WETLAND DELINEATION & FUNCTIONAL ASSESSMENT

Wetland Delineation & Functional Assessment for the Proposed Transmission Lines from the Port of Richards Bay to the proposed Switching Station and associated temporary laydown areas, uMhlathuze Local and King Cetshwayo District Municipalities, KwaZulu-Natal

A Project for Karpowership South Africa

October 2022

triplo4 sustainable solutions

DOCUMENT DESCRIPTION

Client / Applicant:	Karpowership South Africa (Pty) Ltd (KSA)
Report name:	Wetland Delineation & Functional Assessment for the proposed Transmission Lines from the Port of Richards Bay to the proposed Switching Station
Report type:	Wetland Delineation & Functional Assessment (WD&FA)
Project name:	Proposed Transmission Lines from Port of Richards Bay to the proposed Switching Station
Project number:	E-BL01.200446
Version:	Final04
Proposed reference:	Port of Richard Bay Wetland Delineation and Functional Assessment, Triplo4 Sustainable Solutions, T4-WDFA-RB, Final revision 04, Oct 2022.
Proposed citation:	T4-WDFA-RB, Oct 2022

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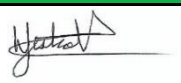
Wayne Westcott Wetland Specialist *Pri Sci Nat*	29/09/2022	
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1. EXECUTIVE SUMMARY

Triplo4 Sustainable Solutions (hereafter referred to as Triplo4) was appointed by Karpowership SA (Pty) Ltd (KSA) to conduct a Wetland Delineation and Functional Assessment (WDFA) for the proposed Transmission Line Routes (Transmission Line Preferred Route and Alternative Route, proposed Switching Station and associated laydown areas) in the Port of Richards Bay and surrounding landscape, hereafter known as the proposed development, within uMhlathuze Local and King Cetshwayo District Municipalities, KZN.

The KSA project entails the generation of electricity by two Powerships moored in the Port of Richards Bay, fueled with natural gas supplied from a third ship, a Floating Storage & Regasification Unit (FSRU). The three ships will be moored in the port for the Project's contracted 20-year lifespan. A Liquefied Natural Gas Carrier (LNGC) will deliver Liquified Natural Gas (LNG) and offload it to the FSRU approximately once every 20 to 30 days, dependent on power demand which is determined by the buyer (ESKOM). The FSRU stores the LNG onboard and turns the liquid form into gaseous form (Natural Gas) upon demand from the Powership (Regasification). Natural gas will be transferred from the FSRU to the Powerships via a subsea gas pipeline. The Project's design capacity is 540MW and the contracted capacity will be 450MW of electricity to be supplied to the national grid.

The power that is generated is converted by the on-board High Voltage substation and the electricity evacuated via a 132kV transmission line over a distance of approximately 3.6km. The power will be evacuated from the Powership to the Impala substation, via a connection point (necessitating a new switching station) in proximity to the existing Bayside Substation, which feeds electricity into the national grid.

The purpose of this Wetland Delineation and Functional Assessment (WD&FA) was to identify sensitivities on site in order to determine the developable land and associated environmental legal requirements. The report provides input to the Water Use License Application (WULA) and Scoping and Environmental Impact Assessment (EIA), should it be required, by identifying, classifying and presenting infield delineations of the watercourses within the 500 metre (m) assessment radius of the proposed development. Additionally, the specialist will present and provide quantitative data to justify his recommendations associated with the proposed development.

The proposed development was observed to fall within the Mhlathuze sub-Water Management Areas (WMA), which is situated within the greater Usuthu to Mhathuze WMA, within Quaternary Catchment U12F. The proposed development traverses a FEPA Estuary at a desktop level (Nel *et al*., 2011) and confirmed as wetlands upon the site visit. The vegetation units which are traversed by the proposed development are the Maputaland Coastal Belt and Subtropical Freshwater Wetlands (Mucina and Rutherford, 2012). The conservation status of these vegetation types are least threatened and vulnerable, respectively (SANBI, 2011). Lastly, the proposed development was noted to fall within a CBA irreplaceable (EKZNW, 2016).

Delineated watercourses and watercourses at risk

A total of twenty-six (26) watercourses were identified within the 500m assessment radius. The classification of these watercourses is: one (1) artificial dam, one (1) estuary/port waters, three (3) channelled valley bottom wetlands, two (2) depression wetlands, five (5) floodplain wetlands, four (4) unchannelled valley bottom wetlands, six (6) hillslope seepage wetlands and four (4) river riparian systems. It was determined that CVB01, FP01, FP02 and Seep06 will be impacted upon by the transmission line alternative route and switching station, whereas CVB01, FP03, UVB01, UVB04 and Seep06 will be impacted upon by the transmission line preferred alternative, temporary laydown areas and switching station. Features which calculated a high and moderate risk in the initial risk assessment were assessed further using the appropriate assessment tools/methods. The following Tables EX1 and EX2 present the at-risk watercourses (wetland systems) and the Present Ecological State (PES) scores that were calculated for the transmission line preferred alternative and alternative routes. The PES of all the at-risk wetland systems were assessed with the use of the WET-Health Tool (Macfarlane *et al.,* 2009).

Table EX1: Assessed at risk wetland systems associated with the transmission line preferred alternative route, temporary laydown areas and switching station.

WET-HEALTH SCORES				
WATERCOURSE	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	**OVERALL SCORE**
CVB01	4.0 (D) ↓	1.1 (B) ↓	5.5 (D) ↓	**3.6 (C) ↓**
FP03	7.5 (E) ↓	2.5 (C) ↓	6.6 (E) ↓	**5.8 (D) ↓**
UVB01	6.5 (E) →	2.1 (C) →	6.5 (E) →	**5.2 (D) →**
UVB04	7.0 (E) ↓	2.2 (E) ↓	6.3 (E) ↓	**5.5 (D) ↓**
Seep06	3.5 (C) →	1.6 (B) →	3.6 (C) →	**2.9 (C) →**

Key: B – Slightly Modified, C – Moderately Modified, D – Largely Modified, E – Seriously Modified

Table EX2: Assessed at risk wetland systems associated with the transmission line alternative route and switching station.

WET-HEALTH SCORES				
WATERCOURSE	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	**OVERALL SCORE**
CVB01	4.0 (D) ↓	1.1 (B) ↓	5.5 (D) ↓	**3.6 (C) ↓**
FP01	6.0 (E) ↓	1.3 (B) ↓	3.1 (C) ↓	**3.8 (C) ↓**
FP02	4.0 (D) ↓	1.6 (B) ↓	5.6 (D) ↓	**3.7 (C) ↓**
UVB01	6.5 (E) →	2.1 (C) →	6.5 (E) →	**5.2 (D) →**
UVB04	7.0 (E) ↓	2.2 (E) ↓	6.3 (E) ↓	**5.5 (D) ↓**
Seep06	3.5 (C) →	1.6 (B) →	3.6 (C) →	**2.9 (C) →**

Key: B – Slightly Modified, C – Moderately Modified, D – Largely Modified, E – Seriously Modified

Wetland Systems Functional Importance

The Ecosystem Services (ESS) and functionality of the at-risk wetland systems associated with the proposed development were assessed with the WET-Ecoservice tool developed by Kotze *et al.* (2009). These systems were considered of high importance in terms of assimilation of toxicant and nitrate removal, phosphate and sediment trapping, erosion control and flood attenuation. Conversely, these systems did not provide any socio-cultural ESS, besides UVB01, in which *Cyperus papyrus* was being harvested.

Ecological Importance and Sensitivity (EIS)

The EIS of the assessed wetlands systems were calculated utilising the EIS Tools developed by Rountree *et. Al.* (2013) and Kleynhans (1999), respectively. The overall EIS scores calculated for CVB01, FP01, FP02 and UVB01 were High due to these systems falling within a CBA irreplaceable (EKZNW, 2016), FEPA Estuary (Nel *et al*., 2011) and hosting habitats that can contain red data species. Although FP03 falls within a CBA irreplaceable (EKZNW, 2016), FEPA Estuary (Nel *et al*., 2011), this wetland scored a Moderate EIS due to it being transformed drastically historically and being poorly rehabilitated. Seep06 scored a Low EIS due to this wetland not falling within a CBA irreplaceable (EKZNW, 2016), FEPA Estuary (Nel *et al*., 2011), and the ecosystem services it provided were limited due to the size of the wetland.

Impact Statement

The watercourses that have been delineated within the study area have undergone moderate to moderately high disturbance from historic and current land use practices. The changes that these watercourses have experienced are due to anthropogenic pressures in the catchment and wetland extent namely; construction of linear infrastructure (dirt and tar roads, overhead powerlines) within the catchment, increase in hardened surfaces in the catchment predominantly by industry development, construction of industry and industry platforms within the wetland, creation of dirt roads within the wetland, infilling (i.e. with dredged material) within the wetland, historic construction activities coupled with poor rehabilitation and proliferation of AIPs due to the aforementioned changes. This has resulted in the overall integrity of the assessed wetlands

scoring an overall PES of C (moderately modified) for CVB01, FP01, FP02 and Seep06 and PES of D (largely modified) for FP03, UVB01 and UVB04.

As per the request received from the Department of Forestry, Fisheries and the Environment (DFFE), a quantitative impact assessment was conducted for the proposed development which provides an overall significance of impact pre- and post-mitigation; and determines the reversibility, irreplaceable features and fatal flaws of the project as per each aspect. Table EX3 is a summary of the pre- and post-mitigation overall significance scores; to understand the potential impacts on the receiving wetland environment.

It must be noted that it is the opinion of the author of this report that the scoring methodology provided is not a true reflection of the project situation and the findings of this assessment (e.g. impact duration). The overall specialist recommendation scoring has thus been added to provide the best assessment possible as indicated in the table below.

From the quantitative impact assessment conducted and presented in Table 46 of this report, it is evident that the overall impact significance scores can be mitigated to a medium to low and low impact rating as per DFFE preferred scoring method. However, utilising the specialist's preferred methodology the overall impact significant scores are noted to be low to very low, post-mitigation. All impacts are regarded as reversible, with no loss to irreplaceable features. However, it must be noted that in order to achieve reversibility of impacts and no loss of irreplaceable features, the mitigation measures outlined in this report coupled with the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) must be implemented. It was concluded that no fatal flaws exist for the preferred alternative of the proposed development from a wetland perspective.

Table EX3: Impact overall significance pre-and-post mitigation, reversibility, irreplaceable features and fatal flaw for each aspect of the proposed development.

Aspect:	Overall Significance - Pre as per DFFE	Overall Significance-Pre as per Specialist Recommendation	Overall Significance - Post as per DFFE	Overall Significance-Post as per Specialist Recommendation
Direct habitat modification	Medium (Negative)	Medium Low (Negative)	Medium Low (Negative)	Low (Negative)
Water Quality (Pollution)	Medium (Negative)	Medium Low (Negative)	Medium Low (Negative)	Low (Negative)
Catchment modifications (land cover and surface runoff)	Medium Low (Negative)	Low (Negative)	Low (Negative)	Very Low (Negative)
Water Quality (Pollution)	Medium Low (Negative)	Low (Negative)	Low (Negative)	Very Low (Negative)

The DWS Risk Assessment Matrix concluded that several aspects of the proposed development did not have the ability to be mitigated from a moderate to low risk rating. Thus, in line with GN509 of 26 August 2016, which was drafted in accordance with the NWA (No. 36 of 1998), as well as the specialist's opinion, the proposed development has undergone a full Water Use License Application (WULA) process in the form of an Integrated Wastewater Management Plan (IWWMP) and received the relevant Water Use License (WUL) for the project (DWS, 2016).

NB: With regards to the terminology irreplaceability, other terminology is utilised in the impact assessment such as: partial loss of wetland habitat, partial loss of ecosystem services and partial loss of migratory routes for semi-aquatic species. Furthermore, it must be noted that mitigation measures outlined in this report and the conducted Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) would render the aforementioned irreplaceable terms (e.g: partial loss of wetland habitat) to be reversible as the mitigation and rehabilitation measures being proposed will improve the functionality of the wetlands if properly implemented. Additionally, the rationale for these wetlands to be improved in terms of functionality can be better understood reading the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022). A brief explanation of this is that certain area of these wetlands were noted to not be functional anymore due to historic and current land use practices. The rehabilitation plan, if followed step by step, will ultimately create more functional area in the wetlands.

Cumulative Impact Statement

The assessment of cumulative impacts took into consideration four (4) projects that might occur within the Port of Richards Bay and IDZ area namely:

- the RBGP2 400MW Gas to Power project,
- the Nseleni Independent Floating Power Plant – Port/old Bayside complex project, the
- 320MW Emergency Risk Mitigation Power Plant (RMPP), and
- the Eskom 3000MV CCPP and associated infrastructure project.

It was determined overall that the cumulative impacts, including the KSA Gas to Power Project will be Moderate Low Negative if the Wetland Rehabilitation Plan for Karpowership project in conjunction with the mitigation measures outlined in this report and the other four (4) environmental assessment projects are followed.

Residual Impact Statement

The potential residual impact assessment with the proposed development were considered to be Low, should the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) be strictly implemented and subsequently monitored onsite. However, in implementing the precautionary approach, it is recommended that potential residual impacts, especially with regard to FP03/Transformed Swamp Forest, be monitored biannually by an appointed environmental consultant and reported to KSA and competent authority (Department of Forestry, Fisheries and Environment; and Department of Water and Sanitation) on any negative impacts been identified. As part of the monitoring, a Wetland Specialist must conduct an annual audit of the wetlands that will be directly impacted upon by the preferred alternative route (i.e' wetlands FP03 and UVB04).

Potential Wetland Offsetting

Upon conducting the Wetland Offset utilizing the best practice guideline (Macfarlane *et al*., 2014), FP03 and UVB04 did not require any offsetting due the potential improvement of the Wetland Functionality Targets and no change value for the Ecosystem Conservation Targets.

Need and Desirability

In South Africa's current and past climate, the ongoing need for electrified energy has become a very significant and increasing challenge over the years. Due to lack of maintenance and upgrading of existing electrical infrastructure (e.g. generation facilities, transmission lines and substations) coupled with the demand for more electricity due to ongoing development in the country and population growth, South Africa's electricity supply has been under constant strain and has led to loadshedding. Loadshedding has crippled the South African economy and has led to the loss of income and jobs for large portions of the South African population. Furthermore, due to the desire of businesses to continue operating during loadshedding schedules, alternative energy measures such as diesel operated generators have been purchased and utilised, which result in increased expenses for businesses, reduced profit margins and greater individual environmental impacts. Thus, the 'need' for electrified energy in South Africa has risen and thus alternative energy creating mechanisms such as Karpowership are required to eliminate loadshedding in the near future. The ability of Karpowership to bring in electrified energy is immediate if the required infrastructure (e.g. substation and transmission lines) and regulatory permissions are in place, unlike alternative energy sources

such as wind farms and solar photovoltaic farms, which require lengthy construction of energy infrastructure (i.e. battery housings, wind turbines and solar fields) before the transmission of electrified energy can occur, which also brings with it completion risks. In comparison to the proposed development, the footprint of the aforementioned energy infrastructure (i.e. wind farms and solar photovoltaic farms) would have a much larger footprint (typically land use of at least a multiple of x100 or greater) to produce the same amount, or less, energy. This huge increase in land use required can in turn negatively impact on the receiving environment and organisms.

From a freshwater perspective associated with the proposed development in Port of Richards Bay, Karpowership will have a minimal impact on freshwater resources, seeing that it will occur in an operational port and will only require monopole transmission lines on land, some of which will be placed in an already existing transmission line servitude and degraded areas. Therefore, the need from an energy, social and economic perspective will be positive for South Africa, whilst environmental impacts will need to be mitigated and monitored as outlined in this report.

Specialist's Recommendation

Upon the site visit and conducting the assessments, the specialist is **not in support** of the proposed Transmission Line Alternative Route as this route was deemed to impact on a major portion of wetlands within the study. The specialist does support the proposed Transmission Line Preferred Route and all of its construction activities. Furthermore, the mitigation measures outlined in this report are to be included in the EMPr, and must be followed. Lastly, due to certain portions of the proposed development occurring within the at risk wetlands, in order to be in line with NEM:BA, the conducted **Wetland Rehabilitation Plan (**T4-WRP-RB*,* Oct 2022 must be implemented to ensure no net loss of biodiversity occurs.

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

Table EX01 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 following information outlined in **Table EX01**.

Table EX01: 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	Section 3.4
	(ii) the expertise of that specialist to compile a specialist report, including a curriculum vitae;	Section 18
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 19
(c)	an indication of the scope of, and the purpose for which the report was prepared;	Section 3.2
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 7
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 8, 11
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 6
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 5
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Sections 7, 8 and 9
(g)	an identification of any areas to be avoided, including buffers;	Section 10
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 10
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge.	Section 6
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Sections 8, 9
(k)	any mitigation measures for inclusion in the EMPr;	Section 12
(l)	any conditions for inclusion in the environmental authorisation;	Sections 15, 16
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 13
(n) a reasoned opinion—	(i) whether the proposed activity, activities or portions thereof should be authorised;	Section 16
	(iA) regarding the acceptability of the proposed activity or activities; and	Section 16

	(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;	Sections 11.2, 12
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Sections 3
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Sections 6, 11, 16
(q)	any other information requested by the competent authority.	N/A
(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.	Aquatic biodiversity theme as per DEA (2020). All the minimum requirements for this are covered in the report

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GLOSSARY OF TERMS

Auger
An auger is a drilling device that usually includes a rotating screw to act as a screw conveyor to remove the drilled out material such as soils. The rotation of the blade causes the material to move out of the hole being drilled. A Dutch (or mud) auger has a unique open design for cutting through boggy, saturated and/or heavily rooted soils such as those found in wetlands.

Biodiversity
The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas which they are found.

Biophysical Environment
All aspects of the natural environment including physical features such as watercourses, groundwater and soils as well as the biological features such as plants and animals.

Buffer
A zone or area around a geographic feature measured in distance. Example: an assessment buffer is an area around a proposed development which needs to be assessed within the report.

Catchment
All the land area from mountaintop to seashore which is drained by a single river and its tributaries.

Chroma (Soil Colour)
The relative purity of the spectral colour, which decreases with increasing greyness.

Competent Authority
The national or provincial governmental department or body responsible for the environmental applications being placed. DWS and DFFE are the most likely competent authorities to be associated with wetland delineations and functional assessments.

Delineation
To determine the boundary of a wetland based on soil, vegetation, and/or hydrological indicators (see definition of a wetland).

Ecosystem Services
Benefits people obtain from ecosystems including provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other non-material benefits.

Environment
The environment means the surroundings within which humans exist and that could be made up of water, air, soil, sand, plants and animals.

Environmental Impact
An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of an activity. An impact may be the direct or indirect consequence of a construction, operational or decommissioning activity.

Environmental Consultant
An independent consultant that is appointed by the Client to compile an Environmental Management program and to undertake environmental audits or Control Officer functions.

Environmental Specifications
Instructions and guidelines for specific activities designed to help prevent, reduce and/or control the potential environmental implications of these activities during the operational, construction or decommissioning / closure phases of the facilities.

Fauna
Any and all animals identified within or outside of the operational or project areas. Animals may not be harmed in any way.

Flora
All species of plants that are found in a particular region, habitat, or time period within or outside of the operational or project areas.

Freshwater Systems / Habitats
A subset of Earth's aquatic ecosystems. They include wetlands, rivers, streams, ponds, dams and lakes.

Gleying (Soil Characteristic)
Soil material that has developed under anaerobic conditions as a result of prolonged saturation with water. Grey and sometimes blue or green colours predominate but mottles (yellow, red, brown and black) may be present and indicate localised areas of better aeration.

Hue (Soil Colour)
The dominant spectral colour (e.g. red).

Hydrogeomorphic (HGM)
A wetland classification/typology system based on the hydrological and landscape (geomorphic) characteristics of wetlands.

Hydrogeomorphic (HGM) Unit
A single "reach", segment or unit of a particular type of HGM wetland type.

Incident
The occurrence of a pollution or degradation event that will have a direct or indirect effect on the environment e.g. surface water, groundwater, soils, ambient air as well as plants, animals and humans.

Invasive Alien Plants (IAP)
An Alien Species is a species that has been intentionally or unintentionally introduced to a location, area, or region where it does not occur naturally. An Invasive Alien Plant is an alien species that causes, or has the potential to cause, harm to the environment, economies, or human health (Global Invasive Species Programme).

Land owner
The individual, company, entity, lawful occupier, Tribal Authority, Local Municipality or District Municipality that legally owns the land.

Mitigation measures
Mitigation seeks to address poor or inadequate practices, procedures, systems and/ or management measures by the implementation of preventative and corrective measures to reduce, limit, and eliminate adverse or negative environmental impacts or improve the positive aspects.

Mottle (Soil Characteristic)
Soils with variegated colour patters are described as being mottled, with the "background colour" referred to as the matrix and the spots or blotches of colour referred to as monies.

Permanent (Wetland Zone)
Soil which is flooded or waterlogged to the soil surface throughout the year, in most years.

Proposed Project / Development
The activities, footprint and structures proposed by the client.

Reference State
The natural or pre-impacted condition of the system. The reference state is not a static condition, but refers to the natural dynamics (range and rates of change or flux) prior to development.

Rehabilitation
Rehabilitation is defined as the return of a disturbed area, feature or structure to a state that approximates to the state (where possible) that it was before disruption, or to an improved state.

Remediation
The management of a contaminated site to prevent, minimise, or mitigate harm to human health or the environment

Riparian
The area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).

Runoff
Total water yield from a catchment including surface and subsurface flow.

Seasonal (Wetland Zone)
Soil which is flooded or waterlogged to the soil surface for extended periods (>1 month) during the wet season, but is predominantly dry during the dry season.

Social Environment
Persons likely to be directly or indirectly affected by the day-to-day operations of the mill.

Solid Waste
Means all solid waste, including domestic and office waste (food, paper, plastic), waste from operations e.g. empty chemical containers, dried sludge as well as waste from the construction and / or decommissioning phases, chemical waste, excess cement/concrete, inert building rubble, packaging, timber, tins and cans.

Soil Profile
The vertically sectioned sample through the soil mantle, usually consisting of two or three horizons (Soil Classification Working Group, 1991).

Study Area
The proposed project/development's site and footprint as well as an assessment buffer. Assessment buffers are decided upon by the reports intended use, i.e. 500m for WULAs or 32m for S&EIA.

Sustainable development / sustainability
The integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

Temporary (Wetland Zone)
The soil close to the soil surface (i.e. within 50 cm) is wet for periods > 2 weeks during the wet season in most years. However, it is seldom flooded or saturated at the surface for longer than a month.

Terrain Unit Classes
Areas of the land surface with homogenous form and slope. Terrain may be seen as being made up of all or some of the following units: crest (1), scarp (2), midslope (3), footslope (4), and valley bottom (5).

Topsoil
The layer of soil covering the earth which provides a sustainable environment for the germination of seeds, allows water penetration, and is a source of micro-organisms and plant nutrients.

Value (Soil Colour)
The relative lightness or intensity of colour.

Waste
Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered.

Watercourse / Water Resource
A river or spring; a natural channel or depression 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.

Watershed
A ridge of land that separates waters flowing to different rivers, basins, or seas. These split areas into different catchments.

Wetland
Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin *et al*., 1979).

