Proposed Gas to Power Powership Project at the Port of Richards Bay, uMhlathuze Local Municipality, KwaZulu-Natal

Specialist Study on Birds

November 2022

Proposed Gas to Power Powership Project at the Port of Richards Bay, uMhlathuze Local Municipality, KwaZulu-Natal

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REPORT VERSION AND QUALITY CONTROL:

Date	Report No. and Revision No.	Created	Reviewed	Authorised for Release
4/11/2022	AEC 2057.2 v1.0	JK Turpie and L-A DeWet	B.M. Clark	B.M. Clark

SPECIALIST REPORT REQUIREMENTS AS PER EIA REGULATIONS 2014 (AS AMENDED)

Table 1 outlines the requirements of the Specialist Reports as per the NEMA EIA Regulations, 2014 (as amended). According to Appendix 6 (1) "A specialist report prepared in terms of these Regulations must contain …" the information outlined in Table 1 below.

Table 1 Prescribed contents of the Specialist Reports (Appendix 6 of the EIA Regulations, 2014)

Relevant section in GNR. 982	Requirement description	**Relevant section in this report**
(a) details of—	(i) the specialist who prepared the report; and	Front pages
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 6b
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Front pages
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 1.5, Section 2.3
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1.5
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.5
(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 4
(g)	an identification of any areas to be avoided, including buffers;	Section 4.4
(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 4
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.5
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 2, 3 and 4
(k)	any mitigation measures for inclusion in the EMPr; Note: We need to include whether these mitigation measures (excluding ongoing monitoring) can be practically implemented prior to commencement or not.	Section 4
(l)	any conditions for inclusion in the environmental authorisation;	Section 5
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7
(n) a reasoned opinion—	(i) whether the proposed activity, activities or portions thereof should be authorised;	Section 5
	(iA) regarding the acceptability of the proposed activity or activities; and	

	(ii) 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; Note: We need to include whether these mitigation measures (excluding ongoing monitoring) can be practically implemented prior to commencement or not.	Section 4
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	-
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	-
(q)	any other information requested by the competent authority.	-
(2)	Where a government notice gazetted 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.	-

PREFACE

This report was prepared by Anchor Environmental Consultants (Pty) Ltd as part of an Environmental Impact Assessment (EIA), undertaken on behalf of Karpowership SA (Pty) Ltd (Karpowership) by Triplo4 Sustainable Solutions (Triplo4) for the deployment of a floating power plant (FPP) facility at the Port of Richards Bay, uMhlathuze Local Municipality, KwaZulu-Natal (DEFF REF NO: 14/12/16/3/3/2/2007). The report updates an earlier report prepared by The Biodiversity Company.

The Competent Authority for the project, Department of Forestry Fisheries and the Environment (DFFE) issued a Record of Refusal refusing Environmental Authorisation for the project on 23 June 2021. Reasons for refusing Environmental Authorisation are outlined in the Record of Refusal issued by the DFFE dated 23 June 2021 (DFFE Reference: 14/12/16/3/3/2/2004), and include the allegations that the applicant did not meet the minimum requirements relating to public consultation and information gathering set out in the National environmental Management Act (NEMA 1998) and the Environmental Impact Assessment Regulations of 2014, that certain specialist studies (specifically a noise modelling study) recommended by specialists on the project had not been completed, and that all potential and actual impacts on the environment had not been fully evaluated.

Karpowership SA (Pty) Ltd appealed this decision, but the appeal was also rejected by the Minister DFFE on 5th of August 2022. Reasons for the rejection are set out in a letter issued by the minister on 1 August 2022 (Ref: LSA207022). In refusing the Appeal, the Minister noted that there were gaps in information and procedural defects in relation to the process followed for the EIA that could not be corrected during the appeal process and made the decision, and in accordance with her powers under NEMA, elected to remit the Karpowership SA Environmental Authorisation to the Competent Authority in the DFFE, to enable the applicant to address the perceived gaps and procedural defects, and to resubmit the application to the Department.

Following the advice of the Minister, Karpowership SA (Pty) Ltd has elected to revise and resubmit an application for Environmental Authorisation to the Competent Authority for consideration. This report represents the Bird Specialist Report for the EIA. This study was undertaken, and the report specifically designed to meet all of the requirements of NEMA (1998) and the Environmental Impact Assessment Regulations (2014).

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1 INTRODUCTION

1.1 Background

This avifaunal specialist report, prepared by Anchor Environmental Consultants (Pty) Ltd ("Anchor") and The Biodiversity Company ("TBC"), was commissioned by Triplo4 Sustainable Solutions (Pty) Ltd ("Triplo4") as part of an Environmental Impact Assessment (EIA) being conducted for the proposed deployment of a floating power plant (FPP) facility at the Port of Richards Bay, uMhlathuze Local Municipality, KwaZulu-Natal. The report updates earlier work done by The Biodiversity Company.

This EIA will be submitted as part of the renewed application for the proposed activity by Karpowership SA (Pty) Ltd ("Karpowership") to the Competent Authority (Department of Forestry Fisheries & Environment - DFFE), following the rejection of an earlier application which did not meet all the necessary requirements set out in the National environmental Management Act (NEMA 1998) and the Environmental Impact Assessment Regulations of 2014. Karpowership appealed this decision, but the appeal was rejected by the Minister of DFFE on 5th of August 2022.

The bird specialist study is taken into account in the updated Coastal, Estuarine and Marine Specialist Impact Assessment Report (Breetzke et al. 2022) as well as in the overall EIA. It can also be read in conjunction with the other specialist studies, including:

- the updated Terrestrial Noise Assessment (Safetech, 2022);
- the updated Terrestrial Ecology Assessment (de Wet, 2022);
- the updated Wetland Assessment (Triplo4, 2022a);
- the Underwater Noise Assessment (Subacoustech Environmental, 2022)
- the updated Climate Change Assessment (Promethium Carbon, 2022);
- the Richards Bay Landscape and Visual impact assessment report (Environmental Planning & Design, 2022); and
- the Socio-Economic Impact Assessment and small-scale fisheries appendix (Steenkamp and Weaver, 2022).

1.2 Project description and location

The information presented below was obtained from the project method statement (document number S2117-DEFF-MS-001-R1) and the relevant draft scoping report and study plan for the EIA process in the Port of Richards Bay and, as per emails sent on the 10th October 2022, regarding the revised location for the Powership and associated infrastructure within Richards Bay (document number, S2117-05-SK-GA-211-S1 B). The information is repeated here for convenience.

In the current context, the proposed Gas to Power project will entail the mooring, deployment and operation of two gas engine Powerships (one Shark and one Khan Class vessel) and a floating storage & regasification unit (FSRU) within the Port of Richards Bay (Figure 1, Figure 2), uMhlathuze Municipality, for a contracted 20-year lifespan. The project location is immediately adjacent and linked to the Richards Bay Industrial Development Zone (IDZ), which is a designated Special Economic Zone (SEZ).

As provided in the project overview (Triplo4, 2022b), the components and processes of the power-generating arrangement include:

- mooring facilities for the Liquefied Natural Gas (LNG) carrier;
- LNG supply, storage and regasification on-board a Floating Storage Regasification Unit (FSRU);

- distribution of the natural gas to the Powership via subsea gas pipeline infrastructure;
- the berthed Powerships – a ship and barge, which have been reconfigured to incorporate elements for the generation of electricity using natural gas. The natural gas is supplied to the engines. The 27 reciprocating engines in operation drive the generator shaft to generate electricity, and the heat generated by the engines in operation is captured and used by additional steam turbines for increased efficiency;
- an on-board High Voltage substation for the conversion of the generated power; and
- overhead lines for the evacuation or transmission of the generated electricity to transmission connection points onshore and onward to the substation that is connected to the national grid.

1.2.1 Location of moored vessels

The Port of Richards Bay is South Africa's most northern port, located 160 km northeast of Durban on the east coast of South Africa. It hosts the Transnet operated Dry Bulk Terminal and Multipurpose Terminal and the privately operated Richards Bay Coal Terminal. Several other terminals are in operation, including wood chip export terminals and a bulk liquid terminal.

Within the Port of Richards Bay, the proposed Gas to Power project will be located in the far western portion of the bay, on the northern side of the sandspit that is adjacent to the area known as the Kabeljous Flats (Figure 1 and Figure 2). Both these features are considered ecologically-sensitive.

Two layout options or mooring locations are proposed (Figure 1 and Figure 2) based on vacant space, existing and planned port operations, depth considerations, and adequate space for mooring, navigation and operations (Triplo4, 2022b). The sand spit area has been identified as sensitive, so a minimum offset distance of 200 m from the low water mark and 170 m from the base of the sandspit to the moored FSRU will be maintained (Triplo4, 2022b); while the closest mooring legs will be approximately 120 m of the base of the sandspit.

In Alternative Layout 1 (preferred option) (Figure 1), the proposed Khan Class and Shark Class Powerships (450 MW combined contracted output) are positioned within the dead-end 600 Berth basin adjacent to the break bulk quay /multi-purpose terminal. The Khan Powership will be approximately 81 m and 175 m off the main land promontory along its starboard side and from the stern, respectively, and the Shark Powership approximately 192 m off the water line of the sandspit along its starboard side. The Powerships are positioned "in-line" and connected to the FRSU by approximately 1 400 m of subsea gas pipeline (Triplo4, 2022b).

In Alternative Layout 2, the Powerships are positioned roughly 900 m further seaward (closer to the FSRU) and side-by-side, and connected to the LNG/ FRSU mooring facility by approximately 500 m of subsea gas pipeline (Figure 2) (Triplo4, 2022b). In Alternative Layout 2, the marine infrastructure (ships, mooring, and gas pipeline, etc.) is in closer proximity to the sensitive sandspit and without the "buffer" afforded by the promontory, and is thus the least preferred alternative from an ecological perspective, but also engineering perspective. Although this alternative presents a shorter gas pipeline, the position of the Powerships in relation to the shore is not supported from an engineering design perspective, and consequently the position of the associated gas pipeline is also not supported (Triplo4, 2022b).

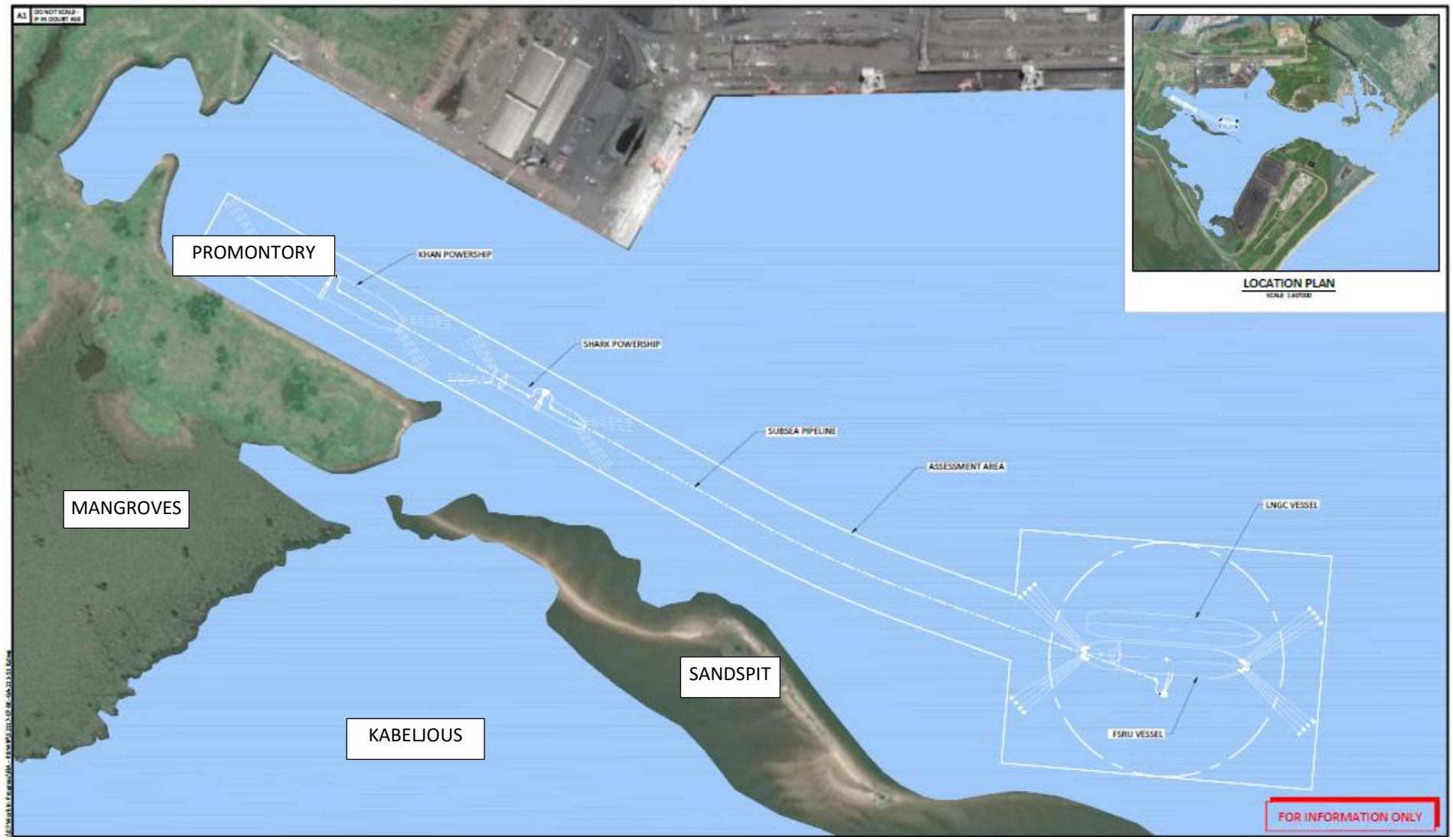

Figure 1. Alternative Layout 1 (Preferred option) of the proposed Gas to Power components within the Port of Richards Bay

Figure 2. Alternative layout 2 of the proposed Gas to Power components within the Port of Richards Bay

1.2.2 Mooring

The Powerships and the FSRU are assembled off-site and delivered fully equipped and operational to the Port of Richards Bay. Berthing and mooring of the Powerships and the FSRU will be conducted as per the Ports approved maintenance plans, procedures and requirements. They will be moored in position (approximately 14 m deep) using a spread mooring arrangement, comprising 16 mooring legs (four from each corner of the vessel) each consisting of a catenary mooring chain connected to an anchor pile with a padeye connector (Triplo4, 2022b). The vertical load anchors are by design buried during the installation, whilst the anchor piles will be installed such that they are flush or below the surrounding seabed (Triplo4, 2022).

1.2.3 Gas Lines

Gas will be transferred between the FSRU and the Powerships in sequence via flexible risers attached to a pipeline end manifold (PLEM) (containing necessary valves, connections, etc.), one for each vessel installed on the seabed next to the respective vessel, and onward via the subsea steel pipeline with concrete weight coating installed on the seabed between vessels. The subsea pipeline will be installed according to international best practice, along the existing dredged slopes between the Powerships and FSRU and will have a servitude of approximately 50m either side of the pipeline (Triplo4, 2022b).

The pipeline will have a diameter of approximately 600 mm and will be weight coated for stability and welded together at a pipe stringing yard in close proximity to the water's edge. Incremental assembly and installation will take place using a winch-mounted barge. The pipeline will be placed on the seabed with minimal disturbance to the seabed and weighted with concrete elements to ensure the on-bottom stability of the pipeline during operation. It is important to note that dredging will not be required for the instalment of the Gas to Power components, although levelling of high spots or infilling of depressions in the seabed may be necessary for the subsea pipeline, and likely to be undertaken by divers during installation (Triplo4, 2022b).

1.2.4 Contractor Facilities

The contractor facilities include a site office and concrete coating yard, a material laydown area, the stringing yard and the load out berth (Figure 3), and there are no alternative locations for these facilities. These areas were carefully selected from areas within the port that have been previously disturbed and with sufficient space to accommodate the construction and pipe assembly activities (Triplo4, 2022b).

The site office and concrete coating yard (11 000m^2) will be located on historically disturbed open space/scrubland westward of the harbour arterial road, approximately 100 m from the port access control gate. The material laydown area (8 000m^2) will be located on disturbed open space/scrubland north of the 600 Berth quayside, adjacent to the break bulk (ferro manganese) storage facilities. The stringing yard (10 000m^2) is located at the landward extent of the adjacent promontory, perpendicular to the Harbour Arterial Road. A launch way will be constructed with rollers to transfer the pipeline from the stringing yard to the sea. The load out berth is located in the far southern portion of the port, within the 300 Berth Coal Terminal area (Figure 3) (Triplo4, 2022b). Once the pipeline installation is complete, the stringing yard and laydown site will be rehabilitated to the topographical and environmental condition prior to the disturbance during the construction phase of this project (Triplo4, 2022b).

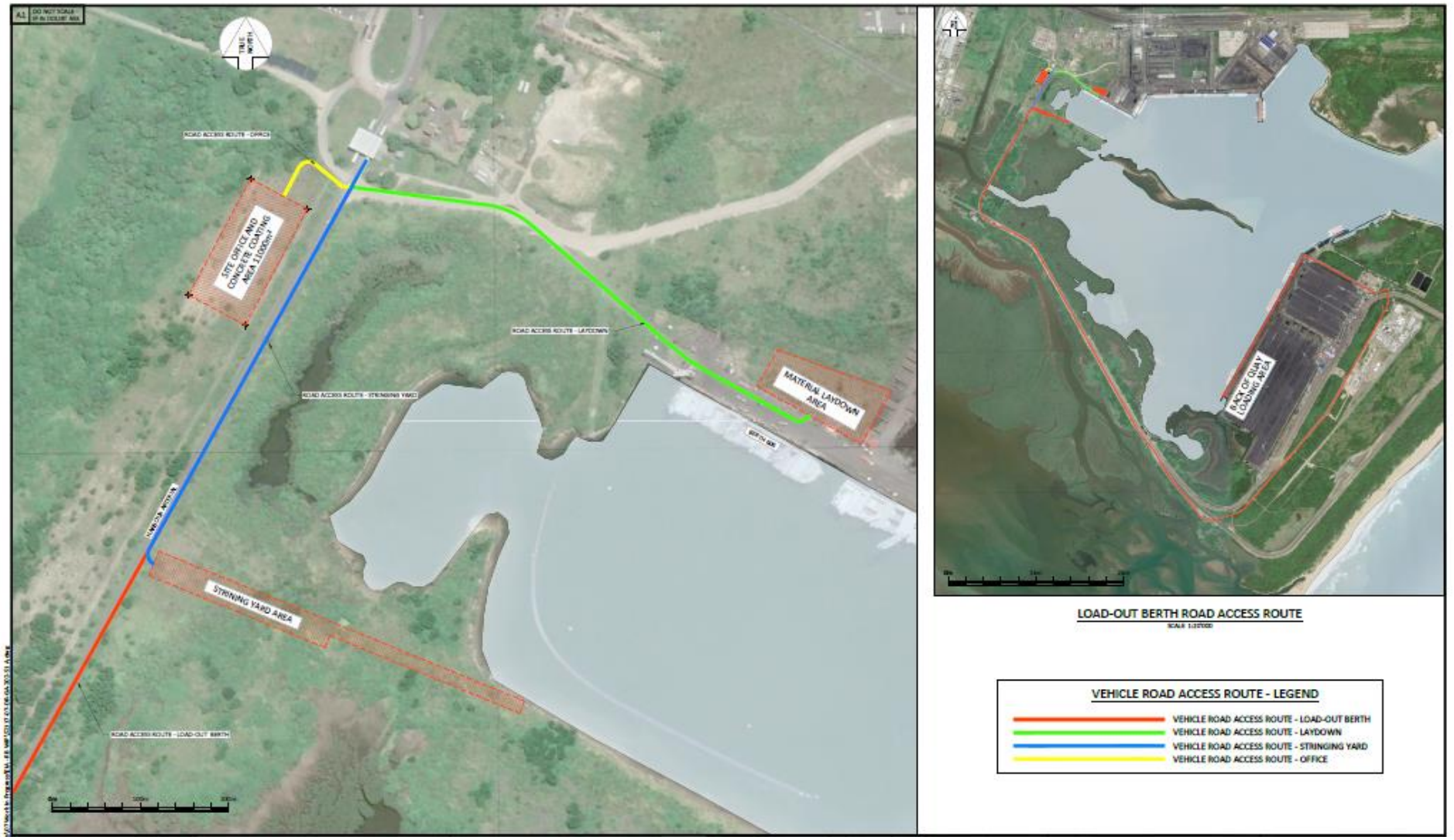

Figure 3. Location of the proposed Gas to Power components within the Port of Richards Bay, showing site office and concrete coating area, materials laydown area, stringing yard area, load out berth, and associated existing access routes (2022)

1.2.5 Transmission Lines

The proposed transmission line will comprise piled monopoles. The span lengths between towers will vary. Average span lengths will be approximately 200 m, however, based on the ground profile shorter spans of less than 100 m or larger spans of greater than 300 m can be constructed (Triplo4, 2022b).

There are two options for the proposed overhead transmission lines. In both route options, the transmission lines will link to the first land-based connection, that is the terminal tower (monopole design), positioned atop the promontory adjacent to the large mangrove stand (Figure 4) and ultimately link into the Eskom National grid via a new switching station (17 542 m²) in the north western corner of the former Bayside Aluminium Smelter site (Figure 4) (Triplo4, 2022b).

Alternative 1 route (preferred route) runs westwards, joins into the existing power servitude through open grassland/scrubland and unchanneled valley bottom wetland, thereafter running north along the existing power servitude along the Manzamnyama Canal, before heading around the northern property boundary of the smelter site to the endpoint at the switching station. The route is the preferred overhead transmission line from the Powerships to the proposed switching station, as it offers a shorter route to the end point, covering approximately 3.6 km with estimated 16 towers (31 m working servitude, 111 600 m^2) (Triplo4, 2022b). In addition, the majority of the Alternative 1 route is located in areas of low to moderate ecological sensitivity, and will not be traversing highly sensitive wetland and swamp forest. The location of the route is in transformed areas or in highly degraded areas adjacent to transformed areas, and a large portion of this alternative follows the route of the existing powerline servitude. The existing servitude will be used for access for the majority of this route, and an additional access / working servitude will be required for the construction of tower(s) in the area between the port and the Manzamynama Canal as well as from the start point to the Harbour Arterial Road (the first four towers) (Triplo4, 2022b).

