



Pembroke – Poseidon 400 kV Freshwater Walkdown Report

**Buffalo City, Amathole and Cacadu District
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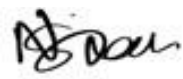

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Declaration	<p>The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, Amended. We have no conflicting interests in the undertaking of this activity and have no interest in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.</p>	

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1 Introduction

1.1 Background

The Biodiversity Company was commissioned to conduct a freshwater ecological walkdown survey in support of the site-specific Environmental Management Programme report (EMPr) and/or Water Use Authorisation process for the proposed ±165 km 400 kV powerline from the Pembroke to the Poseidon Substation as part of the proposed Greater East London Phase 4 Project. The proposed powerline starts near Qonce and ends near Cookhouse, traversing the Buffalo City Metropolitan, Raymond Mhlaba and Blue Crane Route Local Municipalities in the Eastern Cape ([Figure 1-11](#) ~~Figure 1-4~~).

According to the National Transmission Company South Africa SOC LTD (2024) this project is part of the minimum strengthening requirements in the Eastern Cape Province in meeting the IRP 2019 renewable generation integration. There is high potential for wind generation around Poseidon Substation. The expected renewable energy generation to be evacuated from the Port Elizabeth power pool is approximately 5 GW as per the IRP 2019. There has been minimal progress achieved on the Greater East London Strengthening phase 4 project thus far because of resource constraints as well as the relocations on the revised Greater East London strengthening phase 3 (Neptune – Pembroke 400 kV line and associated substation works) that were taking priority. The phase 4 project only recently became a priority project due to the IRP 2019. The concept designs that were originally done for Greater East London Strengthening phase 3 was no longer applicable to the Greater East London Phase 4 because of the re-phasing and change of scope and it was no longer valid as it was done almost 10 years ago. The concept designs for the Greater East London strengthening phase 4 project was recently redone and approved at the PDE DRT.

Eskom had provided four corridor options as part of the initial EIA process for the Neptune – Poseidon 400 kV powerline in 2012 where NEMA Consulting was appointed to do the Environmental Impact Assessment report. Freshwater ecosystems were only identified on a desktop level for the EIA phase of the project with the recommendation of having a walkdown survey to determine the final location of pylon towers ensuring that freshwater features and their respective buffers that are delineated during the walkdown are avoided.

The purpose of the ecological walkdown was to undertake a walking survey of the ±165 km, 400 kV power line from Pembroke to Poseidon and identify buffers, sensitive sites, no-go areas and provide site-specific mitigation measures where necessary. Thereafter, to advise if there is a need to change the pylon/tower location based on the anticipated impact.

A 500 m radius has been demarcated for the project to facilitate the identification of wetlands; this area is referred to as the Project Area of Influence (PAOI). This report only presents the findings from the freshwater ecological walkdown, and should be considered in conjunction with other disciplines, specifically the terrestrial findings. These disciplines will collectively provide the demarcation of ecological constraints for the larger area.

The walkdown was undertaken from the 7th to the 17th of April 2024. The survey constituted a late wet season/high flow assessment.

This assessment has been completed in accordance with the requirements of the published Government Notice (GN) 4167 by the Department of Water and Sanitation (DWS) (previously GN 509 of 2016 and GN 3139 of 2023). The said notice was published in the Government Gazette (no. 49833) under Section 39 of the National Water Act (Act no. 36 of 1998) in December 2023, for a Water Use Licence (WUL) in terms of Section 21(c) & (i) water uses. The GN 4167 process provides an allowance to apply for a WUL for Section 21(c) & (i) under a General Authorisation (GA), as opposed to a full Water Use Licence Application (WULA). A water use (or potential) qualifies for a GA under GN 4167

when the proposed water use/activity is subjected to analysis using the DWS Risk Assessment Matrix (RAM), provided the identified risks are all considered a low risk, and the applicant is listed under Appendix D1 or Appendix D2 of the same notice. This assessment will implement the RAM and provide a specialist opinion on the favourability for a water use authorisation.

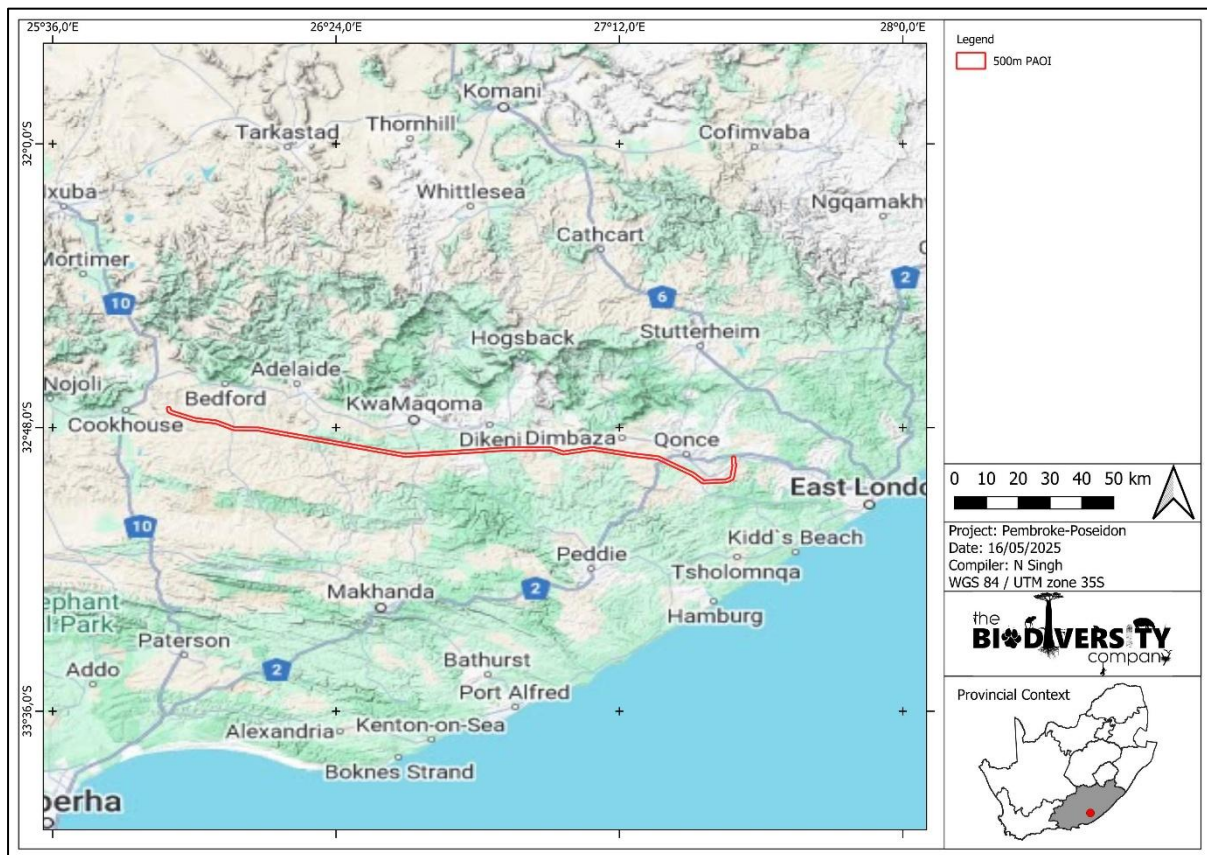


Figure 1-11114 Location of the proposed project

1.2 Terms of Reference

The aim of the assessment was to provide information to guide the proposed infrastructure development with respect to the location of the associated watercourse in the project area. This was achieved through the following:

- Review of existing information related to the development;
- Conduct a freshwater ecological walkdown for the planned footprint areas;
- Compilation of a report detailing the results of the walkdown:
 - Detail and ecological constraints identified for the planned infrastructure; and
 - Provide information and recommendations for the micro-siting of relevant infrastructure.
- Provide information to adequately inform any contractors, environmental officers and personnel pertaining to the ecological significance for the area.

1.3 Project Area

The powerline pylon positions were supplied by the client. The precise locations of each towers/pylon were visited and used as guidelines during the walkdown and ecosystem evaluation phase. The powerline route, tower placement and respective 500 m PAOI for the identification and delineation of water resources is indicated in [Figure 1-2222](#)[Figure 1-22](#)[Figure 1-2](#). The maps in the following sections show limited extents of the PAOI in detail and the areas displayed were not selected based on any criteria and are included to provide context for the project.

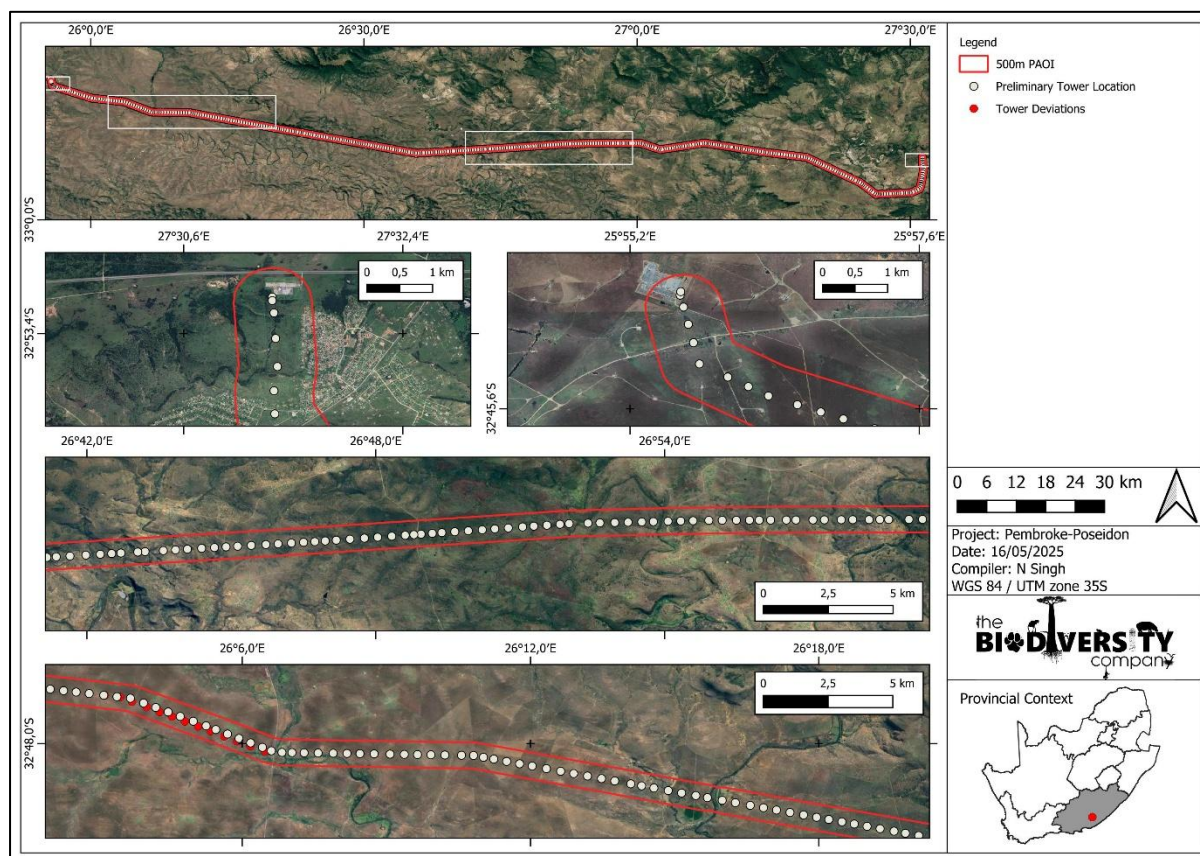


Figure 1-2222 Proposed route, pylon placement and Project Area of Influence. Top – Entire route; Second Row (Left) – Start of route; Second Row (Right) – End of route; Third Row – General overview of tower spacing and; Fourth Row – Tower deviations

1.3.1 Desktop Dataset Assessment

The PAOI traverses the South Eastern Uplands Ecoregion in the extreme east followed by the Eastern Coastal Belt Ecoregion and the Drought Corridor Ecoregion within the Mzimvubu-Tsitsikamma Water Management Area (WMA) (GG no. 49225, GN no. 3855, 2023). At a finer scale, the proposed powerline route will intersect the R20F, R20E, R20D, R10K, R10E, R10H, Q94F, Q92G, Q92E and Q92F quaternary catchments.

The topographical inland and river line data indicated several inland water areas within the PAOI, which were classified as dams and non-perennial pans ([Figure 1-3333](#)[Figure 1-33](#)[Figure 1-3](#)). Furthermore, a network of non-perennial drainage features and several perennial features were identified ([Figure 1-3333](#)[Figure 1-33](#)[Figure 1-3](#)).

The two major dams intersected are the Laing and Debe dams with the remaining features being smaller earth dams used for agricultural purposes. The main river systems intersected by the proposed project are discussed in the following sections.

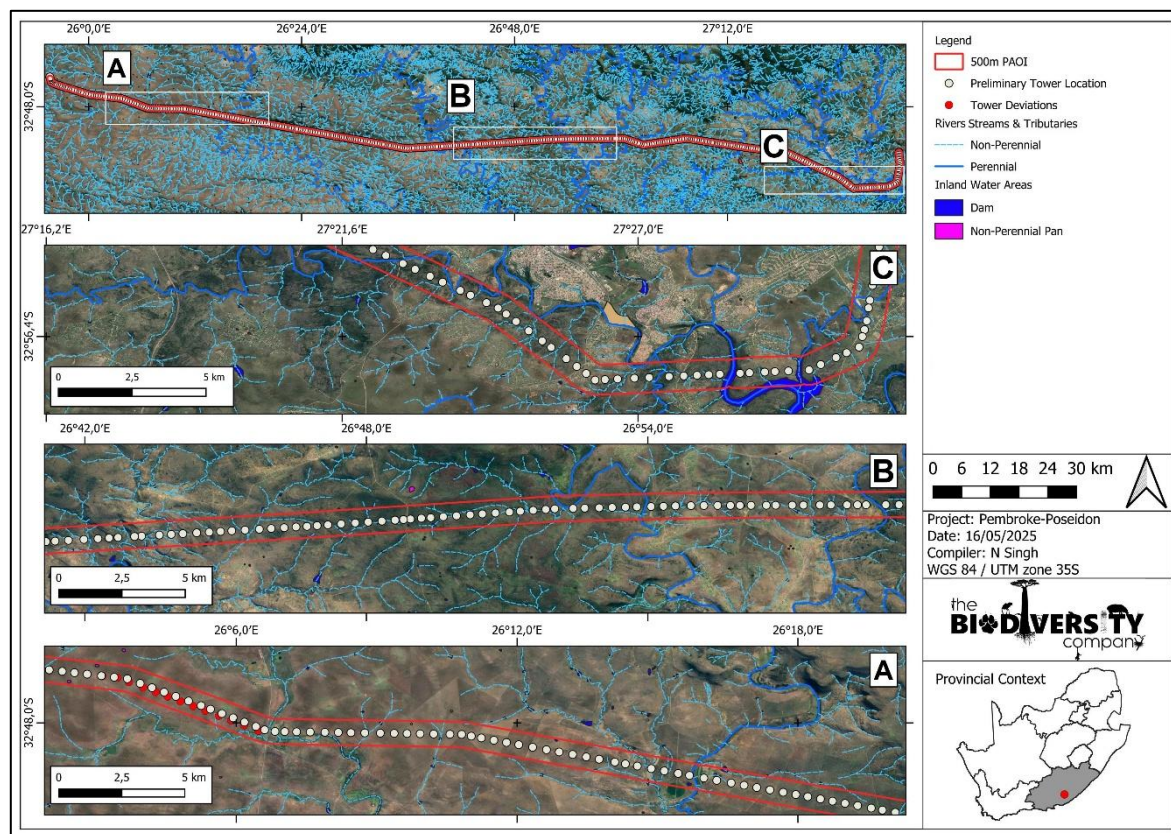


Figure 1-33333 Topographical Inland Water Areas and River Lines that intersect the Project Area of Influence

1.3.1.1 South African Inland Inventory of Aquatic Ecosystems

Various (15) wetland features were identified within the PAOI by means of the South African Inland Inventory of Aquatic Ecosystems (SAIIAE) dataset, classified as being rivers, depressions, seeps and channelled-valley-bottoms. A map representing these features was not included due to the scale of the project and given that there is likely a presence of more features than represented by the dataset. Nevertheless, the features identified by the dataset were classified to be “Endangered” or “Critically Endangered” ecosystems with a “Not Protected” status. Furthermore, majority of the wetlands were classified according to the dataset to have “D/E/F – Largely/Seriously/Critically Modified” conditions with some features having an “A/B – Natural/Largely Natural” condition.

In addition, several rivers were identified and are discussed in the table below.

Table 1-11114 Rivers (SAIIAE – NBA, 2018) identified within the PAOI

River Name	Ecosystem Protection Level	Ecosystem Threat Status	Approximated Intersection Location
Tshabo	Poorly Protected	Endangered	32°55'42.46"S 27°31'15.63"E
Tshabo	Not Protected	Critically Endangered	32°57'2.39"S 27°29'59.07"E
Buffalo	Poorly Protected	Least Threatened	32°57'5.12"S 27°28'47.27"E
Ngqokweni	Not Protected	Least Threatened	32°55'28.94"S 27°23'35.93"E
Tshoxa	Not Protected	Least Threatened	32°54'59.80"S 27°22'33.18"E

Mdizeni	Not Protected	Least Threatened	32°52'28.81"S 27°13'21.24"E
Debe	Not Protected	Endangered	32°51'57.31"S 27° 1'30.07"E
Keiskamma	Not Protected	Critically Endangered	32°51'34.41"S 26°58'52.18"E
Tyume	Not Protected	Endangered	32°51'37.88"S 26°53'55.95"E
Mxelo	Poorly Protected	Endangered	32°52'13.44"S 26°43'23.37"E
Kat	Not Protected	Critically Endangered	32°52'26.54"S 26°39'27.70"E
Rietfonteinspruit	Poorly Protected	Endangered	32°52'10.61"S 26°32'47.23"E
Kroomie	Poorly Protected	Endangered	32°51'3.55"S 26°26'40.73"E
Koonap	Not Protected	Critically Endangered	32°49'8.26"S 26°15'45.68"E
Tributary to the Koonap	Poorly Protected	Endangered	32°48'58.41"S 26°14'49.82"E
eNyara	Not Protected	Critically Endangered	32°48'10.01"S 26° 6'42.59"E

1.3.1.2 Eastern Cape Conservation Plan

According to the Eastern Cape Conservation Plan for freshwater biodiversity ([Figure 1-4444Figure 1-44Figure 1-4](#)), the PAOI intersects the following map categories:

- Critical Biodiversity Areas 1;
- Critical Biodiversity Areas 2; and
- Ecological Support Areas 2.

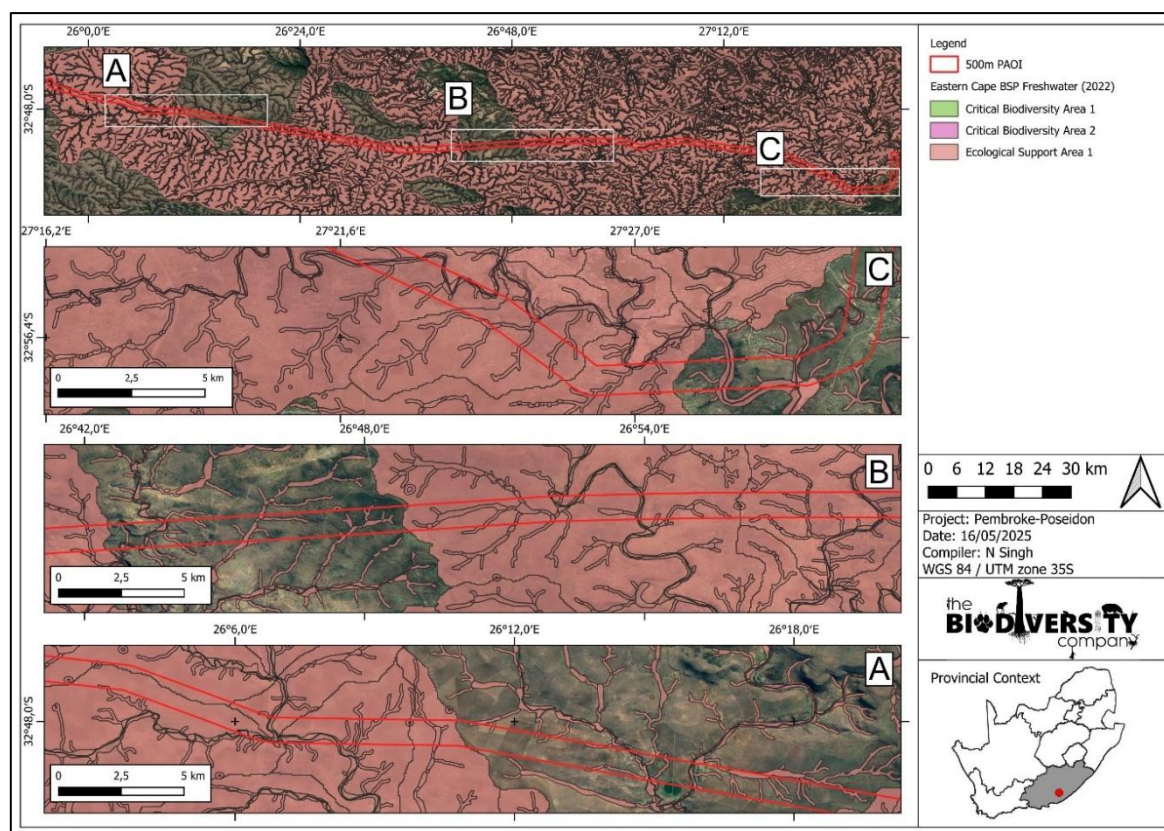


Figure 1-4444 Eastern Cape Conservation Plan overlayed with the Project Area of Influence

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It has been assumed that the spatial files provided to the specialist are accurate;
- Apart from the location of the proposed pylon infrastructure as indicated in [Figure 1-2222Figure 1-22Figure 1-2](#), no other relevant spatial information in terms of the structure design was provided in relation to the proposed development at the time of report preparation;
- Due to the nature of the assessment (i.e. a walkdown) areas characterised by external wetland attributes were the focus for this assessment in order to compute delineations and areas within the 500 m PAOI were delineated via desktop. Therefore, there is a likelihood of wetland features existing within the PAOI that did not form part of the delineation;
- A single survey was conducted, thus temporal trends were not investigated;
- Access to certain pylons (No. 39, 103, 104, 201-210 and, 259-265) was not possible during the survey due to the thickness of vegetation, traditional activities taking place in proximity to the tower, the presence of high electrified fences which could not be crossed and fenced-off servitude gates. Freshwater delineations with regard to these towers have been undertaken at a desktop level with a medium confidence and is considered sufficient for this stage of the assessment;
- No detailed ecological assessments are included in the report as this document focuses only on the findings of the walkdown in relation to the identification and delineation of freshwater ecosystems which was done at a desktop level for large parts of the 500 m PAOI;
- Some powerline towers were noted to be located within the watercourses or in close proximity to the watercourse areas. Therefore, alternative positions or locations were suggested. These suggestions are based solely on water resources features and the spatial layers for the PAOI. Therefore, other sensitivity layers (such as soils, terrestrial fauna, and flora) should be consulted before approval; and
- The GPS used for water resource delineations is accurate to within five meters. Therefore, the wetland delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

1.5.1 National Water Act (NWA, 1998)

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way;
- The prevention of the degradation of the water resource; and
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem, not just the water itself, constitutes a water resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

1.5.2 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

2 Walkdown

The specialist traversed the planned powerline route and visited each pylon or tower location (where accessible) on foot with the intention of identifying ecologically sensitive freshwater habitats. The site coverage by the specialist is indicated in [Figure 2-1111](#) [Figure 2-11](#) [Figure 2-1](#).

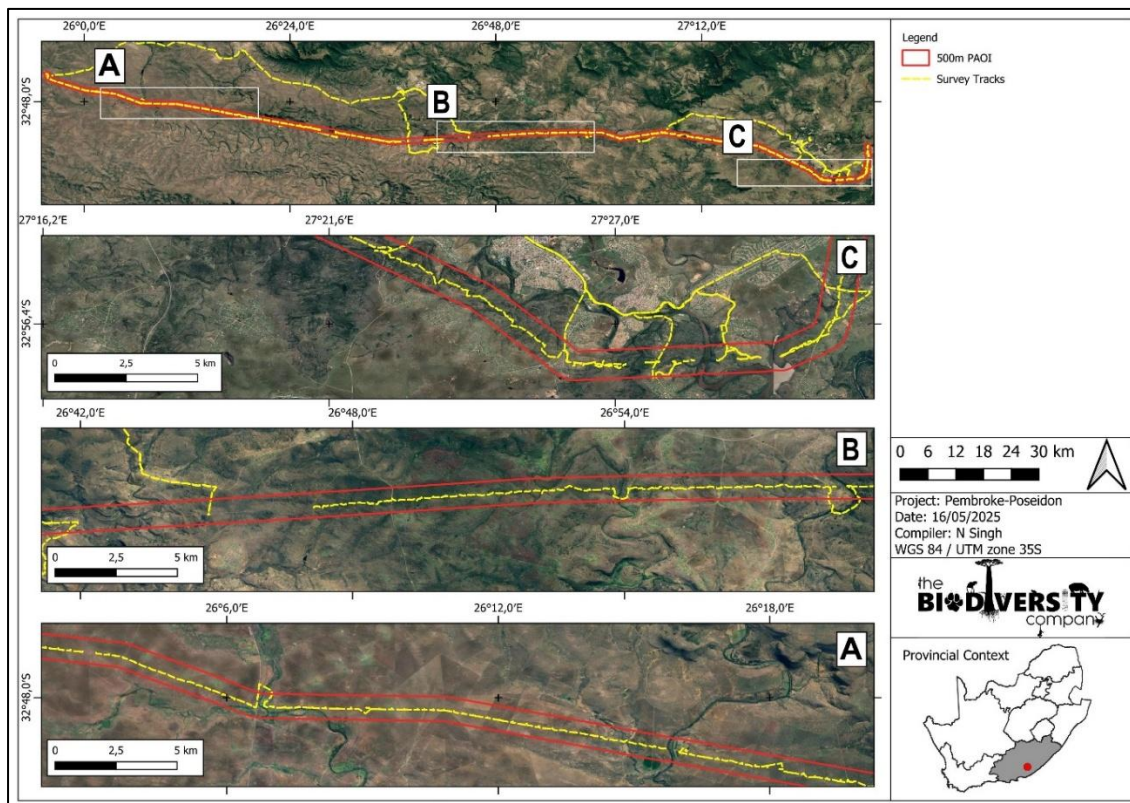


Figure 2-1111 Specialist GPS survey track

During the walkdown assessment multiple watercourses were identified and delineated. The delineation maps were not included in the report due to the scale of the project, however the delineation shapefiles and a set of maps for the entire powerline will be provided by the specialist and must accompany this report. Due to the scale of the project, the watercourses were grouped into feature types such as: HGM Units (Wetlands were further categorised according to the HGM type), Riparian Rivers, Non-perennial Drainages, Preferential Flow Paths, Stormwater Drainage, Dams and Artificial Wetlands. These distinctions were made based on the observable characteristic vegetation, soil, hydrology and topographic setting of the watercourses. Representative photographs of each feature type are displayed in [Figure 2-2222](#) ~~Figure 2-22~~ ~~Figure 2-2~~.

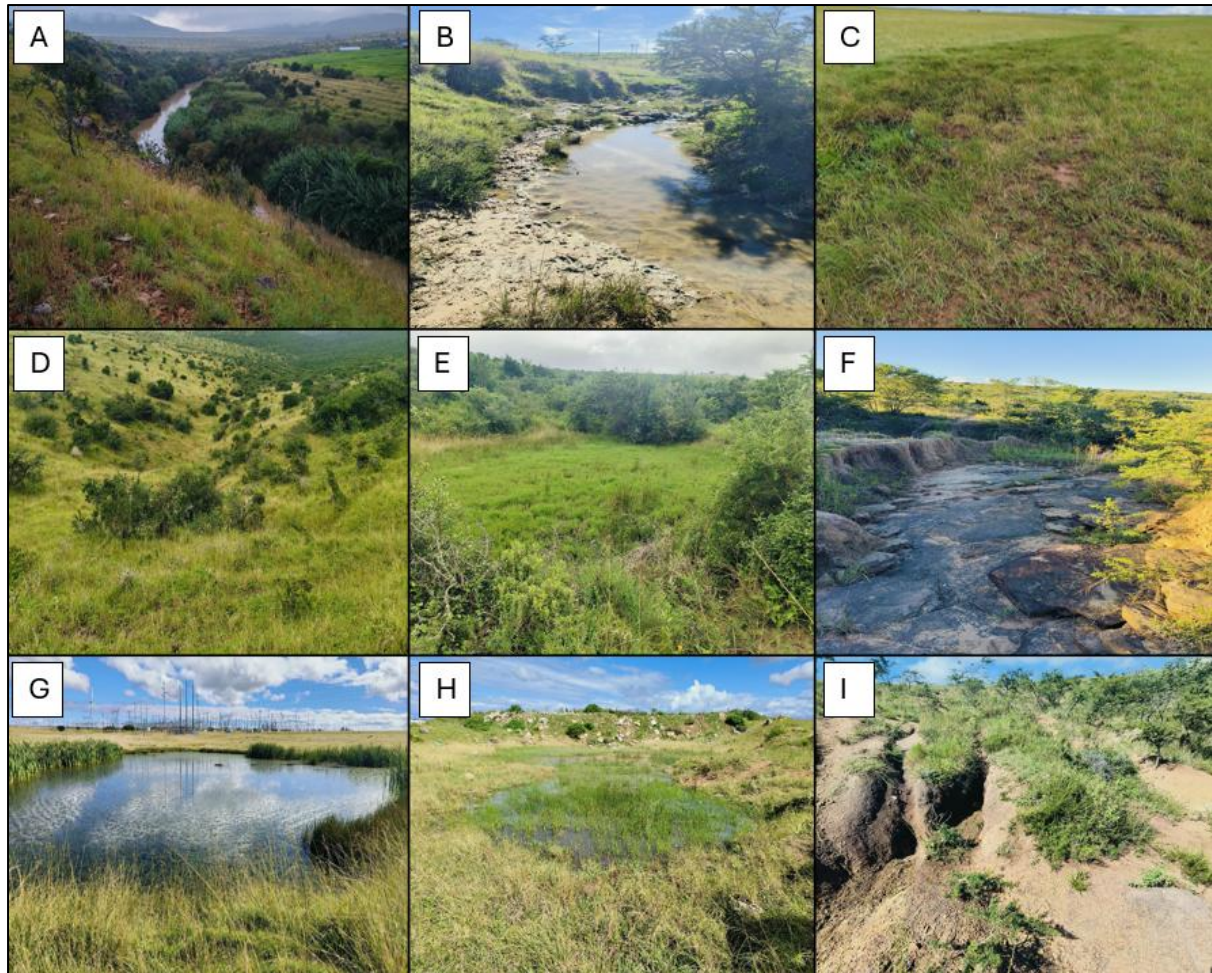


Figure 2-~~2222~~ *Representative photographs of the different feature types identified within the Project Area of Influence. A) Riparian River; B) Channelled Valley-Bottom; C) Unchannelled Valley-Bottom; D) Seep; E) Depression; F) Non-Perennial Drainage feature; G) Instream Dam; H) Artificial Wetland; I) Preferential Flow Path*

2.1 Observations

The following are observations made in the general area during the walkdown. These are discussed below due to the nature of the occurrence of these characteristics being ubiquitous throughout the area:

- Surface water was not present in all of the visited wetlands during the survey, however, the rivers were characterised by high flows and the valley-bottoms and several of the seeps displayed active flows;

- Due to the timing of the survey, occurring just after excessive and heavy rains, several of the hillslope and side slope landscapes particularly in the historical crop field areas displayed active flows on the surface of the landscape likely stemming from higher up the slope and out of the PAOI. These areas were not identified to be characteristic of a watercourse by its definition and were therefore not delineated as such. These flows indicate potential areas of water accumulation and movement, which could affect the stability of construction sites and access routes. Understanding these dynamics is assumed to assist in the planning and designing effective drainage and erosion control measures, ensuring the infrastructure's resilience;
- The desktop ecological integrity, supported by visual observations of the wetlands and their respective catchments is a Class "D – Largely Modified". The main observable impacts were grazing within the watercourses, proliferation of alien and woody species in the watercourse areas, large-scale and extensive gully erosion across the entire landscape and within the delineated features, altered hydrodynamics from formal and informal crossings, altered hydrodynamics from the presence of instream dams that impound water and water quality impairment from agricultural and domestic runoff and inputs;
- The desktop ecosystem service score, supported by visual observations of the watercourses and their respective catchments, are as follows:
 - "High" provision of services by Riparian River systems;
 - "Moderately High" provision of services by valley-bottom systems;
 - "Intermediate" provision of services by seep and depression systems; and
- The ecological importance and sensitivity of features are directly correlated to the observable and likely provision of services. The most important and sensitive features were considered to be the Riparian Rivers, followed by the wetland systems. The non-perennial and preferential flow path systems were considered to be of a lower sensitivity due to characteristic erosion and lack of vegetation within these areas. Furthermore, artificial features are not considered to represent natural ecological sensitivities are therefore considered to be the least important in relation to conservation efforts.

2.2 Buffer Requirements

The buffer requirements for the wetlands were calculated using the Site-Based Tool: Determination of buffer zone requirements for wetland ecosystems (Macfarlane *et al.*, 2014). The recommended buffer zones are presented in [Table 2-1111Table 2-11Table 2-4](#). Whilst a map of the buffer requirements is not included in this report due to the project scale, a shapefile of the "Watercourse Buffers" will be provided by the specialist and must complement this report.

A minimum buffer zone strip of at least 32 meters wide is required for rivers as per NEMA (Act no. 107 of 1998). Due to the scale of the project, main stem rivers recognised by the SAIIE dataset were assigned a 35 m post-mitigation buffer as these would theoretically form the most sensitive watercourse areas. Wetlands on the other hand are considered to be less sensitive as they are known to have a natural resilience and will be able to tolerate a certain level of environmental or anthropogenic stress which can be overcome if promptly rehabilitated or if the stressors are reduced, controlled or stopped. The wetland systems were therefore assigned a 30 m post-mitigation buffer. The non-perennial and preferential flow drainage features were the most abundant feature identified within the PAOI and usually form the hydrological network supporting the wetlands and riparian areas. Although not considered as particularly sensitive, these features were assigned a 25 m post-mitigation buffer to allow for habitat protection and to buffer against potential impacts to the systems they have connectivity to.

Off-channel dams do not necessarily require a buffer, given that they are artificial features, however given that parts of the PAOI occur in the areas susceptible to droughts, these features will have some importance in retaining rainwater for consumption by local wildlife and as such was assigned a 10 m post-mitigation buffer.

Table 2-11114 Buffer requirements for the relevant freshwater features

Aspect	Post-Mitigation	Pre-Mitigation
Riparian River (Incl. Instream Dams)	35 m	50 m
Wetland (Incl. Instream Dams)	30 m	45 m
Drainage (Non-perennial/Preferential Flow/Stormwater)	25 m	30 m
Off-Channel Dam	10 m	15 m

2.3 Towers of Concern

Using the delineations and the infield data gathered it was found that multiple pylons should be moved (if possible). A 25 m by 25 m disturbance footprint was used to investigate the intersection of towers and watercourses. For the theoretical best-case scenario, it is suggested that all watercourse and watercourse buffers be avoided for the construction of the pylon towers, and this should be considered by the developer and applied, where possible.

It must also be considered that a suggested relocation of a tower could result in a knock-on effect of several more tower-watercourse intersections or a higher proximity of towers in relation to watercourse areas which would potentially be more harmful to the freshwater environment. The knock-on effect is likely given that:

- Should one pylon be relocated; it would likely necessitate an offset for the relocation of a number (dependent on project specifications) of towers on either side; and
- The required offset of other towers may not be attainable given that certain tower locations are not adjustable (eg. bend points) and that viability of movement is also dependent on the span of relocation attributed to the design specifications for the project.

The focus on relocation was therefore placed on pylon towers that occur within the riparian buffers, directly within the wetlands and those that occur in the centre of the non-perennial or preferential drainages and wetland buffers in a position that is considered to have a high impact potential. A distance and direction specification were not provided for the pylons that require resitting as input from the design team will be required to consider the feasibility in terms of the design specifications and to optimise the layout.

Using the 25 m by 25 m footprint for towers, a total of 53 intersections were identified. A summary of the tower intersections with an appropriate prioritisation level for the relocation is provided in [Table 2-2222Table 2-22Table 2-2](#).

Table 2-22222 Priority categorisation for tower relocations

No Intersection with feature or buffers	Intersection with preferential flow or buffer, artificial feature or non-perennial buffer	Intersection with preferential flow, non-perennial drainage or buffer and wetland buffer	Intersection with non-perennial drainage and wetland
No Priority	Low Priority	Medium Priority	High Priority
Standard application of best practice mitigation	Minimise impact by applying stringent and suggested mitigation	Relocate to avoid features and buffers where feasible	Relocate to avoid wetland, drainage and buffer
PemPos 1 – PemPos 2	PemPos 3	PemPos 10	PemPos 29 – PemPos 30
PemPos 4 – PemPos 6	PemPos 7	PemPos 13	PemPos 39
PemPos 9	PemPos 8	PemPos 36	PemPos 63

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PemPos 11 – PemPos 12	PemPos 15	PemPos 61	PemPos 68 – PemPos 69
PemPos 14	PemPos 20 – PemPos 21	PemPos 83	PemPos 72
PemPos 16 – PemPos 19	PemPos 87 – PemPos 89	PemPos 102	PemPos 86
PemPos 22 – PemPos 28	PemPos 133	PemPos 162	PemPos 111 – PemPos 112
PemPos 31 – PemPos 35	PemPos 173	PemPos 177	PemPos 130
PemPos 37 – PemPos 38	PemPos 186	PemPos 181	PemPos 160
PemPos 40 – PemPos 60	PemPos 189	PemPos 187	PemPos 171
PemPos 64 – PemPos 66	PemPos 203	PemPos 204	PemPos 270 – PemPos 271
PemPos 70 – PemPos 71	PemPos 211	PemPos 310	PemPos 311
PemPos 73 – PemPos 82	PemPos 216	PemPos 315	PemPos 314
PemPos 84 – PemPos 85	PemPos 243 – PemPos 245	PemPos 382	PemPos 389
PemPos 90 – PemPos 101	PemPos 254 – PemPos 257	PemPos 340	
PemPos 103 – PemPos 110	PemPos 261		
PemPos 113 – PemPos 129	PemPos 263 – PemPos 265		
PemPos 131 – PemPos 132	PemPos 278 – PemPos 279		
PemPos 134 – PemPos 159	PemPos 343		
PemPos 161	PemPos 344		
PemPos 163 – PemPos 170	PemPos 344A		
PemPos 172	PemPos 348A		
PemPos 174 – PemPos 176	PemPos 350A – PemPos 351A		
PemPos 178 – PemPos 180	PemPos 357A		
PemPos 182 – PemPos 185			
PemPos 188			
PemPos 190 – PemPos 202			
PemPos 205 – PemPos 210			
PemPos 212 – PemPos 215			
PemPos 217 – PemPos 242			
PemPos 246 – PemPos 253			
PemPos 258 – PemPos 260			
PemPos 262			
PemPos 266 – PemPos 269			
PemPos 272			
PemPos 280 – PemPos 309			
PemPos 312 – PemPos 313			
PemPos 316 – PemPos 339			
PemPos 341 – PemPos 342			
PemPos 345 – PemPos 381			
PemPos 382 – PemPos 388			
PemPos 390			
PemPos 345A – PemPos 347A			
PemPos 349A			
PemPos 352A – PemPos 356A			

2.4 Regulation Zones

Table 2-3333Table 2-33Table 2-3 presents the legislated zones of regulation that would be applicable to the delineated freshwater features. The proposed pylon towers occur within 32 m, 100 m and 500 m of the delineated watercourse features which are the regulation zones of wetlands and rivers in relation to the NEMA and NWA, respectively. Furthermore, the powerline cable itself will inevitably have to cross several watercourses, therefore both types of authorisations are applicable for the project. Whilst a map of the regulation zones is not included in this report due to the project scale, a shapefile of the “Zones of Regulation” with an accompanying summary of the pylon towers in relation to the Zones of Regulation will be provided by the specialist and must be used to complement this report. It should be noted that the Zones of Regulation were only computed for the delineated extent of the natural watercourse features.

Table 2-33333 Legislated zones of regulation

Regulatory authorisation required	Zone of applicability
<p>Water Use License Application in terms of the National Water Act, 1998 (Act No. 36 of 1998).</p> <p>GN 4167 as published in the Government Gazette 49833 of 2023.</p> <p>GN 509 as published in the Government Gazette 40229 of 2016.</p> <p>Department of Water and Sanitation (DWS)</p>	<p>In accordance with GN 4167 of 2023 and GN 509 of 2016, as it relates to the National Water Act, 1998 (Act 36 of 1998), a regulated area of a watercourse in terms of water uses as listed in Section 21c and 21i is defined as:</p> <ul style="list-style-type: none"> the outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; in the absence of a determined 1 in 100 year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or a 500 m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.
<p>Activity 12 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No.107 of 1998) EIA regulations, 2014 (as amended) states that:</p> <p>The development of:</p> <p>(xii) Infrastructure or structures with a physical footprint of 100 square meters or more;</p> <p>Listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)</p> <p>EIA Regulations (2014), as amended.</p>	<p>Where such development occurs—</p> <ol style="list-style-type: none"> Within a watercourse; In front of a development setback; or If no development setback has been adopted, within 32 meters of a watercourse, measured from the edge of a watercourse. <p>Excluding –</p> <p>...(dd) where such development occurs within an urban area...</p> <p>Activity 19 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA regulations, 2014 (as amended) states “The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.”</p>

3 Risk Assessment

The Risk / Impact Assessment considered the direct and indirect impacts to the wetland systems. The mitigation hierarchy as discussed by the Department of Environmental Affairs (2013) will be considered for this component of the assessment ([Figure 3-1111](#)~~Figure 3-11~~~~Figure 3-1~~). In accordance with the mitigation hierarchy, the preferred mitigatory measure is to avoid impacts by considering options in project location, siting, scale, layout, technology and phasing to avoid impacts.

A risk assessment was conducted for the proposed development. It should be noted that the assessment considers the post-mitigation risk ratings which assumes that mitigations will successfully be implemented, and that the layout will not be able to avoid all wetland, drainage features and their post-mitigation buffers. Should all recommendations with regards to the relocation of the pylons be implemented, then the associated risks to the water resources will decrease, and the RAM will be required to be updated accordingly.

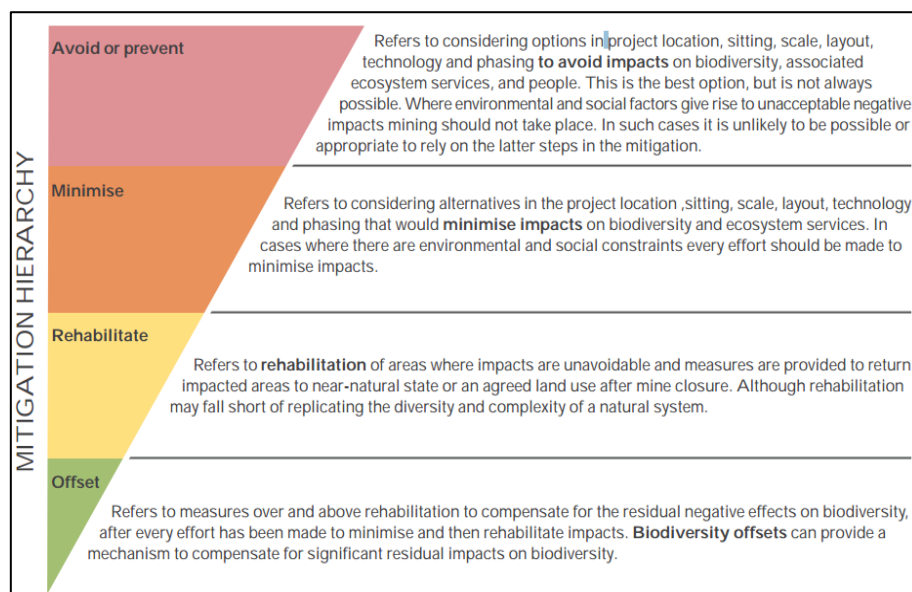


Figure 3-11114 The mitigation hierarchy as described by the DEA (2013)

3.1.1 Potential Anticipated Impacts

The Risk Assessment Matrix illustrates the potential aspects expected to threaten the integrity of sensitive receptors during the proposed activities. The post-mitigation significance ratings have been calculated considering various parameters, these results are presented in the subsequent tables.

During construction (and without mitigation) the clearing and preparation of the powerline towers and storage of equipment may lead to the disturbance and degradation of watercourse vegetation, increased bare surfaces, runoff, and potential for erosion. Additionally, the excavation, levelling and installation of towers may lead to increased sediment loads and contamination of watercourses with hydrocarbons due to leaks and spillages from machinery, equipment & vehicles as well as contamination and eutrophication of watercourse systems with human sewerage and litter. It is also assumed that most watercourse and buffers can be avoided for the project.

Once constructed the routine operation and maintenance of powerline route will invariably result in the degradation of vegetation due to mandatory and routine clearing of vegetation within the powerline servitude. These routes together with any residual disturbances from construction may facilitate proliferation of alien and invasive species, if not managed appropriately. Risks associated with decommissioning the powerline infrastructure centre on vegetation degradation from vehicle access and increased bare surfaces, runoff, and potential for erosion from the removal of the tower infrastructure.

Provided that the suggested mitigations are implemented, the project is anticipated to result in “Low” and “Moderate” post-mitigation risks to the watercourses.

Table 3-11114 DWS Risk Assessment for the proposed Pembroke-Poseidon 400kV Powerline

Phase	Activity	Impact	Potentially affected watercourses	Significance (max = 100)	Risk Rating
CONSTRUCTION	Construction of Powerline (Intersecting wetlands) Site Preparation (Clearance and establishment of site access through formal and informal roads) Excavation and Earthworks (for pylon	Altered hydrology	Wetlands Riparian Rivers	32	M
			Non-Perennial Drainages Preferential Flow Path Drainages	16	L

Pembroke - Poseidon

OPERATIONAL	<p>foundations) Stormwater Management (necessary diversions of runoff from roads and potential dewatering of excavated areas) Transportation and Installation of Infrastructure (pylon steel and cabling) Waste Management and Sanitation Post-installation Rehabilitation (residual disturbed areas from construction and installation activities)</p>	Induced erosion and sedimentation from soil compaction	Wetlands Riparian Rivers	32	M
			Non-Perennial Drainages Preferential Flow Path Drainages	16	L
		Loss or disturbance of native vegetation and habitat fragmentation (reduction in ecosystem services)	Wetlands Riparian Rivers	32	M
			Non-Perennial Drainages Preferential Flow Path Drainages	16	L
		Proliferation of alien and invasive species	Wetlands Riparian Rivers	32	M
			Non-Perennial Drainages Preferential Flow Path Drainages	16	L
		Impaired water quality from contaminated runoff (accidental chemical and oil spills from machinery and equipment used for clearance activities and road development)	Wetlands Riparian Rivers	32	M
			Non-Perennial Drainages Preferential Flow Path Drainages	16	L
	<p>Upgrade of Substation (Within 500m of wetlands) Site clearing, preparation and access Earthworks and vehicle movement Civil works Transportation, stockpiling and installation of infrastructure Storage and use of hazardous substances and equipment</p>	Altered hydrology	Wetlands	24	L
		Induced erosion and sedimentation from soil compaction		24	L
		Loss or disturbance of native vegetation and habitat fragmentation (reduction in ecosystem services)		24	L
		Proliferation of alien and invasive species		24	L
		Impaired water quality from contaminated runoff (accidental chemical and oil spills from machinery and equipment used for clearance activities and road development)		24	L
	<p>Operation of Powerline (Intersecting and within Zones of Regulation) Routine Maintenance using Powerline Servitude</p>	Altered overland flows from existing infrastructure and hardened surfaces (roads) and induced erosion and sedimentation of watercourses	Wetlands Riparian Rivers	32	M
			Non-Perennial Drainages Preferential Flow Path Drainages	16	L
		Continued proliferation of alien invasive vegetation	Wetlands Riparian Rivers	32	M
			Non-Perennial Drainages Preferential Flow Path Drainages	24	L

DECOMMISSIONING	Operation of Substation (Within 500m of wetlands) Stormwater management	Altered overland flows from facility, hardened surfaces (roads) within the facility and stormwater management with induced erosion and sedimentation of watercourses	Wetlands	30	M
		Water quality impairment from contaminated runoff		19,2	L
		Continued proliferation of alien invasive vegetation		19,2	L
	Removal of Powerline Infrastructure (Intersecting and within Zones of Regulation) Dismantlement and deconstruction of structures Relandscaping Waste Management Stormwater Management	Altered overland flows from existing hardened surfaces (roads) within the servitude and induced erosion and sedimentation of watercourses	Wetlands Riparian Rivers	32	M
			Non-Perennial Drainages Preferential Flow Path Drainages	16	L
		Continued proliferation of alien invasive vegetation	Wetlands Riparian Rivers	32	M
			Non-Perennial Drainages Preferential Flow Path Drainages	12	L
	Removal of Substations (Within 500m of wetlands) Dismantlement and deconstruction of structures Relandscaping Waste Management Stormwater Management	Altered hydrology	Wetlands	24	L
		Proliferation of alien and invasive species		24	L
		Induced erosion and sedimentation from soil compaction		24	L
		Loss or disturbance of native vegetation and habitat fragmentation (reduction in ecosystem services)		24	L
		Impaired water quality from contaminated runoff (accidental chemical and oil spills from machinery and equipment used for clearance activities and road development)		24	L

3.1.2 Unplanned Events

The planned activities will have known impacts as discussed above; however, unplanned events may occur on any project and may have potential impacts which will need mitigation and management. [Table 3-2222](#) ~~Table 3-2~~ is a summary of the findings from a watercourse ecology perspective. Please note not all potential unplanned events may be captured herein and this must therefore be managed throughout all phases of the project.

Table 3-2222 Unplanned Events, Risks and their Management Measures

Unplanned Event	Potential Impact	Mitigation
Uncontrolled erosion	Sedimentation of downstream watercourse	Erosion control measures must be put in place. These should be adaptive to onsite conditions.

3.1.3 Cumulative Impacts

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 freshwater ecosystems. Localised cumulative impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers. These include dust deposition, noise and vibration, disruption of wildlife corridors or habitat, groundwater drawdown, groundwater and surface water quality impairment, and transport. The overall cumulative impact is expected to be “Moderate” (~~Table 3-3333~~~~Table 3-33~~~~Table 3-3~~).

Table 3-~~3333~~ Cumulative impact assessment for the development

Impact Nature: Loss / Degradation to Local Freshwater Ecosystems		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Activity Specific	Development Specific
Duration	Short term	Medium term
Sensitivity of Receiving Environment	Moderately Sensitive	Moderately Sensitive
Probability	Highly Likely	Likely
Significance	Moderate	Moderate

4 Recommendations

The following are recommendations made in support of the water resource assessment:

- Avoid the delineated watercourse areas where feasible;
- In a case where the tower is located within the delineated watercourse, try and relocate the tower at the highest point to avoid the micro-channel or preferential flow paths;
- Ensure that all mitigation measures are adhered to;
- If possible, try to avoid the wider area of the watercourse;
- Take special precautions in order to prevent erosion;
- The use of existing roads is preferable to avoid additional impact to the area;
- A competent Environmental Control Officer (ECO) must oversee the construction and rehabilitation phase of the project, with watercourse areas as a priority; and
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase.

4.1 Mitigation Measures

In light of the expected impacts from proposed activities, the following mitigation measures have been proposed to lower the intensity of the impacts on the ecological integrity of the wetland catchment and its downslope wetland features.

The focus of mitigation measures should be to reduce the significance of potential environmental impacts associated with the mixed land use development and thereby to:

- Prevent the unnecessary destruction of, and fragmentation, of the vegetation community of the wetland areas; and

- Limit the construction area to the defined project areas and only impact those areas where it is unavoidable to do so otherwise.

It is imperative that the mitigations provided in the full EIA is also adhered to in addition with those measures presented below.

As much as the emphasis of the walkdown is to determine site-specific mitigations for each tower location, it is deemed necessary to apply the general mitigations to all construction and operational works occurring within the regulated areas of the watercourses throughout the project's life cycle. This is requisite given that the general landscape is characterised by steep terrain and high levels of erosion which increase the potential for impacts reaching the watercourse.

4.1.1 Construction

- Restrict the disturbance and clearance footprint to within 5 m on either side of the proposed powerline route (10 m disturbance corridor).
- Avoid riparian rivers, wetlands and buffers where feasible.
- Implement a rehabilitation plan for any disturbed wetlands. Cleared areas must be rehabilitated and stabilised to avoid impacts to adjacent wetland and buffer areas.
- Reduce the disturbance footprint and the unnecessary clearing of vegetation when traversing the identified drainage lines.
- Make use of existing access routes as much as possible, before new routes are considered. Any selected "new" route must not encroach into the wetland areas.
- Keep tower base excavation and soil heaps neat and tidy.
- Limit construction activities in proximity (< 50 m) to wetlands to the dry season when storms are least likely to wash concrete and sand into wetlands. This is only where towers are within wetlands and buffer areas.
- Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.
- Mixing of concrete must under no circumstances take place in any riparian rivers, wetlands or their buffers. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished.
- Limit the placement of towers within riparian rivers, wetlands and buffer areas where feasible.
- Do not situate any of the construction material laydown areas within any riparian rivers, wetlands or buffer areas. Try adhering to the buffers in these instances.
- No machinery should be allowed to park in any wetlands or buffer areas.
- Promptly remove all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed.
- Limit soil disturbance.

- The use of herbicides is not recommended in or near riparian rivers or wetlands (opt for mechanical removal).
- Appropriately stockpile topsoil cleared from the powerline footprint.
- Clearly demarcate powerline construction footprint and limit all activities to within this area.
- Minimize unnecessary clearing of vegetation beyond the tower footprints and powerline corridors.
- Lightly till any disturbed soil around the tower footprint to avoid compaction.
- Re-instate topsoil and lightly till transmission tower disturbance footprint.
- Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility.
- Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering riparian rivers, wetlands or buffer areas.
- Mixing of concrete must under no circumstances take place within the wetland or buffer areas.
- Check for oil leaks, keep a tidy operation, and promptly clean up any spills or litter.
- Provide appropriate sanitation facilities for workers during construction and service them regularly.
- The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected must be disposed of at a licensed disposal facility.
- The Contractor must be in possession of an emergency spill kit that must be complete and available at all times on site.
- Any possible contamination of topsoil by hydrocarbons must be avoided. Any contaminated soil must be treated in situ or be placed in containers and removed from the site for disposal in a licensed facility.

4.1.2 Operation

- Clear vegetation in line with the 2010 Eskom Environmental Procedure Document entitled "Procedure for vegetation clearance and maintenance within overhead powerline servitudes".
- Any maintenance activities must be conducted in accordance with a workplan and all waste resulting from the maintenance activities must be adequately managed and disposed of at licensed facilities.
- Avoid the use of herbicides and diesel to treat stumps within the riparian rivers, wetlands and buffer areas.
- Maintenance activities should not take place within watercourses or buffer zones. Where unavoidable, the footprint needed for maintenance must be kept to a minimum.

- Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone must be provided for maintenance staff in the event of prolonged and large-scale maintenance activities.
- Maintenance vehicles must stay on dedicated roads/ servitudes and make use of existing access routes as much as possible, before new routes are considered. Any selected “new” route must not encroach into the riparian rivers or wetland areas.
- In line with the 2010 Eskom Environmental Procedure Document entitled "Procedure for vegetation clearance and maintenance within overhead powerline servitudes" all alien vegetation along the transmission servitude should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. By this Eskom is obliged to control category 1, 2 and 3 plants to the extent necessary to prevent or to contain the occurrence, establishment, growth, multiplication, propagation, regeneration and spreading such plants within servitude areas.

4.1.3 Road Construction

A key component of any development is the road network that is expected to traverse the project footprint, altering the surface topography while lowering the infiltration rate due to increased hardened surfaces. The increased hardened surfaces are expected to alter the movement of surface water, increasing the erosion and sedimentation potential along the water path and receiving areas, negatively influencing freshwater habitats. Therefore, the project must focus on responsible stormwater management during construction and operation.

The following road construction specific mitigation measures are provided:

- The disturbance footprint for the crossing construction must be kept to a minimum and only necessary and authorised activities should take place within the watercourse and buffer during the construction.
- To minimise the impact on both surface water flow and interflow, portions of the road must include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability of the sub-layers of the road. This is most applicable in depressions and the supporting structures of watercourse crossings.
- The culverts used for the road crossings must span the width of the watercourse and be positioned to allow flow even during the dry season.
- Box culverts are preferable over pipe culverts as these structures provide more stability and are less likely to be affected by extreme flows.
- Exposed road surfaces awaiting grading must be stabilised to prevent the erosion of these surfaces. Signs of erosion must be addressed immediately to prevent further erosion of the road.
- The road surface should limit the potential for increased surface flows and be fitted with regular drainage channels/furrows that channel flows (adjacent to surface flow direction) into adjacent drainage depressions that are grassed with regular berms.
- A combination of step like grassed berms and silt traps must be placed in the preferential flow paths along the road to prevent scouring of the road margins and subsequent sedimentation of the downslope water resources.

- Contamination of the wetland and river system with unset cement or cement powder should be negated as it is detrimental to freshwater biota. It is preferable that all mixing of construction materials take place outside the watercourse buffers.

5 Impact Statement

A risk assessment was conducted for the proposed project. The post-mitigation risks for the project presented within the “Low” and “Moderate” significance category. The cumulative impact of the development was calculated to be “Moderate”. The wetland’s integrity and functionality conditions are expected to deteriorate slightly and temporarily but no irreplaceable loss of resources is anticipated due to the linear nature of the project and the assumption that the environment will return to its pre-construction state within 2 years of project completion.

No fatal flaws were identified for the project. It is the opinion of the specialists that the site-specific EMPr may be considered for approval, and the Competent Authority must consider the prescribed mitigation measures and recommendations for the authorisation.

6 References

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Van Deventer, H., Smith-Adao, L., Mbona, N., Petersen, C., Skowno, A., Collins, N.B., Grenfell, M., Job, N., Lötter, M., Ollis, D., Scherman, P., Sieben, E., Snaddon, K. 2018. South African Inventory of Inland Aquatic Ecosystems. South African National Biodiversity Institute, Pretoria. Report Number: CSIR report number CSIR/NRE/ECOS/IR/2018/0001/A; SANBI report number <http://hdl.handle.net/20.500.12143/5847>.

7 Appendix Items

7.1 Appendix A – Methodology

7.1.1 Desktop Dataset Assessment

The desktop assessment was undertaken using Geographic Information System (GIS) to access, view and overlay the latest available related datasets with the project area. The information represented within the datasets was used to develop the relevant digital maps used to identify potentially environmentally sensitive areas. These datasets and their respective dates of publishing are provided below.

7.1.1.1 Topographical River Lines and Inland Water Areas

Topographical Inland Water Areas and River Lines for South Africa are based on the topographic maps dated 1994 as per the National Geo-spatial Information. These datasets are used in this report to provide insight on potential wetland areas and serves to highlight the location and extent of drainage features, dams, wetlands, reservoirs and other relevant inland waterbodies.

7.1.1.2 The South African Inventory of Inland Aquatic Ecosystems

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the 2018 NBA, the SAIIAE is a collection of spatial data layers that represent the extent of river and inland wetland ecosystem types as well as the pressures on these systems. The same two headline indicators, and their associated categorisations, are applied as with the terrestrial ecosystem NBA, namely Ecosystem Threat Status and Ecosystem Protection Level. The Ecosystem Threat Status of river and wetland ecosystem types are based on the extent to which each ecosystem type had been altered from its natural condition.

7.1.1.3 National Freshwater Ecosystem Priority Areas, Rivers and Wetlands

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its inland aquatic systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs). The FEPAs are intended to be conservation support tools, and it is envisioned that they will guide the effective implementation of measures to achieve the National Environment Management: Biodiversity Act's biodiversity conservation goals (Nel *et al.*, 2011).

7.1.1.4 Strategic Water Source Areas

SWSAs are defined as areas of land that supply a disproportionate quantity of mean annual surface water runoff in relation to their size, and therefore contribute considerably to the overall water supply of the country, as well as national aquatic and terrestrial biodiversity resources. These are considered key ecological infrastructure assets and the effective protection of SWSAs is vital for national security because a lack of water security will compromise national security and human wellbeing on all levels.

7.1.2 Wetland Field Survey

7.1.2.1 Identification and Mapping

The wetland areas were delineated in accordance with the DWAF (2005) guidelines, a cross section is presented in [Figure 7-11](#)~~Figure 7-11~~[Figure 7-4](#). The outer edges of the wetland areas were identified by considering the following four specific indicators:

- The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;

- The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation.
- The soil forms (types of soil) found in the landscape were identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991);
- The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation is used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role.

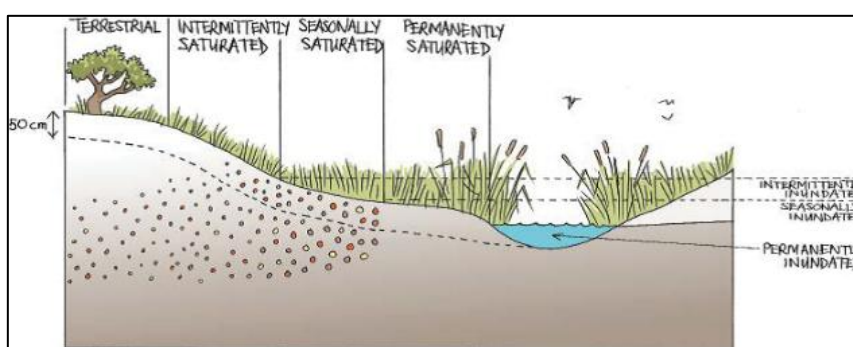


Figure 7-1111 Cross section of a wetland, indicating how the soil wetness and vegetation indicators respond to changes in topography (Ollis et al. 2013)

7.1.2.2 Delineation

The wetland indicators described above are used to determine the boundaries of the wetlands within the project area. These delineations are then illustrated by means of maps accompanied by descriptions.

7.1.3 Buffer Requirements

The "Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries" (Macfarlane et al., 2014) was used to determine the appropriate buffer zone for the proposed activity.

7.2 Appendix B – Risk Assessment

The Department of Water and Sanitation (DWS) risk matrix assesses impacts in terms of consequence and likelihood. The significance of the impact is rated according to the classes presented in [Table 7-1111](#) ~~Table 7-11~~ ~~Table 7-1~~.

Table 7-1111 Significance ratings matrix

Rating	Class	Management Description
1 – 29	(L) Low Risk	Acceptable as is or with proposed mitigation measures. Impact to watercourses and resource quality small and easily mitigated, or positive.
30 – 60	(M) Moderate Risk	Risk and impact on watercourses are notable and require mitigation measures on a higher level, which costs more and require specialist input. Licence required.
61 – 100	(H) High Risk	Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.

7.3 Appendix C – Specialist Declaration of Independence

Declaration

I, Namitha Singh, 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 71 and is punishable in terms of Section 24F of the Act.



Namitha Singh

Ecologist

The Biodiversity Company

May 2025

Declaration

I, Rowan Buhrmann, 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 71 and is punishable in terms of Section 24F of the Act.



Rowan Buhrmann

Ecologist

The Biodiversity Company

May 2025