GLOSSARY OF ACRONYMS

AIP(s)	Alien Invasive Plant(s)
BAR:	Basic Assessment Report
DFFE:	Department of Forestry, Fisheries and Environment
(D)EDTEA:	(Department of) Economic Development, Tourism and Environmental Affairs
DMR:	Department of Mineral Resources
DOT:	Department of Transport
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
ECA:	Environment Conservation Act
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EIS:	Ecological Importance and Sensitivity
EMPr:	Environmental Management Programme
GA:	General Authorisation
HGM(U):	HydroGeoMorphic (Unit)
HSE:	Health, Safety and Environment.
NEMA:	National Environmental Management Act
NEM:BA:	National Environmental Management: Biodiversity Act
NFEPA:	National Freshwater Ecosystem Priority Area
NWA:	National Water Act
PE:	Project Engineer
PES:	Present Ecological State
PM:	Project Manager
PU:	Planning Unit
RAM:	Risk Assessment Matrix (in referral to the DWS RAM)
SEMA:	Specific Environmental Management Acts
S&EIA	Scoping and Environmental Impact Assessment
WUL(A):	Water Use License (Application)

3. INTRODUCTION

3.1. BACKGROUND INFORMATION

Triplo4 Sustainable Solutions (hereafter referred to as Triplo4) was appointed by Karpowership South Africa (Pty) Ltd (KSA) to conduct a Wetland Delineation and Functional Assessment (WDFA) for the proposed Transmission Line routes (Transmission Line Preferred Route and Alternative Route, proposed Switching Station and temporary laydown areas) in the Port of Richards Bay and surrounding landscape, hereafter known as the proposed development, within uMhlathuze Local and King Cetshwayo District Municipalities, KZN.

The KSA project entails the generation of electricity by two Powerships moored in the Port of Richards Bay, fueled with natural gas supplied from a third ship, a Floating Storage & Regasification Unit (FSRU). The three ships will be moored in the port for the Project's contracted 20-year lifespan. A Liquefied Natural Gas Carrier (LNGC) will deliver Liquified Natural Gas (LNG) and offload it to the FSRU approximately once every 20 to 30 days, dependent on power demand which is determined by the buyer (ESKOM). The FSRU stores the LNG onboard and turns the liquid form into gaseous form (Natural Gas) upon demand from the Powership (Regasification). Natural gas will be transferred from the FSRU to the Powerships via a subsea gas pipeline. The Project's design capacity is 540MW and the contracted capacity will be 450MW of electricity to be supplied to the national grid.

The power that is generated is converted by the on-board High Voltage substation and the electricity evacuated via a 132kV transmission line over a distance of approximately 3.6km. The power will be evacuated from the Powership to the Impala substation, via a connection point (necessitating a new switching station) in proximity to the existing Bayside Substation, which feeds electricity into the national grid.

The proposed development exhibits two routes known as the Transmission Line Preferred Route and Transmission Line Alternative Route; and proposed Switching Station. The length of the Preferred Alternative Route is approximately 3.6km, whereas the length of the Alternative Route is approximately 4.5km and the proposed switching station area is approximately 1.75 hectares. Furthermore, three (3) temporary laydown areas consisting of a material laydown area, site office and concrete coating area and stringing yard at central geographical co-ordinates 28°47'29.29"S, 32° 1'52.38"E; 28°47'23.92"S, 32° 1'28.66"E and 28°47'37.15"S, 32° 1'29.80"E, respectively, will be constructed. These areas will be accessed via existing TNPA roads and short new access roads leading to the temporary laydown area which are temporary in nature and will be completely rehabilitated post-construction. The piece of land in which these routes will occur are gentle in nature, approximately 450m away from the Richards Bay Port sandbar. The Preferred Alternative Route begins on a FEPA Estuary (as per the NFEPA dataset; Nel *et al*, 2011) and heads in a westerly direction initially, thereafter in a northerly direction and finally in a westerly direction before reaching the proposed Switching Station. Similarly, the Alternative Route begins on a FEPA Estuary (as per the NFEPA dataset; Nel *et al*, 2011), thereafter this route heads in a southerly direction, which quickly turns to a westerly direction and finally a northerly direction before reaching the proposed Switching Station. The proposed Switching Station is located at central geographical co-ordinates 28°46'48.43"S 32° 0'43.30"E. It must be noted that both of these routes will begin at a proposed overhead power line which will be connected to the Powerships in two options as per Figure 1 below.

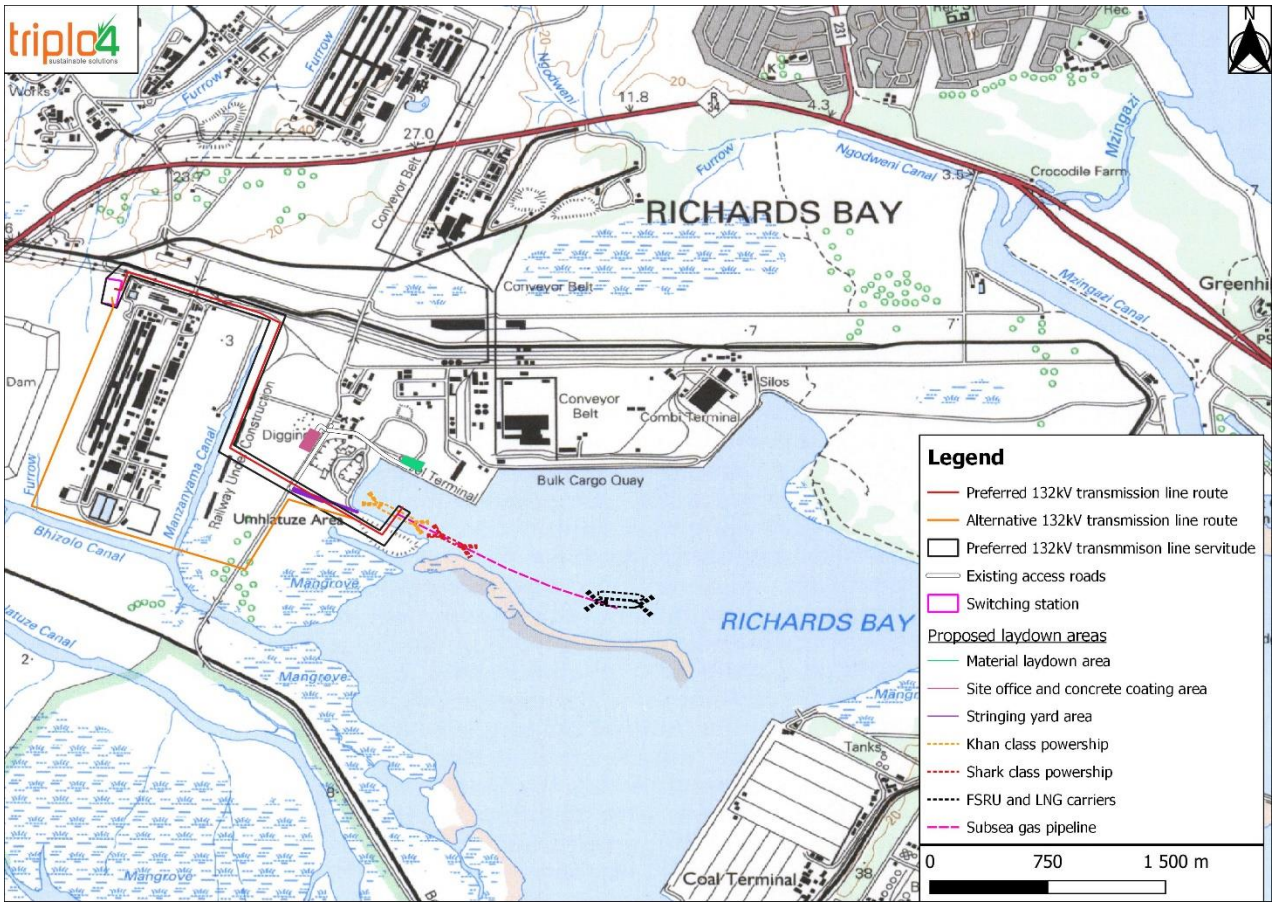


Figure 1: Locality and topographical map of the Preferred Alternative and Alternative Routes, proposed switching station and temporary laydown areas.

3.2. SCOPE OF THE PROPOSED PROJECT

The proposed development encompasses the following activities:

- A FSRU and LNG Carrier (approximately 29 300m^2), the FSRU Carrier is refueled by the LNG Carrier approximately every 20 – 30 days.
- A Khan and Sharp Powerships (approximately 19 000m^2).
- A gas pipeline from the FSRU to the Powership (sub-sea).
- A temporary material laydown area (approximately 8,000m^2), site office and concrete coating area (approximately 11,000m^2); and stringing yard (10,000m^2).
- Transmission Lines from the Powerships.
- Two options of Transmission Lines (Preferred Alternative and Alternative Route).
- Proposed Switching Station.
- Preferred alternative route to include sixteen (16) overhead transmission towers.
- Alternative route to include nineteen (19) overhead transmission towers.

3.3. OBJECTIVES OF THE WD&FA

The objective of the WD&FA for the proposed development as adopted from the specific terms of reference presented within the DWS Government Gazette No. 40713 of the 24th of March 2017:

- Desktop delineation and illustration of all watercourses within 500m assessment radius of the proposed development utilising available site-specific data such as aerial photography, elevation data and regional water resource data.
- Risk screening assessment of the delineated watercourses to determine which watercourses will be significantly impacted upon by the proposed development. This was based on professional opinion which may be scientifically substantiated;

- Infield delineation and digital mapping of all watercourses in relation to the proposed development in accordance with the methods contained in the manual 'A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas' (DWAF, 2005);
- Classification of the delineated watercourses in accordance with the 'National Wetland Classification System for Wetlands and other Aquatic Ecosystems in South Africa (Ollis *et al*., 2013), watercourses will be classified in terms of being artificial or natural and wetland or riverine;
- Identification of site-specific biophysical characteristics namely: the hydrological, geomorphological and vegetation modules;
- Assess the current health and functionality of the systems that were identified to be at risk in terms of:
    - Present Ecological State - Level 2 WET-Health Tool (Macfarlane *et al*., 2009)
    - Ecological Importance and Sensitivity (EIS) assessment (Rountree, 2013)
    - Functional Assessment – Level 2 WET-EcoServices (Kotze *et al*., 2009)
    - Index of Habitat Integrity (IHI), adapted from 1996 (Kleynhans, 2012)
    - Ecological Importance and Sensitivity assessment for riverine systems (Kleynhans & Louw, 2007)
- Determine the type and degree of potential impacts which may affect these systems (qualitative assessment);
- Conduct a Risk Assessment Matrix (RAM) (DWS, 2016) analysis to determine whether the proposed development may be authorised under a GA or WULA process or exemption as per General Notice 509 of 2016 in accordance with Section 39 of the NWA (No. 36 of 1998);
- Determine appropriate buffer guidelines by utilising the tool composed by (Marcfarlane and Bredin, 2016);
- Specify mitigation measures to reduce the impacts of the proposed development.

3.4. AUTHORS OF THE WD&FA

This document was compiled by:

Mr Suheil Malek Hoosen - Masters in Environmental Science
Suheil Malek Hoosen is a Wetland Ecologist, who holds a Master's Degree in Environmental Science with approximately 7 years of environmental experience in Wetland Ecology. He has been responsible for conducting Wetland Delineation and Functional Assessments, Wetland Rehabilitation Plans and Vegetation Impact Assessments. He has previously worked as a Wetland Specialist at KSEMS Environmental Consulting and Aeon Nexus, being involved in overseeing approximately 50 specialist projects. He is a fully registered SACNASP professional (*Pr.Sci.Nat.)* within the Environmental Science field of practice.

Triplo4 has gained experience on a wide spectrum of projects, spanning from Greenfield Mixed Use developments to industrial (e.g. mining), hazardous waste management operational facilities and linear developments (pipelines, roads, bridges). We have a balanced approach and sustainability perspective on development and operations, understanding not only the need for environmental management, but also the requirements for socio-economic development. It is recognised that socio-economic development may require environmental compromises or trade-offs, as long as these are done responsibly and within the legislative frameworks.

Triplo4 is registered with the Green Building Council of South Africa (GBCSA) allowing us to provide expertise and sustainability measures on Energy (Lighting, Heating & Cooling); Water; Stormwater; Waste; Biodiversity & Materials. Furthermore, Triplo4 is a member of and subscribes to various Codes of Ethics e.g. the International Association for Impact Assessment (IAIAsa), the Institute for Waste Management South Africa (IWMSA) and the Water Institute of South Africa (WISA).

Experience, having been gained in mining and environmental consulting enables Triplo4 to provide a broad range of environmental consulting services, including:

- environmental authorisations and feasibility assessments;

- environmental management systems;
- environmental capacity building / training and awareness;
- waste and water management and pollution control;
- environmental control officer functions and auditing;
- wetland and vegetation assessments;
- carbon footprint analysis and sustainability reporting.

4. APPLICABLE LEGISLATION, GUIDELINES AND DOCUMENTATION

This document describes the role of specialist studies such as wetland and vegetation reports in IEM and planning for environmentally sustainable development within the framework of existing legislation and environmental management policies.

South Africa is a constitutional democracy, which means the constitution and Bill of Rights are the supreme law. Our Constitution guarantees certain human rights and is one of the most progressive in the world. In line with a constitutional democracy everyone has responsibilities.

In terms of The Constitution of the Republic of South Africa (Act No. 108 of 1996) everyone has the right:

- to clean water;
- to an environment that is not harmful to their health or well-being and to have the environment protected, for benefit of present and future generations, through reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The overarching legislative framework that governs all environmental activities is the National Environmental Management Act (No 107 of 1998). NEMA aims to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith. NEMA can help deal with problems at a municipal level and enables one to determine whether proper IEM procedures have been followed.

Accompanying NEMA is a set of Specific Environmental Management Acts (SEMA's). Known by the abbreviation of SEMA's, Specific Environmental Management Acts all fall under the auspices of the overarching National Environmental Management Act (NEMA). To date five SEMA's have been promulgated, with the most recent one being Waste Act in 2008. The full list of SEMA's is:

1. National Environmental Management: Protected Areas Act (57 of 2003), known as the NEM:PAA
2. National Environmental Management: Biodiversity Act (10 of 2004), known as the NEM:BA
3. National Environmental Management: Air Quality Act (39 of 2004), known as the NEM:AQA
4. National Environmental Management: Integrated Coastal Management Act (24 of 2008), known as the NEM:ICM
5. National Environmental Management: Waste Act (59 of 2008), known as the NEM:WA

Section 28 of NEMA (Duty of care and remediation of environmental damage) states that every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

4.1. APPLICABLE ENVIRONMENTAL LEGISLATION

The following Environmental legislation was considered, in the evaluation of the activities of the proposed development, as applicable to the WD&FA. It must be noted that only relevant sections of Acts have been listed below, as these were deemed pertinent and specific to the scope of the proposed development. These Acts must be considered and adhered to in their entirety at all times.

The list of applicable legislation and permits provided is intended to serve as a guideline only and is not exhaustive.

Table 1: Applicable Environmental Legislation

Legislation	Section	Relates to
The Constitution (No 108 of 1996)	Chapter 2	Bill of Rights.
	Section 24	Environmental rights.
National Environmental Management Act (NEMA): EIA Regulations (2014, as amended in 2017)	Section 2	Defines the strategic environmental management goals and objectives of the government. Applies through-out the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The entity has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
	Section 30	Deals with the control of emergency incidents, including the different types of incidents, persons responsible for the incidents and reporting procedures to the relevant authority.
National Environmental Management: Biodiversity Act (No 10 of 2004)		Provides for the management and conservation of biodiversity, protection of species and ecosystems, and sustainable use of indigenous biological resources
National Water Act (No 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution
	Section 20	Control of emergency incidents
	Section 21/40	Licenses for water use – most important of those include discharge & abstraction licenses
Nation Veld & Forest Fire Act (No 101 of 1998)		Provides for a variety of institutions, methods and practices to prevent and combat veld, forest and mountain fires.
National Forests Act (No 84 of 1998)		Protects and controls certain vegetation types as well as specific species.
Government Notice (GN) 320 Aquatic Biodiversity Theme		This protocol provides the criteria for the specialist assessment and minimum report content requirements for impacts on aquatic biodiversity for activities requiring environmental authorisation. The assessment and reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool). The relevant aquatic biodiversity data in the screening tool has been provided by the South African National Biodiversity Institute

The potential environmental impacts associated with the current project are required to be considered in compliance with the EIA Regulations (2017) as well as all the SEMA's. It must also be noted that the list of Acts and their associated regulations must be frequently updated to ensure that all assessments are done according to and comply with the most current legislation.

Table 2: Current Environmental Legislation

Regulations and Guidelines
2014 Environmental Impact Assessment Regulations (as amended)
The General Policy on Environmental Conservation (January 1994)

Table 3: Current Provincial Legislation

Legislation
Provincial Conservation Ordinance

5. METHODOLOGY AND DATA

As a necessary part of any specialist impact assessment, the relevant methodologies required to determine and assess the proposed project as well as the data available for the area, must be described. The below section is divided into a methodology subsection, where all methodologies are discussed in relevant detail, and a data subsection, where the data utilised for this assessment are named.

5.1. DESKTOP ASSESSMENT AND DELINEATION

An initial desktop assessment was done utilising all relevant GIS data available for the proposed project's study area. This included, but was not limited to, Google Earth terrain models, contours, NFEPA datasets, vegetation units, and past and present satellite imagery. Utilising these data, a desktop assessment of the study area (500m for NWA WULAs, 32m for NEMA BA or S&EIA) was performed to identify wetlands, rivers, and other watercourses in the area. These were then delineated using the contours, terrain models, and past and present satellite imagery to as high an accuracy as possible. Table 4 below is a list of utilised data and their associated sources which was used for the proposed project.

Table 4: Utilised data, associated sources and significance to the proposed project

DATA	SOURCE	APPLICATION TO PROPOSED DEVELOPMENT
DWS Eco-regions (Geographic Information System (GIS) data)	DWS (2005)	Local eco-region classification.
Google Earth Pro™ Imagery	Google Earth Pro™ (2018)	Up-to-date satellite imagery of the proposed development, area (size) determination, desktop watershed determination, desktop identification of catchment and HGM impacts.
Interactive catchment CD	Frank Sokolic of GISolutions in the WET-Health package by Macfarlane et al. (2009)	Determine primary, secondary, tertiary and quaternary catchments applicable to the study area and their climate.
National Biodiversity Assessment (NBA) Threatened Ecosystems (GIS Coverage)	South African National Biodiversity Institution (SANBI) (2011)	Determine the national threat status of the terrestrial and aquatic vegetation types.
National Freshwater Ecosystem Priority Areas (NFEPA) river and wetland inventories (GIS Coverage)	Council for Scientific and Industrial Research (CSIR) (2011)	Identify potentially important river and wetland systems at a local and regional scale.
NEFPA river, wetland and estuarine FEPAs (GIS Coverage)	CSIR (2011)	Indicates national aquatic ecosystem conservation priorities.
South African Vegetation Map (GIS Coverage)	Mucina & Rutherford (2006/2012)	Determine the national vegetation type of the study area.
South African Geological Map (GIS Coverage)	Geological Survey (2008)	Determine regional and study site geology and soil types.

The desktop assessment allowed for certain watercourses within the study area to be excluded from further investigation based on whether these systems were likely to be impacted upon by the proposed development. Reasons for exclusion will be justified for any system not further assessed within the screening sections (Section 5.2.2) of this report but some factors (amongst others) which were taken into consideration include:

- Whether the system is found within the same catchment as the proposed development. Systems found in different catchments will be excluded as they will not be impacted.
- The distance and location of system from the proposed development. Systems found at a suitably distant location upstream from the proposed development will be excluded as a result of the low likelihood of being impacted.

- The degree to which natural or currently present infrastructure buffers are present between the system and the proposed development. If these are deemed sufficient to shield the system from impact, they will be excluded from further investigation.

5.2. INFIELD VERIFICATION AND DATA COLLECTION

Following the completion of the desktop assessments, the watercourse delineations had to be verified infield. Infield verification used field work techniques to more accurately determine the limits of the watercourses temporary zones, confirm the wetland type classification according to the Department of Water Affairs delineation manual (DWAF, 2005), and record information to be utilised in the functional assessment of all potentially impacted systems.

Wetland delineation verification requires the use of wetland indicators: measurable parameters that confirm the presence and type of wetland systems.

Four specific wetland indicators were used to confirm the presence of wetlands, including the:

- **Terrain Unit Indicator** which uses topography to identify the landscape features where wetland systems may develop;
- **Vegetation Indicator** (the NWA primary indicator) which takes the vegetation located in the area and determines the likelihood to which they are found in wetland soils (Obligate, Facultative Wetland, Facultative, or Facultative Dryland species);
- **Soil Indicator** that classifies certain soil forms according to the degree and regularity to which these soils are saturated; and
- **Soil Saturation Indicator** where soil features such as mottles and gleying were identified within the soil profile to indicate fluctuating saturation level.

Soil saturation indicators are obtained by observing soil characteristics in samples taken from soil cores using a Dutch soil auger. Samples were taken from depths of 0 -10cm and 30-50cm to determine the degree of saturation of the soils at these levels within potential wetland areas. In cores where indicators are present, and depending on the combination of which indicators are present at which depth, the zonation (permanent, seasonal, and temporary zone) can be determined.

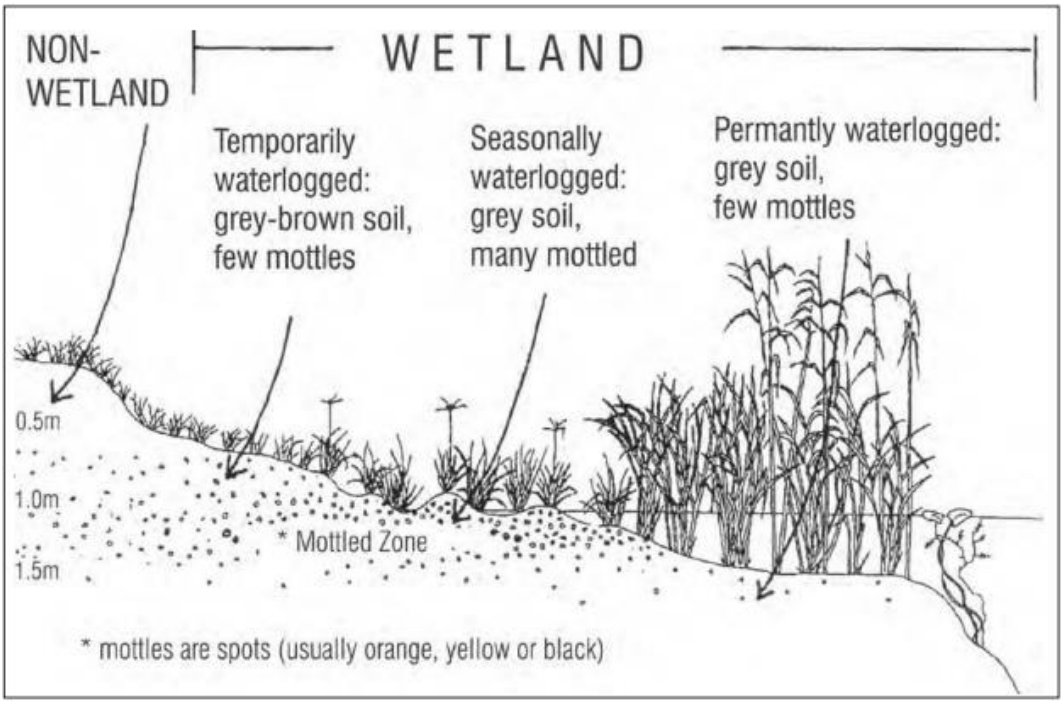


Figure 2: Cross section through a wetland, indicating how the soil wetness and vegetation indicators change as one moves along a gradient of decreasing wetness, from the middle to the edge of the wetland (Kotze et al., 2009).