From the same starting point as Alternative 1, the Alternative 2 route (Figure 4) joins the harbour arterial road servitude, and before the lower Bhizolo Canal, it cuts west passing through the mangroves and across the lower Manzamnyama Canal, traversing the smelter site, before heading north through mixed mangrove and wetland habitat on the western boundary of this site. The route is approximately 4km long, requiring 19 towers (31m working servitude, 124 000m^2) (Triplo4, 2022). This alternative route traverses areas that have been historically transformed, however these areas are still considered highly sensitive due to the unique flora and fauna that resides within these environments. Furthermore, a substantial length of this proposed transmission line route is located within wetlands, and it traverses two Critically Endangered vegetation types, namely Mangrove Forest and Swamp Forest. These have extremely high sensitivity and as such, can be considered as a fatal flaw and therefore this alternative route is not supported (Triplo4, 2022b).

Both options traverse properties owned by the TNPA. Each tower will cover a maximum footprint of 2.75 m x 2.75 m for monopoles, which will necessitate the clearing of vegetation to allow for these structures to be erected (Triplo4, 2022b). The monopoles are to be an Eskom-approved, bird-friendly design.

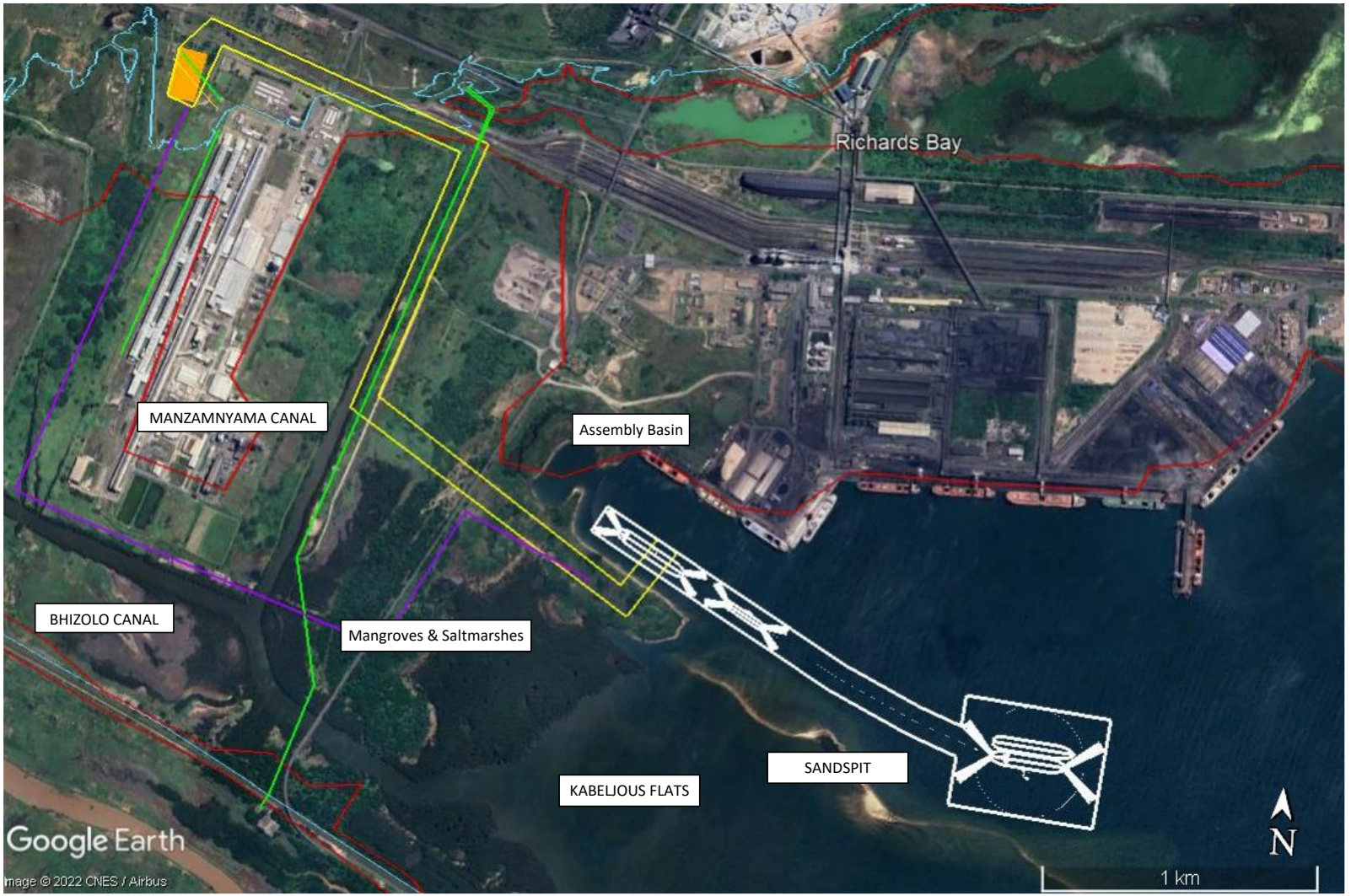

Figure 4. Location of the proposed Gas to Power components within the Port of Richards Bay, indicating the corridor of the alternative 1 transmission line route (yellow), the alternative 2 route (purple), switching station (orange polygon) existing Municipal transmission line (green), relative to the 5 m (red) and 10 m estuarine functional zone (blue) boundaries (Image source: Google Earth, 2022)

1.2.6 Power Generation

A LNG carrier will periodically supply LNG to the FSRU (approximately once every 20 to 30 days) and will temporarily stay (1-2 days) in the location in a ship-to-ship configuration to offload the LNG cargo. The LNG remains on the FSRU and is regassified to natural gas. It has been confirmed that the system is closed and requires no uptake or discharge of water). The natural gas will be transferred to the Powerships through a connecting pipeline as indicated above.

The two Powerships will have a combined total electrical output capacity of 540 MW. The Powerships use reciprocating engines (GEN-SET) that run on gas. These can run in a simple cycle configuration or a combined cycle with steam turbine generators (STG) that utilise exhaust heat from the engine. The on-board high voltage substation then converts the power generated from this. The electricity is evacuated via the 132 kV overhead transmission line that runs to the switching station. The Powerships also have freshwater generators (FW GEN) to produce freshwater for operational purposes.

The operation of the Powerships involves the abstraction of seawater for cooling of the power generators and the subsequent discharge of heated water back into the receiving environment. Total intake/outlet flow rates range from 2.4 to 11.4 m^3/s, and the increase in temperature (ΔT) ranges from 4 to 15°C (PRDW, 2020). For example, based on the modelled scenario detailed in PRDW (2022), in which the reciprocating engines, steam turbine generators and freshwater generators are in use with 100% loads (*i.e.* the worst-case scenario), the estimated total intake/outlet flow rate for both vessels (all generators combined) is 8.49 m^3/s. The increase in temperature is between 10 and 15°C (Table 1). The total flows will be discharged at depth (8 m) through multiple outlets on the vessel hulls. Discharges will operate continuously, and no other constituents, such as biocides or brine[1], will be added to the cooling water discharge.

Table 1. Discharge characterisation for the Powerships moored in the Port of Richards Bay, based on the modelled scenario for the 100% load case (PRDW, 2022)

	Total flow (m^3/s)			Discharge temperature increases (ΔT)		
POWERSHIP	**GEN-SET**	**STG**	**FW GEN**	**GEN-SET**	**STG**	**FW GEN**
Shark	1.25	0.50	0.13	14.0	10.0	15.0
Khan	4.38	2.00	0.23	13.0	12.0	14.0

[1] Total brine discharge is less than 1% of total sea water outlet hence brine outlet is neglected and assumed zero.

1.3 Scope of the avifaunal study

The specialist assessment considered the proposed mooring, deployment and operation of the Powerships and their associated facilities and infrastructure, including natural gas supply, storage and distribution and overhead lines for the transmission of the generated electricity to the transmission connection point.

The scope of the avifaunal impact assessment included:

- Providing a description of the existing baseline conditions of the bird habitats and communities in the vicinity of the FPP facility, and their importance;
- Identifying birds that may be sensitive to the construction and operation of the FPP;
- Providing an assessment of the potential impacts of the construction and operation of the FPP on these birds;
- Providing recommendations on how best to avoid, minimise and mitigate identified impacts on avifauna; and
- Providing recommendations for environmental monitoring.

1.4 Study area

The development is located in the western (inland) side of the Port of Richards Bay, with transmission lines connecting to the existing Bayside substation approximately 3 km away from the Port. The study thus focuses on the birds of the Richards Bay Estuary and immediate surrounds.

The Richards Bay Estuary was created when the original uMhlathuze estuarine bay area was divided into two by the construction of the 4 km long causeway in 1976 in order to create the harbour in the location of the original estuary mouth. Since its construction the Port has gone through an extensive transformation with a number of expansion and industrial projects. The rivers are canalised and there has been substantial reclamation of land and subsequent loss of estuarine habitat. Without significant freshwater inflow, the Richards Bay estuary is now classified as an estuarine bay, which is marine dominated.

The uMhlathuze Estuary is fed by the uMhlathuze River, and a new mouth was created for what has now become a predominantly open estuary. While originally connected via a channel under the causeway, there is no longer any hydrological connection between the two estuaries.

While the Richards Bay Estuary is dominated by a working harbour, most of the uMhlathuze estuary has been set aside as a sanctuary area, the Richards Bay Game Reserve. The protected area, often referred to as the Sanctuary, is an Important Bird Area (IBA). Despite being a working harbour, the Richards Bay Estuary also contains significant areas of bird habitat, including a long sandspit and extensive mudflats known as the Kabeljou flats, recognised as important for waders and terns (Cyrus & Vivier 2014), and the eChwebeni Natural Heritage Site of conservation significance and consisting of mud flats and an ecologically sensitive mangrove area providing suitable breeding environments for numerous bird species (Figure 5). These areas are described in more detail in Chapter 2.

Because of their proximity, this study also considers the avifauna of the neighbouring waterbodies – Thulazihleka Pan (previously included as part of the IBA; BirdLife SA) and Lake Mzingazi to the northeast, Lake Cubhu to the south/southwest, and Lake Nsezi to the west (Figure 6). All of these are within 10 km of the proposed development.

Figure 5. Map of the core study area (delineated by the yellow line), showing the location of the uMhlatuze estuary to the south of the causeway, the Richard's Bay estuary north of the causeway, and the locations of the sand spit, Kabeljou flats, Thulazihleka Pan and eChwebeni National Heritage Site in relation to the location of the Powerships (within red box).

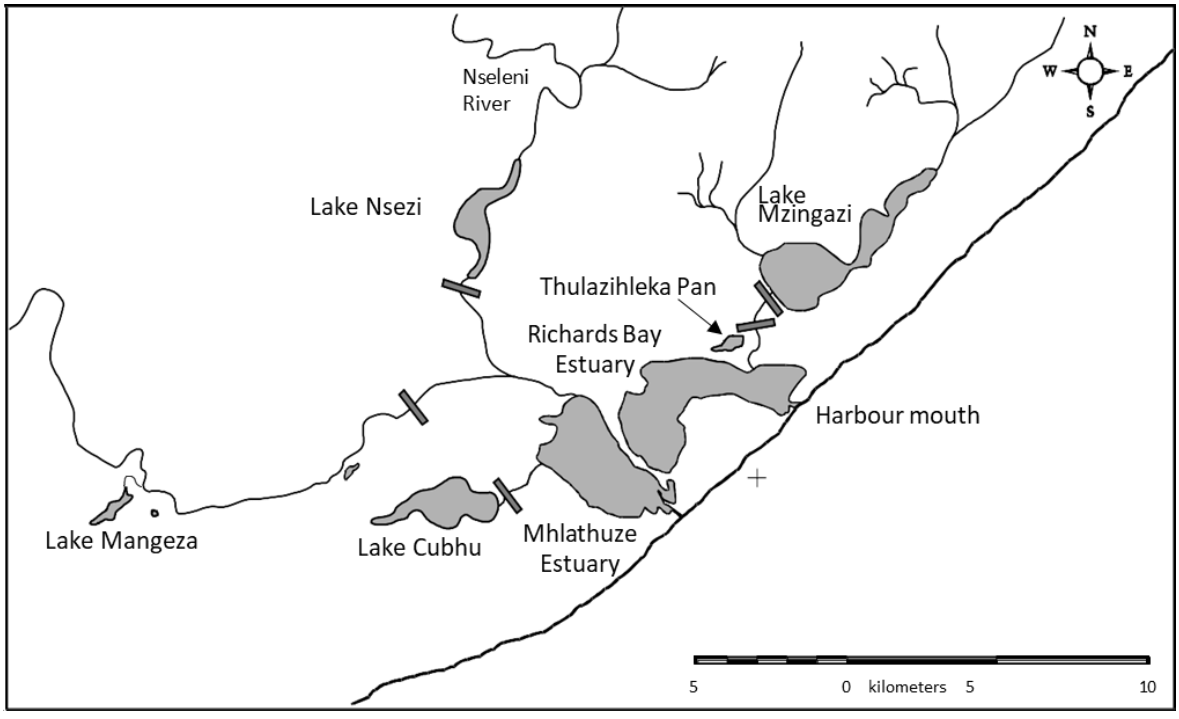

Figure 6. Sketch map showing the location of the main waterbodies in relation to the Richards Bay Estuary (modified from Weerts & Cyrus 2001).

1.5 Data and methods

1.5.1 Overview

The baseline description summarises available information on the avifauna of the project area based on a review of the literature, existing bird lists and count data for the area, the estuaries and the surrounding wetlands, and fieldwork. Information on the proposed development was supplied by the client. The impact assessment was carried out using a scoring method devised by Triplo4.

1.5.2 Existing bird data

The following waterbird count data exist for the Richards Bay - uMhlathuze Estuary systems (counted jointly):

- December 1980 (Ryan et al. 1986),
- Series of mid-summer and mid-winter counts conducted under the Co-ordinated Waterbird Counts (CWAC) monitoring programme during 1993-2012,
- summer count by David Allan in 2009,
- summer count by Digby Cyrus in 2020.

The full extent of the CWAC counting area is shown in Figure 7. The amount of this area covered in each count varies from 20% to 80% of the shoreline (typically 40-60%), with no particular trend over time from 1993 to 2004. Four *ad hoc* CWAC counts were added in summer 2008 (covering 50%) and in winter 2010, winter 2011 and April 2012, but only covering 10% of the shore area. It is assumed that the last three counts did not include the uMhlathuze Estuary, possibly due to a deterioration in personal safety and/or difficulty of access. Subsequent counts conducted for impact assessments have also been restricted to the Port of Richards Bay.

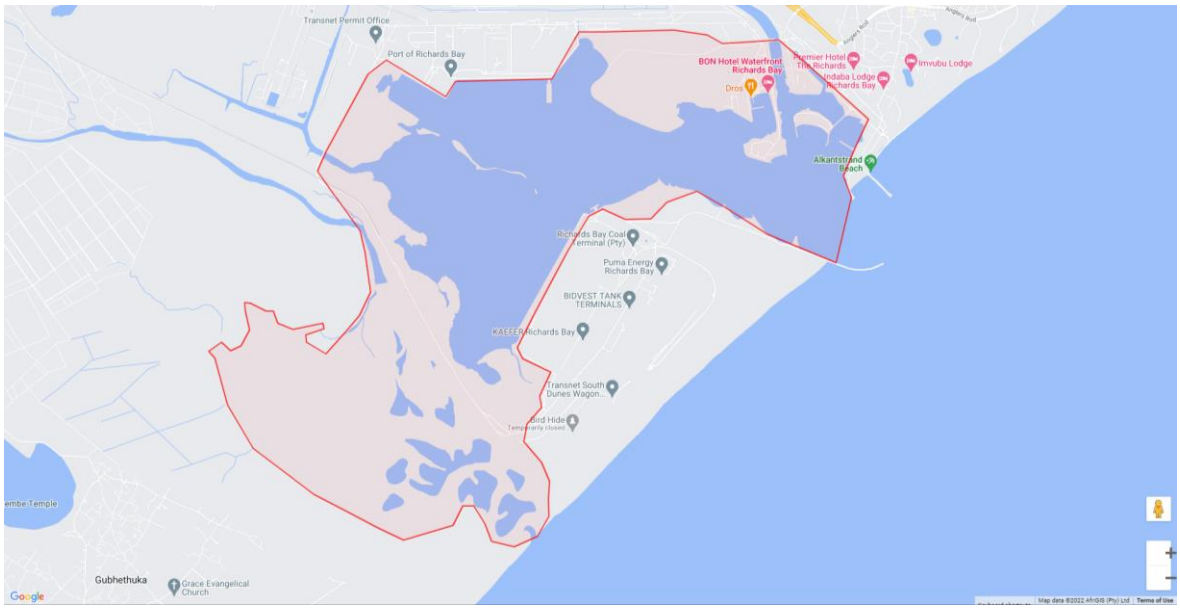

Figure 7. CWAC counting area (https://cwac/birdmap.africa)

A list of bird species observed in and around the study area was extracted from the Southern African Bird Atlas Projects (SABAP) downloaded from the Animal Demography Unit website (http://sabap2.adu.org.za/index.php) for the relevant "pentads" of 5' x 5'. These data cover

observations for the period 2007 to 2022. Species of Conservation Concern were determined using the Birdlife South Africa Regional and Global Red List Categorisations (Birdlife SA 2022) based on the IUCN Red List (2020) and the South African Red Data Book of Birds (Taylor et al. 2015).

1.5.3 Fieldwork

The following site visits were made:

- Incidental notes were made by Leigh-Ann de Wet on birds seen during the terrestrial ecological field survey on the 30th of September 2020 in the area outside of the Transnet port and on the 4th of February 2021 inside of the Transnet port;
- An avifaunal survey was carried out on the 10th and 11th of February 2021 by Leigh-Ann de Wet, in which a list of bird species seen at several point locations around the development area was compiled;
- Boat-based counts of the Richards Bay estuary at low tide in April 2022, July 2022 and August 2022, plus a record of incidental sightings around the study area, by Leigh-Ann de Wet and Themba Mthembu of Zululand Birding and Ecotours; and
- Boat-based count of the Richards Bay estuary at low tide in September 2022 by Barry Clark, divided into 10 counting sections.
- In addition, further perspective on the nature of the study area was obtained by inspection of photographs taken from a drone (supplied by Liebenconsult Pty Ltd).

The land-based assessment was designed to assess each of the avifauna habitats present on the terrestrial areas of the site surveying the transmission line and other associated infrastructure within the limits of time and access (with some areas of the site covered in impenetrable vegetation). Surveys were conducted throughout the day, with a focus on diverse habitat in the early morning and early evening. Sampling comprised of the following methods:

- **Incidental records.** These are records of bird species encountered within the general site and surrounding area when not part of a particular survey.
- **Point samples**. These samples were located in areas of avifaunal habitat. Points included samples as short as 10 minutes and as long as 2.5hours depending on the rate at which new species were recorded. All species were recorded for the site locality using both sightings and sound. If no new species for the habitat were recorded within 5 minutes, the point sample was stopped. Notes and identifications were made of any birds within sight flying at heights and distances of up to 1km. Point samples included all habitats including shore and mudflat habitats as well as the sandspit area.
- **Driven transects**. As part of the survey, the site access roads were driven slowly (at a maximum speed of 10km/hr) and all bird species seen and herd recorded throughout the site in this manner.

The water-based assessment focused on the estuarine habitats, and involved making observations from a boat at low tide. This entailed travelling around the Richards's Bay Estuary and identifying and counting all birds seen within this area including sea and shore birds as well as birds seen and heard in vegetation alongside the water's edge. CWAC survey methodology was employed (see at http://cwac.birdmap.africa/instructions_protocol.php). Land-based birds were also counted whether seen or heard to be added to the incidentals lists. Access to the uMhlathuze estuary was

attempted by proved to be impossible. Note that the counts were conducted between April and September, and include winter data but not a summer count.

1.5.4 Environmental Impact Assessment Methodology

The impact rating methodology applied was guided by that specified by Triplo4 and adapted by Coastwise and Anchor Environmental (Table 2). This assessment process consists of three steps: 1) predicting the type of disturbance (area, duration and intensity of impacts) and the sensitivity of the receptors, 2) indicating the likelihood of the disturbance occurring and then 3) determining the significance of the impacts of this disturbance. The significance of each impact was determined pre-and, where required, post-mitigation, i.e., before and then after implementing measures designed to avoid or reduce the severity of impacts. The impact assessment criteria have been modified to apply to the avifauna assessment specifically.

Further to the methodology outlined, here, impacts are also considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in the table below. Depending on the data available, a higher level of confidence may be attached to the assessment of some impacts than others. For example, if the assessment is based on extrapolated data, this may reduce the confidence level to low, noting that further ground-truthing is required to improve this.

Table 2. Impact assessment criteria and scoring used in this avifauna study.

Consequence	
Severity the degree to which the project affects or changes the environment	1 - Site-specific and wider natural functions and processes are not altered 2 - Site-specific and wider natural processes and functions are slightly altered 3 - Site-specific and wider natural processes and/or functions continue albeit in a modified way (general integrity maintained) 4 – Site-specific and wider natural processes and/or functions are altered to a large degree/temporarily cease 5 - Site-specific and wider natural functions and/or processes are completely altered/cease
Duration a measure of the lifetime that the impact will be present	1 – up to 1 year 2 – 1 to 2 years 3 – 2 to 20 years 4 – Beyond 20 years 5 – Permanent
Spatial Scale the extent / size of the area that may be affected	1 – Project footprint 2 – Within the broader EFZ 3 – Beyond the EFZ, 4 – Beyond uMhlathuze Municipality 5 – Affecting KZN, SA, or Global
Overall Consequence = (Severity + Duration + Extent) / 3	
Likelihood	
Frequency how often the impact will occur	1 – Once a year, or once or more during operation, or once off 2 – Once or more in 6 months 3 – Once or more a month 4 – Once or more a week 5 – Daily or hourly
Probability the likelihood or the chances that the impact will occur	1 – < 5% chance of occurring (improbable) 2 – >5 - 25% chance of occurring (possible) 3 – >25% - 50% chance of occurring (probable) 4 – 50% - 75% (highly probable) 5 – >75% chance of occurring (definite)

Overall Likelihood = (Frequency + Probability) / 2	
Overall Environmental Significance = Overall Consequence X Overall Likelihood	
Overall Environmental Significance:	
0 - 2.9	Very Low
3 - 4.9	Low
5 - 6.9	Medium – Low
7 - 8.9	Medium
9 - 10.9	Medium – High
11 and above	High
Reversibility	
Reversibility degree to which the impact can be reversed	Reversible – the impact is reversible Irreversible – the impact is not reversible
Irreplaceable Loss of Resources	
Irreplaceable Loss of Resources degree to which the loss of resources can be replaced	Yes – the impact causes a loss of resources that cannot be replaced No – the impact does not cause a loss of resources that cannot be replaced
Fatal Flaw	
Fatal Flaw degree to which the impact is a fatal flaw	Yes – the impact results in a fatal flaw No – the impact does not result in a fatal flaw
Confidence (from Anchor methodology)	
Status of impact	+ve (beneficial) or – ve (cost)
Confidence of assessment	Low, Medium or High

1.6 Assumptions and limitations

This assessment is based on the description of the project given in section 1.2, as supplied by the developer. Our understanding of the avifauna of the study area is based mainly on desktop information in conjunction with limited fieldwork. Not all original count data/reports are available online, notably Allan 2009 and Cyrus 2020, and there are no recent counts of the uMhlathuze Estuary. Thus, the assessment is done in the absence of recent comprehensive summer count data. There is no precedent for this type of development in the country, and very little, if any, research on the impacts of ships, noise and powerlines in estuaries.

The scope of the study did not extend to the assessment of the broader impacts of investing in energy from fossil fuels. Increased use of fossil fuels will contribute to the devastating impacts of climate change on the biosphere at global scale. Birds are already being shown to be suffering major impacts of climate change, resulting in shifting ranges and population declines. Some of the affected species are part of the avifauna of the study area.

2 AVIFAUNAL BASELINE DESCRIPTION

2.1 Overview

The Richards Bay and uMhlathuze Estuaries have long been recognised as important in terms of the diversity and abundance of bird populations that they support, providing extensive and varied habitat for waterbirds. Indeed, out of the 42 South African estuaries with the highest numbers of birds, the combined Richards Bay - uMhlathuze Estuary was ranked top in terms of species richness (numbers of species recorded, not counting vagrant species), 11th in terms of total numbers of birds, and third overall in terms of conservation importance for estuarine waterbirds in South Africa (Turpie, 1995).

The uMhlathuze Estuary falls partly within the Richards Bay Game Reserve, which is recognised as an important bird area. The Richards Bay Game Reserve is a proclaimed Protected Area in terms of the National Environmental Management: Protected Areas Act (Act No. 57 of 2003). The reserve is approximately 1290 ha and is formally recognised as a nature reserve (Category IV, Site Code 13307) by the International Union for Conservation of Nature.

While the status of the Richards Bay and uMhlathuze Estuaries is fairly well documented, the overall importance of the broader set of wetlands within the combined estuarine functional zone (EFZ) of these two estuaries further raises the conservation significance of the area. Lake Mzingazi, in particular, has been shown to be one of the most important wetland areas along the KwaZulu-Natal coastline (Cyrus 2001).

The diverse habitats, water bird populations, and species of concern and the current status of the system in terms of its importance for waterbirds are discussed in more detail in the following sections.

2.2 Bird habitats

The project area is surrounded by a range of bird habitats, primarily estuarine, but also freshwater wetlands to the north and south of the estuaries, marine and coastal habitats to the east of the estuaries and limited terrestrial habitats inland of this. Habitats are only briefly dealt with for context, since the development does not directly impact on habitat apart from open water area and limited terrestrial area.

2.2.1 Estuarine habitats

Both the uMhlathuze and Richards Bay Estuaries are large systems, and therefore contain both a high diversity of habitats and significant areas of most of these. The two estuaries contain seven of the ten different types of estuarine habitats that are recognised in South Africa (Table 3). Some of these are depicted in Figure 8. Unfortunately, most of the bird habitats close to the Port are currently covered in a layer of coal dust due to the recent dramatic increase in the use of the Multipurpose Terminal instead of the Coal Terminal for offloading coal and the prevailing winds that blow it into the estuary. This is likely detrimental both to the vegetation and to the birds feeding on intertidal habitats.

2.2.1.1 *Mangroves and swamp forest*

Some 25% of the area is under mangrove forest, with the majority of this being in the uMhlathuze. Mangroves are situated in the north, west, and south-west portions of the Richards Bay Estuary. The mangrove forests shelter many wader species, especially at high tide, and also make an important contribution to the overall productivity and hence numbers of birds that the estuaries support. Mangroves support large numbers of invertebrate and fish species which in turn support a number of piscivorous and benthic feeding waterbird species. Swamp forests, which tend to be confined to fresher waters at the head of estuaries, are relatively limited in the study area and provide additional roosting habitat for some waterbirds.

Table 3. Area (ha) of different types of estuarine habitats in the uMhlathuze and Richards Bay estuaries (source: Janine Adams estuary vegetation database, 2018)

Estuarine habitats	uMhlathuze	Richards Bay	Combined
Intertidal salt marsh	60.0	69.9	129.9
Zostera beds	28.5	-	28.5
Reeds and sedges	205.0	309.0	514.0
Mangroves	761.5	171.0	932.5
Sand/mud banks	90.0	531.0	621.0
Open water	679.0	869.0	1 548.0
Swamp forest	-	16.0	16.0
Total estuary area	**1 824.0**	**1 965.9**	**3 789.9**

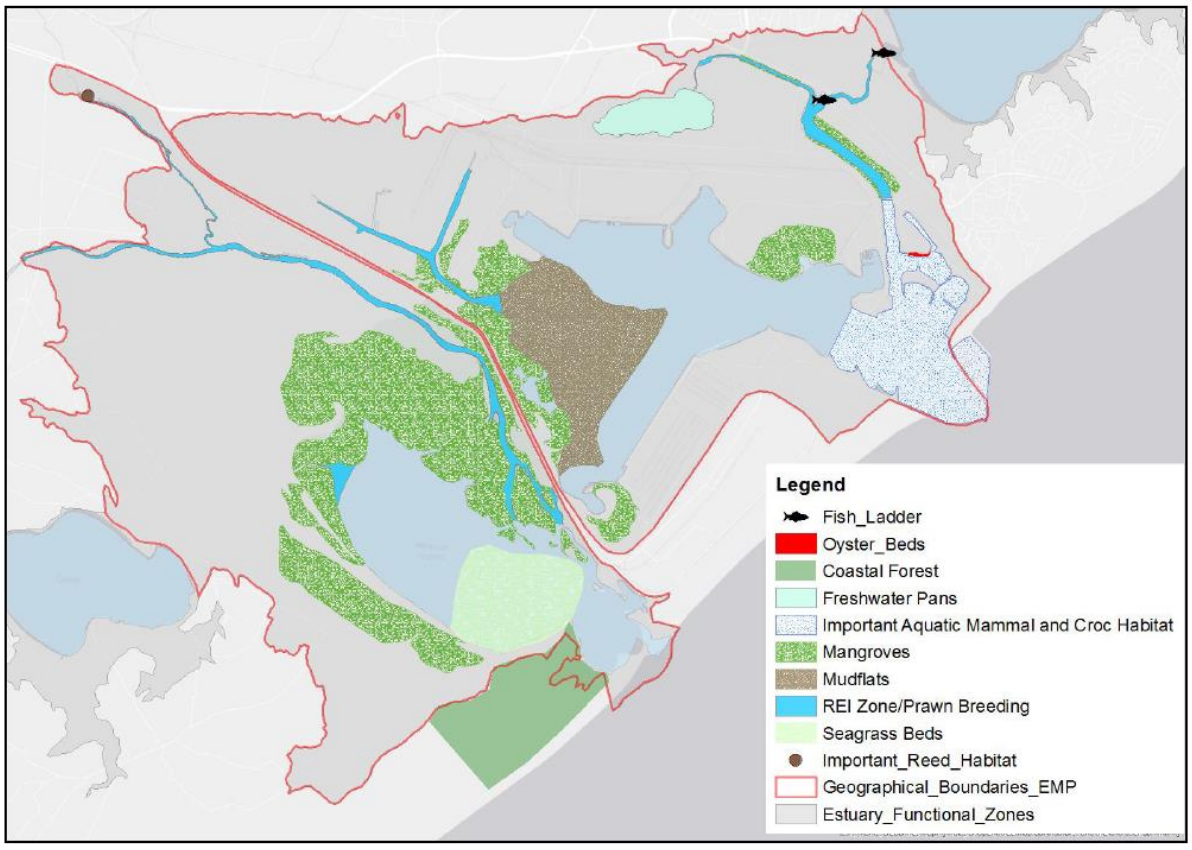

Figure 8. Identified estuarine habitats within the geographic boundaries of the uMhlathuze and Richards Bay estuaries that are used by waterbirds. Source: DEA 2017.

2.2.1.2 Saltmarshes

Intertidal saltmarshes also cover a significant area, and although structurally very different, perform similar roles to mangroves for birds (foraging area for some species, high tide roosting areas for many, and overall system productivity).

2.2.1.3 Sandflats, mudflats and Zostera beds

About 16% of the area is made up of bare intertidal sand and mudbanks, with majority of this in the Richards Bay Estuary, where they make up 27% of the estuary. These are particularly important as feeding areas for waders, as are the intertidal seagrass beds (*Zostera capensis*), mainly found in the uMhlathuze Estuary. They are also important as roosting areas, particularly for terns and gulls.

The intertidal mudflats (referred to Kabeljou flats; Cyrus and Vivier 2014) to the south-west of the sand spit in the Richards Bay Estuary are important feeding grounds for waders. Although not recorded in the statistics above, this area also has established seagrass beds (*Zostera capensis*). The sandspit which separates the intertidal flats from proposed berthing area of the Powership and FSRU in Richards Bay Port is also an important roosting area for waterbirds, particularly waders and terns. Sandflats are also prevalent on shoreline edges in undeveloped areas of the Richards Bay Estuary.

2.2.1.4 Reed and sedge marshes

Reeds and sedges also make up a significant amount of habitat in the two estuaries, covering 14% of their total area. These tend to be found in the upper parts of the systems where salinity is lower and provide habitat for a number of the shier and skulking species, such as rallids and herons.

2.2.1.5 Open water

Open water makes up some 41% of the combined area, and ranges from a low salinity habitat at the head of the estuaries to sea water at the mouth of the estuary. The lower salinity areas, along with their fringing vegetation, are important for a variety of ducks, while all the open water areas support a range of piscivorous species, such as kingfishers, cormorants, herons, pelicans and terns. Lower salinity areas are more widespread in the uMhlatuze Estuary due to the inflowing uMhlatuze River. Due to the limited freshwater inputs to the Richards Bay Estuary, its salinity levels are generally similar to that of the adjacent marine environment, ranging between 34 PSU and 36 PSU throughout the year (Jerling 2008, CSIR 2018).

2.2.2 Freshwater wetlands

One freshwater pan and two freshwater lakes occur within the 5-metre contour line that defines the combined Richards Bay – uMhlathuze estuarine functional zone. The Thulazihleka Pan is about 2.5 km from the proposed berthing area for the project, lying just beyond the Port's multipurpose terminal. This is a relatively shallow open water ecosystem that is fringed with emergent vegetation. However, the system has become polluted with nutrient inputs and has become eutrophic or hypertrophic, characterised by dense algal blooms and lack of water clarity. Lake Cubhu and Mzingazi are much larger lakes (450 ha and 1216 ha, respectively), but also have some water quality challenges (Cyrus 2001). In addition, the construction of weirs to increase their storage capacity has reduced of the availability of fringing marshes, swamp forest and exposed shoreline, and has altered the fish fauna (Cyrus 2001).

2.2.3 Offshore marine environment

The offshore marine environment is located within 5 km of the proposed berthing area. Many of cormorants, gulls, and terns recorded on the estuary are birds that typically forage in the marine environment and use the estuary for roosting, though some also feed in the estuary.

2.2.4 Terrestrial vegetation

The study area lies within the Maputaland Coastal Belt (Mucina & Rutherford, 2018), but most of the terrestrial area outside the estuaries and wetlands is developed or disturbed, with high levels of human activity in the area. Furthermore, the terrestrial extent of the transmission line footprint is limited to a small area (see Figure 5) and there is very sparse terrestrial bird habitat elsewhere in the project area of influence.

2.3 Bird species and numbers

A total of 106 bird species were recorded in and around the study area in habitats present within the footprint of the proposed development in the first survey, of which 100 were bird species associated with the water, sand and mudflats and associated adjacent terrestrial habitat. The following sections provide descriptions of the birds of estuaries, freshwater wetlands and the terrestrial habitats of the study area.

2.3.1 Estuary waterbirds

This assessment focuses mainly on waterbirds as these are the birds most likely to be impacted by the proposed Powership project. Waterbirds are species that specifically tend to use aquatic environments for at least part of their lifecycle, for activities such as feeding, breeding or roosting. In particular this assessment considers non-passerine estuarine waterbirds excluding vagrant, extralimital exotic, domesticated species and hybrids.

Excluding exotic and vagrant species, some 91 non-passerine waterbird species have been recorded in seasonal counts of the Richards Bay and uMhlathuze Estuaries, belonging to ten different taxonomic orders (Table 4). Of these, 70 species are South African residents, and 21 species are palearctic migrants. Note that vagrant species are extremely rare and, together with exotic species, are of no conservation importance.

The order Charadriiformes (waders, gulls and terns) account for 42% of the species recorded, with most of these being wader species (Table 4). Two thirds of the 28 wader species are regular migrants from the Palaearctic region of Eurasia. Apart from these and two migratory tern species, the remaining species are species that breed in southern Africa, some making local or regional movements in response to rainfall. Among the resident species, the order Ciconiiformes (herons, egrets, ibises, storks, openbills) and Anseriformes (ducks and geese) form the most diverse groups on the estuary, but most waterbird orders are well represented.

The bird species have been grouped into seven functional groups on the basis of a combination of taxonomic and trophic characteristics. These groups are described in more detail in Table 5.

Table 4. Taxonomic composition of the waterbirds recorded in the estuarine habitats of the study area.

Common groupings	Order	SA Resident species	Palearctic migrant species	Total
Waterfowl	Podicipediformes (Grebes)	1	-	**1**
	Anseriformes (Ducks, geese)	11	-	**11**
	Gruiformes (Rails, crakes, gallinules, coots)	7	-	**7**
Cormorants, darters, pelicans	Pelecaniformes (Cormorants, darters, pelicans)	6	-	**6**
Wading birds	Ciconiiformes (Herons, egrets, ibises, storks, openbill)	18	-	**18**
	Phoenicopteriformes (Flamingos)	2	-	**2**
Waders, gulls, terns	Charadriiformes: Waders	9	19	**28**
	Charadriiformes: Gulls	2	-	**2**
	Charadriiformes: Terns	6	2	**8**
Kingfishers	Alcediniformes (Kingfishers)	4	-	**4**
Birds of prey	Falconiformes (Birds of prey)	4	-	**4**
	Strigiformes (Owls)	-	-	**-**
Total		**70**	**21**	**91**

Table 5. Description of each functional bird group found in the project area of influence and their defining features.

Bird group	Defining features, typical/dominant species
Cormorants, darters & pelicans	Cormorants, darters and pelicans are common as a group, but are dominated by the marine cormorants feed at sea. African Darters are relatively uncommon and are more typical of lower salinities and habitats with emergent vegetation.
Wading birds	This group comprises the egrets, herons, ibises, flamingos and storks. Loosely termed piscivores, their diet varies in plasticity, with fish usually dominating, but often also includes other vertebrates, such as frogs, and invertebrates. The ibises were included in this group, though their diet mainly comprises invertebrates. They tend to be tolerant of a wide range of salinities. Wading piscivores prefer shallow water up to a certain species dependant wading depth.
Waterfowl	This group includes waterfowl in the orders Podicipediformes (Grebes), Anseriformes (Ducks, geese) and Gruiformes (Rails, crakes, gallinules, and coots). Some waterfowl have been known to occur in fairly large numbers here but in recent years numbers have been low. They are not as dense as they might be in freshwater wetland habitats. Piscivorous waterfowl comprises the Grebes. Herbivorous waterfowl are dominated by species that tend to occur in lower salinity or freshwater habitats, such as the Southern Pochard and the rallids, and are therefore not common. The omnivorous waterfowl comprises ducks which eat a mixture of plant material and invertebrate food such as small crustaceans. Species include the Yellow-billed Duck, Cape Teal, Red-billed Teal and Cape Shoveller. Although varying in tolerance, these species are fairly tolerant of more saline conditions.
Waders	This group includes all the waders in the order Charadriiformes (e.g. Greenshank, Curlew Sandpiper). Waders feed on invertebrates that mainly live in intertidal areas, at low tide, both by day and night. They feed on a whole range of crustaceans, polychaete worms and gastropods, and adapting their foraging techniques to suit the type of prey available. Waders require undisturbed sandflats in order to feed at low tide and undisturbed roosting sites at high tide.
Gulls & terns	This group comprises the rest of the Charadriiformes and includes all the gull and tern species using the Port and estuary. These species are primarily piscivorous, but also take invertebrates. Gulls and terns are common throughout the area. Although their diversity is relatively low, they make up for this in overall biomass, and form an important group.

Kingfishers	Kingfishers prefer areas of open water with overhanging vegetation. They are largely piscivorous but also take other small prey. The rare Mangrove Kingfisher has been recorded here.
Birds of prey	This group are not confined to a diet of fish, but also take other vertebrates and invertebrates. Species in this group include African Fish Eagle, Osprey and African Marsh Harrier.

The earliest count record for the study area was by Ryan et al. (1986), who recorded 56 species of waterbirds on the Richards Bay-uMhlathuze estuaries in January 1981. These included four Crab Plovers, a species that has not been recorded since, but whose range may have extended this far south at the time. An average of 48 (48.5 ± 13.71) and 34 (34.4 ± 13.55) non-passerine waterbird species were recorded in the project area of influence in summer and winter CWAC counts, respectively, from 1993 to 2012 (Figure 9). The highest summer count was 69 species in 1995 and the highest winter count was 56 species in 2001.

The last five counts conducted over the period 2020-2022 have recorded an average of just 14 species with the highest count being 18 species in April 2022. These are similar to the numbers recorded during the last CWAC counts recorded in 2012 (Figure 9). The range of months counted are not sufficient to show seasonal trends.

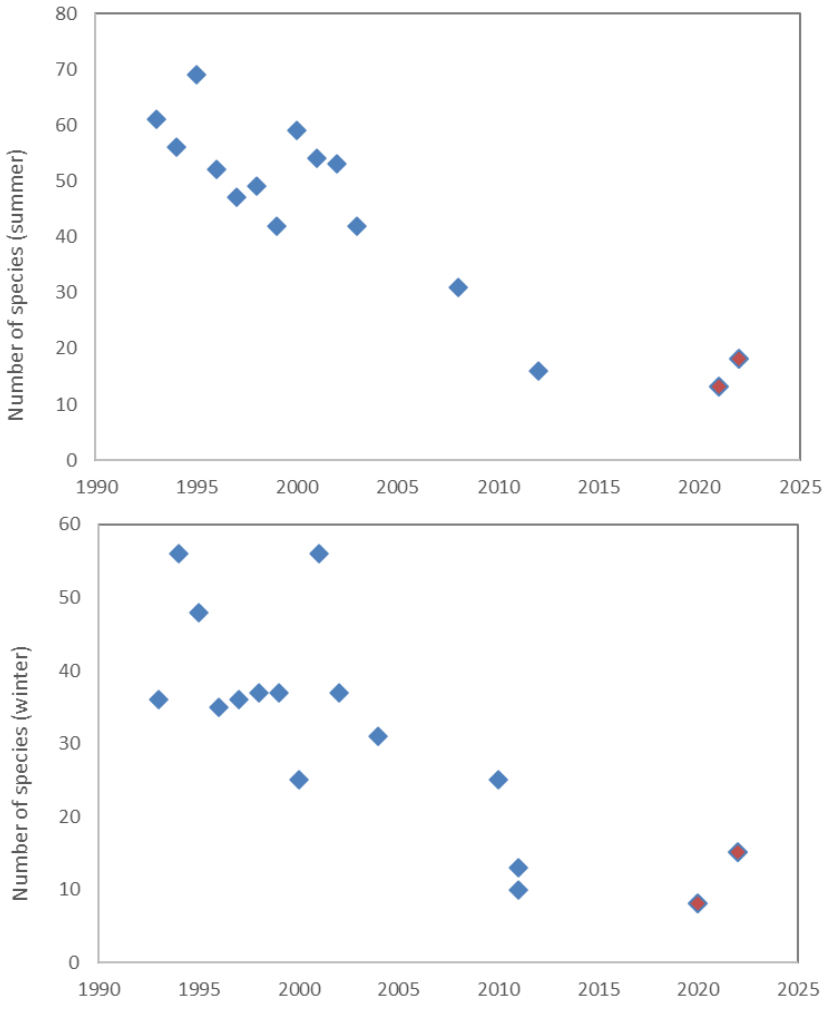

Figure 9. Number of non-passerine waterbird species recorded in CWAC counts and counts conducted as part of project monitoring of the port and estuary. Source: CWAC data (blue fill) and project monitoring data (red fill).

The relative contribution of each bird group to the bird numbers in the project area differs substantially over the summer and winter months, due to the prevalence of migratory birds arriving in summer (Figure 10). Waders account for a third of the birds on the estuary during summer, with most being migratory. Other numerically important groups during summer are the gulls and terns. Avifaunal composition changes significantly in winter, with a far more even representation of taxonomic groups. Kingfishers and birds of prey remain relatively stable throughout the year with little seasonal difference.

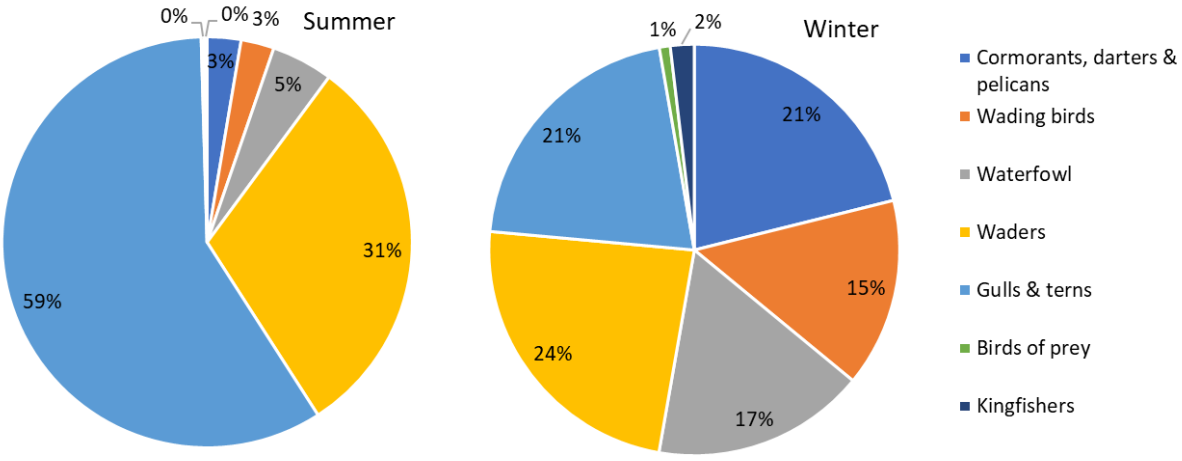

Figure 10. Composition of the birds in the project area of influence during summer and winter (1993-2022).

Ryan et al. (1986) counted a total of 9723 waterbirds in January 1981. In the later CWAC counts, an average of 3434 and 689 non-passerine waterbirds were recorded in summer and winter CWAC counts (1993-2012), respectively. An average of just 215 birds have been recorded during the more recent counts undertaken in the project area (2020-2022). Average numbers of each species are given in Table 6.

Table 6. Non-passerine waterbird species recorded in the project area of influence (Ryan et al. (1986) for 1980 count, CWAC 1993-2012, Monitoring 2020-2022 in Apr 21, Apr 22, Jul 22, Aug 22 and Sep 22), giving common names, and the average and maximum numbers recorded. Exotic, vagrant and extralimital species are excluded.

	1980	CWAC data (1993-2012)				Monitoring data (2020-2022)	
	Summer	Summer		Winter		All months	All months
Common Name	Count	Ave	Max	Ave	Max	Ave	Max
Grebe, Little	0	11.5	82	21.1	90	0.0	0
Pelican, Great White	46	34.4	140	31.9	259	14.7	88
Pelican, Pink-backed	17	4.0	18	6.7	35	0.5	3
Cormorant, White-breasted	0	9.0	40	11.1	35	0.2	1
Cormorant, Cape	0	0.0	0	0.9	7	0.0	0
Cormorant, Reed	0	38.4	342	86.1	383	0.2	1
Darter, African	1	5.7	45	8.9	55	0.0	0
Heron, Grey	5	12.8	40	9.0	27	1.2	2
Heron, Black-headed	2	0.7	4	1.4	7	0.0	0

	1980	CWAC data (1993-2012)				Monitoring data (2020-2022)	
	Summer	Summer		Winter		All months	All months
Common Name	Count	Ave	Max	Ave	Max	Ave	Max
Heron, Goliath	6	2.3	5	2.1	6	0.2	1
Heron, Purple	1	3.8	29	2.3	9	0.0	0
Egret, Great	1	3.7	18	2.6	11	0.2	1
Egret, Little	19	9.8	47	16.9	64	2.0	4
Egret, Yellow-billed	0	0.5	3	0.1	1	0.0	0
Heron, Black	0	0.0	0	0.0	0	0.0	0
Egret, Cattle	0	4.2	54	4.5	21	0.0	0
Heron, Squacco	0	0.1	1	0.6	4	0.0	0
Heron, Green-backed	0	0.2	1	0.9	6	0.0	0
Night-Heron, Black-crowned	0	0.0	0	0.0	0	0.3	2
Hamerkop, Hamerkop	0	0.6	4	0.6	5	0.0	0
Stork, Saddlebilled	1	0.0	0	0.0	0	0.0	0
Stork, Woolly-necked	1	28.5	120	34.9	183	10.8	38
Openbill, African	0	0.0	0	0.9	12	0.0	0
Stork, Yellow-billed	0	1.9	15	1.1	11	0.0	0
Ibis, African Sacred	1	3.8	22	8.6	43	0.0	0
Ibis, Glossy	0	1.8	16	0.4	2	0.0	0
Spoonbill, African	11	13.8	61	2.5	10	0.0	0
Flamingo, Greater	9	1.2	10	13.1	97	0.0	0
Flamingo, Lesser	209	0.0	0	0.1	1	0.0	0
Duck, White-faced	10	2.2	13	13.2	157	0.0	0
Goose, Egyptian	0	2.8	15	2.9	12	2.3	12
Duck, Yellow-billed	3	73.6	326	29.9	190	0.0	0
Teal, Cape	2	1.0	11	1.3	10	0.0	0
Teal, Hottentot	0	21.6	110	3.2	33	0.0	0
Teal, Red-billed	0	24.6	228	1.1	11	0.0	0
Shoveler, Cape	0	0.5	2	0.9	6	0.0	0
Pochard, Southern	0	2.6	30	0.1	2	0.0	0
Pygmy-Goose, African	0	0.2	2	8.2	52	0.0	0
Duck, Knob-billed	0	0.3	4	0.0	0	0.0	0
Goose, Spur-winged	9	3.2	10	2.9	14	0.5	3
Vulture, Palm-nut	0	0.2	2	0.0	0	0.0	0
Fish-eagle, African	3	3.8	8	4.2	9	2.2	4
Marsh-harrier, African	1	0.9	6	0.5	2	0.0	0
Osprey, Osprey	0	3.3	6	1.2	3	2.0	3
Crane, Grey Crowned	0	0.8	3	0.8	4	0.0	0
Rail, African	0	0.0	0	0.3	2	0.0	0
Crake, Black	0	2.7	11	4.9	23	0.0	0
Flufftail, Red-chested	0	0.0	0	0.1	1	0.0	0
Swamphen, African Purple	0	4.3	30	5.8	26	0.0	0
Moorhen, Common	0	7.9	39	13.5	42	0.0	0
Coot, Red-knobbed	0	6.6	32	5.5	16	0.0	0
Jacana, African	0	5.0	18	17.3	92	0.0	0
Jacana, Lesser	0	0.2	1	0.2	2	0.0	0

	1980	CWAC data (1993-2012)				Monitoring data (2020-2022)	
	Summer	Summer		Winter		All months	All months
Common Name	Count	Ave	Max	Ave	Max	Ave	Max
Plover, Common Ringed	1092	59.3	357	0.1	1	0.2	1
Plover, White-fronted	116	41.1	221	44.1	186	13.0	26
Plover, Chestnut-banded	0	0.0	0	0.5	7	0.0	0
Plover, Kittlitz's	3	0.6	6	1.4	12	0.0	0
Plover, Three-banded	2	0.7	2	0.9	6	0.0	0
Plover, Lesser Sand	0	0.1	1	0.0	0	0.0	0
Plover, Greater Sand	137	18.5	65	0.1	1	0.0	0
Plover, Grey	103	149.1	278	25.1	171	22.7	116
Lapwing, Blacksmith	2	1.3	5	2.0	8	0.0	0
Turnstone, Ruddy	5	1.5	8	0.1	1	0.0	0
Sandpiper, Terek	76	121.0	410	2.6	30	1.2	7
Sandpiper, Common	25	5.2	11	0.3	4	1.0	6
Sandpiper, Wood	1	10.2	57	0.1	1	0.0	0
Sandpiper, Marsh	5	5.3	33	0.1	1	0.0	0
Greenshank, Common	18	16.8	118	4.3	35	0.0	0
Knot, Red	21	4.4	27	0.0	0	0.0	0
Sandpiper, Curlew	3180	217.2	717	11.1	100	0.3	2
Stint, Little	3294	171.8	677	0.5	7	0.5	3
Sanderling, Sanderling	13	39.1	195	4.4	60	0.0	0
Ruff, Ruff	24	8.7	64	0.0	0	0.0	0
Godwit, Bar-tailed	54	2.4	10	0.1	1	0.0	0
Curlew, Eurasian	7	5.4	15	0.9	8	0.0	0
Whimbrel, Common	165	166.4	356	41.1	119	44.7	86
Crab Plover	4	0.0	0	0.0	0	0.0	0
Avocet	200	0.0	0	0.0	0	0.0	0
Stilt, Black-winged	0	4.2	25	2.9	29	0.0	0
Thick-knee, Water	0	1.0	5	1.2	8	0.2	1
Pratincole, Collared	8	0.3	4	1.8	13	0.0	0
Gull, Kelp	3	7.0	17	8.2	24	1.2	5
Gull, Grey-headed	115	106.2	210	52.4	135	3.0	15
Tern, Caspian	23	23.0	51	16.6	32	16.0	77
Tern, Swift	10	8.3	25	34.3	115	24.0	67
Tern, Lesser Crested	25	27.7	80	5.4	75	8.0	40
Tern, Sandwich	98	51.3	141	4.1	55	0.7	4
Tern, Common	208	1562.6	13000	2.1	10	23.0	130
Tern, Little	225	211.1	700	5.4	76	11.3	60
Tern, Whiskered	0	0.7	8	14.9	200	0.0	0
Tern, White-winged	93	15.5	50	0.0	0	0.2	1
Kingfisher, Pied	9	6.3	29	9.0	24	2.2	5
Kingfisher, Giant	1	1.0	3	1.1	6	0.2	1
Kingfisher, Malachite	0	0.4	3	2.5	13	0.0	0
Kingfisher, Mangrove	0	0.0	0	0.3	3	0.0	0
Total number of waterbirds	**9723**	**3434.0**		**688.9**		**210.5**	

Since 2012, both the numbers of birds and the numbers of species recorded have been much lower than in earlier counts, and the trend is suggestive of a catastrophic decline in bird numbers. To some extent, this may be related to counting area. The earlier counts by Ryan et al. and the CWAC programme included the whole Richards Bay Estuary and a portion of the uMhlathuze Estuary. The more recent counts have not included the uMhlathuze Estuary. In addition, the most recent counts have taken place outside of the mid-summer and mid-winter periods. Nevertheless, there are good reasons to believe that there has been a dramatic reduction in bird numbers, and that this trend could continue, given the development and expansion of the port, with increases in pollution and industrial and recreational activity, habitat loss due to agriculture and urban expansion in the surrounding areas, and external factors affecting water bird populations at broader scales.

Indeed, the most dramatic declines have been in the numbers of migratory waders, who primarily depend on the open mudflats for foraging. These are mainly located in the Richards Bay Estuary. The numbers of many of these species have plummeted nationally (Turpie et al. 2019) and globally, as a result of habitat degradation and loss on their breeding grounds as well as their wintering areas. The most recent counts have also taken place in highly polluted conditions. Many of these birds are site-faithful (Turpie & Hockey 1993), and therefore the impacts of this kind of disturbance are gradual.

2.3.2 Waterbirds of the surrounding pans and lakes

The closest freshwater wetland to the proposed development site is the Thulazihleka Pan, now a degraded, eutrophic wetland. In 2008, it was already degraded, and a total of 263 waterbirds were counted in winter (Table 7). The species assemblage suggested that the pan was relatively rich in fish and had some good marginal emergent vegetation, as well as suitable roosting and loafing sites for species such as White-breasted Cormorant and Spurwinged and Egyptian Geese. Of note is the fact that many of the species frequenting this pan are large birds and birds that tend to move regularly between different sites, such as pelicans and Yellow-billed ducks.

Lake Mzingazi is also close to the proposed development site, is the largest of the freshwater wetlands, and supports a far greater number of birds. These include fairly large numbers of reed cormorants and darters. Of particular note are the records of Pels Fishing Owl and 150 Pygmy Geese. Both of these are red data species. Lake Cubhu, just south of the uMhlathuze estuary supports a similar number of waterbirds to Thulazihleka Pan, dominated by Reed Cormorants and ducks (Table 7). The other wetlands have not been counted, but are also likely to support a similar array of species to the other wetlands. Overall, these freshwater wetlands support many Red Data species, highlighted in bold in Table 7.

Table 7. Birds recorded on five major freshwater wetlands in the area surrounding the proposed development site, listed in order of proximity to the site. P = present (observed), L = likely to occur. Numbers counted are in July 2008 for Thulazihleka (source: CWAC); Mzingazi sight: DP Cyrus (pers. obs.) and Johnson (1985), Count: Ryan et al. (1986); Cubhu sight: DP Cyrus, Count: R Hattingh (06.07.98); Nsezi: DP Cyrus; Mangeza: DP Cyrus and V Wepener (Source: Cyrus 2001). Red data species are in bold.

Species	Thulazihleka	Mzingazi	Cubhu	Nsezi	Mangeza
Little Grebe	2	46	26	P	L
Great White Pelican	45	P	P	P	
Pinkbacked Pelican		4	P	P	
Whitebreasted Cormorant	65	6	P	P	P
Reed Cormorant		221	120	P	P

Species	Thulazihleka	Mzingazi	Cubhu	Nsezi	Mangeza
African Darter	6	352	3	P	P
Grey Heron	5	P	2	P	L
Blackheaded Heron		1		P	L
Goliath Heron	1	P	1	P	L
Purple Heron	1	4	1	P	P
Great White Egret	1	P	2	P	L
Little Egret	1	9	15	P	L
Yellowbilled Egret		L	L	L	L
Black Egret		L		L	
Squacco Heron	3	P	P	P	P
Greenbacked Heron		P	P	P	L
Blackcrowned Night Heron		L	L	P	L
Whitebacked Night Heron		L	L	L	L
Little Bittern	1	L	L	L	L
Bittern		L	L	L	L
Hammerkop		P	P	P	P
Woollynecked Stork		P	P	P	L
Yellowbilled Stork		P			
Sacred Ibis		P	P	P	L
Glossy Ibis		P	L		
Hadeda Ibis		P	P	P	P
African Spoonbill		P			
Whitefaced Duck		P	40	P	L
Fulvous Duck		L		L	
Whitebacked Duck		L	L	L	
Egyptian Goose	1	P	P	P	L
Yellowbilled Duck	8	P	15	P	P
Cape Teal	2	L			
Hottentot (Blue-billed) Teal	6	L	L	P	L
Redbilled Teal		L			
Cape Shoveler		L			
Pygmy Goose		150	P	P	L
Knobbilled Duck		L	L	L	
Spurwinged Goose	7	3	P	P	L
African Fish Eagle	2	10	2	P	P
African Marsh Harrier		P	1	P	P
Osprey		P	L		
Black Crake	9	P	P	P	P
African Swamphen	3	P	P	P	L
Common Moorhen	5	P	L	P	P
Redknobbed Coot	8	P	L	L	P
African Finfoot		P	L	P	L
African Jacana	17	4	4	P	L
Lesser Jacana	1	L	L	L	
Ringed Plover		P			
Whitefronted Plover		P	P		
Kittlitz's Plover		P	L	L	
Threebanded Plover		P	P	L	
Crowned Plover		L	L	L	

Species	Thulazihleka	Mzingazi	Cubhu	Nsezi	Mangeza
Blacksmith Plover	4	P	P	P	L
Common Sandpiper		1	P	P	L
Wood Sandpiper		P	P	P	L
Marsh Sandpiper		P	L		
Greenshank		L	P	L	
Curlew Sandpiper		P	L		
Little Stint		P	L		
Ruff		P	P	P	
Ethiopian Snipe		L	L	L	
Avocet		P			
Blackwinged Stilt	4	P			
Water Dikkop		P	P	L	L
Redwinged Pratincole		P	P	P	L
Kelp Gull		P			
Greyheaded Gull		P	P	P	
Caspian Tern		P	P	P	
Swift Tern		P			
Lesser Crested Tern		P			
Sandwich Tern		P			
Common Tern		P	P	P	
Little Tern		P	L		
Whiskered Tern	32	P	P	P	L
Whitewinged Tern		P	P	P	L
Pel's Fishing Owl		P	L	L	
Pied Kingfisher	3	30	5	P	P
Giant Kingfisher		P	4	P	L
Halfcollared Kingfisher		L	L	L	
Malachite Kingfisher		1	P	P	L
Bluecheeked Bee-eater		P	P	P	L
African Marsh Warbler		P	L	L	L
Cape Reed Warbler		P	P	P	P
African Sedge Warbler		P	P	P	L
Blackbacked Cisticola		P	P	P	P
African Pied Wagtail		P	2	P	P
Cape Wagtail		P	P	P	P
Yelow Wagtail		P	L	L	L
Pinkthroated Longclaw		L	L	L	
Thickbilled Weaver		P	P	P	L
Yellow Weaver		P	P	P	L
Brownthroated Weaver		P	P	P	L
Red Bishop		P	P	P	L
Total number of species	**27**	**78+18L**	**55+26L**	**55+22L**	**18+39L**
Total number of birds counted	**263**	**1 154**	**243**	**–**	**–**

2.3.3 Terrestrial avifauna

While the relatively disturbed terrestrial areas in the vicinity of the Port and associated infrastructure are likely to be used to some extent by indigenous terrestrial avifauna, it will tend to be the more robust, generalist and widespread species. Thus, the remaining areas of natural bush in the vicinity of the Port are not likely to be of high conservation value for terrestrial birds. Furthermore, the vegetation surrounding the port is currently covered in a fine layer of coal dust as a result of the offloading and movement of coal from transport carriers to the coal terminal and onto the ships. These areas are used by species such as Pied crows, Yellow-billed kites and smaller passerine birds. However, these birds occur in very low densities due to these areas being highly industrialised and polluted. In the context of this study, it is the larger species that are likely to be more vulnerable to collisions with the electrical infrastructure associated with the project. Note that most of the larger species that are found in or flying over the developed and semi-natural or natural areas around the port are waterbirds.

2.4 Conservation importance of the study area for birds

The Richards Bay and uMhlathuze Estuaries have long been recognised as important in terms of the diversity and abundance of bird populations that they support, providing extensive and varied habitat for waterbirds. A total of 109 waterbird species have been recorded in and around the Port of Richards Bay, out of the 135 waterbird species occurring in South African wetlands (Allan 2009, cited in MER 2013). Of these, 82 are resident or local visitors (75%), while 27 are long-distance Palaearctic migrants (25%). A further 29 rare vagrant waterbird species have also been recorded. This high waterbird diversity is attributed to the wide variety of habitats in the area (MER, 2013). MER (2013) also noted that the system supports the highest numbers of individuals in South Africa of 18 species of water birds (MER, 2013). Many of the recorded species feature in species lists associated with the Ramsar and Bonn[2] Conventions, Important Bird Area (IBA) Programme and Red Data book (AECOM, 2014; MER, 2013). At least 15 Red Data species are known to occur in the estuaries and surrounding wetlands.

The rivers draining into the uMhlathuze Estuary create a shallow tidal lagoon fringed by mangroves and reed beds. The estuary and surrounding marginal vegetation provide important estuarine habitat for a complex community of water and water-associated birds. The sanctuary portion of the uMhlathuze Estuary (the Richards Bay Game Reserve) has been known to hold more than 10 000 waterbirds in the summer months. In the late 1990s, good numbers of Common Terns, Crested and Little Terns were recorded and over time there have been high numbers of Reed Cormorant, Woolly-necked Stork, Caspian Terns, and Whimbrels recorded too. Other key species include Greater and Lesser Sand Plovers as well as Terek and Curlew Sandpipers, Common Whimbrel, Bar-tailed Godwit, Greater Sand Plover, Red Knot, Sanderling, White-fronted and Grey Plovers, and Common Greenshank. Because of this, the protected area is recognised by BirdLife International as an Important Bird Area (IBA). However, BirdLife South Africa reports that the IBA has been downlisted from a global to a sub-regional IBA as recent surveys suggest that the site "may only occasionally surpass the threshold of 10 000 waterbirds". Furthermore, the Thulazihleka Pan which

[2] The Bonn Convention also known as the Convention on Migratory Species of Wild Animals is an international agreement that aims to conserve migratory species throughout their ranges, including their habitats and migration routes. South Africa is a signatory to the Bonn Convention, since 1991 (CMS, 2020). As a signatory to the Bonn Convention, South Africa is obligated to take "*individually or in co-operation appropriate and necessary steps to conserve such species and their habitat*" (CMS, 2020) (See Avifauna Specialist Report).

is not connected to the estuary was once considered part of the IBA but is now excluded due to high pollution levels in the pan and the subsequent loss of waterbirds from the site.

Intertidal sand and mudflats are critical feeding habitats for coastal wading birds, which mainly predate on soft-sediment invertebrates, as well as providing sheltered roost sites for seabirds. On a single day during spring high-tide, some 1230 birds representing 24 species were recorded on the sandspit bordering the Kabeljous Flats (Allan 2009, cited in MER 2013) emphasising the ecological importance of this area. About 20 % of the waterbirds that regularly visit the Richards Bay-uMhlatuze estuaries were found here. Moreover, Richards Bay Estuary is critically important for national and global water bird populations.

3 CONSERVATION OBLIGATIONS AND SPECIES OF CONCERN

3.1 Overview

Red lists have been compiled for bird species in order to be able to flag the presence of species that are already endangered due to habitat loss, overexploitation or other causes. The red list consulted for this report is Taylor *et al*. (2015) "Eskom Red Data Book of Birds of South Africa, Lesotho, and Swaziland" as well as the international IUCN red data list.

While it is critical to avoid further impacts on these species, it is also important to avoid further impacts on overall bird diversity and numbers. The potential impacts also need to be assessed against the backdrop of the existing harbour developments and activities in the study area, but also against the deteriorating conservation status of the bird communities in the area that is at least partly a result of the cumulation of these impacts.

Indeed, South Africa has, through a number of international agreements, pledged to increase the protection of biodiversity, and in particular, to protect migratory species. This is particularly pertinent to the study area, due to its high conservation importance and its significant numbers of migratory birds.

3.2 Key obligations pertaining to protection of avifauna

In addition to South African legislation on protected areas and the management of estuaries, South Africa is bound by international agreements to avoid biodiversity losses, particularly of birds. Some of these key agreements are summarised below.

3.2.1 The Convention on Biological Diversity (CBD, 1993)

The Convention on Biological Diversity (CBD) is an international legally-binding treaty, which recognised for the first in international law the conservation of biodiversity as "a common concern of humankind" and an integral part of the development process. The three main goals of the treaty are: (1) conservation of biodiversity, (2) sustainable use of biodiversity, and (3) the fair and equitable sharing of the benefits arising from the use of genetic resources (www.cbd.int). Under this convention, South Africa is expected to expand its protected areas to 30% of land area by 2030.

3.2.2 Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)

This is a treaty of the United Nations on which South Africa is a signatory and is a measure for the global conservation and sustainable use of migratory animals and their habitats (CMS 2021). Migratory species that are threatened with extinction are listed in Appendix I of the convention, with emphasis on strictly protecting such species including the habitats on which they depend. Appendix II includes species that would benefit from global efforts for conservation. Thus, the CMS is a framework convention, from which legally binding treaties can be developed, or informal documents as guidelines for conservation of such species (CMS 2021). The convention lists 385 international bird species, only some of which are relevant to South Africa. It is important that habitats including feeding and roosting grounds (as present in Richards Bay within the sandspit area and Kabeljous flats) are maintained as habitat for birds. If these are lost, then there are global conservation implications for such species.

3.2.3 Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AWEWA)

AWEWA is an intergovernmental treaty to be applied to Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago (AEWA 2021). This is a sub-agreement formed under the United National CMS or Bonn Convention to coordinate conservation over the migratory range of waterbird species in particular. The agreement covers 255 bird species dependent on wetlands including both fresh and saltwater wetland systems. The agreement centres around ensuring the presence, and management of suitable feeding and breeding grounds within the migratory range of such species. 81 countries are signatories to the agreement. The Action Plan is legally binding for signatories, including South Africa (a contracting party since 2002). The strategic plan involves:

- "Strengthening species conservation and recovery and reducing causes of unnecessary mortality.
- Ensuring that any use or management of migratory waterbird populations is sustainable across their flyways.
- Establishing and sustaining a coherent and comprehensive flyway network of managed protected areas and other sites.
- Ensuring significant quality and quality of habitat in the wider environment.
- Ensuring and strengthening the knowledge capacity, recognition, awareness and resources requires for the Agreement to achieve its conservation objectives.

3.3 Species of conservation concern and their risk profile

The assessment considered the list of potential species occurring in the study area based on the South African Bird Atlas Project (Appendix 1) in addition to the count data presented in the previous section. Potential risks posed by the Powership project that could have significant negative impacts on species of conservation concern, include:

a) Habitat loss (infrastructure, transmission line footprint).
b) Disturbance (e.g. lighting, noise, major hazards); and
c) Collisions with overhead transmission lines and electrocution.

The impacts of the potential risks on the populations of species of conservation concern depend on the expected proximity of infrastructure and activity to bird habitat and the behaviour of the bird species being considered within the project area of influence.

The species of conservation concern are listed in Table 8, along with the main risk factors and the level of risk (on a scale from very low to high). Details of those species at risk of impacts from the project are discussed below with emphasis on their populations within the project area of influence.

Collision prone birds include those bird species that are either highly aerial, those that flock, and species that are migratory. In particular, large species with low manoeuvrability and a narrow field of vision, such as cranes, pelicans, storks and waterfowl, as well as those species that habitually fly in low light conditions (e.g., flamingos) are more susceptible to collisions with overhead transmission lines and electrocution.

Based on historic count data, seven species of Conservation Concern were determined to be at Medium Risk of collisions with transmission line infrastructure (Table 8). However, almost all of

these species, with the exception of the Great White Pelican, are uncommon to the project area of influence with very few recorded sightings over the past few years (see Table 8). The greatest risk area for collisions with transmission line infrastructure is between the moored Powerships and the substation to the west/north-west of the Powerships. While the length of transmission line is approximately 3 km, there are numerous species that fly along the coastline between the uMhlatuze Estuary, the Port and the other small uMhlatuze lake systems, such as Mzingazi, Nsezi and Qhubu. The transmission lines would fall within this bird flyway.

Two species, the Cape Cormorant and Grey Crowned Crane, are listed as Endangered globally and in South Africa and the Yellow-billed Stork, African Marsh-harrier and Mangrove Kingfisher are listed as Endangered in South Africa. All of these species are either uncommon or rare to the project area with only a few individuals recorded and none of them have been recorded in the monitoring that has been undertaken over the period 2020-2022. The Caspian Tern, Lanner Falcon and Great White Pelican area the most common of the Red Data species in the project area of influence that have been recorded in recent counts (2020-2022).

Table 8. Species of Conservation Concern recorded in the project area of influence and their risk profile with respect to potential project impacts (disturbance, collisions with transmission lines, habitat loss). Threat Status: CR Critically Endangered; EN Endangered; VU Vulnerable; NT Near-Threatened; LC Least Concern.

Common Name	Scientific Name	Red Data		Abundance	Potential Risks
		IUCN	SA		
Great White Pelican	*Pelecanus onocrotalus*	LC	VU	Common	Medium: Collisions
Pink-backed Pelican	*Pelecanus rufescens*	LC	VU	Uncommon	Medium: Collisions
Cape Cormorant	*Phalacrocorax capensis*	EN	EN	Uncommon	Medium: Collisions
Yellow-billed Stork	*Mycteria ibis*	LC	EN	Uncommon	Medium: Collisions
Greater Flamingo	*Phoenicopterus roseus*	LC	NT	Uncommon	Medium: Collisions
Lesser Flamingo	*Phoeniconaias minor*	NT	NT	Uncommon	Medium: Collisions
African Pygmy-Goose	*Nettapus auratus*	LC	VU	Uncommon	Medium: Collisions
Lanner Falcon	*Falco biarmicus*	LC	VU	Common	Medium: Collisions
African Marsh-harrier	*Circus ranivorus*	LC	EN	Rare	Medium: Collisions
Grey Crowned Crane	*Balearica regulorum*	EN	EN	Rare	Medium: Collisions
Lesser Jacana	*Microparra capensis*	LC	NT	Rare	Very low
Chestnut-banded Plover	*Charadrius pallidus*	NT	NT	Uncommon	Very low
Eurasian Curlew	*Numenius arquata*	NT	NT	Uncommon	Low: Collisions
Caspian Tern	*Sterna caspia*	LC	VU	Common	Low: Collisions
Mangrove Kingfisher	*Halcyon senegaloides*	LC	EN	Rare	Very low

3.4 Species at high risk

Outside of the species of conservation concern, there are a number of species that are not on the Red Data List but are likely to be at risk of collision and/or electrocution. These species are shown in Table 9 and are considered high risk based on their occurrence/abundance within the project area of influence and their sensitivity to disturbance (noise, light) and their proneness to collision with the proposed transmission lines.

Table 9. Bird species (that are not Red Data listed) that are considered at risk

Common name	Scientific name	Collisions	Disturbance
African Fish Eagle	*Haliaeetus vocifer*	X	X
Egyptian Goose	*Alopochen aegyptiaca*	X	
Grey Heron	*Ardea cinerea*	X	X
Goliath Heron	*Ardea goliath*	X	X
Hadeda (Hadada) Ibis	*Bostrychia hagedash*	X	
Pied Crow	*Corvus albus*	X	
Spur-winged Goose	*Plectropterus gambensis*	X	
Woolly-necked Stork	*Ciconia episcopus*	X	X
Whimbrel, Common	*Numenius phaeopus*	X	X
Tern, Swift	*Sterna bergii*	X	X
Tern, Lesser Crested	*Sterna bengalensis*	X	X
Tern, Common	*Sterna hirundo*	X	X
Tern, Little	*Sterna albifrons*	X	X

4 IMPACT ASSESSMENT

The focus of this component of the impact assessment is on the avifauna occurring in the project area of influence, as described in the baseline above, which may be affected by activities associated with the construction and operation of the proposed floating power plant.

4.1 Current Impacts

Due to the anthropogenic developments and activities within the study area, bird habitats have already been reduced and compromised through:

- Reclamation and modification of estuarine habitats and indigenous terrestrial vegetation for harbour development and farming;
- An increase in the area of mangroves (replacing intertidal habitat) after the splitting of the original estuary system into two;
- High levels of disturbance in some areas due to fishing, recreational boating and shipping;
- Excessive nutrient pollution of aquatic habitats;
- Pollution from coal dust, a relatively recent problem which can be seen throughout the estuary area, but which is most visible on plant foliage;
- Noise associated with current port activity as well as activity associated with an army testing facility within the Port area (such as the detonation of explosive devices);
- Litter; and
- Undocumented, uncontrolled illegal exploitation of fish and possibly birds, particularly within the uMhlathuze Estuary.

4.2 Potential Impacts

1.1.1 Habitat loss

The project footprint is relatively small, involving the loss of a small amount of open water habitat, as well as clearing of terrestrial bush to construct the powerlines and access roads. This will have a negligible impact on the availability of habitat for estuarine waterbirds, but may lead to greater levels of human disturbance by providing more access to the shoreline.

Fragmentation of terrestrial habitats will likely have some impact on terrestrial bird populations. The impact on bush birds is likely to be small, but should be minimised by avoiding routes that involve clearing indigenous vegetation. During the operational phase, footprint areas are often kept free of indigenous vegetation or mowed, further reducing habitat and creating fragmentation. Placing transmission lines in intact habitat should be avoided wherever possible. While mitigation is possible by restoring habitats after the construction phase, it can take decades to fully restore coastal forest habitats, therefore it is best to avoid their destruction in the first place.

Powership: habitat loss			**Phase: Construction and operation**		
		Alternative 1		**Alternative 2**	
		No mitigation	**With mitigation**	**No mitigation**	**With mitigation**
A	Severity	1		1	
B	Duration	3		3	
C	Spatial	1		1	
D	**Consequence (A+B+C)/3**	**1.7**		**1.7**	
E	Frequency	1		1	
F	Probability	5		5	
G	**Likelihood (E+F)/2**	**3**		**5**	
H	**Significance = DxG**	**5.1 (Med-Low)**		**5.1 (Med-Low)**	
Mitigation:		**N/A**			

Project infrastructure: habitat loss			**Phase: Construction and operation**		
		Alternative 1		**Alternative 2**	
		No mitigation	**With mitigation**	**No mitigation**	**With mitigation**
A	Severity	1	1	3	
B	Duration	3	3	3	
C	Spatial	1	1	1	
D	**Consequence (A+B+C)/3**	**1.7**	**1.7**	**2.3**	
E	Frequency	1	1	1	
F	Probability	5	1	5	
G	**Likelihood (E+F)/2**	**3**	**1**	**3**	
H	**Significance = DxG**	**5.1 (Med-Low)**	**1.7 (Very Low)**	**7 (Med)**	
Mitigation:		Select alternative 1. Do not place transmission lines or access routes for their construction in functional natural habitat, and do not clear natural vegetation in the process of construction of project infrastructure.			

1.1.2 Collisions with transmission lines

Power lines in South Africa pose a substantial danger to birds, especially larger species such as cranes, bustards (Shaw *et al*., 2010; 2021), diurnal raptors, waterfowl, gamebirds, (Jenkins *et al*., 2010) and secretary birds (BirdLife South Africa, 2019). Research in South Africa has confirmed that powerlines cause significant mortality in these birds. According to Jenkins et al. (2010: 9), a species' *risk* of collision is related to its "likelihood of flying horizontally at power line height", whereas its *susceptibility* has to do with the bird's ability to see and avoid the lines. Indeed, the species at risk are typically large, heavy birds that fly in flocks at power line height. Larger birds also have difficulty manoeuvring quickly and sufficiently enough to avoid the lines. Impacts on their populations also tends to be particularly severe, since larger birds also tend to be long-lived species that reproduce slowly. Of particular concern are birds that tend to fly in low light or at night.

The best way to mitigate these threats is by placing power lines underground, or away from areas with high collision rates (such as water bodies). A next best option is to make them as low as possible with thick, made more visible with markers. Eskom has a standard for line marking, when required. Such measures can reduce collisions by 50-60% (Jenkins *et al*. 2010), but Shaw *et al.* (2021), in an 8-year study over a 117 km area in the Karoo, found that line marking (with the two most common markers) did not reduce the collision rate for bustards, perhaps due to their visual capacity or behaviour, a limitation that is also thought to apply to some vultures (Martin *et al.* 2012). They were, however, effective for Blue Cranes (92% reduction) and all large birds (51% reduction). Barrientos *et al.* (2011), in a meta-analysis, found a 78% decrease in death rates when marking devices are used on lines.

The proposed routes are in proximity to other existing major transmission line routes which increases their visibility. Staggering the pylons relative to the existing ones and setting the lines at the same height as existing lines would help to increase their visibility. Where they are not linked to existing routes, the lines should be set as low as possible. All lines should be well marked to make them visible, using diurnal-nocturnal markers (with lights that are fairly dim, to avoid confounding light pollution impacts).

Project infrastructure: collisions		**Phase: Operation**			
		Alternative 1		**Alternative 2**	
		No mitigation	**With mitigation**	**No mitigation**	**With mitigation**
A	Severity	3	2	3	2
B	Duration	3	3	3	3
C	Spatial	3	3	3	3
D	**Consequence (A+B+C)/3**	**3**	**2.7**	**3**	**2.7**
E	Frequency	3	2	3	2
F	Probability	4	3	4	3
G	**Likelihood (E+F)/2**	**3.5**	**2.5**	**3.5**	**2.5**
H	**Significance = DxG**	**10.5 (Med-High)**	**6.8 (Med-Low)**	**10.5 (Med-High)**	**6.8 (Med-Low)**
Mitigation:		Follow existing routes where possible, staggering pylons and aligning transmission lines with existing lines, or setting the lines low. Mark all transmission lines for diurnal and nocturnal visibility.			

1.1.3 Electrocution

Larger birds are more prone to electrocution by powerlines as they can create a link between two phases or an earthed element and one phase, resulting in a short circuit. One way to mitigate this risk is to create large gaps between the phases and/or between phases and earthed elements. This way, even birds with larger wingspans will not be able to bridge the gap. A number of species such as crows, various raptors, Egyptian Geese and Hadeda Ibises have taken to nesting on transmission towers or polls (de Goede and Jenkins, 2001). This increases their risk of electrocution (as well as collision). To prevent electrocution of birds, all the parts of the infrastructure should be either nest proofed and anti-perch devices placed on areas that can lead to electrocution, or should have the conductors slung below the towers. Any nests that have been made by birds should be removed when inactive, to discourage re-use.

Project infrastructure: electrocution			**Phase: Operation**		
		Alternative 1		**Alternative 2**	
		No mitigation	**With mitigation**	**No mitigation**	**With mitigation**
A	Severity	2	1	2	1
B	Duration	3	3	3	3
C	Spatial	3	3	3	3
D	**Consequence (A+B+C)/3**	**2.7**	**3.5**	**2.7**	**3.5**
E	Frequency	2	1	2	1
F	Probability	3	2	3	2
G	**Likelihood (E+F)/2**	**2.5**	**1.5**	**2.5**	**1.5**
H	**Significance = DxG**	**6.7 (Med-Low)**	**5.3 (Med-Low)**	**6.7 (Med-Low)**	**5.3 (Med-Low)**
Mitigation:		All the parts of the infrastructure to be nest proofed and anti-perch devices placed on areas that can lead to electrocution. Remove nests built on powerline structures when not in use, to discourage re-use.			

1.1.4 Light pollution

While the project is located in a developed port with existing light pollution, it is likely to increase the level of light pollution in the study area. By law, the vessel will need to have certain lights on at night to indicate the size of the vessel and that it is at anchor. However, the vessel could be kitted out to have a much higher degree of light for night operations, which would be far greater than the current levels of lighting in the area.

Light pollution disorientates nocturnally-flying birds, increasing their risk of collision, and may interfere with nocturnal foraging. Most of the charadriiform waders on the estuary are adapted for nocturnal foraging, with highly sensitive vision. Irregular loud noises could impact the foraging behaviour of shorebirds and roosting seabirds, affecting their energy budgets and capacity to gain weight for migration.

According to the light measurement report, illumination of the Powership will range from 53.80 Lux to 322.80 Lux. The latter is brighter than a high-quality hunting or gamespotting spotlight. Lights will be pointed at work areas and will not be used to illuminate surrounding areas as they will be pointed towards the deck of the ship. However, if these spotlights are mounted up on masts, then this could disorient flying birds, especially those trying to navigate by the moon.

To mitigate the impact, it is suggested that only essential lighting is on at night, lumens are kept to a minimum, and that lights are installed as low as possible. Lit up windows should be shuttered at night. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (red/green) motion detection lights should be used wherever possible.

Powership: light pollution		**Phase: Operation**			
		Alternative 1		**Alternative 2**	
		No mitigation	**With mitigation**	**No mitigation**	**With mitigation**
A	Severity	2	1	2	2
B	Duration	3	3	3	3
C	Spatial	2	2	2	2
D	**Consequence (A+B+C)/3**	**2.3**	**2**	**2.3**	**2.3**
E	Frequency	1	1	2	1
F	Probability	3	2	4	3
G	**Likelihood (E+F)/2**	**2**	**1.5**	**3.0**	**2.0**
H	**Significance = DxG**	**4.6 (Low)**	**3.0 (Low)**	**7.0 (Med)**	**4.6 (Low)**
Mitigation:		Essential lighting is on at night, lumens are kept to a minimum, lights are installed as low as possible. Lit up windows are shuttered at night			

1.1.5 Noise and vibration disturbance

The project is likely to result in increased disturbance of birds due to increased noise and vibration. As the project is located within the port area adjacent to existing ships with machinery already permanently running, these impacts will likely add to the existing effects of noise and vibration.

Birds are negatively affected by anthropogenic sound (Slabbekoorn & Ripmeester, 2008) which has been shown to be linked to declining bird densities (Francis *et al.* 2009). Noise affects communication, biology, reproduction, and behaviour (Sordello *et al.* 2020). A meta-analysis by Kunc and Schmidt (2019) concluded that noise pollution has widespread effects on biota. It is particularly problematic for songbirds (Senzaki *et al.* 2020), impacting on reproduction and territorial defence. Adjusting to this also increases energy demands (Gil *et al*. 2015). While most waterbirds in the study area are non-passerine birds, and thus possibly less vulnerable in this respect, many do engage in vocal communication. For example, Whimbrels and Grey Plovers, both common on the estuary, call extensively when gathering into flocks for migration back to their breeding areas (JKT, pers. obs.). Dooling and Popper (2016) suggest that findings from studies on anthropogenic sound affecting terrestrial birds can be applied to seabirds and other aquatic animals, as the basic principles of sound and hearing and the effects of noise pollution apply to all species in different environments. Crowell *et al*. (2015) used the auditory brainstem response (ABR) to study ten species of diving birds and found that their waveforms were indeed similar to terrestrial birds and mammals. All the studied species shared a common range of greatest sensitivity: 1000-3000 Hz.

The Powerships are fitted with a number of noise and vibration attenuation devices. The predicted noise model is presented in Figure 11 and Figure 12. This indicates that, with these sound attenuation measures, at the closest distance from the Powership to the Sandspit, the sandspit will experience a sound level of <60 dB(A) dB(A), and the sound levels at the closest distance from the Powership to the Kabeljous flats will be <60 dB(A). It is considered likely that the presence of the land adjacent to the ship will further attenuate the noise levels reaching the sand spit and Kabeljous flats. The ambient noise levels at the port as reported by Williams and Hutten (2021) are 45 dB(A). Noise noted from the site included the engines of several ships currently running creating a consistent low-level noise, as well as the noise from the coal terminal including ship movement, and conveyer belt sounds comprising consistent low-level sounds. The coal terminal also produces a noticeable high pitched intermittent screech as well as intermittent high beeping. All of which can be heard clearly from the centre of the sandspit.

At low tide, the area of the sandspit closest to the Powership will experience noise levels of <60 dB(A). At high tide, when much of the spit is underwater, sound levels are likely to be much less as the sand above water at high tide is approximately 500m away. Noise limits for busy urban areas are set for 60 dB(A), there is currently no legislation for noise limits in environmentally sensitive areas. Cutts *et al.* (2013) have developed a waterbird disturbance mitigation toolkit that informs estuarine planning and construction projects. Although applicable largely to the UK, the presence of migratory bird species (especially as these are considered the most sensitive for this project) means that this toolkit is applicable to this project and can be used to determine the impacts associated with noise on the avifauna of the Project Area of Influence. This toolkit rates regular noise from 50 to 70 db as a moderate to low impact to estuarine avifauna, with noise below 50 db as a low impact to estuarine avifauna (Cutts *et al*. 2013). There is no feasible mitigation other than to move the ships further from the sensitive bird areas.

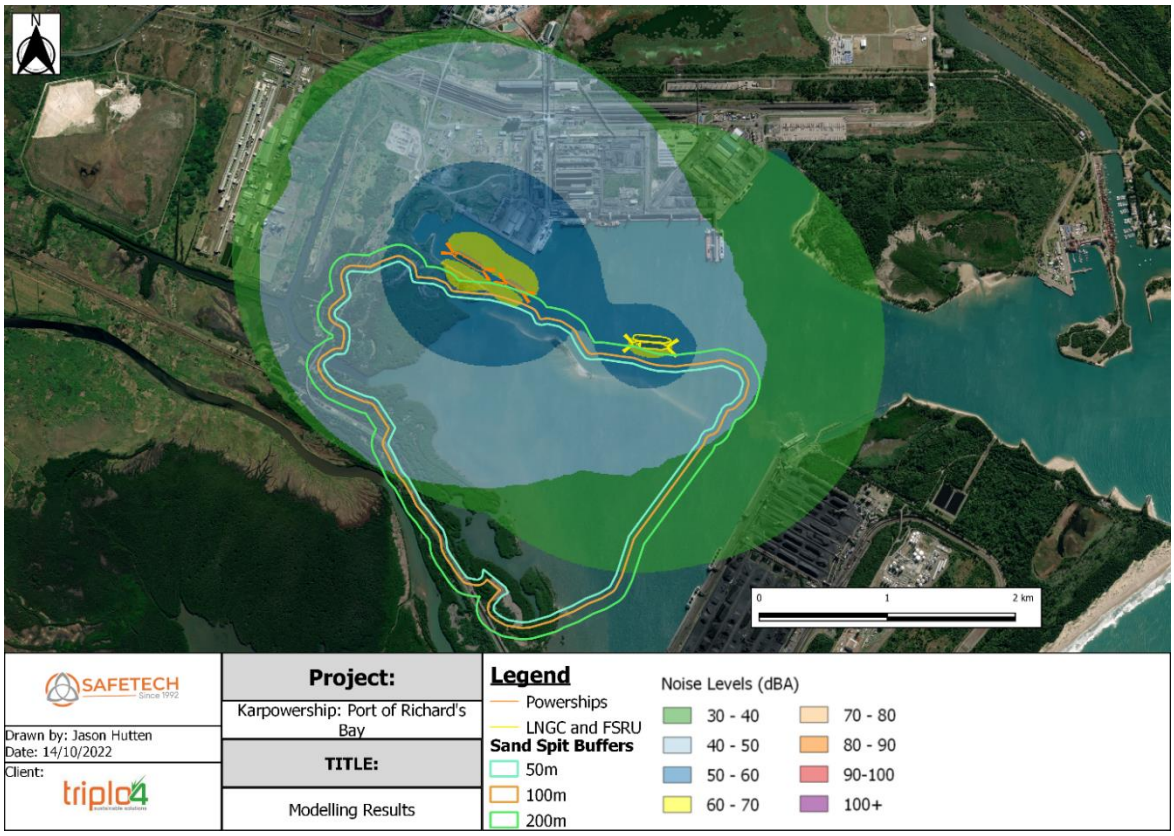

Figure 11. Noise associated with the powership infrastructure.

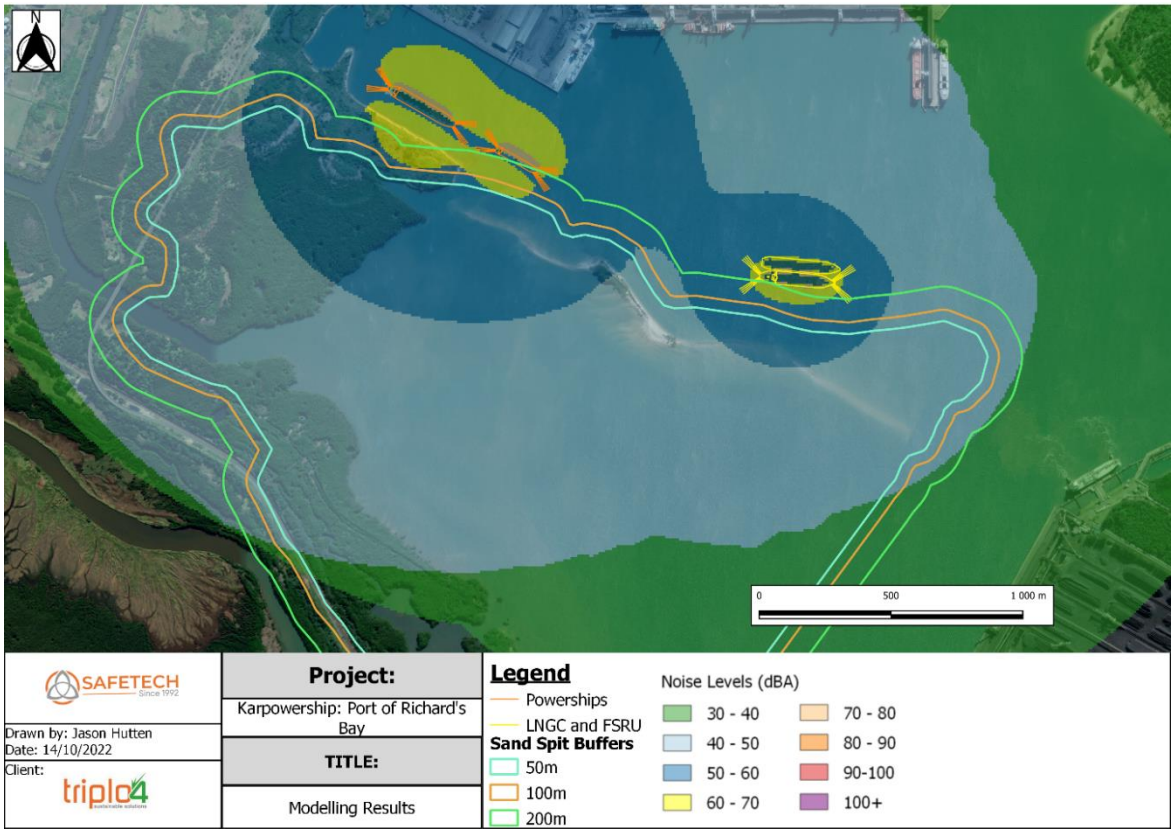

Figure 12. Noise associated with the powership infrastructure in relation to the sensitive habitats of the sandspit and Kabeljous flats

Powership: noise and vibration impacts		Phase: Operation			
		Alternative 1		Alternative 2	
		No mitigation	With mitigation	No mitigation	With mitigation
A	Severity	2		2	
B	Duration	3		3	
C	Spatial	2		2	
D	**Consequence (A+B+C)/3**	**2.3**		**2.3**	
E	Frequency	5		5	
F	Probability	2		3	
G	**Likelihood (E+F)/2**	**3.5**		**4.0**	
H	**Significance = DxG**	**8.1 (Med)**		**9.2 (Med-High)**	
Mitigation:		Choose Alternative 1.			

1.1.6 Increased human disturbance

The increased activity of people in natural areas could lead to disturbance of foraging, roosting or breeding birds. Usually, a flight response is triggered at a distance of 100 – 150 m across a mudflat, with a response (heads up) associated with movement further away (Cutts *et al.* 2013). Frequent disturbances of Palearctic migrants during the summer months can affect their energy budgets and capacity to gain weight for migration and can lead to a decline in bird numbers on estuaries. For example, Turpie & Love (2000) showed that human disturbances during the December holidays reduced bird numbers by more than 40% in some parts of Knysna estuary. The effects are greatest for people moving on the ground. Human movements on board a large vessel or the movements of vessels themselves are not likely to be a significant problem, and birds will quickly habituate to these. Richards Bay is already a working port with a lot of vessel movement. Disturbance will be higher during construction, with avifauna likely becoming habituated during the operational phase (Cutts 2021).

In general, construction activities should be scheduled as far as possible during the least sensitive periods (May – August), to avoid migration, nesting and breeding seasons. Construction activities could detrimentally affect an African Fish Eagle pair that have a nest close to where the Powership connects to the planned transmission line. This can be avoided by avoiding land-based construction activities in the area while the pair is actively tending the nest. Fish eagles typically return to the same nest each year, but if construction activities continue into the next breeding season, there is chance that the pair will relocate their nesting site, or may fail to breed. Based on past records, the breeding season is not fully predictable in this area but is more likely to be in summer.

Some of the Karpowership infrastructure is located within 200 m of the sandspit, with more located within 300 m (Figure 13). To mitigate disturbance, approach and general access to these ships should be from the north side, and no activities (post construction) should occur between the ships and the sandspit, other than activities in direct contact with the vessels, such as ship maintenance.

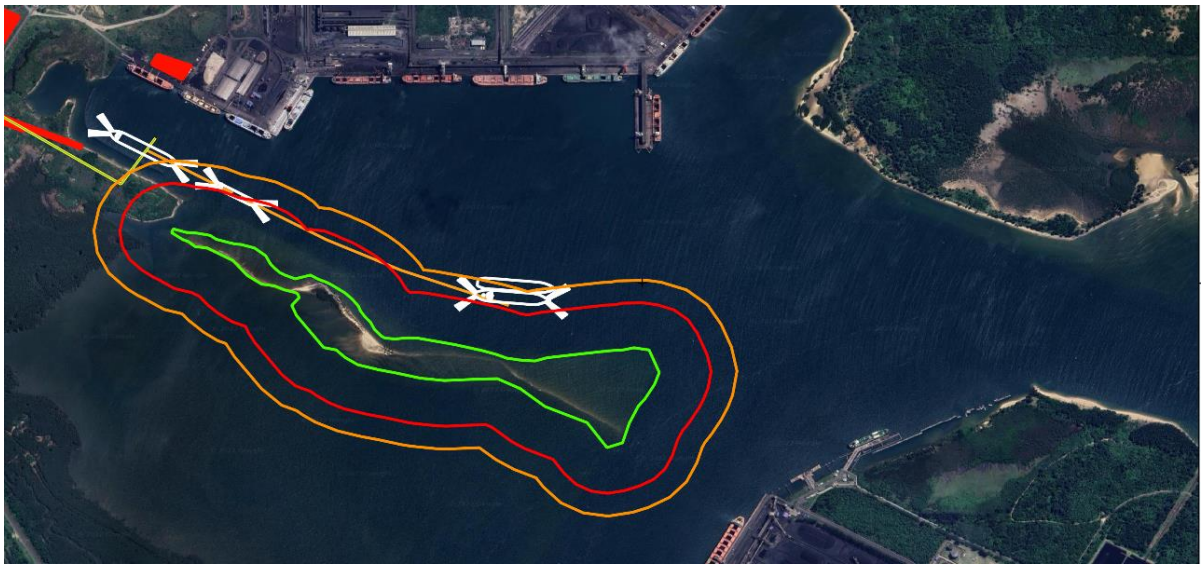

Figure 13. Map showing the location of the project infrastructure in relation to the 200 m buffer (red) and 300m buffer (orange) from the sand spit, outlined in green.

Powership and infrastructure: human disturbance		**Phase: Construction**			
		Alternative 1		**Alternative 2**	
		No mitigation	**With mitigation**	**No mitigation**	**With mitigation**
A	Severity	2	2	2	2
B	Duration	1	1	1	1
C	Spatial	2	2	2	2
D	**Consequence (A+B+C)/3**	**1.7**	**1.7**	**1.7**	**1.7**
E	Frequency	5	5	5	5
F	Probability	4	2	4	2
G	**Likelihood (E+F)/2**	**4.5**	**3.5**	**4.5**	**3.5**
H	**Significance = DxG**	**7.7 (Med)**	**6.0 (Med-Low)**	**7.7 (Med)**	**6.0 (Med-Low)**
Mitigation:		Channel workers and vehicles to minimise access to natural habitats, keeping them to limited designated areas. No access to sandspit.			

Powership: human disturbance		**Phase: Operation**			
		Alternative 1		**Alternative 2**	
		No mitigation	**With mitigation**	**No mitigation**	**With mitigation**
A	Severity	2	2	2	2
B	Duration	3	3	3	3
C	Spatial	2	2	2	2
D	**Consequence (A+B+C)/3**	**2.3**	**2.3**	**2.3**	**2.3**
E	Frequency	3	1	3	1
F	Probability	2	1	3	1
G	**Likelihood (E+F)/2**	**2.5**	**1**	**3**	**1**
H	**Significance = DxG**	**5.8 (Med-Low)**	**2.3 (Very Low)**	**6.9 (Med-Low)**	**2.3 (Very Low)**
Mitigation:		Approach and general access to these ships should be from the north side, and no activities (post construction) should occur between the ships and the sandspit, other than activities in direct contact with the vessels, such as ship maintenance			

4.3 Cumulative impacts

Cumulative impacts are assessed in context of the extent of the proposed assessment area; other developments in the area; and general habitat loss and transformation resulting from other activities in the area.

The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or region, it is appropriate to consider the cumulative effects of development. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system. This section describes the potential impacts of the project that are cumulative for avifauna.

Several projects are currently underway, or in the environmental authorisation phase and include those listed in Table 10

Table 10. Projects considered for cumulative impacts

Project name and description	Applicant	Status
320MW Emergency Risk Mitigation Power Plant (RMPP) and associated infrastructure near Richards Bay. The Project site is to be located in Alton, near the Richards Bay Industrial Development Zone (IDZ). The facility will have an installed generating capacity of 320MW, to operate with liquified petroleum gas (LPG) or naphtha as an initial source and will convert to utilising natural gas once this is available in Richards Bay. **EAP - Savannah Environmental**	Phinda Power Producers (Pty) Ltd	Environmental Authorisation was granted, and NGOs are challenging the decision
RBGP2 400MW gas to power project at the RBIDZ 1F (proposed amendments to the existing Environmental Authorisation and EMPr). The scope includes 6 gas turbines for mid-merit/peaking plant power provision, with 2 steam turbines utilizing the heat from the engineers in a separate steam cycle, as well as 3 fuel tanks of 2000m³ each for on-site fuel storage. **EAP - Savannah Environmental**	Richards Bay Gas Power (Pty) Ltd	Received EA in 2016, applying for amendment in 2020 and an AEL
Nseleni Independent Floating Power Plant (NIFPP) - Port/ old Bayside complex. Floating gas powered power station made up of floating Combined Cycle Gas Turbine (CCGT) power plants and associated infrastructure for the evacuation of power from the NIFPP to the National Grid, in the Port of Richards Bay. Four Floating Power Barges generating a nominal 700 MW per barge resulting in 2 800 MW generation capacity. **EAP – SE Solutions**	Nseleni Power Corporation (Pty) Ltd and Anchor Energy (Pty) Ltd	EA not granted but appeals ongoing
Eskom 3000 MV CCPP and associated infrastructure on Portion 2 of Erf 11376 and Portion 4 of Erf 11376 within the RBIDZ Zone 1D. The facility will operate with natural gas as the main fuel resource and diesel as a back-up resource. **EAP - Savannah Environmental.**	Eskom Holdings SoC Limited	EA granted

The cumulative impacts of the above developments alone, particularly the NIFPP, would amount to a very high impacts on birds. These would collectively result in a large area of habitat loss, and it

increases the risk of collisions and electrocutions for avifauna. This risk is especially high as a number of species expected and recorded is in a high risk category for collisions and electrocutions. Notably, however, the EA for the NIFPP, which would have the greatest direct impact due to its location, has not been granted. The existence of the remaining projects does not diminish the impacts described for the proposed Karpowership development, which will simply add to them.

The above developments, including that of the Karpowership development, will all have an indirect effect on birds not only of the study area, but nationally and globally, through their contribution to climate change.

5 REASONED OPINION

Based on the direct impacts considered in this report as potentially affecting the birds of Richards Bay Estuary, uMhlathuze Estuary, the nearby freshwater wetlands and terrestrial habitats, there are no fatal flaws that would prevent the proposed Gas to Power project from proceeding, on condition that:

- the preferred powership layout and transmission line route are adopted;
- all mitigation measures and recommendations provided are strictly implemented; and
- the construction and operational phases of the project are undertaken accordance in with a stringent environmental management programme (EMPr), which contains all the mitigation measures put forward and which is monitored by a suitably qualified environmental control officer (ECO).

While this study could not estimate the indirect effects on avifauna through the project's contribution climate change, this aspect is worthy of serious consideration, given the tight deadlines to meet global emissions targets to avoid catastrophic climate change.

6 SPECIALIST MANAGEMENT PLAN

The aim of the management outcomes is to present the mitigations in such a way that they can be incorporated into the environmental management programme (EMPr), allowing for more successful implementation and auditing of the mitigations and monitoring guidelines. Table 11 presents the recommended mitigation measures and the respective timeframes, targets, and performance indicators for the avifaunal study.

Table 11. Summary of management outcomes pertaining to impacts to avifauna and their habitats

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Habitats				
Areas of already fragmented indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. Clearing beneath transmission lines should be avoided.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Closure Phase/Rehabilitation phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.	Closure Phase/ Post Closure Phase	Environmental Officer & Contractor	Road edges and project area footprint	During Phase
Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.	Operational/Closure Phase	Environmental Officer & Contractor	Road edges and footprint	During Phase
Erosion control and alien invasive management plan must be compiled.	Life of operation	Environmental Officer & Contractor	Erosion and alien invasive species	Ongoing
Environmentally friendly dust suppressants need to be utilised	Operational phase	Environmental Officer & Contractor	Water pollution	During Phase
A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.	Life of operation	Environmental Officer & Contractor	Fire Management	During Phase

Continued…

Management outcome: Avifauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this.	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing
All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. Signs must be put up to enforce this.	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
Construction of the Powerships including any piling on the land adjacent to the planned Powerships or within 200 m of the sandpit or Kabeljous flats, should be limited the period from mid-April to mid-September to avoid disturbance to breeding and migratory species	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Construction/Closure Phase	During Phase
Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (red/green) motion detection lights should be used wherever possible.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light.	During Phase
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Schedule activities as much as possible during least sensitive periods (May – August), to avoid migration, nesting and breeding seasons	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day in winter.	During Phase
All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region	Construction/Operational Phase	Project manager, Environmental Officer	Noise	During Phase
All areas to be developed must be walked through prior to any activity to ensure no nests or avifauna species are found in the area. Should any Species of Conservation Concern be found and not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	Planning, Construction and Decommissioning	Project manager, Environmental Officer	Presence of Nests and faunal species	During Phase
The design of the proposed transmission line must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa (Jenkins *et al.*, 2017).	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted birds or bird strikes	During Phase
Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of bird collisions	During phase

All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted birds	During phase
Use environmentally friendly cleaning and dust suppressant products	Construction and operation	Environmental Officer & Contractor, Engineer	Presence of chemicals in and around the project area	During phase
Any exposed parts must be covered (insulated) to reduce electrocution risk	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted birds	During phase

7 MONITORING PLAN

Monitoring is to take place monthly for 1 year pre-construction and then monthly for 1 year post construction so that mitigation measures can be adapted to ensure the development does not have a long-term impact on the SCCs and migratory waders in the area. A follow-up assessment on avian biodiversity and species abundance within the assessment area and surrounding areas must be conducted within one year after the facility has been in operation and should be repeated every 3-5 years. A monitoring plan has been developed for the site and monitoring is currently ongoing. Information obtained from the monitoring must be provided to BirdLife Renewable Energy Programme on energy@birdlife.org.za. The data must be presented as described in Jenkins *et al.,* 2017.

8 CONCLUSION

The proposed development will take place within an already developed zone within an estuary ecosystem of very high conservation value. As such it will make a small incremental impact on the ecological integrity of the site, but this needs to be minimised so as to avoid any further compromise of the area's biodiversity. The original development of the Port of Richard's Bay was undertaken before the conservation value was fully understood. The development is also taking place against a backdrop of recent deterioration in the environmental conditions of the area, with dramatic increases in pollution, and an apparent lack of protection of the bird sanctuary area in the neighbouring uMhlathuze Estuary. The latter problems are reversible, and should not be taken as justification for relaxing environmental standards.

While the development is near the working harbour, it does extend the development footprint into the estuary. The ships are to be within 2-300 m of one of the most important parts of the estuary for birds – the sandspit and adjacent mudflats, while the transmission lines will also extend the development footprint into the surrounding bush that not only provides habitat for birds and other wildlife, but helps to buffer the important estuarine habitat from anthropogenic pressures. Layout option 1 is far better than option 2 in terms of the risks it poses to estuarine avifauna. Similarly, the layout of the proposed transmission lines has less incursion into natural habitats under option 1 than under option 2. As is shown in the impact assessment for this and other specialist studies, option 1 is a clear choice.

The risks posed by the proposed development include habitat loss, collisions, electrocution, light and noise pollution and disturbance by the movement of people, machinery and vessels. Of these, the elevated risk of mortality due to collisions with overhead powerlines are a major concern for larger species, particularly waterbirds that are likely to be flying in the area, including threatened species such as flamingos and pelicans. The other risks may contribute to a decline in the abundance and diversity of birds in this important area. Provided the mitigation measures are undertaken, the anticipated impacts do not constitute a fatal flaw.

It is recommended that the following actions be taken to ensure the continued monitoring and protection of these habitats:

- Monthly avifaunal monitoring of the sandspit and Kabeljous flats should continue for at least the next 3 years;
- Waterbird counts of the full site including both Richards Bay Port and the Richards Bay Game Reserve should resume and continue annually in both summer and winter;
- The monitoring plan for the avifauna should speak to the existing monitoring plans of the port, if no such documents are available, Karpowership can contribute to them.
- Monitoring must be done in conjunction with all port users and the TNPA as cumulative impacts are likely to be the most detrimental to such habitats.
- Conservation of the sandspit and Kabeljous flats is recommended, and no development should take place in these areas. An adaptively managed conservation plan should be developed for these areas in particular that aligns with the existing TNPA conservation management plan for the port. If no such document exists, KPS partnership with SANPARKS and EZEMVELO should have input into its development.

9 REFERENCES

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10 APPENDICES

a. Appendix 1: SABAP2 records from the study area

Family	Scientific name	Common name	Red Data (Regional)
Accipitridae	*Stephanoaetus coronatus*	African Crowned Eagle	VU
	Aviceda cuculoides	African Cuckoo Hawk	
	Haliaeetus vocifer	African Fish-eagle	
	Accipiter tachiro	African Goshawk	
	Polyboroides typus	African Harrier-Hawk	
	Circus ranivorus	**African Marsh-harrier**	EN
	Aquila ayresii	Ayres's Hawk-eagle	
	Milvus migrans	Black Kite	
	Accipiter melanoleucus	Black Sparrowhawk	
	Circaetus pectoralis	Black-chested Snake-eagle	
	Elanus caeruleus	Black-shouldered Kite	
	Circaetus cinereus	Brown Snake-eagle	
	Pernis apivorus	European Honey-buzzard	
	Buteo rufofuscus	Jackal Buzzard	
	Accipiter minullus	Little Sparrowhawk	
	Kaupifalco monogrammicus	Lizard Buzzard	
	Lophaetus occipitalis	Long-crested Eagle	
	Gypohierax angolensis	Palm-nut Vulture	
	Circaetus fasciolatus	Southern Banded Snake-eagle	
	Buteo vulpinus	Steppe Buzzard	
	Aquila rapax	**Tawny Eagle**	EN
	Aquila wahlbergi	Wahlberg's Eagle	
	Milvus aegyptius	Yellow-billed Kite	
Acrocephalidae	*Acrocephalus baeticatus*	African Reed-warbler	
	Chloropeta natalensis	Dark-capped Yellow Warbler	
	Acrocephalus arundinaceus	Great Reed-warbler	
	Acrocephalus gracilirostris	Lesser Swamp-warbler	
	Acrocephalus palustris	Marsh Warbler	
	Acrocephalus schoenobaenus	Sedge Warbler	
Alaudidae	*Mirafra africana*	Rufous-naped Lark	
	Calendulauda sabota	Sabota Lark	
Alcedinidae	*Ispidina picta*	African Pygmy-Kingfisher	
	Halcyon albiventris	Brown-hooded Kingfisher	
	Megaceryle maximus	Giant Kingfisher	
	Alcedo semitorquata	**Half-collared Kingfisher**	NT
	Alcedo cristata	Malachite Kingfisher	
	Halcyon senegaloides	**Mangrove Kingfisher**	EN
	Ceryle rudis	Pied Kingfisher	
	Halcyon chelicuti	Striped Kingfisher	
	Halcyon senegalensis	Woodland Kingfisher	
Anatidae	*Anas sparsa*	African Black Duck	
	Nettapus auritus	African Pygmy-Goose	
	Anas smithii	Cape Shoveler	
	Anas capensis	Cape Teal	
	Alopochen aegyptiacus	Egyptian Goose	
	Dendrocygna bicolor	Fulvous Duck	
	Anas hottentota	Hottentot Teal	
	Anas erythrorhyncha	Red-billed Teal	
	Plectropterus gambensis	Spur-winged Goose	
	Thalassornis leuconotus	White-backed Duck	
	Dendrocygna viduata	White-faced Duck	
	Anas undulata	Yellow-billed Duck	
Anhingidae	*Anhinga rufa*	African Darter	
Apodidae	*Apus barbatus*	African Black Swift	
	Cypsiurus parvus	African Palm-swift	
	Tachymarptis melba	Alpine Swift	
	Apus affinis	Little Swift	
	Apus caffer	White-rumped Swift	

Ardeidae	*Egretta ardesiaca*	Black Heron	
	Nycticorax nycticorax	Black-crowned Night-Heron	
	Ardea melanocephala	Black-headed Heron	
	Bubulcus ibis	Cattle Egret	
	Ardea goliath	Goliath Heron	
	Egretta alba	Great Egret	
	Butorides striata	Green-backed Heron	
	Ardea cinerea	Grey Heron	
	Ixobrychus minutus	Little Bittern	
	Egretta garzetta	Little Egret	
	Ardea purpurea	Purple Heron	
	Ardeola rufiventris	Rufous-bellied Heron	
	Euplectes orix	Southern Red Bishop	
	Ardeola ralloides	Squacco Heron	
	Egretta intermedia	Yellow-billed Egret	
Bucerotidae	*Tockus alboterminatus*	Crowned Hornbill	
	Bycanistes bucinator	Trumpeter Hornbill	
Burhinidae	*Burhinus capensis*	Spotted Thick-knee	
	Burhinus vermiculatus	Water Thick-knee	
Campephagidae	*Campephaga flava*	Black Cuckoo-shrike	
Caprimulgidae	*Caprimulgus europaeus*	European Nightjar	
	Caprimulgus pectoralis	Fiery-necked Nightjar	
	Caprimulgus fossii	Square-tailed Nightjar	
Charadriidae	*Vanellus senegallus*	African Wattled Lapwing	
	Vanellus armatus	Blacksmith Lapwing	
	Vanellus melanopterus	Black-winged Lapwing	
	Charadrius hiaticula	Common Ringed Plover	
	Vanellus coronatus	Crowned Lapwing	
	Charadrius leschenaultii	Greater Sand Plover	
	Pluvialis squatarola	Grey Plover	
	Charadrius pecuarius	Kittlitz's Plover	
	Charadrius mongolus	Lesser Sand Plover	
	Charadrius tricollaris	Three-banded Plover	
	Charadrius marginatus	White-fronted Plover	
Ciconiidae	*Anastomus lamelligerus*	African Openbill	
	Ephippiorhynchus senegalensis	**Saddle-billed Stork**	EN
	Ciconia ciconia	White Stork	
	Ciconia episcopus	Woolly-necked Stork	
	Mycteria ibis	**Yellow-billed Stork**	EN
Cisticolidae	*Apalis thoracica*	Bar-throated Apalis	
	Cisticola natalensis	Croaking Cisticola	
	Camaroptera brachyura	Green-backed Camaroptera	
	Cisticola aberrans	Lazy Cisticola	
	Cisticola fulvicapilla	Neddicky Neddicky	
	Cisticola cinnamomeus	Pale-crowned Cisticola	
	Cisticola chiniana	Rattling Cisticola	
	Cisticola erythrops	Red-faced Cisticola	
	Apalis ruddi	Rudd's Apalis	
	Cisticola galactotes	Rufous-winged Cisticola	
	Prinia subflava	Tawny-flanked Prinia	
	Apalis flavida	Yellow-breasted Apalis	
	Cisticola juncidis	Zitting Cisticola	
Coliidae	*Urocolius indicus*	Red-faced Mousebird	
	Colius striatus	Speckled Mousebird	
Columbidae	*Treron calvus*	African Green-pigeon	
	Columba arquatrix	African Olive-pigeon	
	Streptopelia capicola	Cape Turtle-dove	
	Turtur chalcospilos	Emerald-spotted Wood-dove	
	Streptopelia senegalensis	Laughing Dove	
	Aplopelia larvata	Lemon Dove	
	Oena capensis	Namaqua Dove	
	Streptopelia semitorquata	Red-eyed Dove	
	Columba livia	Rock Dove	
	Columba guinea	Speckled Pigeon	
	Turtur tympanistria	Tambourine Dove	

Coraciidae	*Eurystomus glaucurus*	Broad-billed Roller	
	Coracias garrulus	**European Roller**	NT
Corvidae	*Corvus capensis*	Cape Crow	
	Corvus splendens	House Crow	
	Corvus albus	Pied Crow	
Cuculidae	*Chrysococcyx cupreus*	African Emerald Cuckoo	
	Cuculus clamosus	Black Cuckoo	
	Centropus burchellii	Burchell's Coucal	
	Cuculus canorus	Common Cuckoo	
	Chrysococcyx caprius	Diderick Cuckoo	
	Ceuthmochares australis	Green Malkoha	
	Clamator jacobinus	Jacobin Cuckoo	
	Chrysococcyx klaas	Klaas's Cuckoo	
	Cuculus solitarius	Red-chested Cuckoo	
Dicruridae	*Dicrurus adsimilis*	Fork-tailed Drongo	
	Dicrurus ludwigii	Square-tailed Drongo	
Emberizidae	*Emberiza tahapisi*	Cinnamon-breasted Bunting	
	Emberiza flaviventris	Golden-breasted Bunting	
Estrildidae	*Lagonosticta rubricata*	African Firefinch	
	Uraeginthus angolensis	Blue Waxbill	
	Spermestes cucullatus	Bronze Mannikin	
	Estrilda astrild	Common Waxbill	
	Mandingoa nitidula	Green Twinspot	
	Estrilda perreini	Grey Waxbill	
	Amandava subflava	Orange-breasted Waxbill	
	Spermestes nigriceps	Red-backed Mannikin	
	Lagonosticta senegala	Red-billed Firefinch	
Falconidae	*Falco amurensis*	Amur Falcon	
	Falco subbuteo	Eurasian Hobby	
	Falco biarmicus	**Lanner Falcon**	VU
	Falco peregrinus	Peregrine Falcon	
Fregatidae	*Fregata ariel*	Lesser Frigatebird	
Fringillidae	*Crithagra sulphuratus*	Brimstone Canary	
	Serinus canicollis	Cape Canary	
	Crithagra mozambicus	Yellow-fronted Canary	
Glareolidae	*Rhinoptilus chalcopterus*	Bronze-winged Courser	
	Glareola pratincola	Collared Pratincole	
Gruidae	*Balearica regulorum*	**Grey Crowned Crane**	EN
Haematopodidae	*Haematopus ostralegus*	Eurasian Oystercatcher	
Heliornithidae	*Podica senegalensis*	**African Finfoot**	VU
Hirundinidae	*Riparia cincta*	Banded Martin	
	Hirundo rustica	Barn Swallow	
	Psalidoprocne holomelaena	Black (Southern race) Saw-wing	
	Riparia paludicola	Brown-throated Martin	
	Delichon urbicum	Common House-martin	
	Hirundo cucullata	Greater Striped Swallow	
	Pseudhirundo griseopyga	Grey-rumped Swallow	
	Hirundo abyssinica	Lesser Striped Swallow	
	Hirundo semirufa	Red-breasted Swallow	
	Hirundo fuligula	Rock Martin	
	Riparia riparia	Sand Martin	
	Hirundo albigularis	White-throated Swallow	
	Hirundo smithii	Wire-tailed Swallow	
Indicatoridae	*Prodotiscus regulus*	Brown-backed Honeybird	
	Indicator indicator	Greater Honeyguide	
	Indicator minor	Lesser Honeyguide	
	Indicator variegatus	Scaly-throated Honeyguide	
Jacanidae	*Actophilornis africanus*	African Jacana	
	Microparra capensis	**Lesser Jacana**	NT
Laniidae	*Lanius collaris*	Common (Southern) Fiscal	
	Lanius minor	Lesser Grey Shrike	
	Lanius collurio	Red-backed Shrike	
Laridae	*Chlidonias niger*	Black Tern	
	Sterna caspia	**Caspian Tern**	VU
	Sterna hirundo	Common Tern	

	Larus cirrocephalus	Grey-headed Gull
	Larus hartlaubii	Hartlaub's Gull
	Larus dominicanus	Kelp Gull
	Sterna bengalensis	Lesser Crested Tern
	Sterna albifrons	Little Tern
	Sterna sandvicensis	Sandwich Tern
	Sterna bergii	Swift Tern
	Chlidonias hybrida	Whiskered Tern
	Chlidonias leucopterus	White-winged Tern
Locustellidae	*Schoenicola brevirostris*	Broad-tailed Warbler
	Bradypterus baboecala	Little Rush-warbler
Lybiidae	*Tricholaema leucomelas*	Acacia Pied Barbet
	Lybius torquatus	Black-collared Barbet
	Trachyphonus vaillantii	Crested Barbet
	Pogoniulus pusillus	Red-fronted Tinkerbird
	Stactolaema leucotis	White-eared Barbet
	Pogoniulus bilineatus	Yellow-rumped Tinkerbird
Macrosphenidae	*Sylvietta rufescens*	Long-billed Crombec
Malaconotidae	*Dryoscopus cubla*	Black-backed Puffback
	Tchagra senegalus	Black-crowned Tchagra
	Nilaus afer	Brubru Brubru
	Telophorus quadricolor	Gorgeous Bush-shrike
	Malaconotus blanchoti	Grey-headed Bush-shrike
	Telophorus olivaceus	Olive Bush-shrike
	Telophorus sulfureopectus	Orange-breasted Bush-shrike
	Laniarius ferrugineus	Southern Boubou
Meropidae	*Merops persicus*	Blue-cheeked Bee-eater
	Merops apiaster	European Bee-eater
	Merops pusillus	Little Bee-eater
	Merops bullockoides	White-fronted Bee-eater
Monarchidae	*Terpsiphone viridis*	African Paradise-flycatcher
	Trochocercus cyanomelas	Blue-mantled Crested-flycatcher
Motacillidae	*Motacilla aguimp*	African Pied Wagtail
	Anthus cinnamomeus	African Pipit
	Macronyx capensis	Cape Longclaw
	Motacilla capensis	Cape Wagtail
	Motacilla clara	Mountain Wagtail
	Motacilla flava	Yellow Wagtail
	Macronyx croceus	Yellow-throated Longclaw
Muscicapidae	*Muscicapa adusta*	African Dusky Flycatcher
	Saxicola torquatus	African Stonechat
	Muscicapa caerulescens	Ashy Flycatcher
	Cercotrichas signata	Brown Scrub-robin
	Cossypha caffra	Cape Robin-chat
	Cossypha dichroa	Chorister Robin-chat
	Cercomela familiaris	Familiar Chat
	Sigelus silens	Fiscal Flycatcher
	Myioparus plumbeus	Grey Tit-flycatcher
	Bradornis pallidus	Pale Flycatcher
	Cossypha natalensis	Red-capped Robin-chat
	Melaenornis pammelaina	Southern Black Flycatcher
	Muscicapa striata	Spotted Flycatcher
	Cercotrichas leucophrys	White-browed Scrub-robin
Musophagidae	*Tauraco livingstonii*	Livingstone's Turaco
	Gallirex porphyreolophus	Purple-crested Turaco
Nectariniidae	*Chalcomitra amethystina*	Amethyst Sunbird
	Hedydipna collaris	Collared Sunbird
	Cyanomitra veroxii	Grey Sunbird
	Cyanomitra olivacea	Olive Sunbird
	Cinnyris bifasciatus	Purple-banded Sunbird
	Chalcomitra senegalensis	Scarlet-chested Sunbird
	Cinnyris talatala	White-bellied Sunbird
Nicatoridae	*Nicator gularis*	Eastern Nicator
Numididae	*Guttera edouardi*	Crested Guineafowl
	Numida meleagris	Helmeted Guineafowl

Oriolidae	*Oriolus larvatus*	Black-headed Oriole	
	Oriolus oriolus	Eurasian Golden Oriole	
Otididae	*Lissotis melanogaster*	**Black-bellied Bustard**	NT
	Neotis denhami	**Denham's Bustard**	VU
Pandionidae	*Pandion haliaetus*	Osprey Osprey	
Paridae	*Parus niger*	Southern Black Tit	
Passeridae	*Passer domesticus*	House Sparrow	
	Passer diffusus	Southern Grey-headed Sparrow	
	Petronia superciliaris	Yellow-throated Petronia	
Pelecanidae	*Pelecanus onocrotalus*	**Great White Pelican**	VU
	Pelecanus rufescens	**Pink-backed Pelican**	VU
Phalacrocoracidae	*Phalacrocorax capensis*	**Cape Cormorant**	EN
	Phalacrocorax africanus	Reed Cormorant	
	Phalacrocorax lucidus	White-breasted Cormorant	
Phasianidae	*Coturnix coturnix*	Common Quail	
	Pternistis natalensis	Natal Spurfowl	
	Pternistis swainsonii	Swainson's Spurfowl	
Phoenicopteridae	*Phoenicopterus ruber*	**Greater Flamingo**	NT
	Phoenicopterus minor	**Lesser Flamingo**	NT
Phoeniculidae	*Rhinopomastus cyanomelas*	Common Scimitarbill	
Phylloscopidae	*Phylloscopus trochilus*	Willow Warbler	
Picidae	*Dendropicos fuscescens*	Cardinal Woodpecker	
	Campethera abingoni	Golden-tailed Woodpecker	
Platysteiridae	*Platysteira peltata*	Black-throated Wattle-eye	
	Batis molitor	Chinspot Batis	
Ploceidae	*Ploceus capensis*	Cape Weaver	
	Ploceus bicolor	Dark-backed Weaver	
	Euplectes axillaris	Fan-tailed Widowbird	
	Ploceus xanthops	Golden Weaver	
	Ploceus intermedius	Lesser Masked-weaver	
	Quelea quelea	Red-billed Quelea	
	Euplectes ardens	Red-collared Widowbird	
	Quelea erythrops	Red-headed Quelea	
	Ploceus xanthopterus	Southern Brown-throated Weaver	
	Ploceus velatus	Southern Masked-weaver	
	Ploceus ocularis	Spectacled Weaver	
	Amblyospiza albifrons	Thick-billed Weaver	
	Ploceus cucullatus	Village Weaver	
	Euplectes albonotatus	White-winged Widowbird	
	Ploceus subaureus	Yellow Weaver	
Podicipedidae	*Tachybaptus ruficollis*	Little Grebe	
Pycnonotidae	*Pycnonotus tricolor*	Dark-capped Bulbul	
	Andropadus importunus	Sombre Greenbul	
	Phyllastrephus terrestris	Terrestrial Brownbul	
	Chlorocichla flaviventris	Yellow-bellied Greenbul	
Rallidae	*Crecopsis egregia*	African Crake	
	Porphyrio madagascariensis	African Purple Swamphen	
	Rallus caerulescens	African Rail	
	Porphyrio alleni	Allen's Gallinule	
	Porzana pusilla	Baillon's Crake	
	Amaurornis flavirostris	Black Crake	
	Gallinula chloropus	Common Moorhen	
	Fulica cristata	Red-knobbed Coot	
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt	
	Recurvirostra avosetta	Pied Avocet	
Rostratulidae	*Rostratula benghalensis*	**Greater Painted-snipe**	VU
Sarothruridae	*Sarothrura elegans*	Buff-spotted Flufftail	
	Sarothrura rufa	Red-chested Flufftail	
Scolopacidae	*Gallinago nigripennis*	African Snipe	
	Limosa lapponica	Bar-tailed Godwit	
	Tringa nebularia	Common Greenshank	
	Actitis hypoleucos	Common Sandpiper	
	Numenius phaeopus	Common Whimbrel	
	Calidris ferruginea	Curlew Sandpiper	
	Numenius arquata	**Eurasian Curlew**	NT

	Calidris minuta	Little Stint	
	Tringa stagnatilis	Marsh Sandpiper	
	Calidris canutus	Red Knot	
	Arenaria interpres	Ruddy Turnstone	
	Philomachus pugnax	Ruff Ruff	
	Calidris alba	Sanderling Sanderling	
	Xenus cinereus	Terek Sandpiper	
	Tringa glareola	Wood Sandpiper	
Scopidae	*Scopus umbretta*	Hamerkop Hamerkop	
Strigidae	*Strix woodfordii*	African Wood-owl	
	Asio capensis	Marsh Owl	
	Bubo africanus	Spotted Eagle-owl	
Sturnidae	*Lamprotornis corruscus*	Black-bellied Starling	
	Lamprotornis nitens	Cape Glossy Starling	
	Acridotheres tristis	Common Myna	
	Sturnus vulgaris	Common Starling	
	Onychognathus morio	Red-winged Starling	
	Cinnyricinclus leucogaster	Violet-backed Starling	
	Creatophora cinerea	Wattled Starling	
Sulidae	*Morus capensis*	**Cape Gannet**	VU
Sylviidae	*Sylvia borin*	Garden Warbler	
Threskiornithidae	*Threskiornis aethiopicus*	African Sacred Ibis	
	Platalea alba	African Spoonbill	
	Plegadis falcinellus	Glossy Ibis	
	Bostrychia hagedash	Hadeda Ibis	
Trogonidae	*Apaloderma narina*	Narina Trogon	
Turdidae	*Psophocichla litsipsirupa*	Groundscraper Thrush	
	Turdus libonyanus	Kurrichane Thrush	
	Zoothera guttata	**Spotted Ground-thrush**	EN
Turnicidae	*Turnix sylvaticus*	Kurrichane Buttonquail	
Tytonidae	*Tyto alba*	Barn Owl	
Upupidae	*Upupa africana*	African Hoopoe	
Viduidae	*Vidua funerea*	Dusky Indigobird	
	Vidua macroura	Pin-tailed Whydah	
	Vidua chalybeata	Village Indigobird	
Zosteropidae	*Zosterops virens*	Cape White-eye	

b. Appendix 2: Curriculum vitae of authors

Dr Jane Turpie

Born:	17 March 1965, Durban, South Africa
Present occupations:	Director: Anchor Environmental Consultants (Pty) Ltd Senior Research Fellow: Environmental Policy Research Unit, School of Economics, University of Cape Town Honorary Research Associate: South African Institute of Aquatic Biodiversity
Work address:	8 Steenberg House, Silverwood Close, Tokai 7945, South Africa. Tel. (021) 701 3420 Fax (021) 701 5280 Cell: 082 4595960.
Email address	jane@anchorenvironmental.co.za; jane.turpie@uct.ac.za
Memberships:	European Association of Environmental and Resource Economists African Association of Environmental and Resource Economists South African Association of Professional Natural Scientists 400577/14

Summary profile

Dr Turpie has a background in ecology and has worked and taught in the applied fields of ornithology, conservation biology and resource economics for the past 30 years. Her work includes quantification and valuation of ecosystem services, household livelihoods and pressures on natural resources, modelling socio-ecological systems, incentive and financing systems for conservation including payments for ecosystem services, integrated conservation and development planning, quantitative scenario analysis for integrated water resource management, and impact and adaptation studies relating to climate change and biodiversity. Jane is director of Anchor Environmental Consultants, a part-time Senior Research Fellow of the Environmental-Economics Policy Research Unit at the School of Economics, University of Cape Town, and an Honorary Research Fellow of the South African Institute of Aquatic Biodiversity. Jane has supervised 44 postgraduate students, published 66 peer-reviewed papers in ecology, conservation and economics disciplines, 14 book chapters, and numerous technical reports.

Working experience

2011 to present: Senior Research Fellow, Environmental Economics Policy Research Unit, University of Cape Town, and from 2021 heading the Environment for Development's Natural Capital Collaborative (10 countries).
2009 to present: Contract lecturer for Percy FitzPatrick Institute Conservation Biology MSc Coursework module on Environmental Economics and Policy.
2003 to present: Director, Anchor Environmental Consultants.
2003- 2009 Senior Lecturer at the Percy FitzPatrick Institute of African Ornithology (PFIAO), UCT;
1997 to 2002: Lecturer at the PFIAO and Zoology Department, UCT;
Jan to Dec 1996: Senior Scientific Officer at the PFIAO; primary research projects on economic aspects of coastal tourism and waterfowl conservation in Africa.
March 1994 to Dec 1995: Scientific Officer at the PFIAO, primarily in the fields of conservation biology and resource economics, with particular reference to protected areas.
January-December 1989: Research assistant to Dr P.A.R. Hockey (PFIAO), on a variety of ornithological projects.

Tertiary Education and Qualifications

• **PhD** (Behavioural Ecology/Estuary/Ornithology) - University of Cape Town 1990-1994
Thesis title: Comparative foraging ecology of two broad-ranging migrants, Grey Plover *Pluvialis squatarola* and Whimbrel *Numenius phaeopus* (Aves: Charadrii), in tropical and temperate latitudes of the western Indian Ocean.
• **BSc Honours** (Zoology) - University of Cape Town 1986
• **BSc** (Zoology) - University of Cape Town 1983-1985; Class medal for Marine ecology
• **Matriculated 1982** (Collegiate School for Girls, Port Elizabeth); Class prize for Standards 6 to 10; honours blazer for academic achievement, matric Geography prize. Matric overall aggregate: A.

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Leigh-Ann de Wet

M.Sc (*Pr Sci Nat*)

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Identity Number: 8209010127081

Date of birth: 1 September 1982

Profile Summary

Working experience throughout South Africa, Southern Africa West and Central Africa and also Madagascar.
Specialist experience in exploration, mining, engineering, hydropower, private sector and renewable energy.
Experience with project management for national and international biodiversity projects.
Experience with IFC Performance Standards, Critical Habitat and High Conservation Value Assessments. Experience in numerous vegetation and habitat types throughout Africa,
Specialist expertise includes botany, forest ecology, avifauna and terrestrial fauna. Methodology development, conservation management and terrestrial monitoring.

Areas of Interest

Forest ecology and ecosystem functionality.
Ecology and plant identification.
Field methodology.
Publication of scientific journals and articles.

Key Experience

- Familiar with World Bank, Equator Principles and the International Finance Corporation requirements.
- Familiar with High Conservation Value assessments as per ProForest guidelines.
- Conservation Management Plans.
- Flora assessments.
- Avifauna assessments.
- Terrestrial fauna assessments.
- Monitoring.
- Ecosystem services
- Rehabilitation Plans.
- Alien Invasive Plant Management Plans.
- Permitting.

Country Experience

Mozambique,
Malawi,
Zambia,
Madagascar,
Liberia,
Guinea'
Democratic Republic of the Congo,
South Africa

Nationality

South African

Languages

English – Proficient
Afrikaans – Conversational
Zulu - Basic

Qualifications

- MSc (Rhodes University) – Botany.
- BSc Honours (Rhodes University) – Botany
- BSc Natural Science (Botany and Entomology)
- Pr Sci Nat (400233/12)
- Certificate of Competence: UFS Introduction to wetland delineation.
- Certificate of Competence: UFS Introduction to wetland law
- Certificate of competence: Africa Land Use Training Grass Identification (long and short course)
- Certificate of Competence: ASI Snake Awareness, first aid for snake bite and venomous snake handling.

SELECTED PROJECT EXPERIENCE

Project Name: The Environmental Impact Assessment for the Karpowership Project including ships, and associated terrestrial infrastructure in Richards Bay, Coega and Saldanha Bay, South Africa.

Personal position / role on project: Specialist Terrestrial Ecologist and Avifauna specialist.
Location: South Africa (including KZN, Eastern and Western Cape) (2021).
Main project features: To determine the current status of the avifauna and terrestrial biodiversity.

Project Name: A biodiversity baseline and impact assessment for the proposed Siguiri Gold Mine Project, in Kankan Province, Guinea.

Personal position / role on project: Botanist
Location: Guinea

Main project features: To conduct a dual season ecological baseline assessment for the expected impact footprint area. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: The Environmental Impact Assessment for the proposed Sibaya Node 6 development, Umdloti, South Africa.

Personal position / role on project: Terrestrial Ecologist

Location: South Africa

Main project features: To conduct a flora and fauna specialist assessment of the proposed mixed use development location and determine the impacts associated with the proposed development in relation to terrestrial fauna and flora.

Project Name: Terrestrial Biodiversity Monitoring (including rehabilitation, alien vegetation and indigenous ecology) for the Sibaya Node 6 development, Umdloti, South Africa.

Personal position / role on project: Terrestrial Ecologist

Location: South Africa

Main project features: To conduct monthly monitoring for the Sibaya Node 6 development (Salta) for 6 months including completing a detailed Vegetation Assessment, Rehabilitation Plan, Plant Rescue Plan, Conservation Management Plan and Biodiversity Action Plan.

Project Name: The Environmental Impact Assessment for the proposed Roodeplaatwind energy facility, Eastern Cape, South Africa.

Personal position / role on project: Terrestrial Ecologist

Location: South Africa

Main project features: To conduct a flora and fauna specialist assessment of the proposed wind farm location and determine the impacts associated with the proposed development in relation to terrestrial fauna and flora. This included An Ecological Assessment, Rehabilitation Plan, Plant Rescue and Protection Plan, Open Space Management Plan and Alien Vegetation Management Plan.

Project Name: The Environmental Impact Assessment for the proposed Roodeplaatwind energy facility, Eastern Cape, South Africa.

Personal position / role on project: Terrestrial Ecologist

Location: South Africa

Main project features: To conduct a flora and fauna specialist assessment of the proposed wind farm location and determine the impacts associated with the proposed development in relation to terrestrial fauna and flora.

Project Name: Conservation Value Assessment for the City of Johannesburg (Little Falls Nature Reserve, Melville Koppies Nature Reserve, Ruimsig Butterfly Reserve and Rietfontein Nature Reserve)

Personal position / role on project: Terrestrial Ecologist

Location: Gauteng, South Africa

Main project features: Determination of the conservation potential and connectivity of four nature reserves within the City of Johannesburg including both fauna and flora.

Project Name: Feronia Palm Oil Projects, Including Boteka, Lokutu and Yaligimba, Democratic Republic of the Congo.

Personal position / role on project: Terrestrial Ecologist and HCV Specialist

Location: Democratic Republic of the Congo

Main project features: Determination and mapping of High Conservation Value areas within three oil palm plantations in the DRC to meet international best practice. Components including flora and fauna assessments as well as the integration of social aspects into the HCV assessment.

OVERVIEW

An overview of the specialist technical expertise includes the following:

- Terrestrial Ecological baseline assessments and categorization of the current condition of the environment.
- Ecosystem services for biodiversity, and the ecological and social interactions.
- Integration of specialist reports into IFC standard or HCV reporting.
- Design and adaptation of field methodology for assessment.
- Terrestrial Biodiversity offset strategy designs.
- Terrestrial rehabilitation plans.
- Monitoring plans for terrestrial systems.
- Faunal surveys which include mammals, birds, amphibians and reptiles.
- The design, compilation and implementation of Biodiversity and Land Management Plans and strategies.

EMPLOYMENT EXPERIENCE

The Biodiversity Company (March 2022 – Present)
Terrestrial Ecologist.
LD Biodivesity (August 2014 – March 2022)
Director and Terrestrial Ecologist
Digby Wells Environmental (July 2012 – September 2014)
Terrestrial Ecologist
Coastal and Environmental Services (March 2009 – June 2012)
Terrestrial Ecologist
PREVIOUS EMPLOYMENT: Rhodes University Department of Botany
Research Assisstant

ACADEMIC QUALIFICATIONS

Rhodes University, Grahamstown, South Africa (2007): MAGISTER SCIENTIAE (MSc) - Botany:
Title: *Pollinator mediated selection in Pelargonium reniforme Curtis (Geraniaceae): Patterns and Process.*
Rand Afrikaans University (RAU), Johannesburg, South Africa (2004): BACCALAUREUS SCIENTIAE CUM HONORIBUS (Hons) – Botany
Rand Afrikaans University (RAU), Johannesburg, South Africa (2001 - 2004): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Entomology and Botany.

PUBLICATIONS

Taylor, S, Ripley, B, Martin, T, **de Wet, L,** Woodward, I and Osborne, C (2014.) Physiological advantages of C4 grasses in the field: a comparative experiment demonstrating the importance of drought. Global Change Biology – in Press.

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Dr Barry Clark

Born:	25 August 1968; Livingstone, Zambia
Nationality:	South African, British
Languages:	English (excellent)/Afrikaans (good)
Present occupation:	Director: Anchor Environmental Consultants PTY Ltd.

ACADEMIC QUALIFICATIONS:

Ph.D. Marine Biology, 1997, University of Cape Town
BSc (Hons) Marine Biology, 1991, University of Cape Town
BSc Zoology and Ocean & Atmosphere Science, 1990, University of Cape Town

COUNTRY EXPERIENCE:

South Africa, Namibia, Lesotho, Mozambique, Tanzania, Kenya, Mauritius, Seychelles, Angola, Ghana, Cote d'Ivoire, Nigeria, Liberia, Sierra Leone, Somaliland, Republic of Congo, Egypt, United Arab Emirates, Azerbaijan

RELEVANT WORK AND PROJECT EXPERIENCE

- 1991-1993 – Scientific Officer, University of Cape Town
- 2000-2002 – Marine Coordinator, Cape Peninsula National Park
- 1996-Present - Director, Anchor Environmental Consultants PTY Ltd.
- 2002-Present – Research Associate, University of Cape Town

MEMBERSHIP OF PROFESSIONAL BODIES/ORGANISATIONS

- Professional Natural Scientist, registered with the South African Council for Natural Scientific Professions (2004-)
- Professional member of the South African Institute of Ecologists and Environmental Scientists (2000-)
- South African representative to the SURVAS Network (Synthesis and Upscaling of Sea-level Rise Vulnerability Assessment Studies) (2000-)
- Member of the International Association of Impact Assessors (IAIA) (2000-)
- Member of the Subsistence Fisheries Task Group (1999-2000)
- Member of the Subsistence Fisheries Advisory Group (2000-2002)
- Member of the South African Network for Coastal and Oceanic Research (SANCOR) Economics Task Team

SUMMARY PROFILE

Dr Barry Clark has thirty years' experience in marine biological research and consulting on coastal zone and marine issues. He has worked as a scientific researcher, lecturer and consultant and has experience in tropical, subtropical and temperate ecosystems. He is presently Director of an Environmental Consultancy firm (Anchor Environmental Consultants) and Research Associate at the University of Cape Town. As a consultant has been concerned primarily with conservation planning, monitoring and assessment of human impacts on estuarine, rocky shore, sandy beach, mangrove, and coral reef ecosystems as well as coastal and littoral zone processes, aquaculture and fisheries. Dr Clark is the author of 27 scientific publications in class A scientific journals as well as numerous scientific reports and popular articles in the free press. Geographically, his main area of expertise is southern Africa (South Africa, Lesotho, Namibia, Mozambique, Tanzania, Seychelles, Mauritius and Angola), but he also has working experience from elsewhere in Africa (Republic of Congo, Sierra Leone, Liberia, Cote d'Ivoire, Ghana, Nigeria), the Middle East (UAE) and Europe (Azerbaijan, Greenland).

SCIENTIFIC PUBLICATIONS

- **Clark,** B.M. 1997. Dynamics and utilization of surf zone habitats by fish in the south-western Cape, South Africa. PhD Thesis, University of Cape Town, 216 pp.
- SHELTON, J.M., **CLARK, B.M.,** SEPHAKA, T. & TURPIE, J.K. 2016. Population crash in Lesotho's endemic Maloti minnow *Pseudobarbus quathlambae* following invasion by translocated smallmouth yellowfish *Lebeobarbus aeneus*. *Aquatic Conservation: Marine and Freshwater Ecosystems.* DOI: 10.1002/aqc.2633.
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- **Clark, B.M.,** Hutchings, K. & Lamberth, S.J. 2009. Long-term variations in composition and abundance of fish in the Berg estuary, South Africa. Transactions of the Royal Society of South Africa 64(2): 238–258.
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- **Clark, B.M**. & B.A. Bennett 1993. Are juvenile fish an issue in the trek net controversy? *Fish, fishers and fisheries, Proc. 2nd Mar. Recreational Angling Symp., Durban, October 1992*. Beckley, L.E. & R.P. van der Elst (eds.) *Spec. Publ. oceanogr. Res. Inst. S. Afr*. 2: 157-159.
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- Branch, G.M. and **Clark, B.M**. 2006. Fish stocks and their management: The changing face of fisheries in South Africa. *Marine Policy* 30 (1): 3-17.
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- Niang, I., Nyong, A., **Clark, B.M.**, Desanker, P., Din, N., Githeko, A., Jalludin, M., Osman, B. (2007) Vulnerability, Impacts and Adaptation to Climate Change. In: Otter, L., Olago, D.O. and Niang, I. (eds) Global Change Processes and Impacts in Africa: A Synthesis. START/East African Educational Publishers, Nairobi, pp. 226-249.

SELECTED PROJECT EXPERIENCE

Period	Country	Client	Project, Tasks
2020-2021	**Sierra Leone**	**Iluka/Sierra Rutile/Digby Wells**	Environmental, Safety and Health Impact Assessment (ESHIA) for mining of the Sembehun group of deposits in the Southern Province of Sierra Leone
2020	**South Africa**	**Department of Forestry, Fisheries and the Environment**	Environmental assessment and monitoring for a sea-based Aquaculture Development Zone (ADZ) in Saldanha Bay
2020	**Kenya**	**Ministry of Water, Sanitation and Irrigation of Kenya / Aurecon**	Kenya Water Security and Climate Resilience Project - Development and piloting of a resource directed measures (RDM) Framework for Kenya
2020	**South Africa**	**Diamond Coastal Aquaculture**	Design and implementation of an environmental monitoring programme for an abalone ranching operation at Kleinzee, Northern Cape.
2020	**South Africa**	**Department Forestry Fisheries & Environment**	Implementation of an environmental monitoring programme for the Saldanha Bay Aquaculture Development Zone
2018	**Somaliland**	**WSP/DP World**	Marine specialist study for an Environmental and Social Impact assessment (ESIA) for the upgrade of Berbera Port, Somaliland
2017-2018	**Sierra Leone**	**Iluka/Sierra Rutile (Ltd)**	Marine and estuarine specialists studies for an Environmental, Social and Health Impact Assessment (ESHIA) for proposed expansions to Sierra Rutile Limited's mining operations in Sierra Leone
2017	**South Africa**	**Viking Fishing (Pty) Ltd**	Socio-economic assessment of a 60% reduction in Viking fishing group's allocation in the inshore demersal trawl fishery
2016-2017	**South Africa**	**Department of Agriculture, Forestry, Fisheries**	Assessment of catch and effort in the West Coast Rock Lobster recreational fishery
2014-2015	**South Africa**	**South African Pelagic Fishing Industry Association**	Assessment of the socio-economic impacts of a reduction in the sardine minimum Total Allowable Catch (TAC)
2014	**Seychelles**	**USAID**	Implementation of the "reef gardening" approach for restoration of coral reefs on Praslin Island, Seychelles, lost as a result of El Nino and global warming induced bleaching events.
2014	**South Africa**	**WWF-SA**	Design and development of a Fisheries Improvement Project for Small Scale Fisheries in the Kogelberg
2014	**Tanzania**	**Aurecon**	Development of a Spatial Development Framework for the coastal environment in the Mtwara/Mikandani Municipal area, Tanzania
2009-2011	**South Africa**	**WWF-SA, Lotto Programme**	Recreational fisheries monitoring programme coordinating a team of 20 fisheries monitors at 6 sites on the South and East coasts of South Africa.

Period	Country	Client	Project, Tasks
2009-2010	**Azerbaijan**	**United National Development Programme, Azerbaijan**	International consultant appointed to prepare Project Identification Form (PIF) and Project Preparation Grant (PPG) for a GEF medium-size project on the expansion of the marine and coastal protected area network in Azerbaijan.
2009	**Global**	**UNDP**	Researcher on an assessment of the impact of climate change on the Global Fisheries sector and opportunities and incentives required for adaptation
2008-2009	**Tanzania, Kenya**	**Programme for the Sustainable Management of the Coastal Zone of the Countries of the Indian Ocean**	Design and implementation of training courses and workshops on Information for Fisheries Co-Management in Dar es Salaam, Tanzania and Mombassa, Kenya.
2007-2011	**South Africa**	**Department of Environmental Affairs & Tourism**	Shore based fisheries monitoring programme designed to assess levels of fishing mortality, stock abundance indices and to evaluate the effectiveness of management measures for the commercial and recreational linefishery, tuna pole and hake handline fishing in South African waters.
2007-2011	**South Africa**	**Department of Environmental Affairs & Tourism**	Offshore, boat-based fisheries monitoring programme designed to supply and deploy aboard fishing vessels, competent, suitably trained and equipped scientific observers for the inshore trawl, hake longline and west coast rock lobster fisheries.
2006-2011	**Tanzania**	**International Conservation Union (IUCN)/Pangani Water Basin Office, Tanzania**	International mentor of the Estuary Team for a project entitled "Flows for People and the Environment: Supporting Sustainable Land Management in the Pangani Basin (Tanzania)".
2005-2007	**Angola, Namibia, South Africa**	**BCLME Programme/ United Nation Development Programme (UNDP)/ UNOPS/Global Environment Facility (GEF)**	Assessment of human capacity, training and infrastructure available within the three countries bordering the BCLME – Angola, Namibia and South Africa.
2005	**South Africa**	**Department of Environmental Affairs & Tourism**	Supervisor on a project to assess the socio-economic value and ecological impacts of the subsistence fishery for sand and mud prawns, and fish in the Knysna estuary, South Africa
2004-2008	**South Africa**	**WWF-SA/South African National Parks**	Development and implementation of a coastal monitoring programme for the Table Mountain National Park Marine Protected Area.
2004	**DRC, Angola, Namibia, South Africa, Mozamb., Tanz., Mauritius, Seychelles**	**EU-SADC MCS Fisheries Programme**	Production of instructional material and the holding of a seminar on the effects of pollutants, illegal fishing methods and the requirements of relevant conventions signed by the SADC states.
2004	**Mozambique**	**Southern African Development Community/ Government of Mozambique**	Production of a policy document and strategy for fisheries Monitoring Control Surveillance in Mozambique.
2004	**South Africa**	**EKZN Wildlife Service/ Department of Environmental Affairs and Tourism (DEAT)**	Review and assessment of the management of subsistence fisheries in KwaZulu-Natal, South Africa.
2002-2003	**South Africa**	**Department of Environmental Affairs & Tourism**	Assessment of the quantity of abalone caught by recreational fishers during the 2002/2003 fishing season.

Period	Country	Client	Project, Tasks
2002	**Africa**	**GEF/UNDP UNESCO/IOC/ACOPS**	Regional Technical Coordinator for the Working Group on Sustainable Use of Living Resources as part of Phase 2 of the GEF MSP Sub-Saharan Africa Project (GF/6010-0016): Development and Protection of the Coastal and Marine Environment in Sub-Saharan Africa.
2002	**South Africa**	**Department of Environmental Affairs & Tourism**	Acoustic tracking study of the West Coast rock lobster (*Jasus lalandii*) in the Hermanus Whale Sanctuary, on the south-west coast of South Africa.
2002	**South Africa**	**Department of Environmental Affairs & Tourism**	Assessment of sardine migration habitats off the East coast of South Africa.
2002	**South Africa**	**Department of Environmental Affairs & Tourism**	Fisheries monitoring programme for an experimental hoop-net fishery for west coast rock lobster off Cape Hangklip, South Africa.
2002	**South Africa**	**University of Rhode Island/ History of Marine Animal Populations**	Desktop assessment of the likely impacts of climate change on the ecosystem functioning and fisheries of the Benguela ecosystem, South Africa.
2001-2002, 2009-2010	**South Africa**	**Department of Environmental Affairs & Tourism**	Assessment of the quantity of west coast rock lobster caught by recreational fishers during the 2001/2002 and 2009/2010 fishing seasons.
2001-2003	**South Africa**	**Department of Environmental Affairs & Tourism/ Rhodes University**	Economic Sectoral Study of the South African Fishing Industry.
2000-2002	**South Africa**	**South African National Parks**	Marine Coordinator Cape Peninsula National Park, responsible for the design and development of a marine component for the newly established Cape Peninsula National Park.
1999-2000	**South Africa**	**Foundation for Research Development**	Assessment of impacts of exploitation of wonderworm *Marphysa sanginea* on bouldershore habitats on the Cape Peninsula, South Africa.
1999-2000	**South Africa**	**Department of Environmental Affairs & Tourism, South Africa**	National Co-ordinator of the Subsistence Fisheries Programme designed to identify subsistence fishing communities in South Africa, to assess socio-economic profiles and resource harvesting techniques and to provide recommendations for the implementation of appropriate management systems for these fishers.

environmental affairs

Department
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/14/12/16/3/3/2007
Date Received:	02 November 2020

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

The Proposed Gas to Power Powership Project at the Port of Richards Bay, Umhlathuze Local Municipality, King Cetshwayo District, Kwazulu-Natal.

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1.

SPECIALIST INFORMATION

Specialist Company Name:	The Biodiversity Company			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	2	Percentage Procurement recognition	
Specialist name:	Leigh-Ann de Wet			
Specialist Qualifications:	MSc			
Professional affiliation/registration:	SACNASP (400233/12)			
Physical address:	12 Sunningdale Avenue, Howick			
Postal address:	12 Sunningdale Avenue, Howick			
Postal code:	3290	Cell:	0833521936	
Telephone:	0833521936	Fax:		
E-mail:	Leigh-ann@thebiodiversitycompany.com			

2. DECLARATION BY THE SPECIALIST

I, ____Leigh-Ann de Wet_____, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

The Biodiversity Company

Name of Company:

27/10/2022

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, ____Leigh-Ann de Wet_____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

The Biodiversity Company

Name of Company

Date

Signature of the Commissioner of Oaths

13:30 27/10/2022.

Date

CERTIFIED TRUE COPY
I Certify that this document is a true copy of the original which was examined by me and that, from my observations, that there are no indications that the original document has been altered by unauthorised persons

SIGN _____ DATE 27/10/22 TIME 13:30

EX-OFFICIO COMMISSIONER OF OATHS (RSA)
SEAN GORDON TOPPER
PRINCIPAL
ST NICHOLAS DIOCESAN SCHOOL
34 JABU NDLOVU STREET, PIETERMARITZBURG
TEL 033 345 1566
EMAIL reception@stnicholas.co.za

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

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PROJECT TITLE

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Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Anchor Environmental Consultants (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Non-compliant	Percentage Procurement recognition	
Specialist name:	Barry Clark			
Specialist Qualifications:	Ph D Marine Ecology			
Professional affiliation/registration:	SACNASP 400021/05			
Physical address:	8 Steenberg House, Silverwood Close, Tokai			
Postal address:	8 Steenberg House, Silverwood Close, Tokai			
Postal code:	7945	Cell:	0823730521	
Telephone:	021 7013420	Fax:		
E-mail:	Barry @anchorenvironmental.co.za			

2. DECLARATION BY THE SPECIALIST

I, Barry Clark; declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

Anchor Environmental Consultants (Pty) Ltd

Name of Company:

2 November 2022

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Barry Clark, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Anchor Environmental Consultants (Pty) Ltd

Name of Company

2 November 2022

Date

Signature of the Commissioner of Oaths

4·10·2022

Date

Janine van Graan
Commissioner of Oaths
Professional Accountant (SA)
SAIPA Membership No. 7380
Minter House, 1 Otto Close
Westlake, 7945