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**AVIFAUNAL SITE VERIFICATION: PROPOSED
KHAUTA SOLAR PV AND ASSOCIATED 44KV
AND 132KV POWERLINES, IN
RIEBEECKSTAD, FREE STATE**





DOCUMENT CONTROL

Report Name	MOLEPO, M. 2022. AVIFAUNAL SITE VERIFICATION: PROPOSED KHAUTA SOLAR PV AND ASSOCIATED 44KV AND 132KV POWERLINES, IN RIEBEECKSTAD, FREE STATE
Reference	AVI-KPV/052022
Submitted to	ENVIROWORKS
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1. INTRODUCTION

MORA Ecological Services (Pty) Ltd was appointed by EnviroWorks to conduct an avifaunal site verification survey within a several private and municipal land which are used for crop and livestock farming. The site is located in Riebeeckstad Town in the Free State province (Figure 1). The main aim of this assessment was to help EnviroWorks develop an early stage avifaunal sensitivity for the proposed Solar PV facility and associated infrastructure within the project footprint, hereafter referred to as the study site or site.

Objectives of the study

- The scope of work included the following:
- Describe the ecological features of the proposed site;
- Identify No-Go areas within the site; and
- Provide a preliminary opinion on important avifaunal habitats

Assumptions, Limitations, Uncertainties and Gap analysis

- The findings, results, observations, conclusions and recommendations provided in this report are based on the author's best scientific and professional knowledge as well as available information regarding the potential impacts on terrestrial environment.
- It was assumed that a once off site visit with a total of two days of fieldwork would be near sufficient for assessing available habitats for birds of conservation concern.
- MORA reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

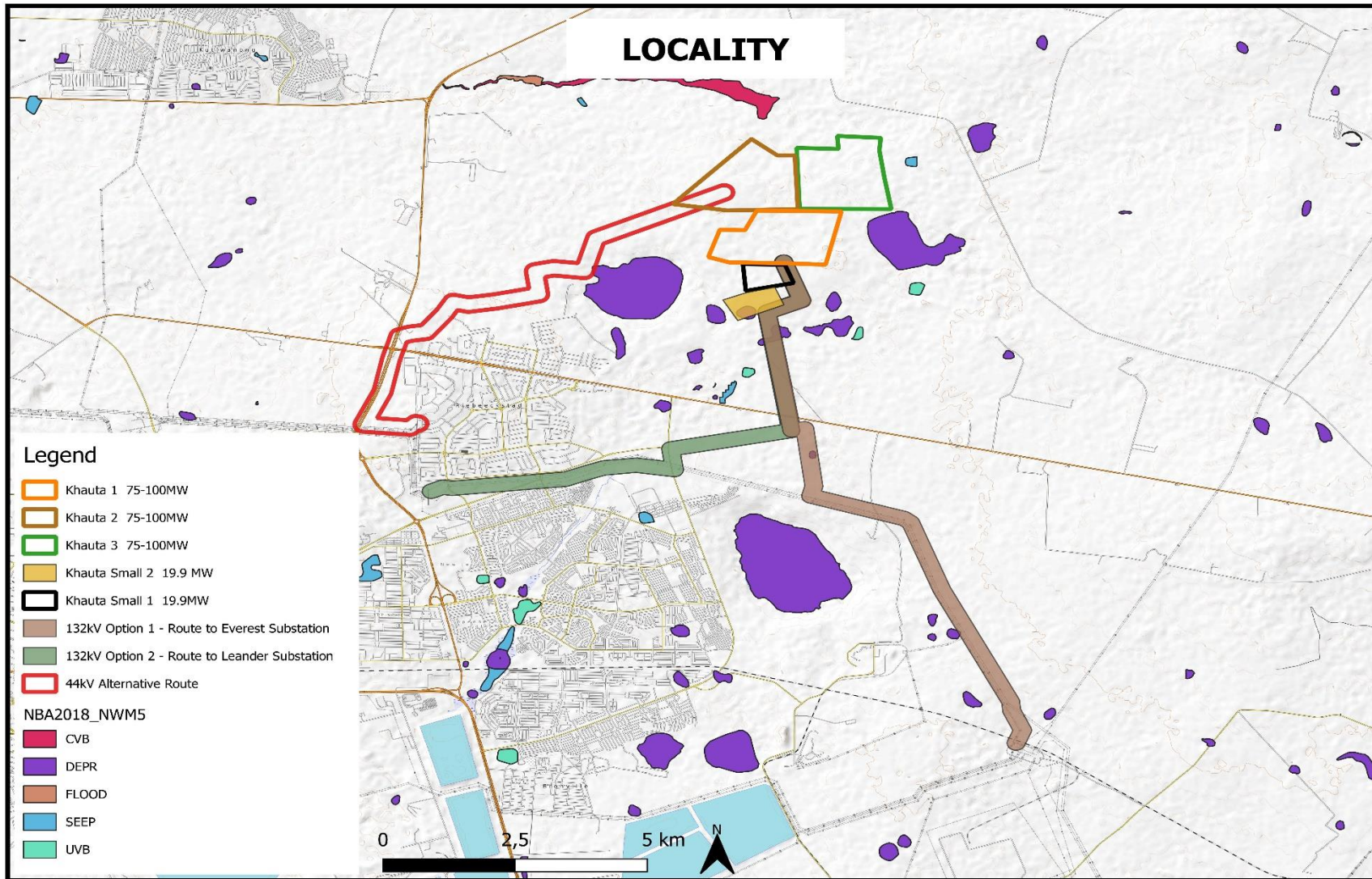


Figure 1: Location of the study site.

2. METHODOLOGY

The study area was surveyed over a period of four days (19-22 April 2022). The survey was conducted by two fieldworkers, and survey time was from 06h00 until 18h00. Prior to fieldwork, a list of previously recorded birds was obtained from Southern African Bird Atlas Project 2 (SABAP 2), and Google Earth was also used to determine potential habitats for birds. The areas were groundtruthed during a site survey (Figure 2).

Birds were observed using 8 x 42 Bushnell binoculars and photographic were taken where possible. For medium to large sized birds, open grassland areas were surveyed on foot in order to flush any available bird species.

For large tree-nesting birds, tall Eucalyptus trees were walked through in order to check for raptor nests.

Lastly, waterbodies were inspected for waterfowl and other species that frequent waterbodies.

All data was recorded on BasicAirData GPS logger and Birdlasser.

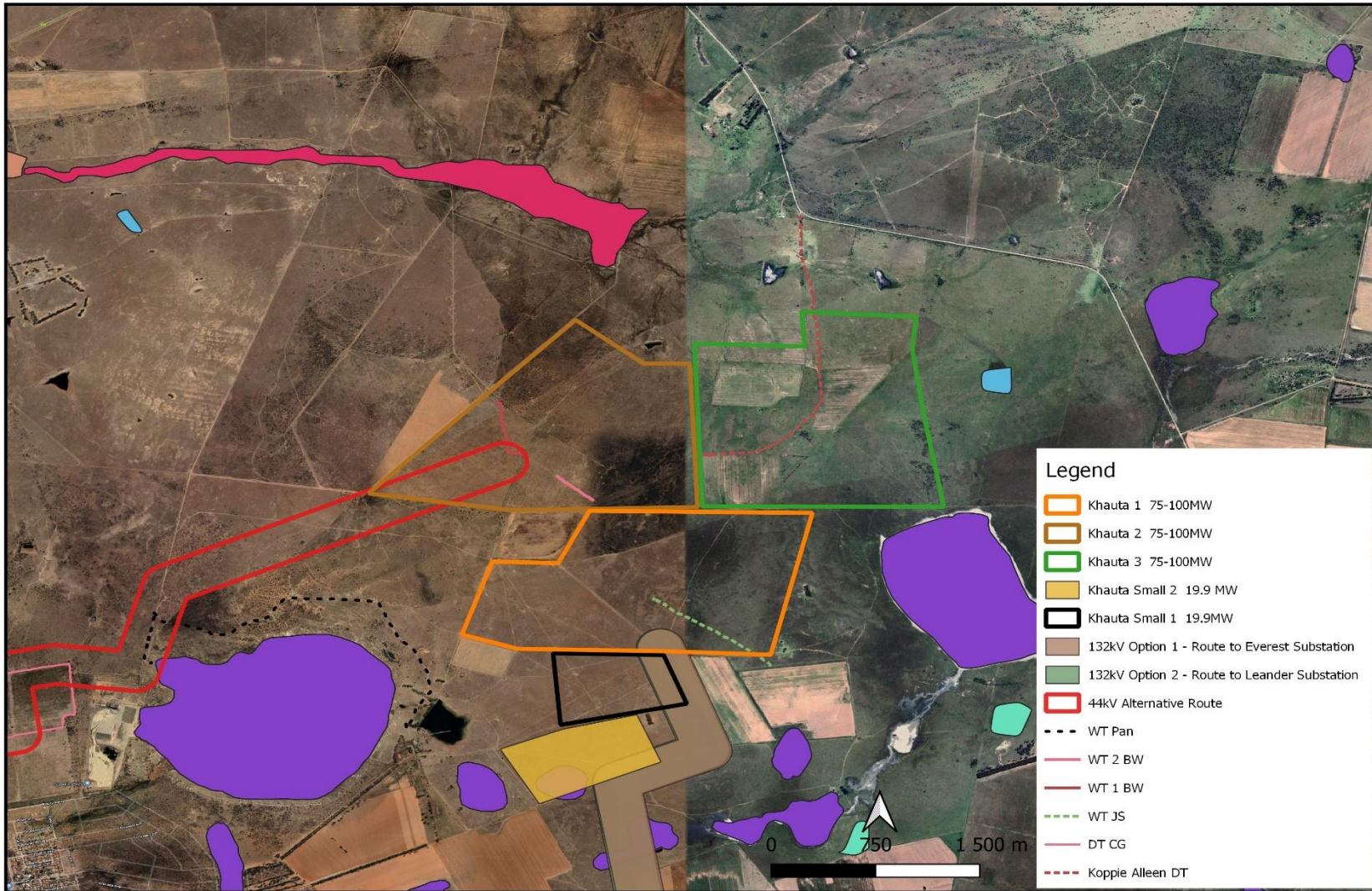


Figure 2: Surveyed area 1.

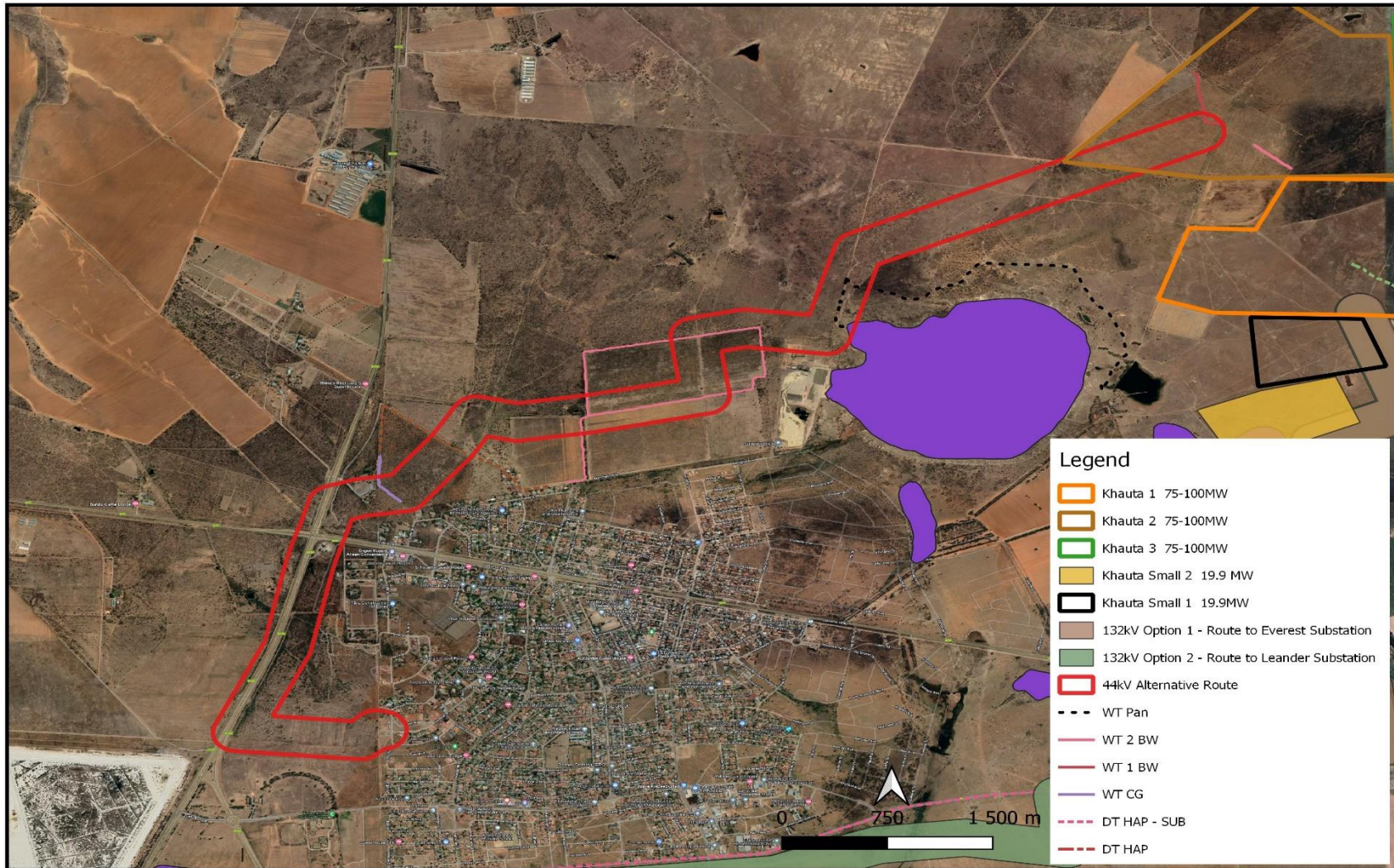


Figure 3: Surveyed area 2.



Figure 4: Surveyed area 3.

RESULTS

The coverage of the study site was deemed adequate for the current scope of work (Figure 2,3 & 4).

From the survey, a total of 65 bird species were observed within and around the proposed site. Out of these observed species, none were classified as Red Data locally. However, there were medium to large sized species that are threatened by habitat loss and may be prone to collision. These species are listed in Table 1. The area has several pans that attract a variety of waterfowl including migrants. This makes the waterbodies an important habitat that warrant conservation.

Table 1: Collision prone species

Common name	Scientific name	BirdMAP ID	Date	Time	Seen/Heard	Latitude	Longitude	Notes
Unidentified	<i>Unidentified</i>	0	2022-04-20	8:34	Seen	-27.907843	26.843554	MJ&SM, Temp20, 2,N,0/8
Northern Black Korhaan	<i>Afrotis afraoides</i>	1035	2022-04-20	9:02	Seen	-27.901157	26.871404	PC, 200m, NE, Grassland
Blue Korhaan	<i>Eupodotis caerulescens</i>	223	2022-04-20	9:11	Seen	-27.891375	26.871075	FL, 0m, NW, Grassland
Northern Black Korhaan	<i>Afrotis afraoides</i>	1035	2022-04-20	9:12	Seen	-27.891233	26.871027	FL, 0m, NW, Grassland
Northern Black Korhaan	<i>Afrotis afraoides</i>	1035	2022-04-20	9:16	Seen	-27.890539	26.86873	FL,200m, N, Grassland
Blue Korhaan	<i>Eupodotis caerulescens</i>	223	2022-04-20	9:20	Seen	-27.891018	26.863882	FL, 300m, W, Grassland
Northern Black Korhaan	<i>Afrotis afraoides</i>	1035	2022-04-20	9:26	Seen	-27.89582	26.861206	FL, 20m, E, Grassland
Northern Black Korhaan	<i>Afrotis afraoides</i>	1035	2022-04-20	9:40	Seen	-27.900586	26.850053	FL, 50m,N,Grassland
African Harrier-Hawk	<i>Polyboroides typus</i>	171	2022-04-20	10:19	Seen	-27.90456	26.841844	FF, 350m, SE, Trees
Black-headed Heron	<i>Ardea melanocephala</i>	55	2022-04-20	10:21	Seen	-27.904538	26.84182	
Northern Black Korhaan	<i>Afrotis afraoides</i>	1035	2022-04-20	11:27	Seen	-27.901425	26.843926	FL, 5m,N,Mix
Black-winged Kite	<i>Elanus caeruleus</i>	130	2022-04-21	8:46	Seen	-27.907709	26.847443	FF, 50m,SE,Grassland
Karoo Korhaan	<i>Eupodotis vigorsii</i>	220	2022-04-21	11:53	Seen	-27.890687	26.87036	FC, 250m,E,Grassland
Karoo Korhaan	<i>Eupodotis vigorsii</i>	220	2022-04-21	11:54	Seen	-27.890667	26.870377	PC, 120m,NW,Grassland
Marsh Owl	<i>Asio capensis</i>	1060	2022-04-21	11:54	Seen	-27.870025	26.855114	

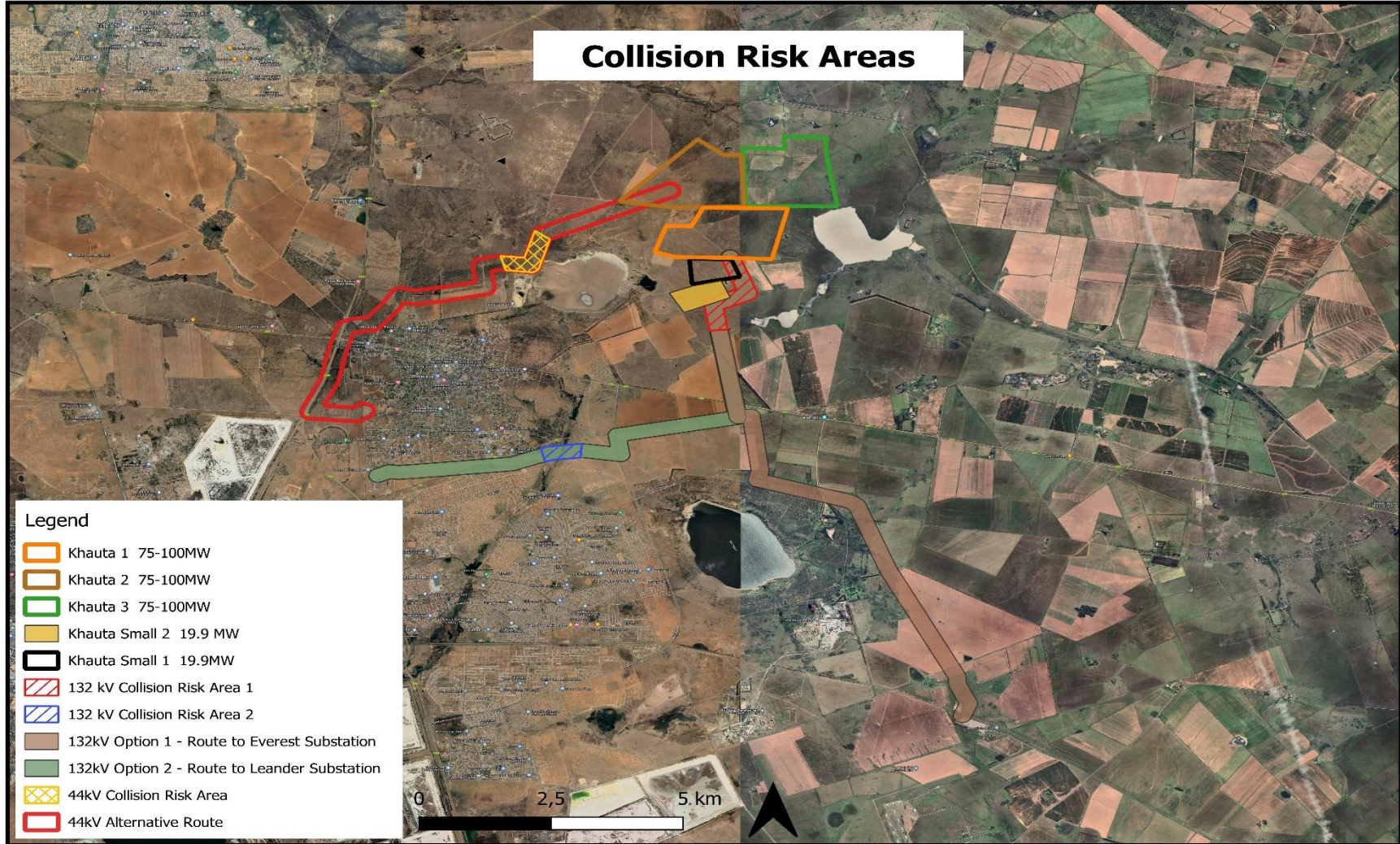


Figure 5: Avifaunal Collision Risk Map.

Table 2: Species recorded during the survey

Common name	Scientific name	BirdMAP ID	Date	Time	Seen/Heard	Latitude	Longitude
Unidentified	Unidentified	0	2022-04-20	8:18	Seen	-27.90784	26.843507
Hadada Ibis	<i>Bostrychia hagedash</i>	84	2022-04-20	8:20	Seen	-27.90792	26.843508
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>	432	2022-04-20	8:21	Seen	27.907902	26.843531
White-browed Sparrow-Weaver	<i>Plocepasser mahali</i>	780	2022-04-20	8:22	Seen	27.907873	26.843499
Glossy Ibis	<i>Plegadis falcinellus</i>	83	2022-04-20	8:22	Seen	-27.90787	26.843458
Laughing Dove	<i>Spilopelia senegalensis</i>	317	2022-04-20	8:23	Seen	27.907864	26.843464
Cape Sparrow	<i>Passer melanurus</i>	786	2022-04-20	8:23	Seen	27.907872	26.843463
Greater Striped Swallow	<i>Cecropis cucullata</i>	502	2022-04-20	8:24	Seen	27.907878	26.84348
Southern Fiscal	<i>Lanius collaris</i>	707	2022-04-20	8:24	Seen	-27.90789	26.84348
Helmeted Guineafowl	<i>Numida meleagris</i>	192	2022-04-20	8:25	Seen	27.907888	26.843485
White-bellied Sunbird	<i>Cinnyris talatala</i>	763	2022-04-20	8:26	Seen	27.907837	26.843453
Cape White-eye	<i>Zosterops virens</i>	1172	2022-04-20	8:32	Seen	27.907862	26.843527
Crowned Lapwing	<i>Vanellus coronatus</i>	242	2022-04-20	8:33	Seen	-27.90784	26.843572
Little Swift	<i>Apus affinis</i>	385	2022-04-20	8:39	Seen	27.907848	26.84357
Ant-eating Chat	<i>Myrmecocichla formicivora</i>	575	2022-04-20	8:49	Seen	27.908875	26.858105
African Pipit	<i>Anthus cinnamomeus</i>	692	2022-04-20	8:49	Seen	27.909076	26.858182
Quailfinch	<i>Ortygospiza atricollis</i>	844	2022-04-20	9:13	Seen	27.891214	26.871008
Zitting Cisticola	<i>Cisticola juncidis</i>	629	2022-04-20	9:14	Seen	27.891272	26.871027
Spur-winged Goose	<i>Plectropterus gambensis</i>	88	2022-04-20	9:17	Seen	-27.89056	26.868725
Red-billed Quelea	<i>Quelea quelea</i>	805	2022-04-20	9:30	Seen	27.900395	26.859561
Desert Cisticola	<i>Cisticola aridulus</i>	630	2022-04-20	9:31	Seen	27.900365	26.859523
Yellow Canary	<i>Crithagra flaviventris</i>	866	2022-04-20	9:53	Seen	27.905992	26.843027
Cape Robin-Chat	<i>Cossypha caffra</i>	581	2022-04-20	9:54	Seen	27.905888	26.842869
Cape Wagtail	<i>Motacilla capensis</i>	686	2022-04-20	10:39	Seen	27.904712	26.841865
Pirit Batis	<i>Batis pirit</i>	674	2022-04-20	10:39	Seen	27.904911	26.841862

Speckled Pigeon	<i>Columba guinea</i>	311	2022-04-20	10:41	Seen	-	27.905384	26.842253
Black-collared Barbet	<i>Lybius torquatus</i>	431	2022-04-20	10:42	Seen	-	27.906003	26.843055
Cape Starling	<i>Lamprotornis nitens</i>	737	2022-04-20	10:52	Seen	-	27.906091	26.843131
Brown-crowned Tchagra	<i>Tchagra australis</i>	714	2022-04-20	11:04	Seen	-	27.897747	26.834178
Crested Barbet	<i>Trachyphonus vaillantii</i>	439	2022-04-20	11:04	Seen	-	27.898274	26.833829
Black-chested Prinia	<i>Prinia flavicans</i>	650	2022-04-20	11:07	Seen	-	27.898816	26.830829
Blue Waxbill	<i>Uraeginthus angolensis</i>	839	2022-04-20	11:12	Seen	-27.89983		26.82638
Common Myna	<i>Acridotheres tristis</i>	734	2022-04-20	11:32	Seen	-	27.906826	26.843283
African Hoopoe	<i>Upupa africana</i>	418	2022-04-20	11:38	Seen	-	27.916925	26.836192
Black-throated Canary	<i>Crithagra atrogularis</i>	860	2022-04-20	11:40	Seen	-	27.919612	26.830635
Ring-necked Dove	<i>Streptopelia capicola</i>	316	2022-04-20	11:40	Seen	-	27.920875	26.82891
Wattled Starling	<i>Creatophora cinerea</i>	735	2022-04-20	11:49	Seen	-27.91237		26.805016
Violet-eared Waxbill	<i>Uraeginthus granatinus</i>	840	2022-04-20	12:38	Seen	-	27.911051	26.803446
African Red-eyed Bulbul	<i>Pycnonotus nigricans</i>	544	2022-04-20	12:39	Seen	-	27.910063	26.801454
Pink-billed Lark	<i>Spizocorys conirostris</i>	490	2022-04-20	13:42	Seen	-27.87773		26.869486
Rufous-naped Lark	<i>Mirafra africana</i>	458	2022-04-20	14:10	Seen	-	27.870025	26.868383
Crested Barbet	<i>Trachyphonus vaillantii</i>	439	2022-04-21	7:14	Seen	-27.94826		26.875652
Cape White-eye	<i>Zosterops virens</i>	1172	2022-04-21	7:21	Seen	-	27.952685	26.878907
Pied Crow	<i>Corvus albus</i>	522	2022-04-21	7:57	Seen	-	27.955158	26.883181
Grey-backed Cisticola	<i>Cisticola subruficapilla</i>	638	2022-04-21	8:08	Seen	-	27.959002	26.88451
Speckled Mousebird	<i>Colius striatus</i>	390	2022-04-21	8:22	Seen	-27.95253		26.88215
Namaqua Dove	<i>Oena capensis</i>	318	2022-04-21	8:27	Seen	-	27.953595	26.879423
Common Quail	<i>Coturnix coturnix</i>	189	2022-04-21	9:58	Seen	-	27.893548	26.853135
Spike-heeled Lark	<i>Chersomanes albofasciata</i>	474	2022-04-21	12:29	Seen	-	27.909071	26.858294
Red-headed Finch	<i>Amadina erythrocephala</i>	820	2022-04-21	12:30	Seen	-	27.908913	26.858133
Common Starling	<i>Sturnus vulgaris</i>	733	2022-04-21	12:40	Seen	-	27.907856	26.843518
Orange River White-eye	<i>Zosterops pallidus</i>	1171	2022-04-21	12:41	Seen	-	27.907787	26.843539

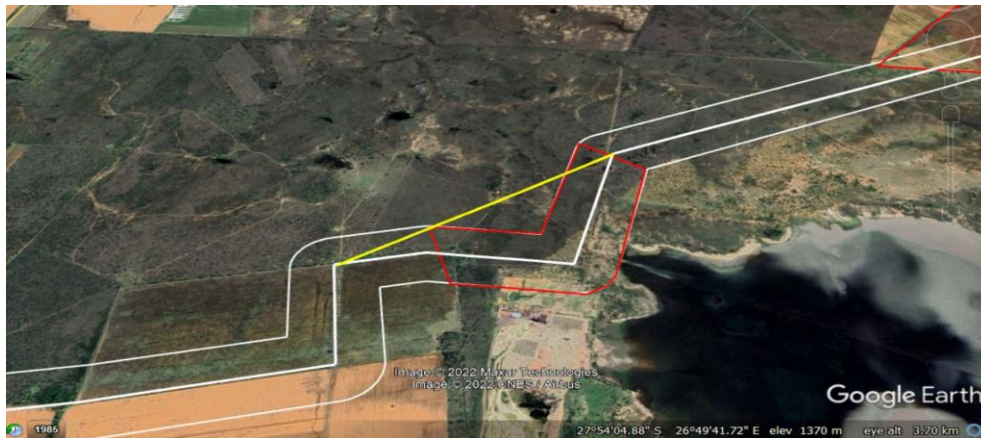
Orange River Francolin	<i>Scleroptila gutturalis</i>	179	2022-04-21	12:43	Seen	-27.909	26.841967
Reed Cormorant	<i>Microcarbo africanus</i>	50	2022-04-21	12:50	Seen	-27.90898	26.841941
White-breasted Cormorant	<i>Phalacrocorax lucidus</i>	47	2022-04-21	12:50	Seen	-	26.841953
Black-necked Grebe	<i>Podiceps nigricollis</i>	5	2022-04-21	12:50	Seen	-	26.841942
Little Grebe	<i>Tachybaptus ruficollis</i>	6	2022-04-21	12:51	Seen	-	26.841965
Cape Shoveler	<i>Anas smithii</i>	94	2022-04-21	12:51	Seen	-	26.841965
White-faced Whistling Duck	<i>Dendrocygna viduata</i>	100	2022-04-21	12:51	Seen	-	26.841965
Southern Grey-headed Sparrow	<i>Passer diffusus</i>	4142	2022-04-21	12:57	Seen	-	26.831331
Fiscal Flycatcher	<i>Melaenornis silens</i>	665	2022-04-22	8:28	Seen	-	26.801444
Cape Canary	<i>Serinus canicollis</i>	857	2022-04-22	8:32	Seen	-	26.798844
Cardinal Woodpecker	<i>Dendropicos fuscescens</i>	450	2022-04-22	8:40	Seen	-	26.797124
Diederik Cuckoo	<i>Chrysococcyx caprius</i>	352	2022-04-22	9:05	Seen	-	26.796965
Fairy Flycatcher	<i>Stenostira scita</i>	678	2022-04-22	9:14	Seen	-	26.797039
Yellow-crowned Bishop	<i>Euplectes afer</i>	812	2022-04-22	9:16	Seen	-	26.797046
Marsh Owl	<i>Asio capensis</i>	1060	2022-04-21	11:54	Seen	-	26.855114

4. DISCUSSION

While the aim of this current assessment was to do a preliminary site sensitivity, it did however manage to collect adequate data to determine important habitats that should be considered in the planning phase of the proposed project. Preliminary site assessment revealed that the solar panels will be located on old farm lands that consist of overgrown vegetation. In terms of 132 kV powerlines, Option 1 is the most preferred as it will run parallel to the existing powerlines until the substation. The only concerns at this stage are the alignment of the 44 kV overhead powerline and location of pans in relation to the powerlines. The following is recommended:

Get rid of the line that runs towards the pan and move the line away from the pan instead as depicted in the image below. This would reduce the collision for birds that flow away or to the pan.

Collision Risk Areas will require marking using bird flight diverters.



Overall, the site was observed to be of low to moderate avifaunal sensitivity.

It is recommended that the developer may proceed with the Environmental Impact Assessment phase. However, the following are recommended:

1. Conduct an Avifaunal Impact Assessment.
2. Waterbodies should be used as focal points throughout the duration of the study, as it is known that several bird species ecologically depend on water.
3. Conduct preconstruction walkthrough and nest surveys to check for active nests on the proposed development footprint.

The final site sensitivity will be finalized during the impact assessment phase.

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