Similarly, riverine delineation verification has its own set of indicators to confirm the location of the instream and riparian zones. The three indicators include:

- **Topography Indicator** whereby riverine systems will only be present at the lowest point within a valley profile and likely be restricted to being within the macro-channel of the stream;
- **Soil Indicator** in which alluvium and recently deposited soils are likely to be present within the riverine zones;
- **Vegetation Indicator**, as with wetland areas, vegetation species composition can be used to determine and confirm the extent of the riverine zone.

The classification of river channels is associated with the type of channel that is identified within a certain section of the channel network. There are three channel types, namely: "A", "B" and "C" sections and the difference between the three is their position relative to the zone of saturation within the system (DWAF, 2008). Figure 4 illustrates two levels of the water table; the line marked "wet" depicts the highest level that the water table would reach during a period of heavy rainfall when the zone of saturation has taken place, while the one marked "dry" depicts the level of the water table at its lowest after a dry period (DWAF, 2008). The zone of saturation must be in contact with the channel network for baseflow[1] to take place at any point in the channel.

(A) channel streams are those streams that have presumable flow three months of the year due to rainfall events and do not have baseflow, these are also considered as ephemeral streams.

(B) channel streams are those streams that have presumable flow six – nine months of the year and those that sometimes have baseflow.

(C) channel streams are those streams that have flow throughout the year and always have baseflow (DWAF, 2008).

This classification was adopted because it is based on the changing frequency of saturation of soils in the riparian zone; from very seldom (A), to quite often (B), and to always (C) (DWAF, 2008).

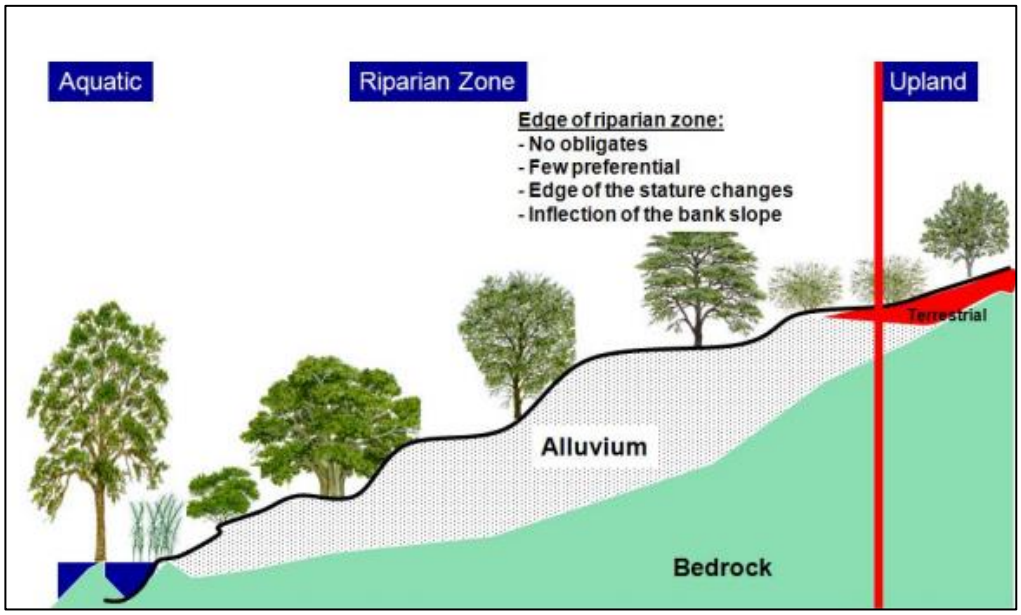


Figure 3: A schematic diagram illustrating the edge of the riparian zone on one bank of a large river. Note the coincidence of the inflection (in slope) on the bank with the change in vegetation structure and composition. The edge of the riparian zone coincides with an inflection point on the bank; where there are not obligates upslope; few preferential. The boundary also coincides with the outer edge of the stature differences (DWAF, 2008)

[1] Baseflow: Long-term flow in a river that continues after storm flow has passed (DWAF, 2008).

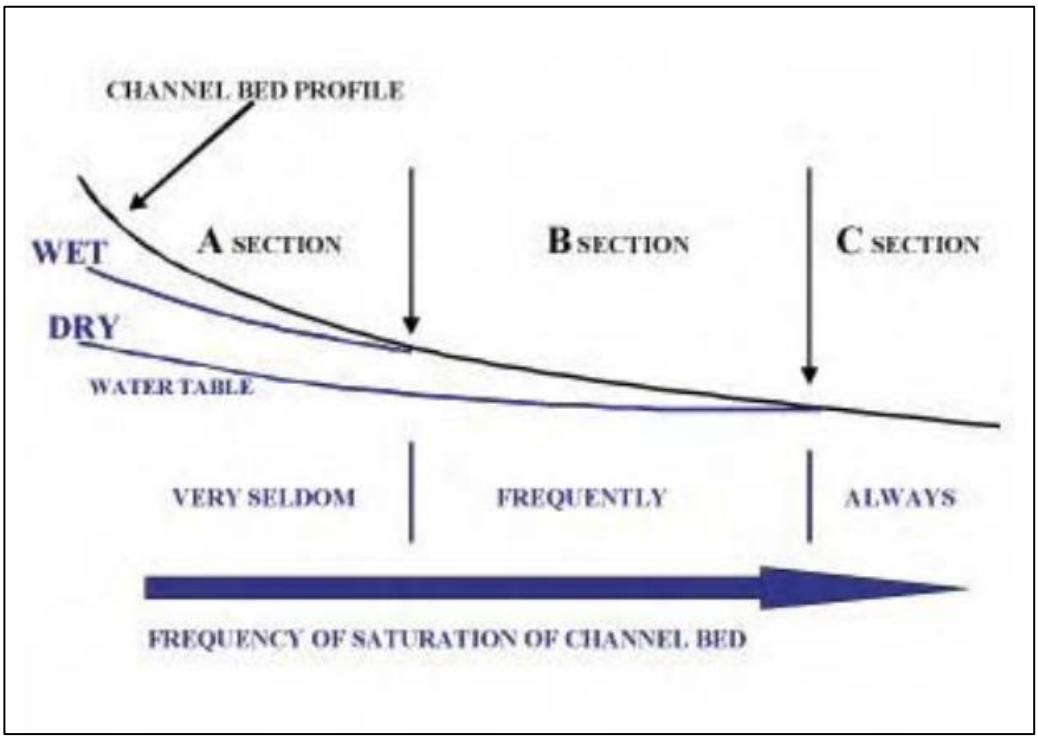


Figure 4: Image illustrating the classification of river channels using the frequency that each channel section contains baseflow (DWAF, 2008).

As per the NWA primary indicator, hydrophytic vegetation species are utilised to guide the delineation of wetness zones within watercourses. The relationship between the wetness zones, vegetation type and classification of occurrence of plants in wetlands can be seen in Table 5 below. Table 6 presents the frequency of plant species occurrence in wetlands within different wetness zones.

Table 5: Wetness zones, vegetation types and classification of plants occurrence in wetlands based on their relationship (Kotze et al., 2009)

VEGETATION	TEMPORARY WETNESS ZONE	SEASONAL WETNESS ZONE	PERMANENT WETNESS ZONE
Herbaceous	Predominantly grass species; mixture of species which occur extensively in non-wetland areas, and hydrophilic plant species which are restricted largely to wetland areas	Hydrophilic sedges and grasses restricted to wetland areas	Dominated by: (1) emergent plants, including reeds (*Phragmites australis*), a mixture of sedges and bulrushes (Typha capensis), usually >1m tall; or (2) floating or submerged aquatic plants.
Woody	Mixture of woody species which occur extensively in non-wetland areas, and hydrophilic plant species which are restricted largely to wetland areas.	Hydrophilic woody species restricted to wetland areas	Hydrophilic woody species, which are restricted to wetland areas. Morphological adaptations to prolonged wetness (e.g. prop roots).

Table 6: Frequency of wetland species plant occurrence within different wetness zones (Kotze et al., 2009)

SYMBOL	HYDRIC STATUS	DESCRIPTION/OCCURRENCE
Ow	Obligate wetland species	Almost always grow in wetlands (> 90 % occurrence)
F+	Facultative positive wetland species	Usually grow in wetlands (67-99 % occurrence) but occasionally found in non-wetland areas
F	Facultative wetland species	Equally likely to grow in wetlands (34-66 % occurrence) and non-wetland areas
F-	Facultative negative wetland species	Usually grow in non-wetland areas but sometimes grow in wetlands (1-34 % occurrence)
D	Dryland species	Almost always grow in drylands

5.3. ASSESSMENT METHODOLOGIES

5.3.1.PRESENT ECOLOGICAL STATE (PES)

Wetland Systems

To determine the PES of the systems affected by the proposed development, a WET-Health Level 2 assessment, as developed by Macfarlane et al. (2008), was performed on all potentially impacted systems. WET-Health assessments evaluate the current state of health for 3 main components of wetland systems, namely: Hydrology, Geomorphology, and Vegetation. The assessment involves the evaluation of several measureable aspects of each component in a series of steps to determine that component's current health. The 3 components are then combined in a weighted average (3:2:2) to gain a final state of health score. The overall health score was classified into a health category. Finally, a health projection was assigned to the score to indicate the projected health of the system within the next 5 years, with the proposed development taking place, based on the specialist's opinion.

The impact scores obtained for each of the modules reflect the degree of change from natural reference conditions. Resultant health scores fall into one of six health categories (A-F) on a gradient from "unmodified/natural" (Category A) to "severe/complete deviation from natural" (Category F) as depicted in Table 7 below. This classification is consistent with DWAF categories used to evaluate the present ecological state of aquatic systems.

Table 7: Health categories used by the WET-Health for describing the integrity of wetlands (Macfarlane et al., 2009)

IMPACT CATEGORY	DESCRIPTION	RANGE	PES CATEGOR
None	Unmodified, natural.	0 – 0.9	**A**
Small	Largely natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1 – 1.9	**B**
Moderate	Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact	2 – 3.9	**C**
Large	Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred.	4 – 5.9	**D**
Serious	The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features	6 – 7.9	**E**
Critical	Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8 – 10	**F**

Riverine Systems

Evaluations of the riverine systems utilised a different methodology which was developed in 1999 by the then Department of Water Affairs and Forestry (DWAF), the previous incarnation of the DWS and DAFF. The methodology, known as the Index of Habitat Integrity (IHI), breaks down riverine systems into instream and riparian zone areas. It then breaks these down further into various aspects associated with the instream and riparian zone habitat which are rated infield on an increasing scale of severity from 0 (no impact) to 25 (highest impact). The instream and riparian zone final scores are classified into Habitat Integrity categories.

The Index of Habitat Integrity, 1996, version 2 (Kleynhans, 2012) was used to obtain a habitat integrity class for the instream habitat and riparian zone. This tool compares the current state of the in-stream and riparian habitats (with existing impacts) relative to the estimated reference state (in the absence of anthropogenic impacts). This involved the assessment and rating of a range of criteria for instream and riparian habitat) scored individually (from 0-25) using Table 8 as a guide.

This assessment was informed by site visits where potential impacts to each metric were assessed and evaluated; and an understanding of the catchment feeding the river and land-uses/activities that could have a detrimental impact on river ecosystems.

Table 8: Category of score for the Present Ecological State (PES)

RATING SCORE	IMPACT SCORE	DESCRIPTION
0	A: Natural	No discernible impact or the modification is located in such a way that it has no impact on habitat quality, diversity, size and variability.
1-5	B: Good	The modification is limited to very few localities and the impact on habitat quality, diversity, size and variability are also very small.
6-10	C: Fair	The modifications are present at a small number of localities and the impact on habitat quality, diversity, size and variability are also limited.
11-15	D: Poor	The modification is generally present with a clearly detrimental impact on habitat quality, diversity size and variability. Large areas are, however, not influenced.
16-20	E: Seriously Modified	The modification is frequently present and the habitat quality, diversity, size and variability in almost the whole of the defined area are affected. Only small areas are not influenced.
21-25	F: Critically Modified	The modification is present overall with a high intensity. The habitat quality, diversity, size and variability in almost the whole of the defined section are influenced detrimentally.

5.3.2.ECOLOGICAL IMPORTANCE AND SENSITIVITY

Wetland Systems

The Ecological Importance and Sensitivity was determined by utilising a rapid scoring system. The system has been developed to provide a scoring approach for assessing the Ecological, Hydrological Functions; and Direct Human Benefits of importance and sensitivity of wetlands. These scoring assessments for these three aspects of wetland importance and sensitivity have been based on the requirements of the NWA, the original Ecological Importance and Sensitivity assessments developed for riverine assessments (DWAF, 1999), and the work conducted by Kotze et al (2008) on the assessment of wetland ecological goods and services from the WET-EcoServices tool (Rountree, 2013). The scores are then placed into a category of very low, low, moderate, high and very high as shown in Table 9 below.

Table 9: Category of score for the Ecological Importance and Sensitivity (Rountree, 2013)

Ecological Importance and Sensitivity categories	Range of EIS score
Very High: Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these systems is usually very sensitive to flow and habitat modification. They play a major role in moderating the quantity and quality of water of major rivers	>3 and <= 4
High: Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these system may be sensitive to flow and habitat modification. They play a role in moderating the quantity and quality of water of major rivers	>2 and <= 3
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modification. They play a small role in moderating the quantity and quality of water of major rivers	>1 and <= 2
Low/marginal: Wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers	>0 and <= 1

Riverine Systems

The ecological importance of a river is an expression of its importance to the maintenance of biological diversity and ecological functioning on local and wider scales. Ecological sensitivity (or fragility) refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred (resilience) (Kleynhans & Louw, 2007; Resh, *et. a*l., 1988; Milner, 1994). Both abiotic and biotic components of the system are taken into consideration in the assessment of ecological importance and sensitivity. The scores assigned to the criteria of the assessment are used to rate the overall EIS of each mapped unit according to Table 10 below, which was based on the criteria used by DWS for river eco-classification (Kleynhans & Louw, 2007) and the WET-Health wetland integrity assessment method (Macfarlane *et al*., 2008).

Table 10: The ratings associated with the assessment of the Ecological Importance and Sensitivity of the riverine areas

RATING	EXPLANATION
None, Rating = 0	Rarely sensitive to changes in water quality/hydrological regime
Low, Rating =1	One or a few elements sensitive to changes in water quality/hydrological regime
Moderate, Rating =2	Some elements sensitive to changes in water quality/hydrological regime
High, Rating =3	Many elements sensitive to changes in water quality/ hydrological regime
Very high, Rating =4	Several elements sensitive to changes in water quality/ hydrological regime

5.3.3.Ecosystem Services (EcoServices)

Wetland systems are subjected to a further assessment which measures the types and levels of ecosystem services each wetland provides to the area. Ecosystem services are evaluated using the Level 2 WET-EcoServices assessment tool (Kotze *et al.,* 2009). This tool quantitatively scores both physical and socio-cultural aspects of the wetland system and produces a score and graph for several services provided by the wetland. The services which are scored can be seen below in Table 11.

Table 11: Physical and socio-cultural ecosystem services

Category	Service
Physical	Flood attenuation Stream flow regulation Sediment trapping Phosphate assimilation Nitrate assimilation Toxicant assimilation Erosion control Carbon storage
Socio-Cultural	Biodiversity maintenance Provision of water for human use Provision of cultural floods Cultural significance Tourism and recreation Education and research

5.3.4.BUFFER ASSESSMENT

A buffer zone assessment was performed using the DWS Buffer Zone Tool developed by MacFarlane and Bredin (2016). This tool takes into account the type of water resources, its condition and ecological importance and determines an appropriate buffer to prevent it from being significantly impacted upon. Within the buffer zone, no construction, movement, waste or ablutions may occur or be situated, either temporarily or permanently.

5.3.5.RISK ASSESSMENT MATRIX

Assessing the risk of all the proposed development impacts, and associated consequences on watercourses was performed utilising the DWS's Aspects and Impact Register/Risk Assessment for Watercourses including Rivers, Pans, Wetlands, Springs, and Drainage Lines tool, otherwise known as the Risk Assessment Matrix or RAM. The RAM assessed different activities and aspects of the development and scores were determined for factors, such as magnitude of the impact, length of time of the activity, length of time for the impact to persist, and geographical scale, to determine an overall risk rating of each impact. Table 12 illustrates the different risk ratings, their classes, and the management descriptions.

Table 12: Freshwater habitat screening

Rating	Class	Management Description
1 – 55	*Low Risk*	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	*Moderate Risk*	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Wetlands are excluded.
170 – 300	*High Risk*	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve.

5.3.6.IMPACT ASSESSMENT METHODOLOGY

2014 NEMA EIA Regulations (as amended), Appendix 3 (3) (1) (h)(v) the impacts and risks identified including the:

- *nature,*
- *significance,*

- *consequence,*
- *extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources; and can be avoided, managed or mitigated; and*
- *(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; viii) the possible mitigation measures that could be applied and level of residual risk.*

This section describes the processes undertaken to identify impacts, to assess and rank the impacts and risks, to describe environmental impacts and risks identified during the EIA process, to assessment the significance of each impact, risk and an indication of the extent to which the issue and risk can be avoided or addressed by the management actions, and any deviations from approved Scoping Report (including Plan of Study). In this assessment the significance of the potential impacts are considered before and after identified mitigation is implemented, for direct, indirect, and cumulative impacts, in the short and long term, for all phases of the proposed project.

The following criteria were considered for the assessment of each impact.

- The **nature** of an impact is the type of effect that the activity will have on the environment. It includes what is being affected and how.
- The **duration** of the impact is the period during which the impact is occurring. Inherent in this is the **reversibility** of the impact, meaning that if the duration of the impact is not permanent, then it can be reversed, i.e. the impact is reversible. Should an impact not be reversible, then this is explicitly stated.
- The **irreplaceable loss of resources** has been assessed, but not explicitly stated as such. For example, a less severe impact will be insignificant or non-harmful and the resultant loss of resources can be replaced. In contrast, the loss of resources from disastrous or extremely harmful impacts cannot be satisfactorily replaced.
- The **significance** of an impact is determined by a combination of its consequence and likelihood.

Table 13 below describes the scoring of the impacts and how they determine the overall significance.

Table 13: Impacts and overall significance

Scoring of Impacts	
Consequence	
Severity the degree to which the project affects or changes the environment	1 – Insignificant / Non-harmful 2 – Small / Potentially harmful 3 – Significant / Slightly harmful 4 – Great / Harmful 5 – Disastrous / Extremely harmful
Duration a measure of the lifetime that the impact will be present	1 – Up to 1 month 2 – 1 month to 3 months 3 – 3 months to 1 year 4 – 1 to 10 years 5 – Beyond 10 years / Permanent
Spatial Scale the extent / size of the area that may be affected	1 – Immediate, fully contained area / within the site 2 – Surrounding area (< 2km) 3 – Within farm / town / city 4 – Within municipal area 5 – Regional, National, International
Overall Consequence = (Severity + Duration + Extent) / 3	
Likelihood	
Frequency	1 – Once a year, or once or more during operation

how often the impact will occur	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 – Almost never / almost impossible 2 – Very seldom / highly unlikely 3 – Infrequent / unlikely / seldom 4 – Often / regularly / likely / possible 5 – Daily / highly likely / definitely
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 t 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 causes a loss of resources that can 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

6. ASSUMPTIONS

ASSUMPTIONS	DESCRIPCTION
According to the SANBI guidelines, specialist assessments should be performed during the rainfall season of assessed area. In this case, KZN is a summer rainfall area and therefore assessments should be performed between October and April. Fieldwork for this project was done at the at mid-September 2020 and beginning of October, two (2) weeks away from the rainfall season and within the rainfall season, respectively. A third site visit was conducted on the 16th of September 2022, for only the proposed new material laydown area. However, it must be noted that KZN experienced a moderate amount of rainfall during the September 2020 month which is considered the dry season. Additionally, during the 16th of September 2022 site visit, KZN experienced sporadic to moderate rainfall two (2) days before the site visit.	First site visit was conducted two (2) weeks away from the rainfall season (18/09/2020) and the second site visit was conducted within rainfall season (4/10/2020). Additionally, a third site visit was conducted on the 16/09/2022. Thus, no issues with season of study in which it was conducted was envisioned. Furthermore, at the time of the first and second survey, KZN was experiencing moderate to high volumes of rainfall.
Accessibility to certain portions of the landscape where watercourses were present was difficult due to the dense vegetation and fences in the area which made these areas inaccessible.	The specialist assessed all the portions of land that were deemed accessible when on site. Several areas of dense Mangrove vegetation, fenced-off portions and areas with safety issues could not be accessed. These areas were assessed utilising the specialist's best knowledge and desktop information, which was deemed to be sufficient by the specialist.
Only those wetland/riverine habitats which will be significantly impacted by the proposed development were accurately delineated in the field. The remaining watercourses within a 500m assessment radius were delineated at a desktop level and broadly verified in the field to obtain an extent of the wetland/riverine areas, and to facilitate an understanding of the dynamics of the systems.	Environmental data such as NFEPA Rivers and Wetlands (Driver *et al*., 2011), contours and river lines coupled with the specialist knowledge of watercourses within the region were utilised to accurately delineate the watercourses within the 500m assessment radius. The data and methods were deemed sufficient to delineate these watercourses at a desktop level with brief infield verification.
These assessments which can only take into consideration the current condition with some speculation of historical events based on evidence observed in the area and satellite imagery. As vegetation and habitats may vary both temporally and spatially, there must be recognition of fact that certain aspects or features may be missed if they do not present themselves on the day.	The specialist conducted three (3) site visits on the 18/09/2020, 04/10/2020 and 16/09/2022. These site visits were utilised to thoroughly delineated and assess the condition and service provision of the at-risk watercourses onsite. The specialist recognised the diversity and changes in the watercourses, which were then reported on in this report.
All delineation verification is done using a GPS system. The precision of such systems is generally limited to 5m and therefore this error must be taken into account when utilising the GPS coordinates.	The specialist delineated the boundaries of the watercourses as per the GPS coordinate taken and considered the potential error that might emanate from the GPS system.
Only vegetation which was present within at risk watercourses were assessed in the field, all other systems were assessed at desktop level and visually confirmed on site.	The specialist did note the vegetation in the catchment area and all at-risk watercourses, in order to fully understand the ecological connectivity of the at-risk receiving environment. This was also

	taken into consideration during the assessment techniques outlined in the Methodology Section (Section 4)
While the assessment techniques utilised in this report are used in order to standardise and 'objectify' the assessment of the systems' function, potential impacts and services, it must be noted that much of the information is subjectively collected based on the assessor's previous experience and training.	The specialist is confident in his findings collected during the site visits and presented in this report.
The assessment of impacts and recommendation of mitigation measures was informed by the site-specific ecological issues identified during the infield assessment and based on the assessor's working knowledge and experience with similar development projects.	The specialist rated the impacts and provided mitigation measures as per the construction methodology received from the client. When rating the impacts and providing mitigation measures, the onsite ecological issues were also taken into consideration.
Evaluation of the significance of impacts with mitigation takes into account mitigation measures provided in this report and standard mitigation measures are to be included in the project-specific Environmental Management Programme report (EMPr).	To be noted when the Environmental Assessment Practitioner (EAP) is compiling the EMPr.
Cumulative impacts assessed in Section 10 of this report is calculated based on current existing impacts on site and assumptions of impacts that might occur from proposed projects in the future	The specialist utilised his best knowledge of existing impacts and potential future projects when rating the potential cumulative impacts that might occur within the proposed project area and catchment areas.

7. DESKTOP ASSESSMENT AND DELINEATION

7.1. STUDY AREA

7.1.1.ECOREGION

According to DWS (previously DWA), the proposed development falls into the Natal Coastal Plain (13) Level 1 Ecoregion (Kleynhans *et al.*, 2005). Level 1 ecoregions are derived primarily from terrain and vegetation, along with altitude, rainfall, runoff variability, air temperature, geology and soil. This region can predominantly be broken down into the following characteristics:

- Mean annual precipitation: Moderate to high.
- Coefficient of variation of annual precipitation: Low to moderate.
- Drainage density: Low.
- Stream frequency: Low to medium.
- Slopes <5%: >80%.
- Median annual simulated runoff: Moderate to high.
- Mean annual temperature: High to very high.

Table 14: Main attributes of the Natal Coastal Plain Eco-region (Kleynhans et al., 2005)

Main Attributes	Description
Terrain Morphology: Broad division (dominant types in bold) (Primary)	**Plains: Low Relief**
Vegetation types (dominant types in bold) (Secondary)	**Coastal Bushveld/Grassland; Subhumid Lowveld Bushveld; Natal Lowveld Bushveld; Patches Sand Forest. Valley Thicket (limited)**
Altitude (above mean sea level – a.m.s.l)	0 - 300
MAP (mm)	500 to 600 (limited); 600 to 1000
Coefficient of Variation (% of annual precipitation)	<20 to 30
Rainfall concentration index	15 to 50
Rainfall seasonality	Mid to late summer
Mean annual temp. (°C)	20 to >22
Mean daily max. temp. (°C): February	26 to 32
Mean daily max. temp. (°C): July	20 to 24
Mean daily min. temp. (°C): February	>20
Mean daily min temp. (°C): July	8 to >10
Median annual simulated runoff (mm) for quaternary catchment	40 to 80; 100 to >250

7.1.2.GEOLOGY

The proposed development is located on over alluvium, sand and calcrete. The aforementioned are known to be loose unconsolidated deposits which were formed during the Quaternary period. An explanation of these deposits are explained in Table 15.

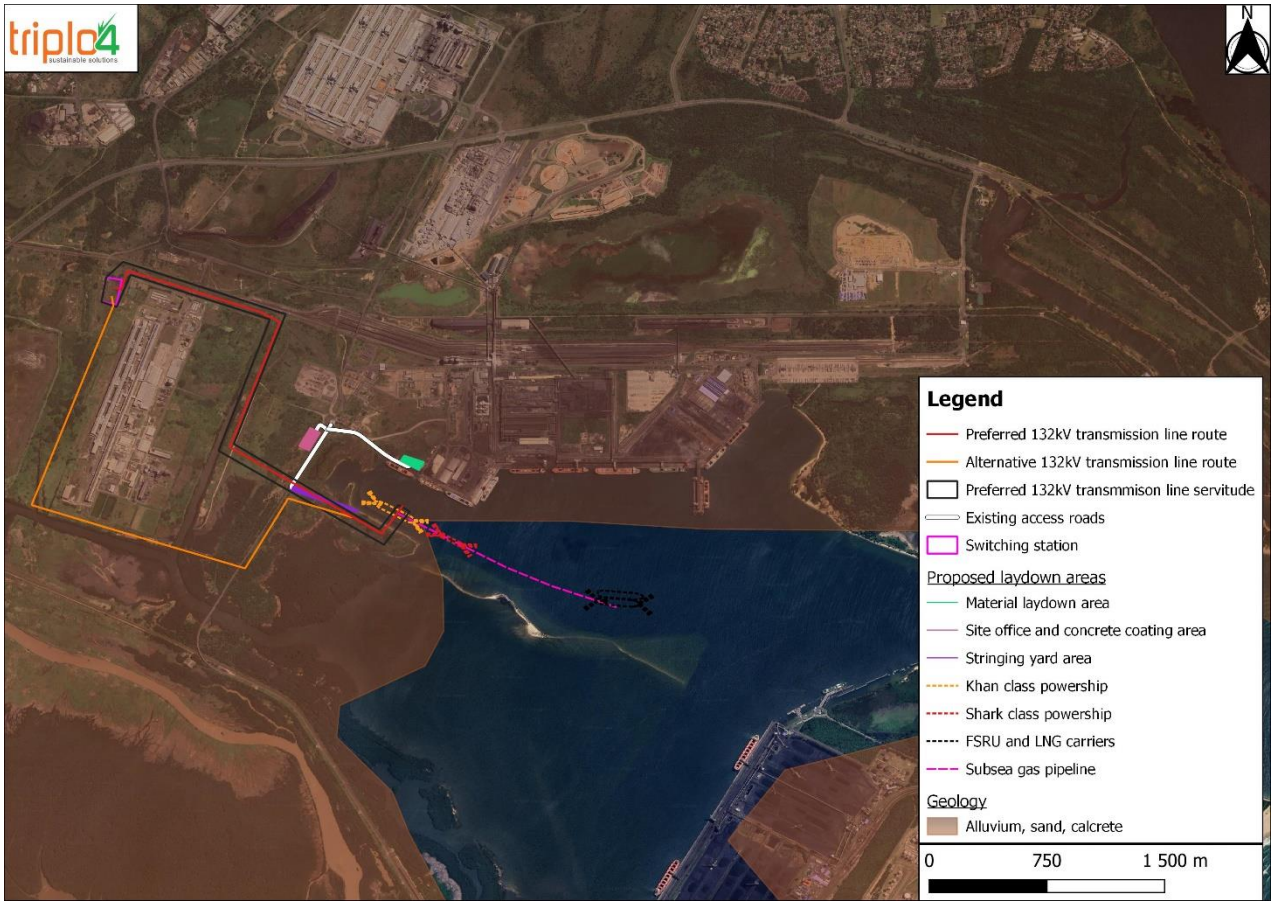


Figure 5: Dominant deposits within the proposed development site

Table 15: Description of the dominant deposits within the proposed development site

No.	Estimates % of Proposed Development	Deposits	Description
1	100%	Alluvium, Sand, Calcrete	Alluvium: Known as loose, unconsolidated (not cemented together into a solid rock) soil or sediment that has been eroded, reshaped by water in some form, and redeposited in a non-marine setting (Geosciences, 2011). Alluvium is typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel. When this loose alluvial material is deposited or cemented into a lithological unit, or lithified, it is called an alluvial deposit (Geosciences, 2011). The term "alluvium" is not typically used in situations where the formation of the sediment can clearly be attributed to another geologic process that is well described. This includes (but is not limited to): lake sediments (lacustrine), river sediments (fluvial), or glacially-derived sediments (glacial till). Sediments that are formed or deposited in a perennial stream or river are typically not referred to as alluvial (Geosciences, 2011). Most alluvium is geologically Quaternary in age and is often referred to as "cover" because these sediments obscure the

			underlying bedrock. Most sedimentary material that fills a basin ("basin fill") that is not lithified is typically lumped together as alluvial (Geoscience, 2011). Sand: A granular material composed of finely divided rock and mineral particles. It is defined by size, being finer than gravel and coarser than silt. Sand can also refer to a textural class of soil or soil type, therefore, a soil containing more than 85 percent sand-sized particles by mass (Geosciences, 2011). The composition of sand varies, depending on the local rock sources and conditions, but the most common constituent of sand in inland continental settings and non-tropical coastal settings is silica (silicon dioxide, or SiO_2) (Geosciences, 2011), usually in the form of quartz. The second most common type of sand is calcium carbonate, for example, aragonite, which has mostly been created, over the past half billion years, by various forms of life, like coral and shellfish (Geosciences, 2011). Calcrete: Also known as Hardpan, calcium-rich duricrust, a hardened layer in or on a soil. It is formed on calcareous materials as a result of climatic fluctuations in arid and semi-arid regions (Geociences, 2011). Calcite is dissolved in groundwater and, under drying conditions, is precipitated as the water evaporates at the surface. Rainwater saturated with carbon dioxide acts as an acid and also dissolves calcite and then re-deposits it as a precipitate on the surfaces of the soil particles; as the interstitial soil spaces are filled, an impermeable crust is formed (Geociences, 2011)..

7.1.3.SOILS

The soil textures within the study area ranged from clay in the watercourses to sandy in the catchment areas. The entire study area was recorded to contain soils that display characteristics associated with C class soils (Schultze et al., 2010). These soils were calculated to exhibit characteristics of a slow infiltration rate and restrictive permeability. According to Schultze (1992), soils within the study area have a moderate to moderately low erosion potential factor of 0.19, indicating that these soils presumably exhibit a moderate level of sandy clay content, are not entirely easily detachable, dependent on surface roughness of an area, thus exhibiting moderate to moderately low erosion potential of soils in the catchment.

7.1.4.VEGETATION TYPES

Mucina and Rutherford and SANBI (2006/2012/2018) delineated vegetation units throughout southern Africa. The purpose of this exercise was to map the extent of various vegetation types across the country and to identify their conservation status. Utilising the Mucina and Rutherford and SANBI (2006/2012/2018) data, Scott-Shaw and Escott (2011) subsequently refined the dataset according to the extent of the vegetation units, as well as their relevant conservation status, within the province of KwaZulu-Natal. Both datasets were utilised in conjunction to determine the natural state of the vegetation units that were recorded within the study area associated with the proposed development. In doing so, a comparison could be conducted between the current state and recorded natural state of the vegetation units to divulge what the primary impacts may have been on the floral habitats. This will allow for more refined analysis of the floral composition within each of the at-risk watercourses.

The proposed development extends over two vegetation unit at a desktop level namely the Maputaland Coastal Belt and Subtropical Freshwater Wetlands (Figure 6). The conservation status these vegetation types are vulnerable and least threatened, respectively (SANBI, 2018). The Maputaland Coastal Belt vegetation was intact to a probably 50%, which was noted to be disturbed by industrial development, tar roads and other linear activity. The Subtropical Freshwater Wetlands was predominantly disturbed along the

routes of the Preferred and Alternative Transmission Lines. The disturbance that were noted were built platforms, industrial development, dirt and tar roads and other linear activities. Thus, it must be noted that the vegetation units identified at a desktop level is not entirely evident during the site visit.

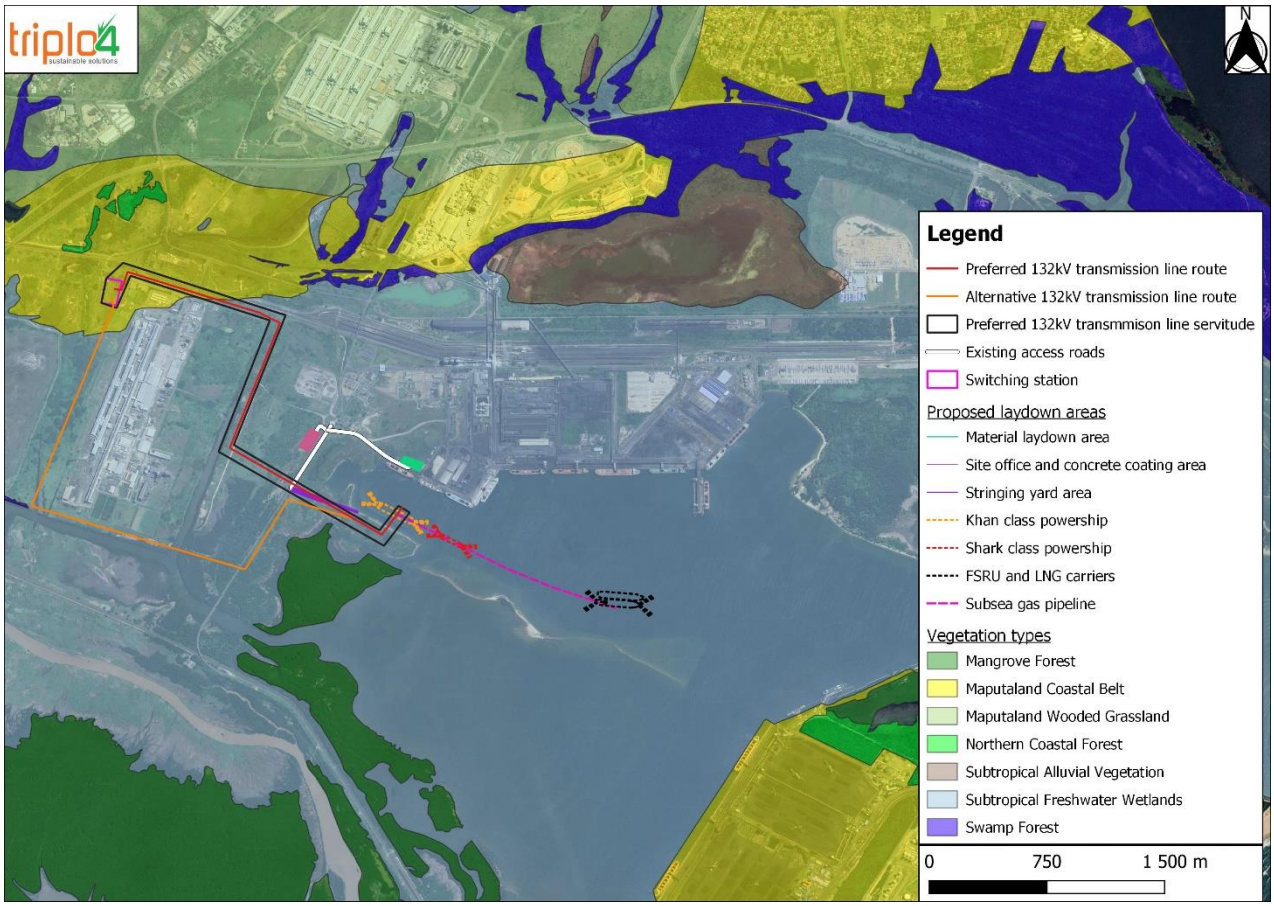


Figure 6: Map of the vegetation types within the proposed development

7.1.5.CRITICAL BIODIVERSITY AREA

Ezemvelo KwaZulu-Natal Wildlife (EKZNW) developed and implemented the KwaZulu-Natal Biodiversity Plan (EKZNW, 2016) to assist with development, protected areas expansion and conservation with the province (EKZNW), 2016). The plan identified areas as Critical Biodiversity Areas (CBAs) which cannot be lost if conservation goals are to be met. Furthermore, Ecological Support Areas (ESAs) were also established as these areas are required to support the functioning of CBAs and ecosystems. The guidelines of the KwaZulu-Natal Biodiversity Plan (EKZNW, 2016) for each CBA and ESA category are outlined in Table 16.

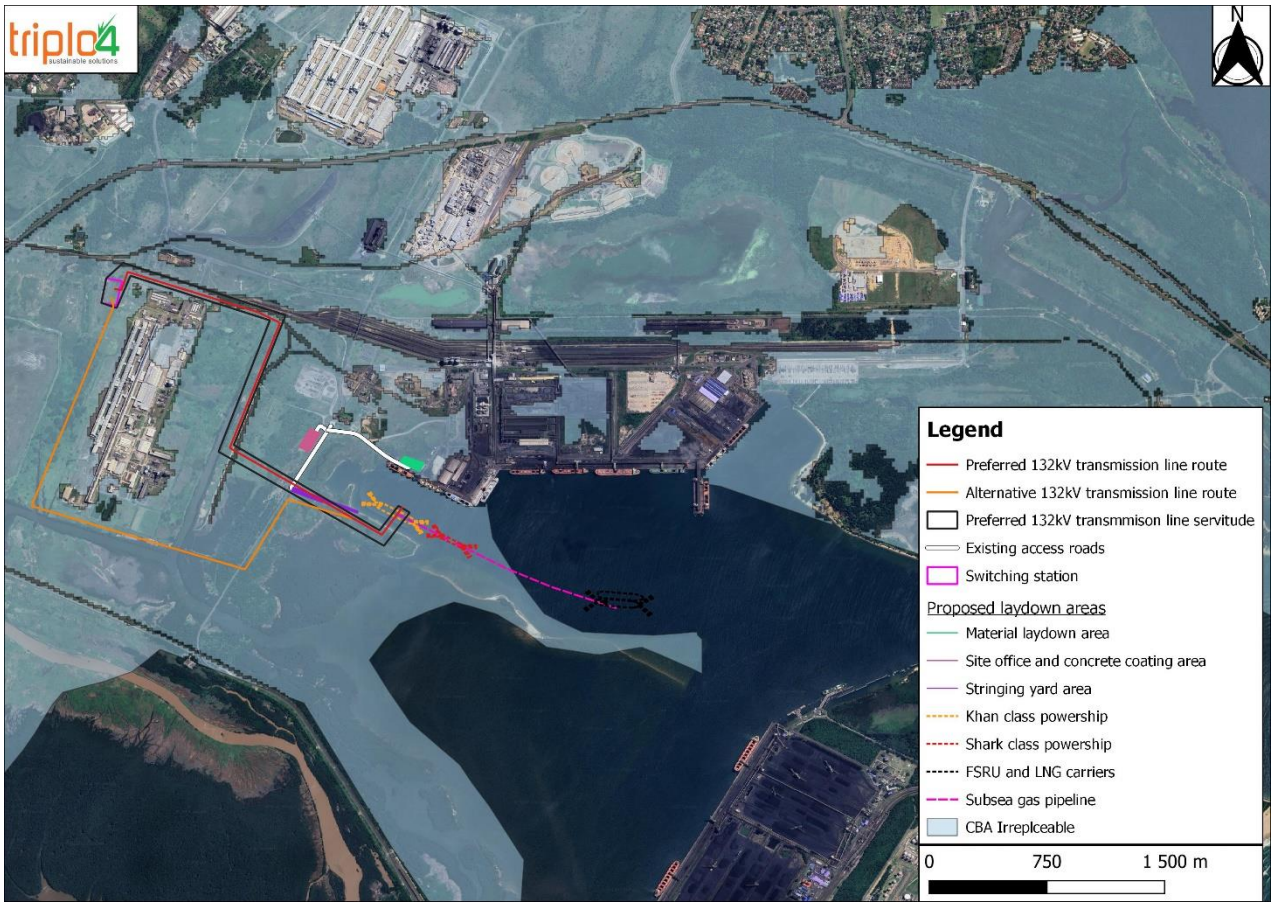


Figure 7: Critical Biodiversity Area within the proposed development

The CBA associated with the proposed development is CBA irreplaceable at a desktop level. This means that the proposed development occurs in areas considered critical for meeting biodiversity targets and thresholds, which are required to ensure the persistence of viable populations of species and the functionality of ecosystems. During the site visit, it was noted that several sensitive areas along the Preferred and Alternative Route had the potential to have habitat for red data species. However, due to the anthropogenic changes in the area, proliferation of AIPs were evident (species: *Ageratum conyzoides, Lantana camara, Ricinius communis* to name a few). Thus, the desktop delineation of the CBA irreplaceable is justified but not entirely due to the changes that has occurred on site which has to a certain degree impacted on the functionality of the surrounding ecosystems.

Table 16: CBA Descriptions for KwaZulu-Natal Province

CBA	Description
Critical Biodiversity Area: Irreplaceable	Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems.
Critical Biodiversity Area: Optimal	Areas that represent an optimised solution to meet the required biodiversity conservation targets while avoiding high cost areas as much as possible (Category driven primarily by process but is informed by expert input).
Ecological Support Areas	Functional but not necessarily entirely natural terrestrial or aquatic areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas. The area also contributes significantly to the maintenance of Ecosystem Services.
Modified Areas	Areas with no significant natural vegetation remaining and therefore regarded as having a low biodiversity value (e.g. sugarcane plantation areas or highly developed areas with no connectivity to natural environment).

Protected Area	A specifically delineated area that is both designated and managed to achieve the conservation of the indigenous state and the maintenance of associated ecosystem services and cultural values, through legal or other effective means.

7.1.6.WATER MANAGEMENT AREAS

The proposed development was observed to fall within the Water Management Area (WMA): Usuthu to Mhlathuze, which falls under the lesser sub-WMA's: Mhlathuze and the quaternary catchment W12F. The aforementioned WMA is drained by several parallel rivers which flow in a south-easterly direction and eventually discharge into the Indian Ocean. The rivers which contribute to the highest flow within this WMA are the Usuthu, Pongola, Mhlathuze, Mfolozi and Mkuze rivers with several smaller coastal rivers that feed the aforementioned larger rivers (Net *et al*., 2011).

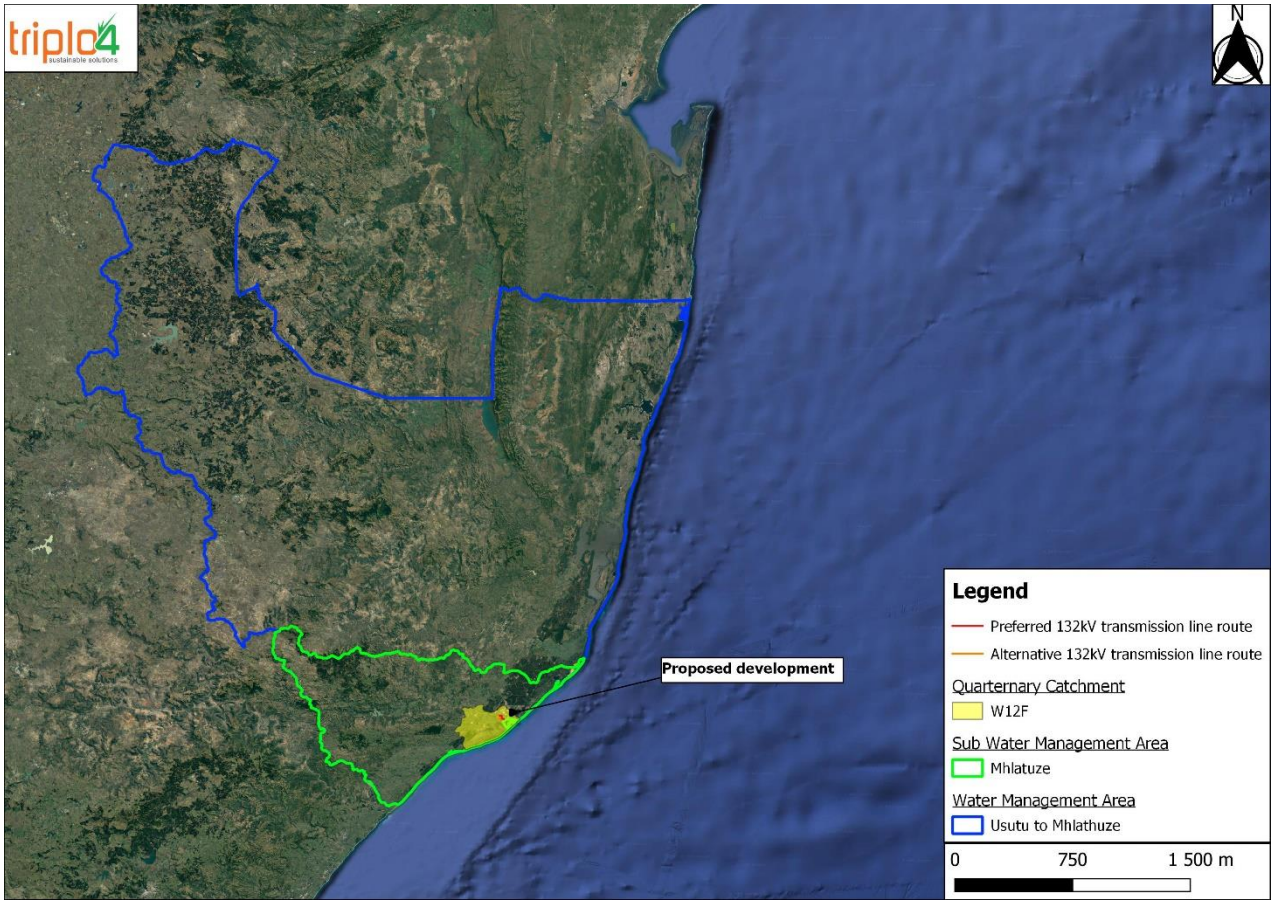


Figure 8: Map of the WMA, sub-WMA and Quaternary Catchment that fall within the proposed development

7.1.7.NFEPA

The National Freshwater Ecosystem Priority Areas (NFEPA), are a selection of rivers, wetlands and estuaries which have been identified as systems of strategic importance to the hydrological functioning of South Africa. These systems have been identified using scientific methodologies as well as consensus amongst researchers, government entities and the general public (Nel *et al*., 2011).

According to the NFEPA dataset, a FEPA Estuary will be at risk as a result of the Preferred and Alternative Routes. Only a small portion of both of the aforementioned routes do not occur within the FEPA Estuary. Upon the site visit conducted, it was determined that the Preferred and Alternative Routes occur in a swamp forest and wetland environment which have the habitat to host red data species, thus showing the importance of these systems.

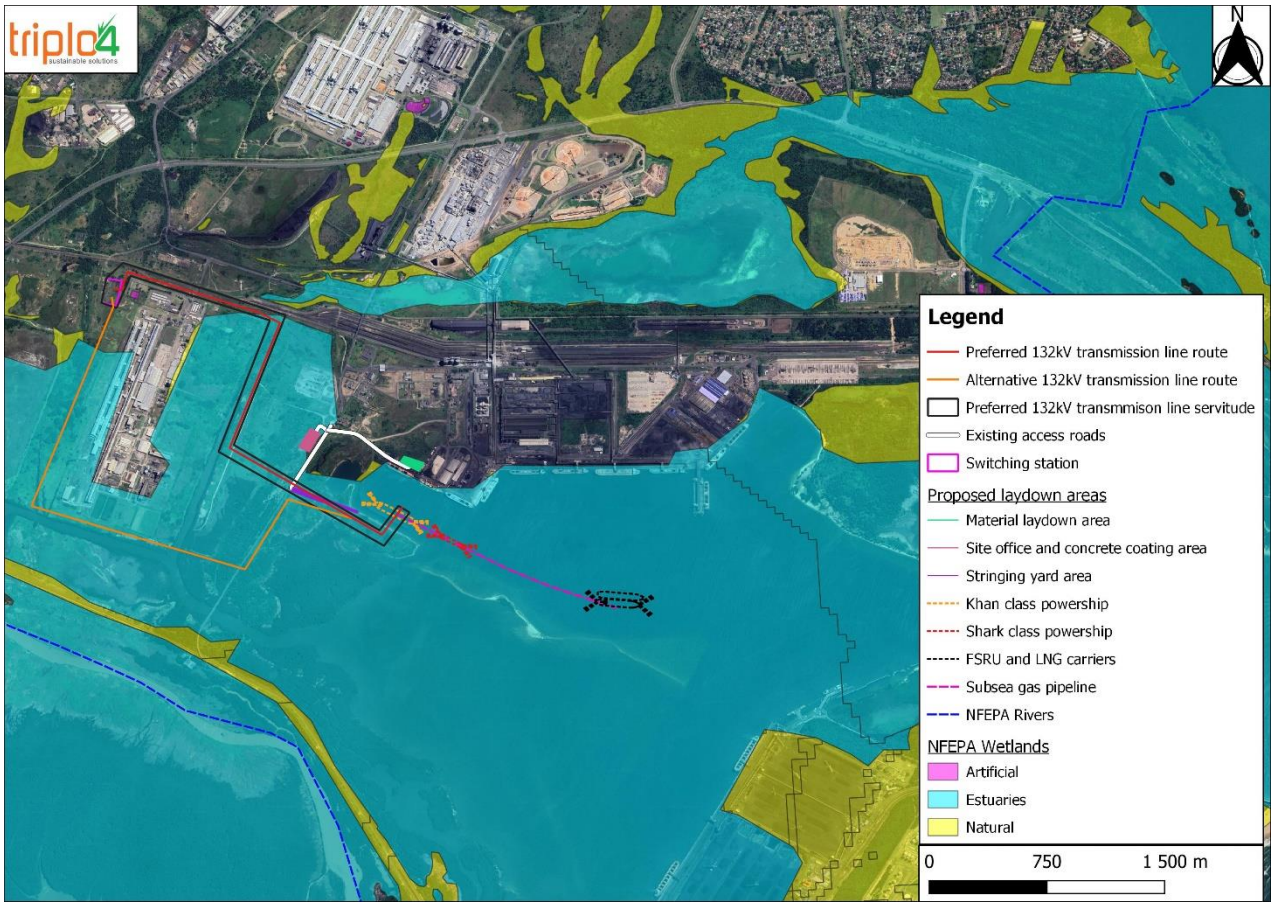


Figure 9: Map of the FEPA Rivers and Wetland in relation to the proposed development, from the NFEPA dataset

7.2. DESKTOP DELINEATIONS & SCREENING

7.2.1.HISTORICAL WETLAND DELINEATION

The Richards Bay Port and the surrounding industrial activities pieces of land were not known to be what we currently see at the Port. Several human made changes have been made to the surrounding pieces of land from linear activities (dirt and tar roads, overhead powerlines), coal storage areas, ship docking areas, industrial hubs, yatch clubs and many more changes. Thus, it is imperative to understand the past landscape features namely; forest, swamps, grasslands and watercourses, in order to understand the current features in the land.

In order to understand the current landscape features, historical topographical maps dating in the years 1943, 1964 and 1983 were interrogated and the following findings were determined.

Year dating 1943:

In the year dating 1943, according to the topographical map, the Richards Bay Port was not in existence at this point and the now Port was known as the Icweba Umhlaluzi Lagoon, also known as the Wildtuin Game Reserve. The area where the Preferred and Alternative Routes are proposed was cut out of the image to a certain extent but was noted to be a perennial swamp.

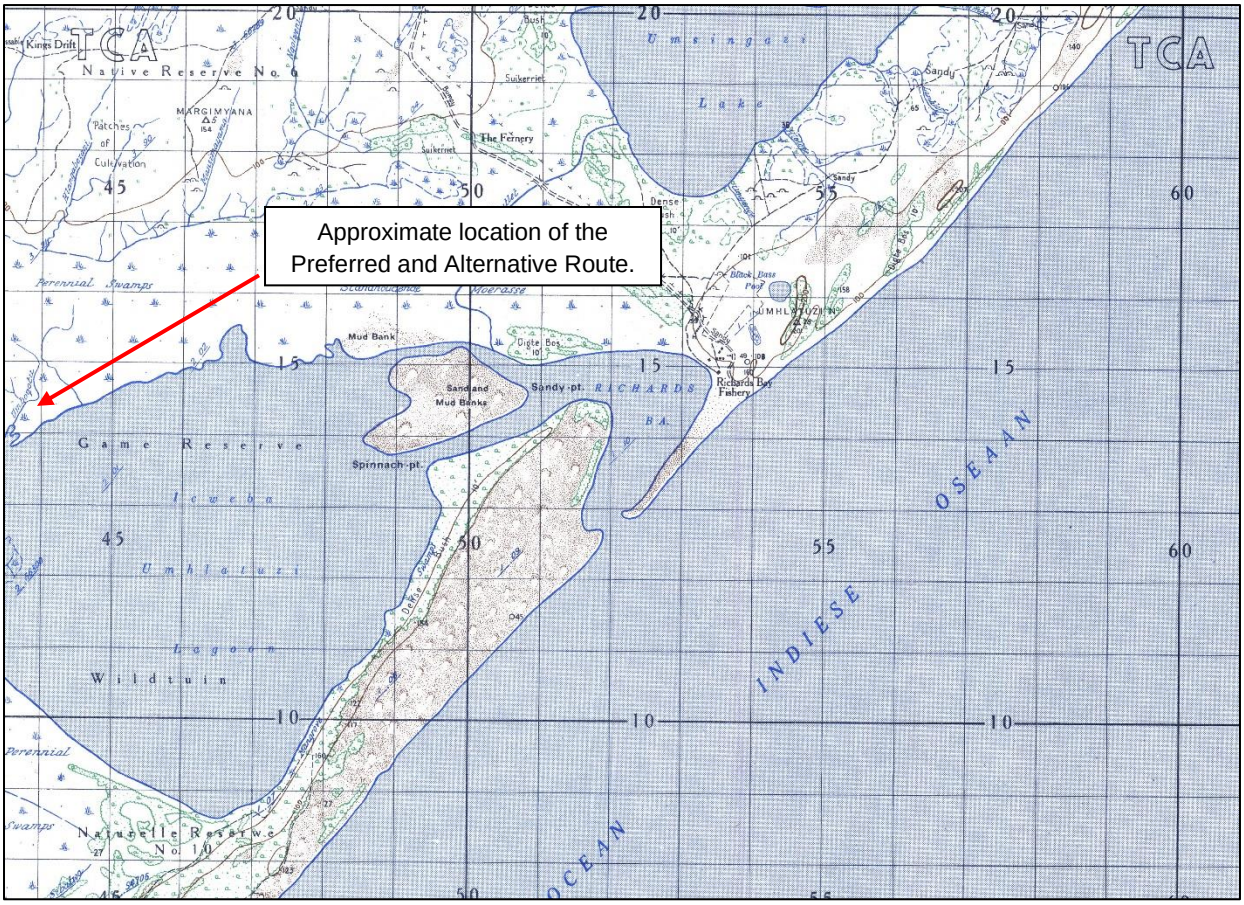


Figure 10: Topographical map of where the current Richards Bay Port exist, year dating 1943, the red arrow shows the approximate area of the Preferred and Alternative Route.

Year dating 1964:

In the year dating 1964, according to the topographical map, Richards Bay Port was in existence at this point but several of the present ship docking areas and industrial hubs were not in existence at that point in time. The area where the Preferred and Alternative Routes are proposed were historically at this point in time was a perennial swamp, inclusive of the Mhlathuze River, however, the upper catchment areas were noted to be minimally changed by anthropogenic factors.

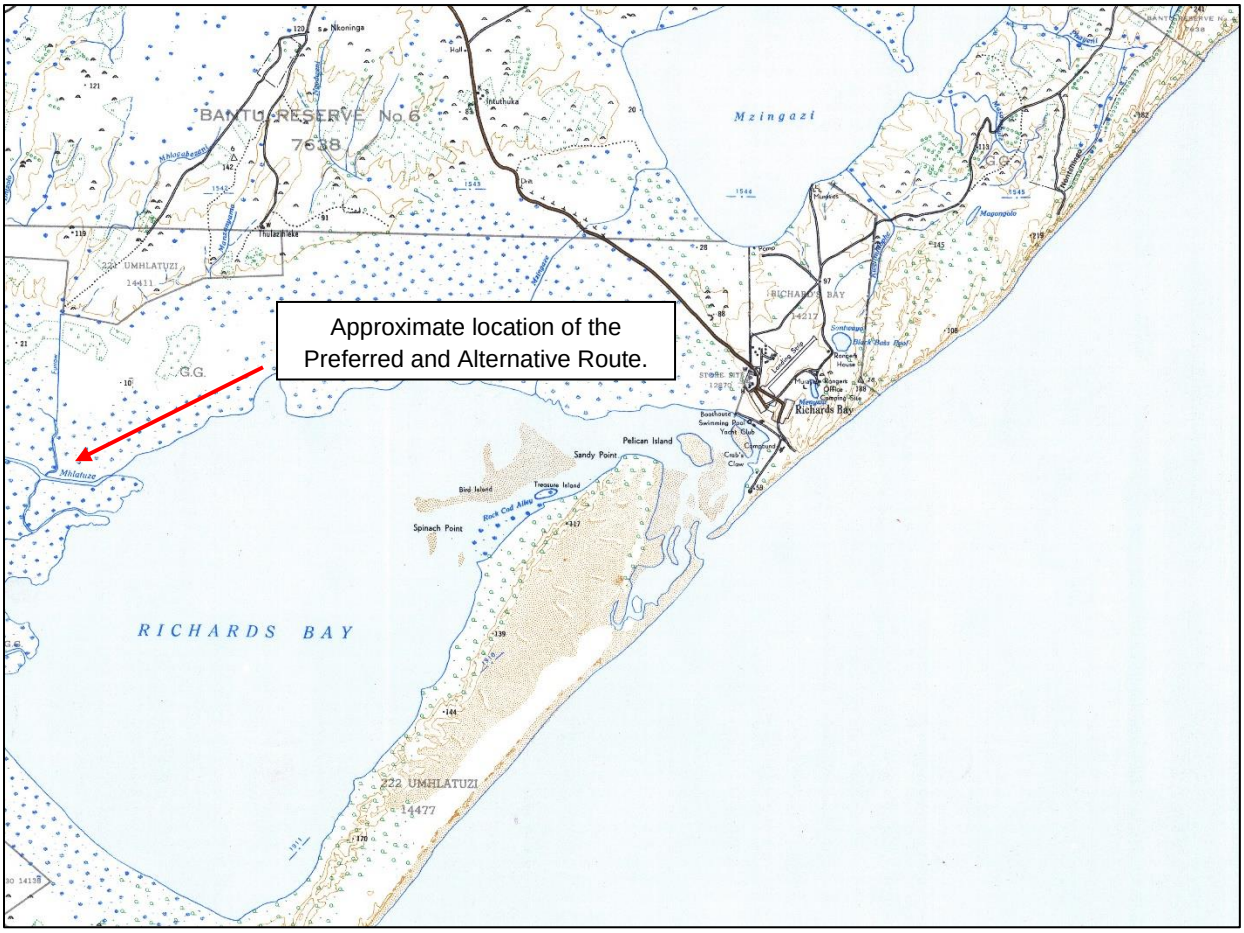


Figure 11: Topographical map of where the current Richards Bay Port exist, year dating 1964, the red arrow shows the approximate area of the Preferred and Alternative Route.

Year dating 1983:

In the year dating 1983, according to the topographical map, Richards Bay Port was in existence at this point and several of the current ship docking areas, industrial hubs and coal storage areas that are present now, were also present in 1983. The area where the Preferred and Alternative Routes are proposed were historically at this point in time almost identical to the current scenario in which industrial hubs have been built around the historical perennial swamp.

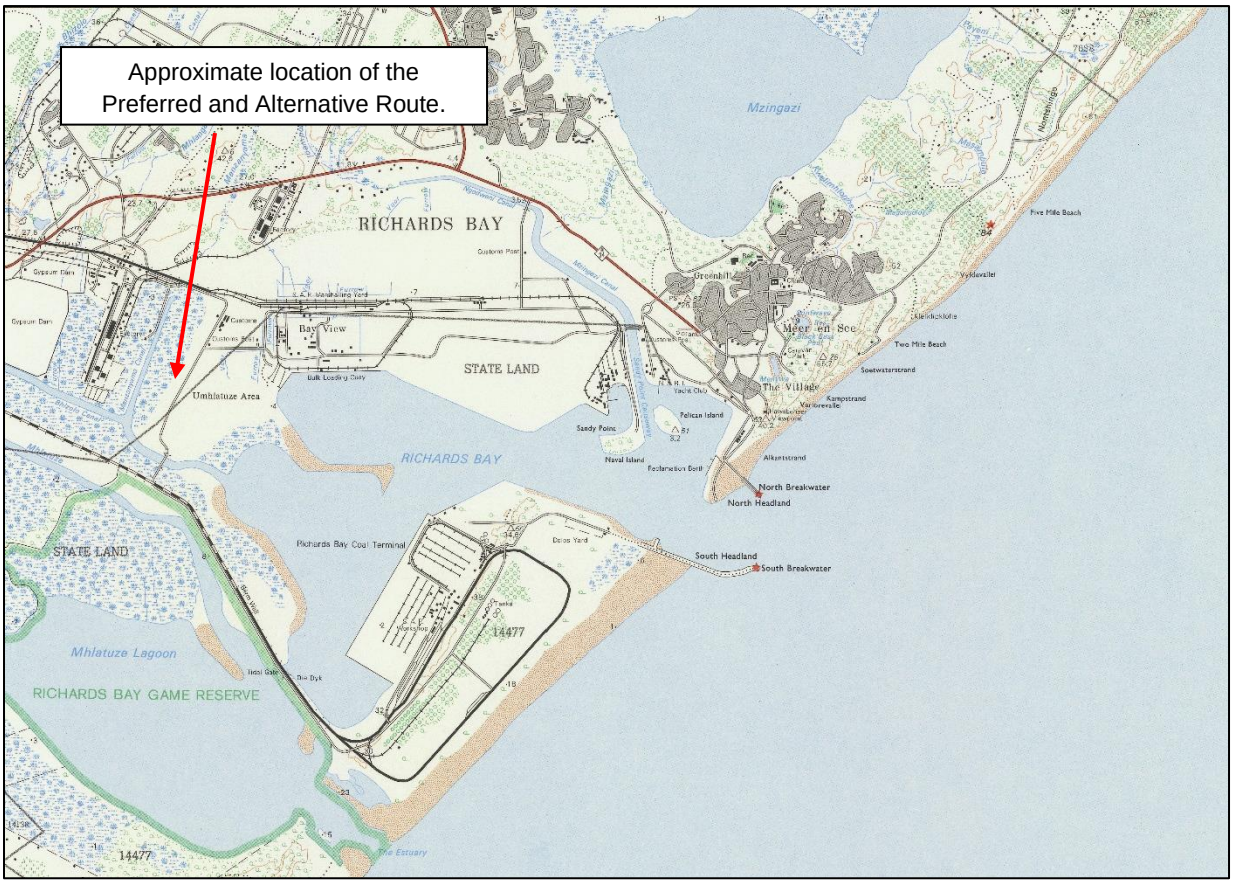


Figure 12: Topographical map of where the current Richards Bay Port exist, year dating 1983, the red arrow shows the approximate area of the Preferred and Alternative oute.

From the historical information provided in Figures 10 – 12, the following watercourse delineation was assumed to be historically present when the Richard Bay Port was not present or entirely present. It must be noted that this watercourse delineation was based on historical data reviewed and with specialist judgement of the type of environment that was present in the passed before human induced changes came into effect within the proposed development area and the 500m assessment radius.

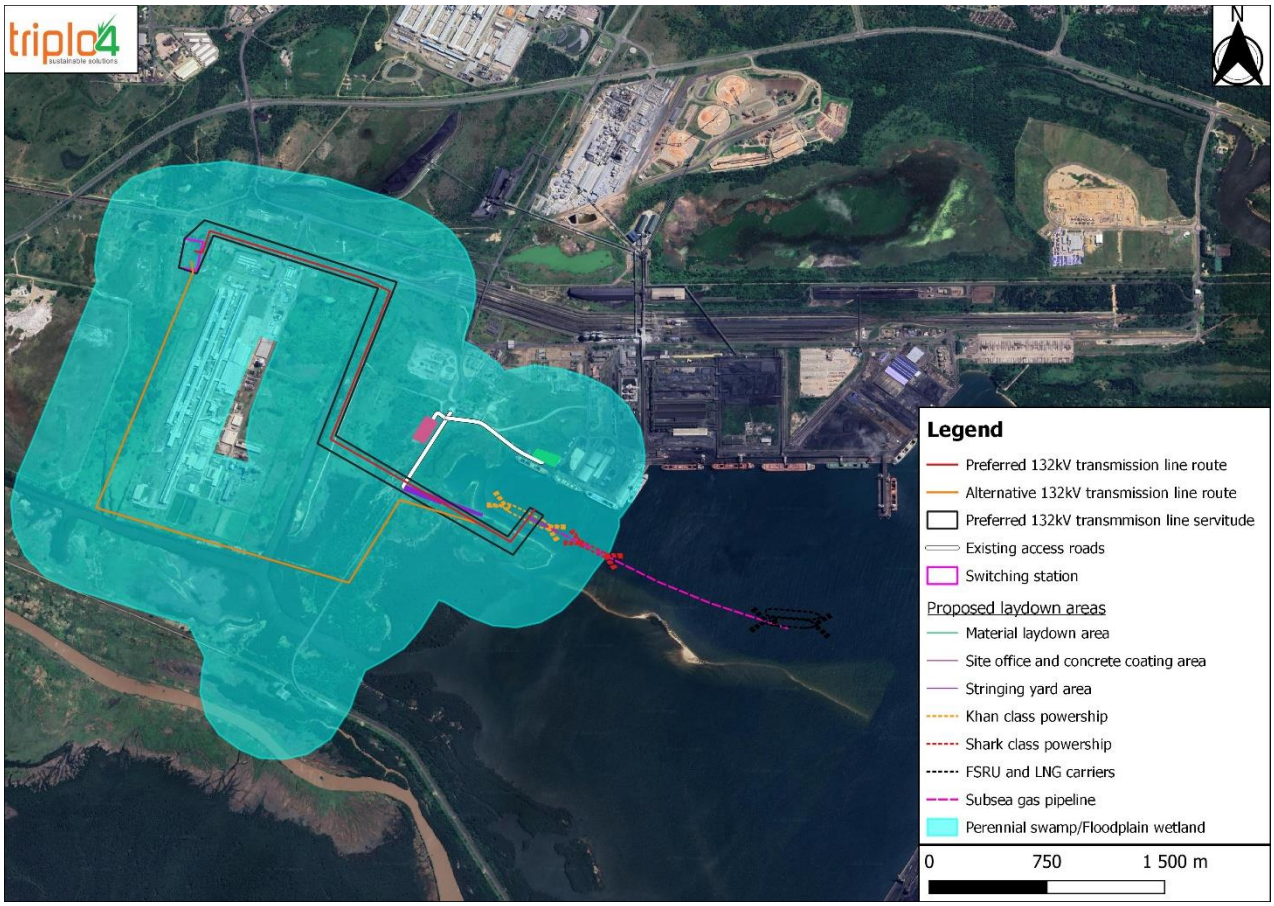


Figure 13: Map representing the historical watercourse delineation within the proposed development and 500m assessment radius

7.2.2.WETLAND DELINEATIONS

The watercourses within the study area were identified on a desktop level, classified and delineated in-field and subsequently mapped utilising GIS (QGIS 2.14 and Google™ Earth Pro) and available spatial data. Figure 14 below demonstrate the delineated watercourses identified within the study area during the field assessment. The at risk wetlands are categorised as high sensitive at risk wetlands and transformed at risk wetlands to in order to visualize the sensitivity vs. transformed wetlands within the 500m assessment radius.

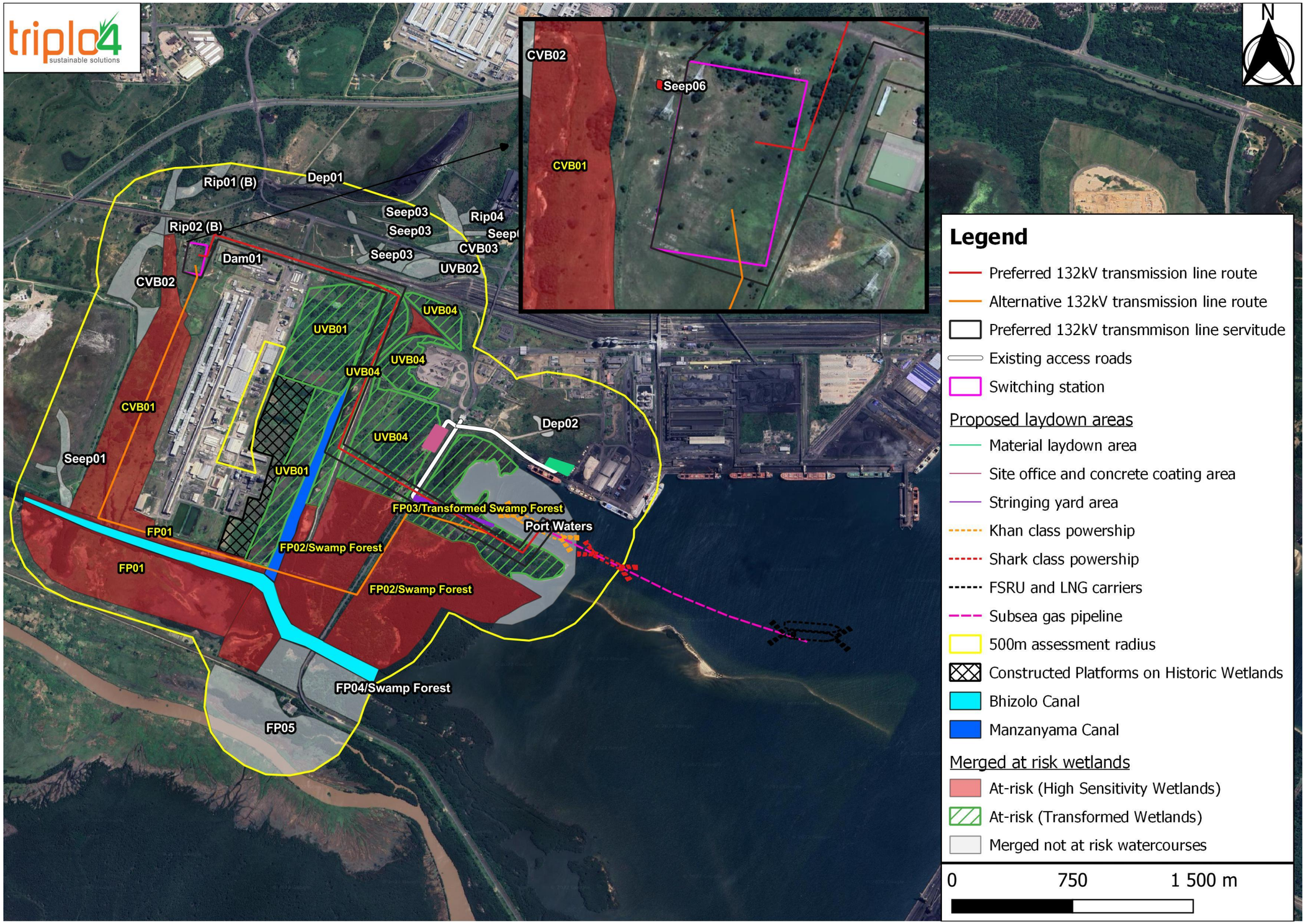


Figure 14 : Map of the in-field delineations of the watercourses identified at the proposed development and 500m assessment radius

7.2.3. INFIELD ASSESSMENT

The first infield assessment was conducted on the 18th of September 2022 and 4th of October 2022 for the transmission line, switching station and temporary laydown areas. An additionally infield assessment was conducted on the 16th of September 2022 for only an additional material laydown area site. Only the first infield assessment was conducted outside of the rainfall season. Thus, no issues with seasonality of study in which it was conducted was envisioned. Furthermore, at the time of the first and second survey, KZN was experiencing moderate to high volumes of rainfall.

7.2.4.INITIAL IMPACT SCREENING

The infield assessment phase confirmed the location and extent of the watercourses and subsequent screening provided an indication of which of the watercourses that may potentially be impacted upon by the proposed development. There are several factors which influence the level a watercourse will be impacted upon such as; type of system, position of the system in relation to the proposed construction and position in which the system is located in the landscape. Table 17 below presents the criteria that was used to rank the various watercourses in terms of risk. It must be noted that the criteria provided in Table 17 is utilised as a guideline to identify at risk watercourses and is not indefinite in terms of risk status of watercourses. Table 18 presents the watercourses delineated within the 500m assessment radius and their respective risk status.

Table 17: Criteria utilised to rank the delineated watercourses and wetlands within the 500m assessment radius around the proposed development

RISK RATING	CRITERIA/DESCRIPTION
High	The watercourse/wetland is situated directly within or in close proximity to, or within the same minor catchment area as, the proposed development footprint. Therefore, the aquatic habitat, biota present within, water quality of and/or the hydrological regime through the watercourse/wetland are highly likely to be impacted on by aspects of the proposed development.
Moderate	The watercourse/wetland is situated directly upstream, or within a medium distance (32m to 54m) downstream of the proposed development within the same minor catchment area. This may result in the aquatic habitat, biota present within, water quality of and/or the hydrological regime through the watercourse/wetland being indirectly impacted on by aspects pertaining to the proposed development (e.g. sedimentation, pollution and/or a change in the hydrological characteristics of the system).
No Risk	The watercourse/wetland is situated a significant distance (>54m) upstream or downstream of the proposed development, or within a landscape that prevents any direct/indirect impacts that have been determined to originate from the activity from reaching it, and thus is not likely to be impacted on by the proposed development.
	The watercourse/wetland is situated within a completed different minor catchment area to the proposed development, and thus is highly unlikely to be affected by direct or indirect impacts that have been determined to originate from the proposed development.

Table 18: Watercourse Risk Screening

Code	System Type	At risk status	Impacted (High, Moderate, Low, Very)	Reasoning
CVB01	Channelled Valley Bottom Wetland		High	The following wetlands occur directly within the footprint of the proposed development (Preferred and Alternative Routes): CVB01, FP01, FP02, FP03, UVB01, UVB04 and

FP01 FP02/Swamp Forest FP03/Transformed Swamp Forest	Floodplain Wetland	Yes		Seep06. Thus these wetlands will be directly impacted by the proposed development which will impact upon the hydrological, geomorphological and vegetation modules. Further assessment of this wetland will be conducted.
UVB01 UVB04	Unchannelled Valley Bottom Wetland			
Seep06	Hillslope Seepage Wetland			
CVB02 CVB03	Channelled Valley Bottom Wetland	No	No Risk	The proposed development occurs >100m away from these watercourses and some of these watercourses occur in a separate minor catchment in the landscape and will not be impacted upon by the proposed development. Thus, no further assessment for these wetlands will be required.
Dam01	Artificial Dam			
Dep01 Dep02	Depression Wetland			
FP04/Swamp Forest FP05	Floodplain Wetland			
Seep01 Seep02 Seep03 Seep04 Seep05	Hillslope Seepage Wetland			
UVB01 UVB02	Unchannalled Valley Bottom Wetland			
Rip01 Rip02 Rip03 Rip04	B Channel Streams			
Port Waters/Estuary	Estuary	N/A	N/A	The overhead transmission lines will not impact upon the estuarine environment, however, other aspects of the project (e.g: proposed Powership and gas pipeline) will most probably have an impact on the estuarine embayment. However, the wetland specialist

				cannot assess the estuary, due to the dynamic nature of the system and not falling within any of the classification categories (Ollis *et al*., 2013). Thus, the estuarine embayment is being assessed by the Marine Ecologist and Estuarine Ecologist.

8. WETLAND SYSTEMS: LEVEL 2 WET-HEALTH ASSESSMENT

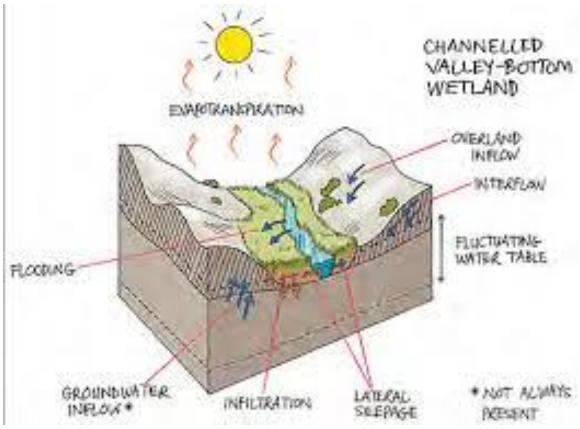
The assessment of the condition or PES of each HGM unit is based on an understanding of both catchment and on-site impacts and the impact that these aspects have on system hydrology, geomorphology and vegetation composition and structure. The WET-Health tool was used to calculate the PES scores, involves a comparison between a wetland in its current PES in relation to its natural/reference condition (Macfarlane *et al*., 2009).

It must be noted that the PES assessment conducted for the at risk watercourses only applies to the portion of the watercourses delineated in the vicinity of the proposed development and not the entire HGM unit. Thus, the PES of the entire HGM unit can be substantially different from that which is assessed on site

8.1. Channelled Valley Bottom Wetland

The following will describe the general characteristics and flow of CVB wetlands.

Table 19: General and flow characteristics that influence the formation of CVB wetlands

HGM Unit	Description	Source of Water Maintaining the Wetland	
		Surface	Sub-surface
	Valley-bottom areas with defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterised by the net accumulation of alluvial deposits or may have steeper slopes and be characterised by the net loss of sediment. Water inputs from main channel during heavy storm events when the channel overtop and from adjacent slopes.	***	*/***

Key: *** = Contribution usually large; */*** = Contribution may be small or important depending on the local circumstances

Table 20 below presents the overall characteristics namely: area of wetland, slope of system and minor catchment area of CVB wetland that were identified to be at risk as a result of the proposed development.

Table 20: Characteristic of CVB01

HGM Unit	Area of System (ha)	Slope of System (%)	Area of Minor Catchment (ha)
CVB01	46.9	1.2	1159

8.1.1. Natural and current state

Table 21 below represents the natural state, current impacts and their present state. The information presented in the table was drafted in accordance with the WET-Health tool modules (Macfarlane *et al*., 2009). It must be noted that CVB01 was assessed due to the potential perceived impacts and risk screening that might arise from the proposed transmission line alternative route and switching station.

Table 21: Presentation of the natural state, existing impacts and current state of CVB01 in relation to each WET-Health modules (Macfarlane *et al*., 2009).

MODULE	NATURAL STATE	EXISTING IMPACTS	CURRENT STATE
Hydrology	A channelled wetland driven by a moderate level of diffuse flow fed by the subsurface and lateral inputs of hillslope seepage wetlands and the surrounding slopes.	- Increased velocity of storm water runoff due to lack of surface roughness in the catchment and neighbouring terrestrial zones, as a result of anthropogenic pressures namely: construction of linear infrastructure (e.g: roads, overhead powerlines, dirt roads) and construction of large industrial hub. - Decrease in wetness zones due uptake of water from Alien Invasive Plant Species (AIPS). - Decrease in wetness zones as a result of industry being built within the wetland wetness boundaries. - Decrease in wetness zones as a result of creation of minor ridge to diverge the natural channel. - Canalisation of natural hydrological flow of the wetland. - Eutrophic conditions observed in constructed stormwater attenuation area from the adjacent industry.	CVB wetland with both seasonal and permanent wetness zones present with minor portion of the temporary zone still present. Loss of wetness zones as a result of decrease in inputs due to anthropogenic changes in the catchment and construction of industry within the wetness zones. Wetland channel diverged due to creation of minor ridge, which has also decreased wetness zones of wetland
Geomorphology	Gentle and gradual slope with natural slight undulation with the system attributed to areas of alluvial deposits and dense vegetation. Dominated by a centralised channel.	- Destruction of the geomorphological zone for the creation of gypsum dam & mining areas, construction of industry, construction of stormwater outlets & attenuation areas. - Minor sedimentation in wetland as a result of poor veld conditions due to anthropogenic pressures in the catchment namely: construction of linear infrastructure and industry. - Infill and construction within the system reducing wetness zones. - Compaction of wetness zones. - Minor evidence of depositional and erosional features within the wetland as a result of anthropogenic pressures.	CVB wetland with moderately incised channel with areas of minor gully erosion and depositional features evident. Confinement of wetland by surrounding land uses namely: industry and gymsum dam & mining. This system was considered aggredational in nature.
Vegetation	100% native vegetation dominated by a mixture of obligate wetland plants, hydrophilous poacaea species and sparsely distributed woody vegetation.	- Anthropogenic disturbances namely; removal of hydric vegetation due to construction in wetness zones and input of industry runoff, resulting in the proliferation of AIPS. - Infill and excavation for development (e.g. construction of industry). - Decrease in wetness zones due to proliferation of woody type AIPS.	CVB wetland that have been encroached upon by opportunistic weeds, pioneer species and AIPS due to changes within the wetland and the surrounding catchment. Altered florist composition within the wetness zones and a general loss of species abundance throughout.

Table 22: List of plant species found within CVB01

No.	Scientific name	Type	Alien/ Indigenous
1	*Chromoleana odorata*	Shrub	Alien
2	*Cyperus papyrus*	Sedge	Indigenous
3	*Digitaria eiranthia*	Poeceae	Indigenous
4	*Eragrostis curvula*	Poeceae	Indigenous
5	*Ficus lutea*	Tree	Indigenous
6	*Ficus trichopoda*	Tree	Indigenous (Red data)
7	*Hibisuc tiliaceus*	Tree	Indigenous
8	*Ipomea spp.*	Shrub	Alien
9	*Lantana camara*	Shrub	Alien
10	*Panixum maximum*	Poeceae	Indigenous
11	*Pennisetum clandestinum*	Poeceae	Alien
12	*Polystichum munitum*	Fern	Alien
13	*Solanum mauritianum*	Shrub	Alien
14	*Syzigium cordatum*	Tree	Indigenous
15	*Themeda triandra*	Poeceae	Indigenous
16	*Trema orientalis*	Tree	Indigenous
17	*Typha capensis*	Bullrush	Indigenous

8.1.2.Present Ecological State (PES)

Utilising the estimated natural state of the at-risk channelled valley bottom wetland and comparing it to the current state of the wetland, the PES score was calculated for this wetland. The overall PES score that was calculated for CVB01 was 3.6, an overall PES C (moderately modified).

8.1.3. Overall trajectory of change of the PES score

In determining the trajectory of change the following question is posed: “is the current state of the wetland system likely to change in the future as a result of the proposed development and if so, by how much and in which direction?” The arrows that are depicted in Table 23 below indicate the estimated trajectory of change that may be observed in each system over the next five years following the proposed development, post mitigation and Wetland Rehabilitation Plan implementation (T4-WRP-RB, Oct 2022). Taking this into consideration, it is expected that the trajectory of change score for CVB01 will **remain the same** over the next five years as a result of the proposed development in conjunction with the existing impacts recorded within the surrounding catchment areas.

Table 23: Presentation of the PES scores that was calculated for CVB01 associated with the proposed development (Macfarlane *et al*., 2009)

WET-HEALTH SCORES				
WATERCOURSE	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	**OVERALL SCORE**
CVB01	4.0 (D) →	1.1 (B) →	5.5 (D) →	**3.6 (C)** →

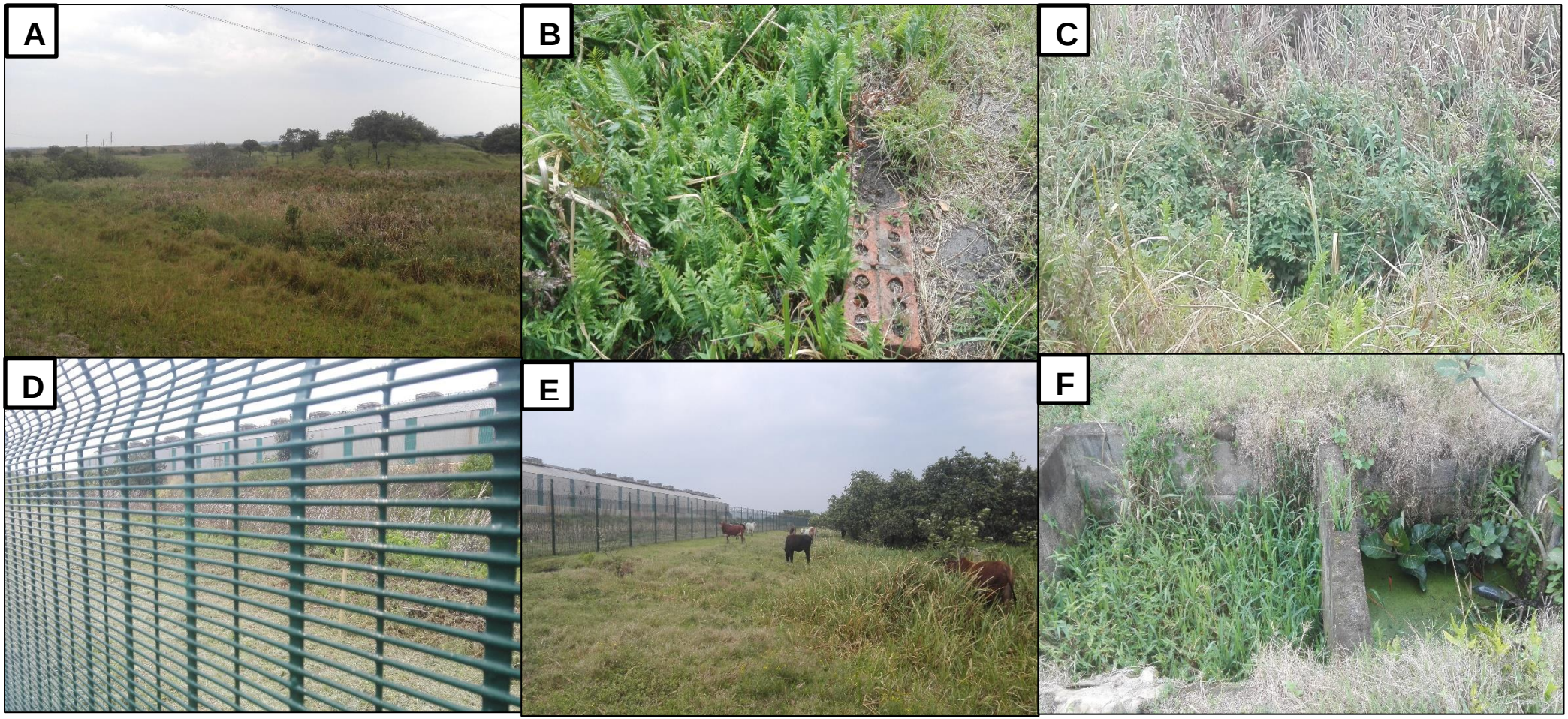


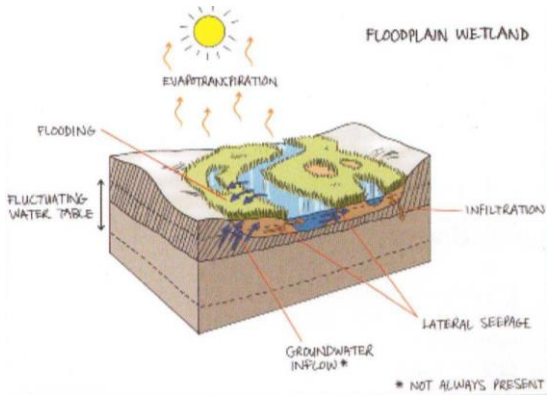
Figure 15: A – *Cyperus papyrus, Typha capensis* and grassland with the different wetness zones of CVB01, B – Constructed stormwater outlet in the temporary zone of CVB01 in which *Polystichum munitum* (AIP) has proliferated, C – Grassland and *Chromoleana ordorata* noted in certain portions of CVB01, D – Construction of an industry and fencing in the wetness zones of CVB01, E - Livestock observed to use the wetland for grazing and a source of water, F – Construction of a stormwater attenuation in which eutrophic conditions were observed.

8.2. Floodplain Wetland

FP01, FP02 and FP03 were grouped due to these wetlands occurring within the same quaternary catchment and minor catchment; which are experiencing similar impacts due to the land use changes in the catchment and in-situ of the wetlands.

The following will describe the general characteristics and flow of FP wetlands.

Table 24: General and flow characteristics that influence the formation of FP wetlands

HGM Unit	Description	Source of Water Maintaining the Wetland	
		Surface	Sub-surface
	A wetland area on the mostly flat or gently-sloping land adjacent to and formed by an alluvial river channel, under its present climate and sediment load, which is subject to periodic inundation by over-topping of the channel bank.	***	*/***

Key: ***= Contribution usually large; */***= Contribution may be small or important depending on the local circustances

Table 25 below presents the overall characteristics namely: area of wetland, slope of system and minor catchment area of FP wetlands that were identified to be at risk as a result of the proposed development.

Table 25: Characteristic of FP01

HGM Unit	Area of System (ha)	Slope of System (%)	Area of Minor Catchment (ha)
FP01	64.8	0.8	3450
FP02	91.4	0.8	4397
FP03	29.0	1.1	3999

8.2.1. Natural and current state

Table 26 below represents the natural state, current impacts and their present state. The information presented in the table was drafted in accordance with the WET-Health tool modules (Macfarlane *et al*., 2009). It must be noted that FP01 was assessed due to the potential perceived impacts and risk screening that might arise from the proposed transmission line alternative route, whereas FP03 was assessed due to the potential perceived impacts and risk screening that might arise from the proposed transmission line preferred route and temporary laydown areas.

Table 26: Presentation of the natural state, existing impacts and current state of FP01, FP02 and FP03 in relation to each WET-Health modules (Macfarlane *et al*., 2009).

Module	Natural State	Existing Impacts	Current State
Hydrology	A floodplain wetland primary driven by overbank flooding and also fed by lateral inputs of hillslope seepage wetlands,	- Increased velocity of storm water runoff due to lack of surface roughness in the catchment and neighbouring terrestrial zones, as a result of anthropogenic pressures namely: construction of	FP01 – Wetland with both seasonal and permanent wetness zones present with no temporary zone. Loss of wetness zones due to historical and

	channelled valley bottom wetlands and unchannelled valley bottom wetlands; and also the surrounding slopes.	linear infrastructure (e.g: roads, overhead powerlines, dirt roads) and construction of large industrial hub. - Decrease in wetness zones due uptake of water from Alien Invasive Plant Species (AIPS). - Decrease in wetness zones as a result of fences, industry, dirt & tar roads, overhead powerlines and railway lines being built within the wetland wetness boundaries. - Canalisation of natural hydrological flow of the wetland by creation of the Bhizolo and Manzanyama Canal (FP01 & FP02) - Historical excavation, infilling and trenching in FP03, which created impoundment within FP03, thus creating retention time of water in the floodplain wetland which will disturb the natural overbank flooding regime of the wetland.	current industry practices and linear activities in the area. Creation of the Bhizolo Canal to allow for drainage into the embayment and reduce opportunity of flooding of industry. FP02 - Wetland with both seasonal and permanent wetness zones present with no temporary zone. Loss of wetness zones due to construction of dirt and tar roads, overhead powerlines and railway lines through wetland. Creation of the Manzanyana Canal to allow for drainage into the embayment and reduce opportunity of flooding of industry. FP03 - Wetland with both seasonal and permanent wetness zones present with no temporary zone. Loss of wetness zones due to current linear activities and historical disturbance of this wetland which increased the opportunity for impoundment to occur as a result of poor rehabilitation.
Geomorphology	Gentle and gradual slope which formed as a result of alluvial deposits from upstream rivers. Dominated by plains that are yearly saturated by over-bank flooding.	- Destruction of the geomorphological zone for the construction of canals, fences, industry, overhead powerlines, dirt & tar roads and railway lines (FP01 & FP02). - Historical excavation and trenching in FP03 coupled with poor rehabilitation which created impoundment in the wetland (Figure 14). - Sedimentation evident in FP01, FP02 and FP03 as a result of poor veld conditions due to anthropogenic pressures in the catchment namely: construction of linear infrastructure and industry. - Infill and construction within the system reducing wetness zones. - Compaction of wetness zones. - Evidence of depositional and erosional features within the wetland as a result of current and historical anthropogenic activities.	FP01 - Wetland with disturbed soils as a result of construction within the wetness zones. Permanent and seasonal zones disturbed by industrial and linear activity practices. This system was considered aggredational in nature due to its gentle slope. FP02 - Wetland with disturbed soils as a result of construction within the wetness zones. Permanent and seasonal zones disturbed by linear activity practices. This system was considered aggredational in nature due to its gentle slope.

			FP03 - Wetland with disturbed soils as a result of historical construction within the wetness zones coupled with poor rehabilitation. Permanent and seasonal zones disturbed by construction of tar road through system. Depositional features visually observed in wetland as a result of poor rehabilitation practices in the pass. This system was considered aggredational in nature due to its gentle slope.
Vegetation	100% native vegetation dominated by a mixture of obligate wetland plants, mangrove forest (FP02) and hydrophilous poacaea	- Anthropogenic disturbances namely; removal of hydric vegetation due to construction in wetness zones and input of industry runoff, resulting in the proliferation of AIPS. - Infill and excavation for development (e.g: construction of canals, fences, industry, dirt & tar roads and railway lines). - Decrease in wetness zones due to proliferation of woody type AIPS.	FP01 & FP03- Wetland that have been encroached upon by opportunistic weeds, pioneer species and AIPS. Altered florist composition within the wetness zones and a general loss of species abundance. FP02 - Wetland that have been encroached upon by opportunistic weeds, pioneer species and AIPS. Altered florist composition within the wetness zones and a general loss of species abundance. Critically endangered Mangrove species present within this wetland.

Table 27: List of plant species found within FP01, FP02 and FP03

No.	Scientific name	Type	Alien/ Indigenous
1	*Arundo donax*	Poeceae	Alien
2	*Avicennia marina*	Tree	Indigenous
3	*Bidens pilosa*	Shrub	N/A
4	*Chloris virgata*	Poeceae	N/A
5	*Chromoleana odorata*	Shrub	Alien
6	*Cyperus papyrus*	Sedge	Indigenous
7	*Digitaria eiranthia*	Poeceae	Indigenous
8	*Eragrostis curvula*	Poeceae	Indigenous

9	*Eragrostis trichophora*	Poeceae	Indigenous
10	*Ficus lutea*	Tree	Indigenous
11	*Ficus trichopoda*	Tree	Indigenous (Red data)
12	*Hibisuc tiliaceus*	Tree	Indigenous
13	*Ipomea spp.*	Shrub	Alien
14	*Lantana camara*	Shrub	Alien
15	*Osteospermum monilifera*	Shrub	N/A
16	*Panixum maximum*	Poeceae	Indigenous
17	*Pennisetum clandestinum*	Poeceae	Alien
18	*Phoenix reclinata*	Tree	Indigenous
19	*Phragmities australis*	Poeceae	Indigenous
20	*Polystichum munitum*	Fern	Alien
21	*Ricinus communis*	Shrub	Alien
22	*Schinus terebonthifolius*	Tree	Alien
23	*Solanum mauritianum*	Shrub	Alien
24	*Syzigium cordatum*	Tree	Indigenous
25	*Themeda triandra*	Poeceae	Indigenous
26	*Trema orientalis*	Tree	Indigenous
27	*Typha capensis*	Bullrush	Indigenous
28	*Vachellia natalitia*	Tree	Indigenous
29	*Vachellia robusta*	Tree	Indigenous

8.2.2.Present Ecological State (PES)

Utilising the estimated natural state of the at-risks floodplain wetlands and comparing it to the current state of the wetlands, the PES scores was calculated for these wetlands. The overall PES score that was calculated for FP01, FP02 and FP03 were 3.8, 3.7 and 5.8, respectively. Thus, FP01 and FP02 scored an overall PES of moderately modified, whereas FP03 scored an overall PES of largely modified.

8.2.3. Overall trajectory of change of the PES score

In determining the trajectory of change the following question is posed: “is the current state of the wetland system likely to change in the future as a result of the proposed development and if so, by how much and in which direction?” The arrows that are depicted in Table 28 below indicate the estimated trajectory of change that may be observed in each system over the next five years following the proposed development, post mitigation. Taking this into consideration, it is expected that the trajectory of change score for all at risk floodplain wetlands will **remain the same** over the next five years as a result of the proposed development in conjunction with the existing impacts recorded within the surrounding catchment areas.

Table 28: Presentation of the PES scores that was calculated for FP01, FP02 and FP03 associated with the proposed development (Macfarlane *et al*., 2009)

WET-HEALTH SCORES				
WATERCOURSE	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	**OVERALL SCORE**
FP01	6.0 (E) →	1.3 (B) →	3.1 (C) →	**3.8 (C)** →
FP02	4.0 (D) →	1.6 (B) →	5.6 (D) →	**3.7 (C)** →
FP03	7.5 (E) →	2.5 (C) ↓	6.6 (E) →	**5.8 (D)** →

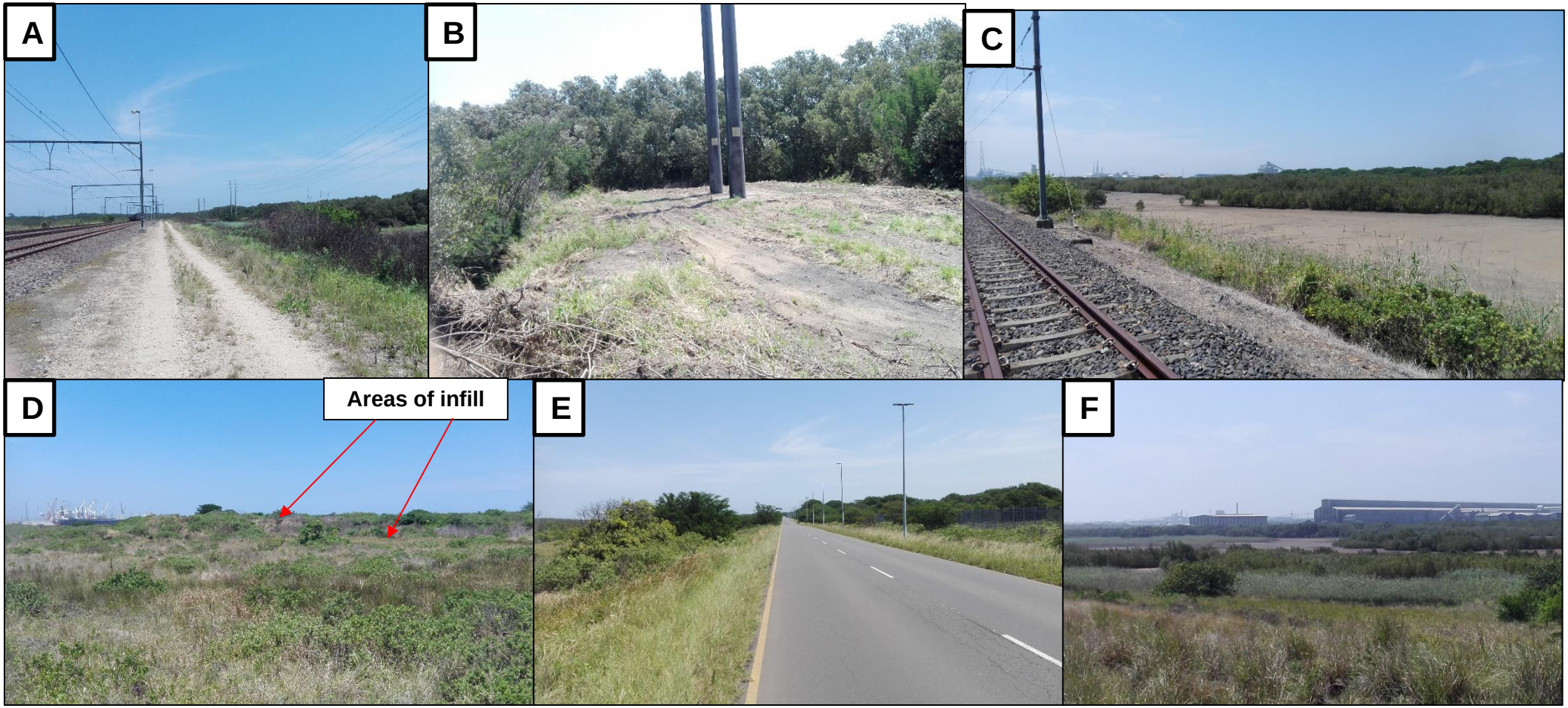


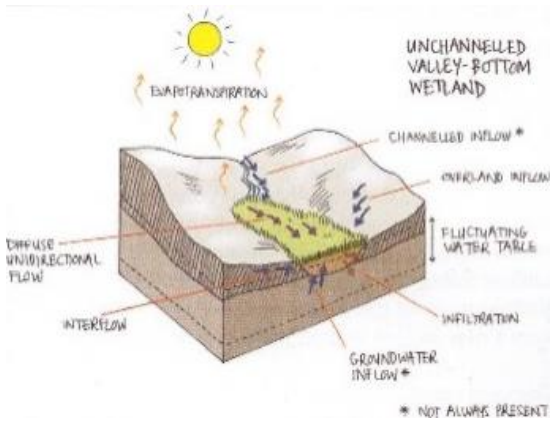
Figure 16: A – Construction of dirt road and railway lines through FP02, B – Infill and construction of overhead powerline within FP02, C – Exposed mudflats of Mangrove Forest due to out-going tide, D – Secondary vegetation (e.g: *Osteospermum monilifera*) and AIPs (e.g: *Arundo donax* and *Lantana camara*) and infill observed within FP03, E – Construction of road between FP03, F – Image of FP01 vegetation (predominantly *Phragmites australis*) and industry in the background.

8.3. Unchannelled Valley Bottom (UVB) Wetlands

UVB01 and UVB04 were grouped due to these wetlands occurring within the same quaternary catchment and minor catchment; which are experiencing similar impacts due to the land use changes in the catchment and in-situ of the wetlands.

The following will describe the general characteristics and flow of UVB wetlands.

Table 29: General and flow characteristics that influence the formation of UVB wetlands

HGM Unit	Description	Source of Water Maintaining the Wetland	
		Surface	Sub-surface
	Unchannelled valley bottom wetlands are defined by linear fluvial, net depositional valley bottom surfaces which do not have a channel. The valley floor is a depositional environment composed of fluvial or colluvial deposited sediment. These systems tend to be found in the upper catchment areas, or at tributary junctions where the sediment from the tributary smothers the main drainage line.	*/**	***

Key: ***= Contribution is typically small; ***= Contribution is typically large.

Table 30 below presents the overall characteristics namely: area of wetland, slope of system and minor catchment area of UVB wetland that was identified to be at risk as a result of the proposed development.

Table 30: Characteristics of UVB01

HGM Unit	Area of System (ha)	Slope of System (%)	Area of Minor Catchment (ha)
UVB01	41.5	0.9	880
UVB04	57.0	0.9	905

8.3.1.Natural and current state

Table 31 below represents the natural state, current impacts and their present state. The information presented in the table was drafted in accordance with the WET-Health tool modules (Macfarlane *et al*., 2009). It must be noted that UVB01 and UVB04 were assessed due to the potential perceived impacts and risk screening that might arise from the proposed transmission line preferred route and temporary laydown area.

Table 31: Presentation of the natural state, existing impacts and current state of UVB01 and UVB04 in relation to each WET-Health modules (Macfarlane *et al*., 2009).

Module	Natural State	Existing Impacts	Current State
Hydrology	A gentle sloping unchannelled valley bottom wetland with various areas of wetness zones ranging from permanent to seasonal wetness fed by the subsurface and	- Increased velocity of storm water runoff due to lack of surface roughness in the catchment and neighbouring terrestrial zones, as a result of anthropogenic pressures namely: construction of linear infrastructure (e.g: roads, overhead powerlines, dirt roads)	UVB01 - The hydrological characteristics can be described as wetland with a seasonal and permanent wetness zone predominantly present, with no temporary zone. Loss of wetness zones due

	lateral inputs which diffuses through the different wetness zones of the wetlands.	and construction of large industrial hub. - Decrease in wetness zones due uptake of water from AIPs. - Decrease in wetness zones as a result of industry platforms, dirt roads, railway lines, TNPA permit office and trucking area being built within the wetland wetness boundaries. - Canalisation of natural hydrological flow of the wetland by creation of the Manzamyana Canal.	to anthropogenic pressures such as construction of industry platforms and dirt roads which have intercepted the natural diffuse flow of this wetland. UVB04 - The hydrological characteristics can be described as wetland with a seasonal and permanent wetness zone predominantly present, with no temporary zone. Loss of wetness zones due to anthropogenic pressures such as construction of dirt roads, TNPA permit office and trucking area which have intercepted the natural diffuse flow of this wetland.
Geomorphology	Gently sloping wetland with a uniform flow gradient which consist of presumably permanent and seasonal wetness zones that are characterised by gleying and mottling and a temporary zone that is semi-saturated.	- Destruction of the geomorphological zone for the construction of industry platforms, dirt roads, railway lines, TNPA permit office and trucking area - Sedimentation in wetland as a result of poor veld conditions due to anthropogenic pressures in the catchment namely: construction of linear infrastructure and industry. - Infill and construction within the system reducing wetness zones. - Compaction of wetness zones. - Evidence of depositional and erosional features within the wetland as a result of anthropogenic pressures.	UVB01 & UVB04 - The geomorphological aspect can be described as an aggregational systems that has experienced destruction of geomorphological extent due to constructional activities within it. Depositional and erosional features were present as a result of in-situ within the wetland and poor veld conditions in the catchment.
Vegetation	100 % native vegetation dominated by a mixture of obligate wetland plants, hydrophilous poacaea species and sparsely distributed woody vegetation.	- Anthropogenic disturbances namely; removal of hydric vegetation due to construction in wetness zones and input of industry runoff, resulting in the proliferation of AIPS. - Infill and excavation for development (e.g. construction of industry). - Decrease in wetness zones due to proliferation of woody type AIPS.	UVB01 & UVB04 - The vegetation aspect has been encroached upon by opportunistic weeds, pioneer species, AIP. Small patches of secondary and degraded grassland were present within this wetland.

Table 32: List of plant species found within UVB01 and UVB04

No.	Scientific name	Type	Alien/ Indigenous
1	*Arundo donax*	Poeceae	Alien
2	*Avicennia marina*	Tree	Indigenous

3	*Bidens pilosa*	Shrub	N/A
4	*Chloris virgata*	Poeceae	N/A
5	*Chromoleana odorata*	Shrub	Alien
6	*Cyperus papyrus*	Sedge	Indigenous
7	*Digitaria eiranthia*	Poeceae	Indigenous
8	*Eragrostis curvula*	Poeceae	Indigenous
9	*Eragrostis trichophora*	Poeceae	Indigenous
10	*Ficus lutea*	Tree	Indigenous
11	*Ficus trichopoda*	Tree	Indigenous (Red data)
12	*Hibisuc tiliaceus*	Tree	Indigenous
13	*Helichrysum spp.*	Shrub	N/A
14	*Ipomea spp.*	Shrub	Alien
15	*Lantana camara*	Shrub	Alien
16	*Osteospermum monilifera*	Shrub	N/A
17	*Panixum maximum*	Poeceae	Indigenous
18	*Pennisetum clandestinum*	Poeceae	Alien
19	*Phoenix reclinata*	Tree	Indigenous (Red data)
20	*Phragmities australis*	Poeceae	Indigenous
21	*Polystichum munitum*	Fern	Alien
22	*Ricinus communis*	Shrub	Alien
23	*Schinus terebonthifolius*	Tree	Alien
24	*Solanum mauritianum*	Shrub	Alien
25	*Strelizia nicola*	Tree	Indigenous
26	*Syzigium cordatum*	Tree	Indigenous
27	*Themeda triandra*	Poeceae	Indigenous
28	*Trema orientalis*	Tree	Indigenous
29	*Typha capensis*	Bullrush	Indigenous
30	*Vachellia natalitia*	Tree	Indigenous
31	*Vachellia robusta*	Tree	Indigenous

8.3.2. Present Ecological State (PES)

Utilising the estimated natural state of the at-risks unchannelled valley bottom wetlands and comparing it to the current state of the wetland, the PES score was calculated for these wetlands. The overall PES score that was calculated UVB01 and UVB04 is 5.2 and 5.5, respectively. This is an overall PES of D (largely modified), for both of these wetlands.

8.3.3. Overall trajectory of change of the PES score

In determining the trajectory of change the following question is posed: "is the current state of the wetland system likely to change in the future as a result of the proposed development and if so, by how much and in which direction?" The arrows that are depicted in Table 33 below indicate the estimated trajectory of change that may be observed in each system over the next five years following the proposed development, post mitigation. Taking this into consideration, it is expected that the trajectory of change score for the unchannelled valley bottom wetlands will **remain the same** over the next five years as a result of the proposed development in conjunction with the existing impacts recorded within the surrounding catchment areas.

Table 33: Presentation of the PES scores that were calculated for UVB01 and UVB04 associated with the proposed development (Macfarlane et al., 2009).

WET-HEALTH SCORES				
WATERCOURSE	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	**OVERALL SCORE**
UVB01	6.5 (E) →	2.1 (C) →	6.5 (E) →	**5.2 (D)** →
UVB04	7.0 (E) →	2.2 (C) ↓	6.3 (E) →	**5.5 (D)** →

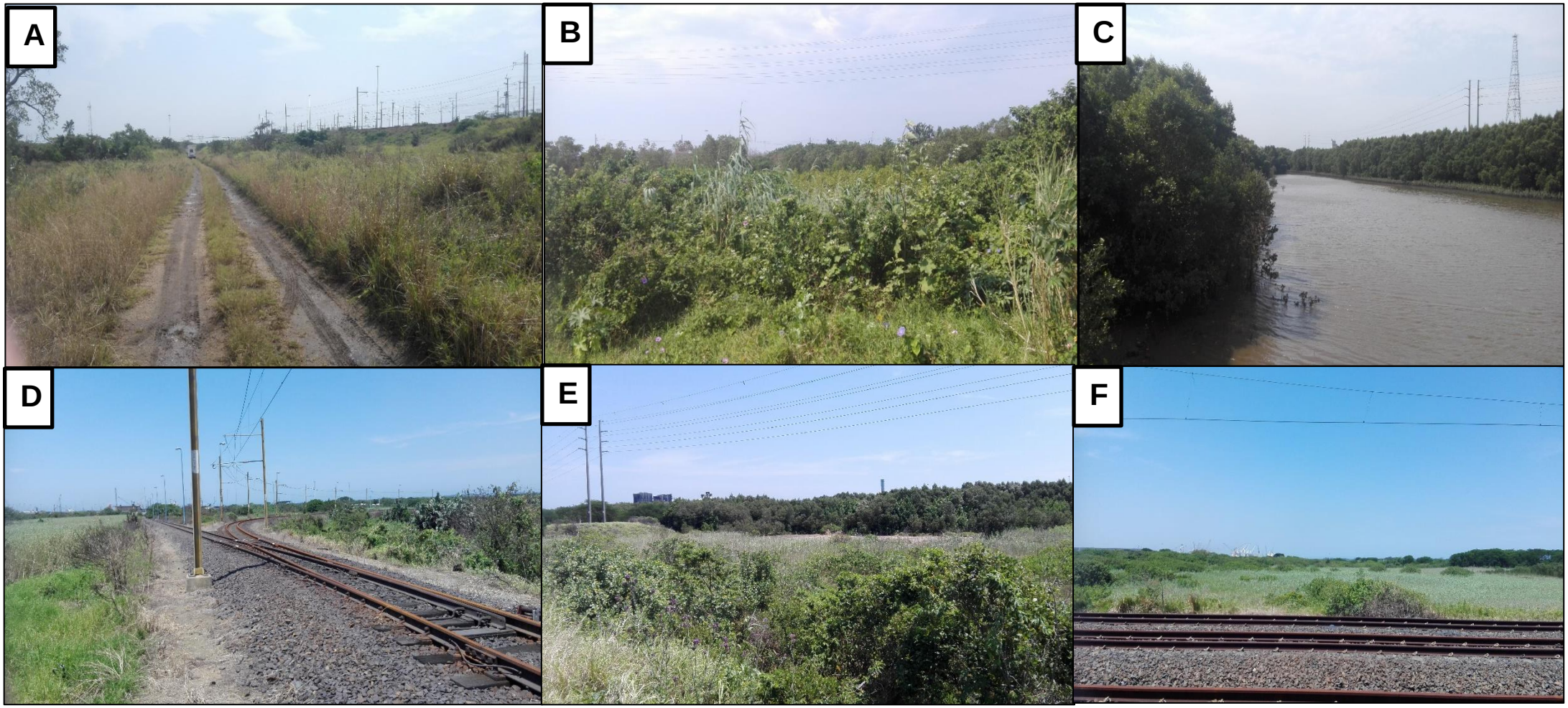
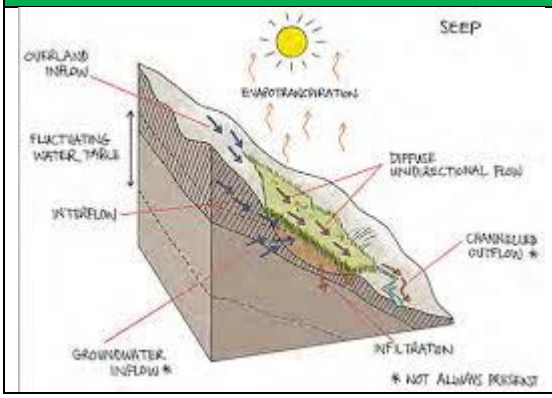


Figure 17: A – Creation of a dirt road through UVB01, B - Proliferation of AIPs (*Lantana camara, ipomea spp., Arundo donax*) within UVB01, C - Creation of the Manzanyama Canal to protect the adjacent industry and other building from flooding through UVB01, D - Construction of linear activities within UVB01 (e.g: railway lines, overhead powerlines), E – Historical infill and construction of overhead powerline within UVB04, F – Wetland area (predominantly *Phragmites australis* vegetation) in which Preferred Route will traverse.

8.4. Hillslope Seepage (HS) Wetland

The following will describe the general characteristics and flow of HS wetlands.

Table 34: General and flow characteristics that influence the formation of HS wetlands

HGM Unit	Description	Source of Water Maintaining the Wetland	
		Surface	Sub-surface
	Hillslope Seepage wetlands on hillside, which are characterised by the colluvial (transported by gravity) movement of material. Water inputs are mainly from subsurface flow and outflow is usually via a instream zone connecting the area directly to a stream channel.	*	***

Key: *= Contribution usually small; ***= Contribution usually large

Table 35 below presents the overall characteristics namely: area of wetland, slope of system and minor catchment area of HS wetland that were identified to be at risk as a result of the proposed development.

Table 35: Characteristic of Seep06

HGM Unit	Area of System (ha)	Slope of System (%)	Area of Minor Catchment (ha)
Seep06	1.0	0.6	4.50

8.4.1.Natural and current state

Table 36 below represents the natural state, current impacts and their present state. The information presented in the table was drafted in accordance with the WET-Health tool modules (Macfarlane *et al*., 2009). It must be noted that Seep06 was assessed due to the potential perceived impacts and risk screening that might arise from the proposed switching station.

Table 36: Presentation of the natural state, existing impacts and current state of Seep06 in relation to each WET-Health modules (Macfarlane *et al*., 2009).

Module	Natural State	Existing Impacts	Current State
Hydrology	Isolated seepage system dominated by subsurface diffuse flow with inputs from lateral surface flow and a fluctuating water table atop an impermeable sedimentary rock layer. The presence of wetness zones depends on the systems position on the slope.	-Increased velocity of stormwater runoff from hardened surfaces and degraded veld conditions within the minor catchment area (e.g: dirt and tar roads, railway lines). - Increased water demand by AIPs. - Creation of drainage channels to reduce seasonal and temporary wetness zones. - Reduced surface roughness within wetland	Isolated seepage moderately dominated by subsurface seepage flow, however activities in the catchment coupled with uptake of water by AIPs have altered the hydrological flow of the wetland.

		which promotes development of erosional features.	
Geomorphology	Moderately low gradient down slope with no erosion within the system. Cohesion of soil particles assisted by good groundcover and soils with a moderately high organic content.	- Exposed bare soil due to potential historic construction near wetland and utilization of area by livestock. - Minor evidence of depositional features as a result of poor veld conditions in the catchment.	Moderate gradient slopes with areas of depositional features evident. Aggregational systems with areas of bare soil evident which potentially promote the opportunity for erosional features to form.
Vegetation	100 % native vegetation dominated by a mixture of obligate wetland plants, hydrophilous poacaea species and sparsely distributed woody vegetation.	- Lack of surface roughness in the wetland. - Decrease in vegetation cover as a result of depositional features drowning vegetation and not allowing photosynthesis process to occur. - Proliferation of AIPs as a result of anthropogenic changes in the wetland and surrounding catchment.	The vegetation aspect has been encroached upon by opportunistic weeds, pioneer species and AIPs.. Small patches of secondary and degraded grassland were present within this wetland.

Table 37: List of plant species found within Seep06

No.	Scientific name	Type	Alien/ Indigenous
1	*Catharanthus roseus*	Shrub	Alien
2	*Centella asiatica*	Shrub	Indigenous
3	*Cyondon dactylon*	Poaceae	Indigenous
4	*Cyperus spp.*	Sedge	Indigenous
5	*Parthenium hysterophorus*	Shrub	Alien
6	*Africanus sporbolus*	Poaceae	Indigenous

8.4.2.Present Ecological State (PES)

Utilising the estimated natural states of Seep06 and comparing it to its current state of the system, the PES score was calculated for this wetland. The overall PES score that was calculated for this wetland was 2.9, a PES category C (moderately modified).

8.4.3.Overall trajectory of change of the PES score

The arrows that are depicted in Table 38 below indicate the estimated trajectory of change that may be observed in each system over the next five years following the proposed development, post mitigation. Taking this into consideration, it is expected that the overall PES score of Seep06 will **remain the same** over the next five years as a result of the proposed development in conjunction with the existing impacts recorded within the surrounding catchment areas.

Table 38: Presentation of the PES scores that were calculated for each WET-Health module associated with Seep06 (Macfarlane et al., 2009).

WET-HEALTH SCORES				
HGM UNIT	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	OVERALL SCORE
Seep06	3.5 (C) →	1.0 (B) →	3.6 (C) →	**2.9 (C)** →

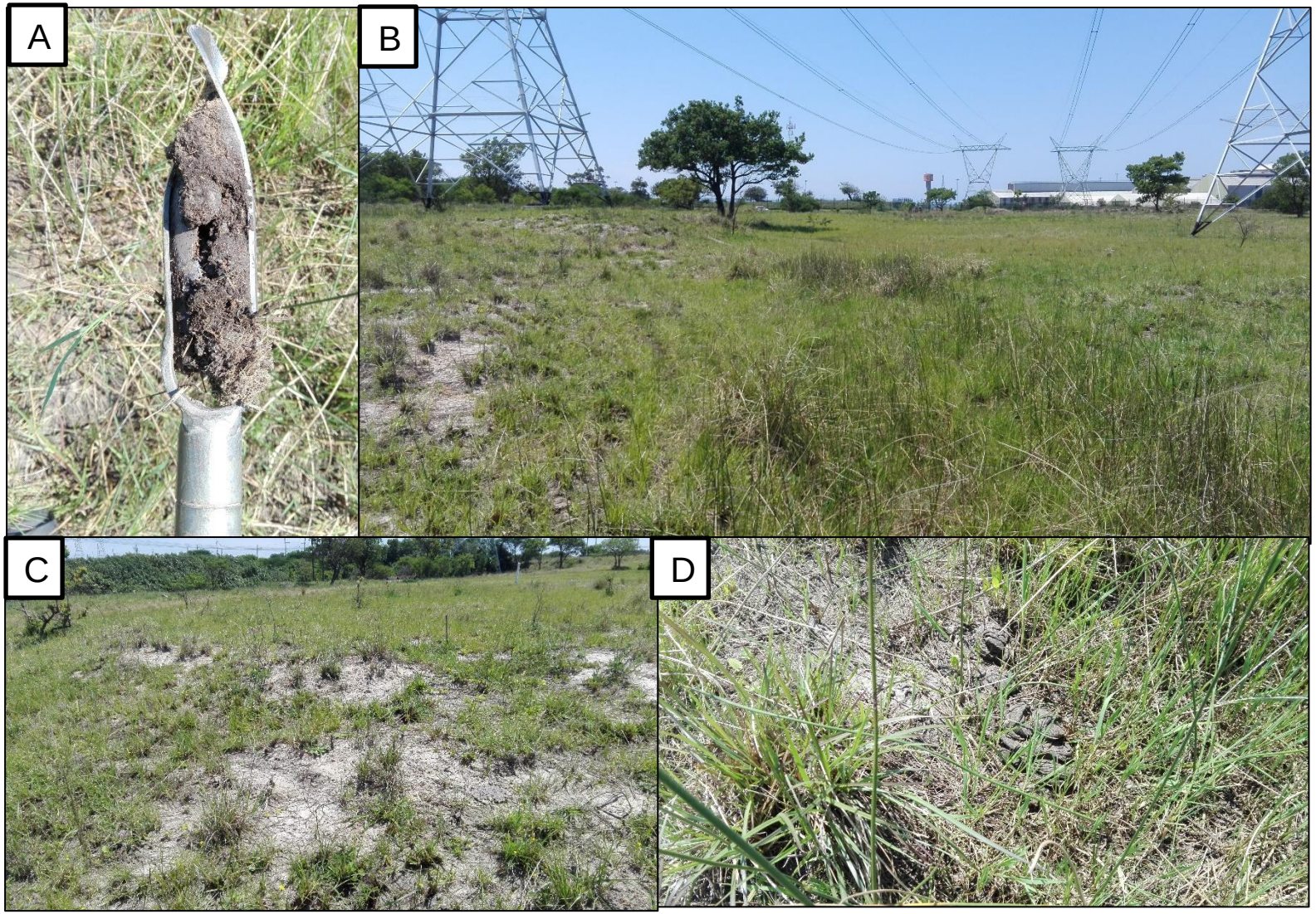


Figure 18: A – Evidence of gleying and mottling in Seep06 soils, B - Extent of Seep06 with predominantly secondary grassland within it, C – Evidence depositional feature within Seep06, D – Evidence of livestock travelling through and utilizing wetland for grazing due to feaces present in Seep06.

9. ECOSYSTEM SERVICES AND ECOLOGICAL IMPORTANTS AND SENSITIVITY

9.1. Ecosystem services of CVB01

CVB01 calculated to be moderately high level at the removal of toxicants and nitrates, trapping of phosphates and sediment and a moderate level of flood attenuation of the water flowing into, through and out of them to ensure adjacent properties are at a reduced risk of getting flooded. The aforementioned ESS can be attributed to these CVB systems exhibiting a diverse flow regime, with the inflow being supplied by both the channel and lateral surface runoff and subsurface leaching from the adjacent catchment. As a result of the upstream catchment being drastically altered, there is great opportunity for toxicant, sediments, nitrates and phosphates to enter the systems through the lateral and channelled flow due to poor veld conditions. What makes the system effective at supplying the aforementioned ESS are its perennial flow regimes, moderately high vegetation cover and the alluvial deposits and clay loam soil present within it, which are recorded to filtrate/absorb toxicants and nutrients that may be detrimental to the health and functionality of downstream systems. Furthermore, CVB01 provided a moderate level of erosion control and carbon storage. Carbon storage in this wetland was determined by the amount of peat present in the soils and the indigenous wetland vegetation which both act as a sink for carbon. The socio-cultural services provided by this wetland was low to moderately low, however maintenance of biodiversity was noted to be moderately high as a result of this wetland being part of a NFEPA dataset (Nel et al., 2011) and falls within a Critical Biodiversity Area (EKZNW, 2016) which should be conserved for conservation purposes.

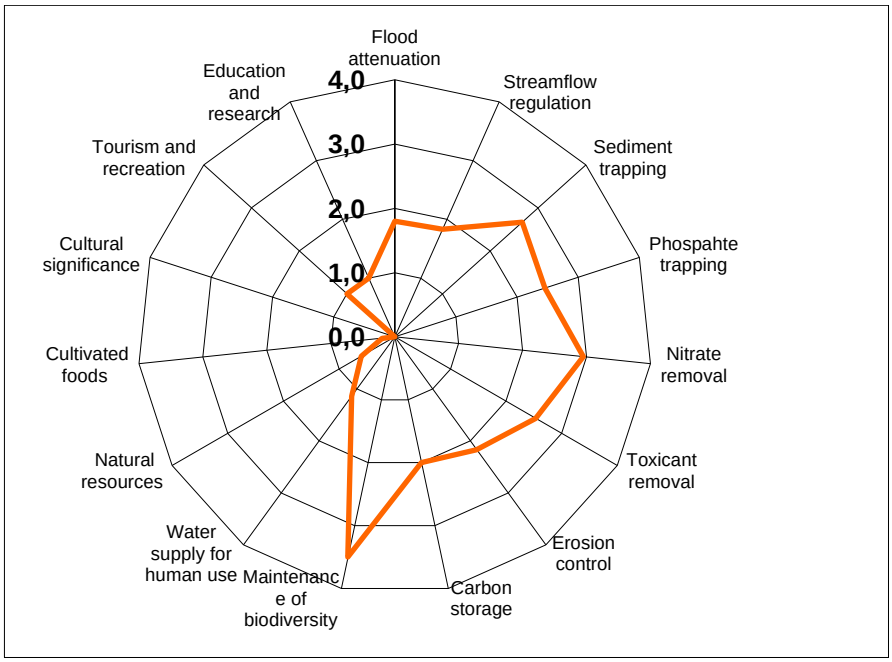


Figure 19: Diagram illustrating the direct and indirect benefits supplied by CVB01

9.2. Ecological Importance and Sensitivity of CVB01

CVB01 calculated to have a High EIS primarily due to this system being identified as a FEPA wetland as per the NFEPA dataset (Nel *et al*., 2011) and a Critical Biodiversity Areas as per the (EKZNW, 2016) dataset. Additionally, this system is rated highly in terms of hydrological and functional importance as a result of supplying valuable regulatory ESS to the surrounding environment. Its Ecological Importance was observed to be Very High as a result of this wetland being identified as important at a National Level and hosting habitat in which red data and unique flora and fauna can reside. According to the current layout, the proposed Alternative Route will occur within CVB01, and as a result of its High EIS, all development that is proposed to be constructed within and adjacent to the wetland should adhere to the NEMA (Act no 107 of 2004)

principles, one of which states that all development should occur sustainably with an end-goal of no net-loss of biodiversity.

Table 39: Summary of the Ecological Importance and Sensitivity scores for CVB01

SUMMARY	CVB01	
	SCORE	RATING
Ecological Importance	3.05	Very High
Functional/Hydrological Importance	2.75	High
Direct Benefits to Society	0.25	Low
Overall Importance	**2.02**	**High**

9.3. Ecosystem services of FP01, FP02 and FP03

FP01, FP02 and FP03 calculated to be moderately high level at the removal of toxicants and nitrates, trapping of phosphates and sediment. Stream flow regulation and flood attenuation were calculated at a moderate level of the water flowing into, through and out of these wetlands to reduce risk of any adjacent linear infrastructure and industry experiencing flood conditions. The aforementioned ESS can be attributed to FP systems exhibiting a diverse flow regime, with the inflow being supplied by both the overbank flooding, lateral surface runoff and subsurface leaching from the adjacent catchment. As a result of the upslope catchment being altered, there is great opportunity for toxicant, sediments, nitrates and phosphates to enter the systems through the lateral and floodplain due to poor veld conditions. Further to the above ESS, the floodplain wetlands contributed to erosion control and carbon storage to a moderate level. What makes these system effective at supplying the aforementioned ESS are its extensive plains of highly vegetated cover, the alluvial deposits and clay loam soil present within it, which are recorded to filtrate/absorb toxicants and nutrients and; store high amounts of carbon within the soils that may be detrimental to the health and functionality of downstream systems and the surrounding environment. The socio-cultural services provided by these wetlands was low to moderately, however these wetlands were identified at a National Level to be part of the NFEPA dataset (Net *et al*., 2011) and a Critical Biodiversity Area (EKZNW, 2016), thus maintenance and conservation of this wetland is essential for the surrounding flora and fauna; and the downstream embayment/estuary environment to achieve conservation targets.

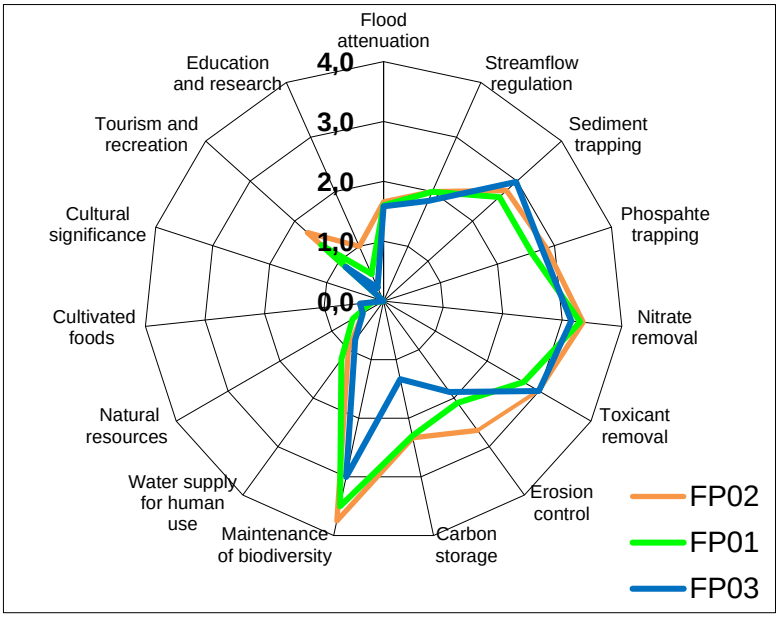


Figure 20: Diagram illustrating the direct and indirect benefits supplied by FP01, FP02 and FP03

9.4. Ecological Importance and Sensitivity of FP01, FP02 and FP03

FP01 and FP02 calculated to have a High EIS primarily due to these systems falling within a within a FEPA wetland (Nel *et al*., 2011) and a Critical Biodiversity Area (EKZNW, 2016), whereas FP03 calculated a Moderate EIS, as this system also falls within a FEPA wetland (Nel *et al*., 2011) and a Critical Biodiversity Area (EKZNW, 2016), but has historically been transformed by TNPA activities.. Additionally, FP01 and FP02 rated Very High; and FP03 rated High in terms of its ecological importance and hydrological/functional importance as a result of supplying valuable regulatory ESS to the surrounding environment and potentially hosting habitats which are inclusive of red data or unique flora and fauna. The proposed development will occur within FP01 and FP03; and adjacent to FP02, due to its High EIS and elevated conservation status at a national scale, all development that is proposed to be constructed within and adjacent to these wetlands should adhere to the NEMA (Act no 107 of 2004) principles, one of which states that all development should occur sustainably with an end-goal of no net-loss of biodiversity.

Table 40: Summary of the Ecological Importance and Sensitivity scores for FP01, FP02 and FP03

SUMMARY	FP01		FP02		FP03	
	SCORE	RATING	SCORE	RATING	SCORE	RATING
Ecological Importance	3.42	Very High	3.67	Very High	2.58	High
Functional/Hydrological Importance	2.81	High	3.13	Very High	2.00	High
Direct Benefits to Society	0.27	Low	0.52	Low	0.14	Low
Overall Importance	**2.16**	**High**	**2.44**	**High**	**1.57**	**Moderate**

9.5. Ecosystem services of UVB01 and UVB04

UVB01 and UVB04 calculated to be moderately high at the removal of toxicants and nitrates, trapping of phosphates and sediment. Flood attenuation and streamflow regulation calculated to be at a moderately level due to water flowing into, through and out of it. Erosion control and carbon storage was calculated to be at a moderate level due to the high surface roughness in the wetlands, moderate amount of peat present in soil and dense vegetation cover which act as a sink for carbon, respectively. The ecosystem services provided by the unchannelled valley bottom wetlands can be attributed to their nature to exhibiting a diffuse flow regime throughout the different wetness zones, being supplied by both the lateral surface runoff from the catchment and subsurface flow. As a result of the upstream catchment being substantially change by linear activities and industry, there is great opportunity for toxicant, nitrates and phosphates to enter the systems through the lateral input. What makes this system effective at supplying the aforementioned ESS are their diffuse flow regime and clay loam soil present within it, which are recorded to filtrate/absorb toxicants and nutrients that may be detrimental to the health and functionality of downstream systems. Furthermore, socio-cultural services provided by all unchannelled valley bottom wetlands were moderately low to low. The reed type vegetation (*Cyperus papyrus*) was being harvested by local community members, which will potentially be utilised for craft or housing purposes. Similarly to the channelled valley bottom and floodplain wetlands, these wetlands was identified at a desktop level to be a FEPA wetland according to the NFEPA dataset (Nel et al., 2011) and fall within a Critical Biodiversity Area (EKZNW, 2016), thus conservation and maintenance of the biodiversity of this wetland is essential in order to meet conservation targets.

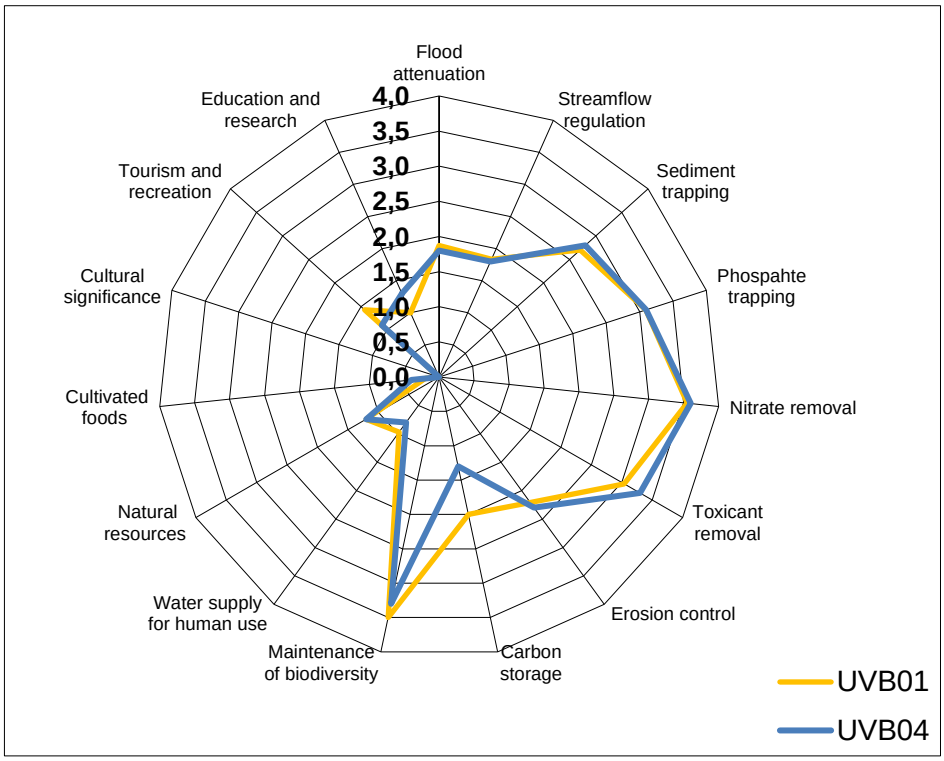


Figure 21: Diagram illustrating the direct and indirect benefits supplied by UVB01 and UVB04

9.6. Ecological Importance and Sensitivity of UVB01 and UVB04

UVB01 and UVB04 calculated to have a High EIS primarily due to these systems falling within a within a FEPA wetland (Nel *et al*., 2011) and a Critical Biodiversity Area (EKZNW, 2016). Additionally, these systems are rated Very High in terms of its ecological importance and hydrological/functional importance as a result of supplying valuable regulatory ESS to the surrounding environment and potentially hosting habitats which are inclusive of red data or unique flora and fauna. The proposed development will occur adjacent to UVB01 and within a portion of UVB04, due to their High EIS and elevated conservation status at a national scale, all development that is proposed to be constructed adjacent and within these wetlands should adhere to the NEM:BA (Act no 107 of 2004) principles, one of which states that all development should occur sustainably with an end-goal of no net-loss of biodiversity.

Table 41: Summary of the Ecological Importance and Sensitivity scores for UVB01 and UVB04

SUMMARY	UVB01		UVB04	
	SCORE	RATING	SCORE	RATING
Ecological Importance	3.25	Very High	3.25	Very High
Functional/Hydrological Importance	2.66	High	2.66	High
Direct Benefits to Society	0.52	Low	0.27	Low
Overall Importance	**2.14**	**High**	**2.06**	**High**

9.7. Ecosystem services of Seep06

Seep06 calculated to be greatest at supplying; toxicant and nitrate removal, sediment and phosphate trapping. Due to the wetlands isolated nature, streamflow regulation is very low, coupled with carbon storage being very low due to the lack of peat and limited very cover within the wetland. Furthermore, flood attenuation and erosion control supplied a moderately low to moderate level due to the small size of this

seepage wetland to capture water from runoff in the catchment and incoming sediment from the catchment, respectively. