniculus purpureus</i>	2,0	1,2	-		
Green-winged Pytilia	<i>Pytilia melba</i>	6,5	0,6	-		
Grey Crowned Crane	<i>Balearica regulorum</i>	0,2	0,0	EN		
Grey Heron	<i>Ardea cinerea</i>	9,6	4,3	-		
Grey-backed Cisticola	<i>Cisticola subruficapilla</i>	1,4	0,0	-		
Grey-backed Sparrow-Lark	<i>Eremopterix verticalis</i>	8,9	1,4	-		
Grey-headed Gull	<i>Chroicocephalus cirrocephalus</i>	19,1	13,4	-		
Groundscraper Thrush	<i>Turdus litsitsirupa</i>	1,7	0,8	-		
Hadada Ibis	<i>Bostrychia hagedash</i>	45,4	17,5	-		
Hamerkop	<i>Scopus umbretta</i>	2,9	0,0	-		
Harlequin Quail	<i>Coturnix delegorguei</i>	0,2	0,0	-		
Helmeted Guineafowl	<i>Numida meleagris</i>	39,8	6,9	-		
House Sparrow	<i>Passer domesticus</i>	34,0	22,4	-		
Icterine Warbler	<i>Hippolais icterina</i>	0,3	0,0	-		
Indian Peafowl	<i>Pavo cristatus</i>	2,6	0,8	-		
Intermediate Egret	<i>Ardea intermedia</i>	1,9	0,2	-		
Jackal Buzzard	<i>Buteo rufofuscus</i>	0,5	0,0	-	x	Near endemic
Jacobin Cuckoo	<i>Clamator jacobinus</i>	4,1	0,2	-		
Jameson's Firefinch	<i>Lagonosticta rhodopareia</i>	0,2	0,0	-		
Kalahari Scrub Robin	<i>Cercotrichas paena</i>	59,4	8,8	-		
Karoo Scrub Robin	<i>Cercotrichas coryphoeus</i>	5,8	0,8	-		
Karoo Thrush	<i>Turdus smithi</i>	27,3	14,3	-	x	Near endemic
Kimberley Pipit	<i>Anthus pseudosimilis</i>	0,3	0,2	-		
Kittlitz's Plover	<i>Charadrius pecuarius</i>	6,3	2,9	-		
Klaas's Cuckoo	<i>Chrysococcyx klaas</i>	0,2	0,0	-		
Knob-billed Duck	<i>Sarkidiornis melanotos</i>	0,2	0,0	-		
Kori Bustard	<i>Ardeotis kori</i>	3,8	0,4	NT		
Lanner Falcon	<i>Falco biarmicus</i>	4,1	0,8	VU		
Lappet-faced Vulture	<i>Torgos tracheliotos</i>	2,7	0,4	EN		
Large-billed Lark	<i>Galerida magnirostris</i>	1,4	0,2	-	x	Near endemic
Lark-like Bunting	<i>Emberiza impetuani</i>	6,5	1,0	-		
Laughing Dove	<i>Spilopelia senegalensis</i>	67,2	33,2	-		
Layard's Warbler	<i>Curruca layardi</i>	0,2	0,0	-	x	Near endemic
Lesser Flamingo	<i>Phoeniconaias minor</i>	17,6	20,4	NT		
Lesser Grey Shrike	<i>Lanius minor</i>	23,4	2,9	-		
Lesser Honeyguide	<i>Indicator minor</i>	2,6	1,2	-		
Lesser Kestrel	<i>Falco naumanni</i>	19,5	3,9	-		
Lesser Swamp Warbler	<i>Acrocephalus gracilirostris</i>	18,4	3,7	-		
Levaillant's Cisticola	<i>Cisticola tinniens</i>	10,8	2,6	-		
Lilac-breasted Roller	<i>Coracias caudatus</i>	2,2	0,2	-		
Little Bee-eater	<i>Merops pusillus</i>	0,2	0,0	-		
Little Bittern	<i>Ixobrychus minutus</i>	0,7	0,0	-		
Little Egret	<i>Egretta garzetta</i>	4,3	1,0	-		
Little Grebe	<i>Tachybaptus ruficollis</i>	25,4	6,1	-		

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Little Rush Warbler	<i>Bradypterus baboecala</i>	0,3	0,0	-		
Little Stint	<i>Calidris minuta</i>	8,0	5,5	-		
Little Swift	<i>Apus affinis</i>	72,4	25,9	-		
Long-billed Crombec	<i>Sylvietta rufescens</i>	11,3	1,0	-		
Long-tailed Paradise Whydah	<i>Vidua paradisaea</i>	1,4	0,4	-		
Ludwig's Bustard	<i>Neotis ludwigii</i>	2,6	0,2	EN		
Maccoa Duck	<i>Oxyura maccoa</i>	3,8	1,6	NT		
Magpie Shrike	<i>Urolestes melanoleucus</i>	0,3	0,0	-		
Malachite Kingfisher	<i>Corythornis cristatus</i>	2,7	0,6	-		
Marico Flycatcher	<i>Melaenornis mariquensis</i>	12,8	1,4	-		
Marico Sunbird	<i>Cinnyris mariquensis</i>	0,3	0,2	-		
Marsh Owl	<i>Asio capensis</i>	0,2	0,4	-		
Marsh Sandpiper	<i>Tringa stagnatilis</i>	2,9	0,4	-		
Martial Eagle	<i>Polemaetus bellicosus</i>	1,4	0,2	EN		
Melodious Lark	<i>Mirafra cheniana</i>	0,0	0,2	-	x	Near endemic
Monotonous Lark	<i>Mirafra passerina</i>	0,9	0,4	-		
Montagu's Harrier	<i>Circus pygargus</i>	0,3	0,0	-		
Mountain Wheatear	<i>Myrmecocichla monticola</i>	2,0	0,2	-		
Namaqua Dove	<i>Oena capensis</i>	35,3	7,9	-		
Namaqua Sandgrouse	<i>Pterocles namaqua</i>	5,8	0,4	-		
Neddicky	<i>Cisticola fulvicapilla</i>	32,3	2,8	-		
Nicholson's Pipit	<i>Anthus nicholsoni</i>	2,6	0,2	-		
Northern Black Korhaan	<i>Afrotis afraoides</i>	71,3	10,4	-		
Orange River Francolin	<i>Scleroptila gutturalis</i>	16,7	2,9	-		
Orange River White-eye	<i>Zosterops pallidus</i>	25,9	10,6	-		
Pale Chanting Goshawk	<i>Melierax canorus</i>	34,6	5,1	-		
Pale-winged Starling	<i>Onychognathus nabouroup</i>	0,3	0,2	-		
Pearl-breasted Swallow	<i>Hirundo dimidiata</i>	3,6	1,2	-		
Pearl-spotted Owlet	<i>Glauclidium perlatum</i>	2,2	0,2	-		
Peregrine Falcon	<i>Falco peregrinus</i>	1,0	0,6	-		
Pied Avocet	<i>Recurvirostra avosetta</i>	5,6	3,3	-		
Pied Crow	<i>Corvus albus</i>	63,8	15,7	-		
Pied Kingfisher	<i>Ceryle rudis</i>	2,7	1,0	-		
Pied Starling	<i>Lamprotornis bicolor</i>	39,9	8,6	-	x	Endemic (SA, Lesotho, Swaziland)
Pink-billed Lark	<i>Spizocorys conirostris</i>	6,0	0,4	-		
Pin-tailed Whydah	<i>Vidua macroura</i>	4,4	0,4	-		
Plain-backed Pipit	<i>Anthus leucophrys</i>	8,9	1,2	-		
Pirit Batis	<i>Batis pirit</i>	30,4	5,5	-		
Purple Heron	<i>Ardea purpurea</i>	2,0	0,2	-		
Pygmy Falcon	<i>Polihierax semitorquatus</i>	0,5	0,2	-		
Quailfinch	<i>Ortygospiza atricollis</i>	10,9	0,8	-		
Rattling Cisticola	<i>Cisticola chiniana</i>	1,0	0,0	-		
Red-backed Shrike	<i>Lanius collurio</i>	11,8	1,0	-		
Red-billed Firefinch	<i>Lagonosticta senegala</i>	4,1	0,8	-		
Red-billed Oxpecker	<i>Buphagus erythrorhynchus</i>	0,2	0,0	-		

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Red-billed Quelea	<i>Quelea quelea</i>	30,0	4,1	-		
Red-billed Teal	<i>Anas erythrorhyncha</i>	22,7	6,7	-		
Red-breasted Swallow	<i>Cecropis semirufa</i>	14,7	2,0	-		
Red-capped Lark	<i>Calandrella cinerea</i>	7,0	0,4	-		
Red-crested Korhaan	<i>Lophotis ruficrista</i>	7,7	1,8	-		
Red-eyed Dove	<i>Streptopelia semitorquata</i>	31,9	13,4	-		
Red-faced Mousebird	<i>Urocolius indicus</i>	25,3	8,8	-		
Red-headed Finch	<i>Amadina erythrocephala</i>	43,7	6,3	-		
Red-knobbed Coot	<i>Fulica cristata</i>	24,9	6,1	-		
Red-winged Starling	<i>Onychognathus morio</i>	0,2	0,0	-		
Reed Cormorant	<i>Microcarbo africanus</i>	16,0	3,1	-		
Rock Dove	<i>Columba livia</i>	24,4	10,2	-		
Rock Kestrel	<i>Falco rupicolus</i>	9,2	1,2	-		
Rock Martin	<i>Ptyonoprogne fuligula</i>	57,3	14,1	-		
Rose-ringed Parakeet	<i>Psittacula krameri</i>	0,0	0,2	-		
Ruff	<i>Calidris pugnax</i>	8,5	3,9	-		
Rufous-cheeked Nightjar	<i>Caprimulgus rufigena</i>	5,8	1,2	-		
Rufous-eared Warbler	<i>Malcorus pectoralis</i>	10,4	1,4	-		
Rufous-naped Lark	<i>Mirafraga africana</i>	31,7	4,7	-		
Sabota Lark	<i>Calendulauda sabota</i>	14,7	2,0	-		
Sand Martin	<i>Riparia riparia</i>	1,0	0,0	-		
Scaly-feathered Weaver	<i>Sporopipes squamifrons</i>	65,2	11,0	-		
Secretarybird	<i>Sagittarius serpentarius</i>	13,1	1,8	VU		
Shaft-tailed Whydah	<i>Vidua regia</i>	5,5	1,2	-		
Short-toed Rock Thrush	<i>Monticola brevipes</i>	4,4	0,4	-		
Sickle-winged Chat	<i>Emarginata sinuata</i>	1,5	0,0	-	x	Near endemic
Sociable Weaver	<i>Philetairus socius</i>	6,7	0,4	-		
South African Cliff Swallow	<i>Petrochelidon spilodera</i>	36,5	6,1	-	x	Endemic (SA, Lesotho, Swaziland) Breeding
South African Shelduck	<i>Tadorna cana</i>	26,8	8,1	-		
Southern Fiscal	<i>Lanius collaris</i>	48,1	9,4	-		
Southern Grey-headed Sparrow	<i>Passer diffusus</i>	29,0	3,3	-		
Southern Masked Weaver	<i>Ploceus velatus</i>	66,7	21,6	-		
Southern Pochard	<i>Netta erythrophthalma</i>	10,2	2,8	-		
Southern Red Bishop	<i>Euplectes orix</i>	55,8	11,8	-		
Southern White-faced Scops Owl	<i>Ptilopsis granti</i>	0,5	0,0	-		
Southern Yellow-billed Hornbill	<i>Tockus leucomelas</i>	2,4	0,6	-		
Speckled Mousebird	<i>Colius striatus</i>	1,0	0,6	-		
Speckled Pigeon	<i>Columba guinea</i>	85,5	27,5	-		
Spike-heeled Lark	<i>Chersomanes albofasciata</i>	40,6	4,9	-		
Spotted Eagle-Owl	<i>Bubo africanus</i>	5,1	1,0	-		
Spotted Flycatcher	<i>Muscicapa striata</i>	8,0	0,6	-		
Spotted Thick-knee	<i>Burhinus capensis</i>	19,5	4,1	-		
Spur-winged Goose	<i>Plectropterus gambensis</i>	11,9	2,0	-		
Squacco Heron	<i>Ardeola ralloides</i>	2,6	0,4	-		
Stark's Lark	<i>Spizocorys starki</i>	0,3	0,0	-		

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Striated Heron	<i>Butorides striata</i>	0,3	0,2	-		
Striped Kingfisher	<i>Halcyon chelicuti</i>	0,2	0,0	-		
Swainson's Spurfowl	<i>Pternistis swainsonii</i>	18,4	2,6	-		
Swallow-tailed Bee-eater	<i>Merops hirundineus</i>	28,2	5,7	-		
Tawny Eagle	<i>Aquila rapax</i>	4,4	0,0	EN		
Temminck's Courser	<i>Cursorius temminckii</i>	0,7	0,0	-		
Three-banded Plover	<i>Charadrius tricollaris</i>	19,1	6,3	-		
Verreaux's Eagle	<i>Aquila verreauxii</i>	0,2	0,2	VU		
Verreaux's Eagle-Owl	<i>Bubo lacteus</i>	0,2	0,4	-		
Village Indigobird	<i>Vidua chalybeata</i>	0,9	0,2	-		
Violet-eared Waxbill	<i>Granatina granatina</i>	12,3	0,8	-		
Wattled Starling	<i>Creatophora cinerea</i>	26,8	4,1	-		
Western Barn Owl	<i>Tyto alba</i>	24,2	3,9	-		
Western Cattle Egret	<i>Bubulcus ibis</i>	48,0	16,5	-		
Whiskered Tern	<i>Chlidonias hybrida</i>	3,4	2,9	-		
White Stork	<i>Ciconia ciconia</i>	1,5	0,2	-		
White-backed Duck	<i>Thalassornis leuconotus</i>	1,0	0,6	-		
White-backed Mousebird	<i>Colius colius</i>	39,1	13,4	-		
White-backed Vulture	<i>Gyps africanus</i>	22,4	7,9	CR		
White-bellied Sunbird	<i>Cinnyris talatala</i>	13,3	3,5	-		
White-breasted Cormorant	<i>Phalacrocorax lucidus</i>	8,0	1,4	-		
White-browed Sparrow-Weaver	<i>Plocepasser mahali</i>	58,4	10,2	-		
White-faced Whistling Duck	<i>Dendrocygna viduata</i>	16,7	8,1	-		
White-fronted Bee-eater	<i>Merops bullockoides</i>	3,2	0,4	-		
White-rumped Swift	<i>Apus caffer</i>	21,5	6,5	-		
White-throated Canary	<i>Crithagra albogularis</i>	2,0	0,2	-		
White-throated Robin-Chat	<i>Cossypha humeralis</i>	0,2	0,0	-		
White-throated Swallow	<i>Hirundo albigularis</i>	10,1	1,6	-		
White-winged Tern	<i>Chlidonias leucopterus</i>	5,1	1,4	-		
Willow Warbler	<i>Phylloscopus trochilus</i>	1,5	0,0	-		
Wing-snapping Cisticola	<i>Cisticola ayresii</i>	0,3	0,0	-		
Wood Sandpiper	<i>Tringa glareola</i>	4,3	2,8	-		
Yellow Canary	<i>Crithagra flaviventris</i>	59,0	12,6	-		
Yellow-bellied Eremomela	<i>Eremomela icteropygialis</i>	6,0	0,2	-		
Yellow-billed Duck	<i>Anas undulata</i>	23,0	7,7	-		
Yellow-billed Stork	<i>Mycteria ibis</i>	1,2	0,0	EN		
Yellow-crowned Bishop	<i>Euplectes afer</i>	4,3	0,8	-		
Zitting Cisticola	<i>Cisticola juncidis</i>	34,3	3,9	-		

APPENDIX 2: AVIFAUNAL HABITAT OBSERVED WITHIN THE DEVELOPMENT AREA



FIGURE 1: Kamfers Dam - flooded wetland margins with reed beds visible in the background



FIGURE 2: Kamfers Dam – open water and wetland margins



FIGURE 3: Degraded habitat within the proposed residential development footprint – note the proximity of Kamfers Dam to the proposed development



FIGURE 4: Surface waterbody located to the north of the proposed development area



FIGURE 5: Mine operations to the west of the proposed development area

APPENDIX 3: METHOD OF ASSESSING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS

Characteristic	Definition	Terms	Scoring
Duration	The time period over which a resource / receptor is affected.	<p>Temporary - (period of less than 1 year - negligible/ pre-construction/ construction)</p> <p>Short term - period of less than 5 years ie commissioning/operational period</p> <p>Medium term - period of less than 15 years ie operational period</p> <p>Long term - period of less than 20 years ie life of project</p> <p>Permanent - a period that exceeds the life of project- ie irreversible.</p>	<p>Temporary – 1</p> <p>Short term – 2</p> <p>Medium term – 3</p> <p>Long term – 4</p> <p>Permanent – 5</p>
Extent	The reach of the impact (ie physical distance an impact will extend to)	<p>On-site - impacts that are limited to the Project site.</p> <p>Local - impacts that are limited to the Project site and adjacent properties.</p> <p>Regional - impacts that are experienced at a regional scale, ie Gauteng.</p> <p>National - impacts that are experienced at a national scale.</p> <p>Trans-boundary/International - impacts that are experienced outside of South Africa.</p>	<p>On-site – 1</p> <p>Local – 2</p> <p>Regional – 3</p> <p>National – 4</p> <p>International – 5</p>
Probability	Measure of the probability with which the impact is expected to occur	<p>Unlikely - probably will not happen</p> <p>Improbable - some possibility, but low likelihood</p> <p>Probable - distinct possibility)</p> <p>Highly probable - most likely</p> <p>Definite - impact will occur regardless of any prevention measures</p>	<p>Unlikely – 1</p> <p>Improbable – 2</p> <p>Probable – 3</p> <p>Highly probable – 4</p> <p>Definite – 5</p>
Magnitude	A measure of the damage that the impact will cause if it does occur	<p>No effect - will have no effect on the environment</p> <p>Minor – minor and will not result in an impact on processes</p> <p>Low – low and will cause a slight impact on processes</p>	<p>No effect – 0</p> <p>Minor – 2</p> <p>Low – 4</p> <p>Moderate – 6</p> <p>High – 8</p>

Characteristic	Definition	Terms	Scoring
		Moderate – moderate and will result in processes continuing but in a modified way High - processes are altered to the extent that they temporarily cease Very high - results in complete destruction of patterns and permanent cessation of processes	Very high – 10

The significance (quantification) of potential environmental impacts identified during the Basic Assessment have been determined using a ranking scale, based on the following (terminology has been taken from the Guideline Documentation on EIA Regulations, of the Department of Environmental Affairs and Tourism, April 1998):

Occurrence

- Probability of occurrence (how likely is it that the impact may occur?)
- Duration of occurrence (how long may it last?)

Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?)
- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?)

The environmental significance of each potential impact is assessed using the following formula:

$$\text{Significance Points (SP)} = (\text{Magnitude} + \text{Duration} + \text{Extent}) \times \text{Probability}$$

The maximum value is 100 Significance Points (SP). Potential environmental impacts were rated as high, moderate or low significance on the following basis:

- < 30 significance points = **LOW** environmental significance.
- 30- 60 significance points = **MODERATE** environmental significance
- >60 significance points = **HIGH** environmental significance

APPENDIX 4: CURRICULUM VITAE

MEGAN DIAMOND

PERSONAL DETAILS

Date of Birth | 7 December 1978
Driver's License | Code A and B
Home Language | English
Other Languages | Afrikaans

EDUCATION

BSc Environmental Management | *University of South Africa (UNISA)* 2002 – 2009

ACCREDITATION

South African Council for Natural Scientific Professions | *Environmental Science*
Registration Number: 300022/14

EXPERIENCE

Owner & Avifaunal Specialist | *Feathers Environmental Services*

July 2013 – Present

- * Perform specialist avifaunal assessment studies to minimise the impact of industrial infrastructure on birds and their habitats;
- * Provide strategic guidance to industry through the development of best practice procedures and guidelines;
- * Review and comment on methodologies, specialist studies and EIA reports for Renewable Energy projects;
- * Provide input into renewable energy and power line developments elsewhere in Africa and across the globe;
- * Manage the collection and collation of relevant and complete desktop and/or field datasets;

September 2022

Oliphant Estate Township Development

82

- * Manage pre- and post-construction avifaunal monitoring data collected at wind and solar energy facilities;
- * Site assessments, either as part of the project team or independently;
- * Preparation of reports according to project deadlines, including the use of Geographic Information Systems (GIS) to portray data;
- * Attendance of specialist integration meetings; and
- * Liaison with stakeholders where necessary.

Wildlife & Energy Programme Manager | *Endangered Wildlife Trust*

October 2006 – June 2013

Programme management

- * Annually review the programme's conservation and research strategic objectives and update in accordance with the EWT's and programme's vision and mission including work plans for staff etc.;
- * Ensure timeous, professional delivery on all aspects of Wildlife & Energy Programme activities;
- * Formulate, prioritise and approve relevant research and conservation projects;
- * Ensure acceptable quality of all research projects and their outputs;
- * Participate in international network liaison as and when required;
- * Produce regular popular articles & media releases on the Wildlife & Energy Programme projects and outputs & contribute to the EWT publications;
- * Establish & maintain a network with relevant national & international stakeholders;
- * Deliver presentations at relevant meetings, functions, workshops & conferences on behalf of the programme;
- * Assist with compilation of newsletters, updating of webpage, compilation of press articles, any advocacy issues;
- * Identify & establish partnerships to achieve Wildlife & Energy Programme conservation goals.

Eskom –EWT Strategic Partnership

- * Ensure that this partnership is managed effectively and sustainably against its goals. Manage staff in this division;
- * Develop and maintain relationships with Eskom;
- * Negotiate the terms of reference for the annual service level agreements between EWT and Eskom, to ensure the sustainability of the relationship;
- * Compile annual report to Eskom Corporate Environment and Sustainability;
- * Produce monthly reports to Eskom's regional grids on the status of incident follow-up;
- * Attend applicable forums to interact with Eskom stakeholders;
- * Participate in international network liaison as and when required;
- * Maintain a network with all relevant local and regional level stakeholders (meetings, forums, workshops, etc.);
- * Identify research needs relating to the management of wildlife interaction with power lines;
- * Conduct research projects on wildlife and power line interaction and present the results at national and international conferences and workshops;

- * Development and implementation of training for Eskom field services staff (at various levels) in the management of wildlife interactions; and
- * Conduct special investigations on power lines relating to wildlife induced faulting.

Environmental Impact Assessment Division

- * Ensure that this division operates effectively and efficiently at all times and manage staff in this division; and
- * Conduct specialist avifaunal studies for new power lines developments including: tendering/quoting for the projects, conducting field work, preparing reports, presenting results & negotiating the acceptance of recommendations, final "walk through" as part of Environmental Management Plans; general project management, all liaison with clients, Eskom, authorities, Interested and Affected Parties etc.

Management and administration

- * Ensure all programme staff have relevant terms of reference;
- * Ensure that all programme staff are performance appraised against their terms of reference;
- * Compile and manage programme budgets, monthly reports, work plans and strategy;
- * Monitor expenditure and take corrective action if necessary; and
- * Ensure timely delivery on all projects to all stakeholders.

CONFERENCE ATTENDANCE

- * *Society for Conservation Biology 21st Annual Meeting (1-5 July 2007)*
- * *The 6th TAWIRI Scientific Conference (3 – 6 December 2007) Presented a paper titled "Co-operative management of wildlife and power line conflicts: an African solution"*
- * *Pan-African Ornithological Congress (7-12 September 2008)*
- * *International Conference on Overhead Lines, Design, Construction, Inspection & Maintenance, Fort Collins Colorado USA. (29 March – 1 April 2010) Presented a paper titled "Bird's eye view: how birds see is key to avoiding power line collision"*
- * *Windaba 2011 – Implementing South African Wind Energy (27-29 September 2011)*
- * *Pan African Vulture Summit (16-20 April 2012) Presented a paper titled "Electrification in Africa – Are our vultures being strung along"*
- * *4th Wind Power Africa Conference & Renewable Energy Exhibition (28-30 May 2012) Presented a paper titled "Wind Energy in Africa – what does this really mean for our continent's birds"*
- * *13th Pan-African Ornithological Congress (14-21 October 2012) Presented a paper titled "Stringing South Africa's Terrestrial Birds Along - Monitoring of Bird Interactions with Power Line and Experimental Testing of Bird Collision Mitigation at the Karoo Long Term Monitoring Site"*
- * *AEWA Single Species Action-Planning Workshop for the Conservation of the Grey Crowned Crane (10-13 September 2013) Presented and participated in the workshop as a subject expert (energy and bird interactions)*

AUTHORED & CO-AUTHORED PAPERS

Jenkins, A.R., Smallie, J. & Diamond, M. 2009. Balls, flashers, flappers and coils: South African perspectives on a global search for ways to prevent avian collisions with overhead lines. In: Harebottle, D.M., Craig, A.J.F.K., Anderson, M.D., Rakatomonana, H. & Muchai, M. (eds). *Proceedings of the 12th Pan-African Ornithological Congress, 2008*. Cape Town, Animal Demography Unit.

Smallie, J., Diamond, M. & Jenkins, A. 2009. Lighting up the African continent – what does it mean for our birds? pp. 38–43. In: Harebottle, D.M., Craig, A.J.F.K., Anderson, M.D., Rakotomanana, H. & Muchai. (eds). *Proceedings of the 12th Pan-African Ornithological Congress, 2008*. Cape Town, Animal Demography Unit.

Jenkins, A. R., Smallie, J.J and Diamond, M. 2010 Avian collisions with power lines: a global review of causes and mitigation with a South African perspective. *Bird Conservation International*, page1 of16.

Retief, E.F., Diamond, M., Anderson, M.D., Smit, H.A., Jenkins, A.R., Brooks, M. 2011. Avian Wind Farm Sensitivity Map for South Africa.

Jenkins, A.R., Van Rooyen, C.S., Smallie, J.J., Harrison, J.A., Diamond, M. And Smit, H.A. 2012. BirdLife South Africa / Endangered Wildlife Trust best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa.

Jenkins, A.R., De Goede, K.H., Sebele, L. and Diamond, M. 2013. Brokering a settlement between eagles and industry: sustainable management of large raptors nesting on power infrastructure. *Bird Conservation International* (2013) 23:232 – 246.

Diamond, M., Harris, J., Mirande, C. and Austin, J. 2014. People of a feather flock together: A global initiative to address crane and power line interactions. 13th North American Crane Workshop Summary. Lafayette, Louisiana.

Page-Nicholson, S., Tate, G., Hoogstad, C., Murison, M., Diamond, M., Blofield, A., Pretorius, M., Michael, M.D. 2018. Mitigating the Impact of Large Mammals on Wooden Electrical Distribution Poles in the Kruger National Park, South Africa. *African Journal of Wildlife Research*.

Diamond, M. and Hoogstad, C. (in press) Collisions and habitat loss associated with utility lines and wind turbines. IUCN SSC Crane Specialist Group – Crane Conservation Strategy.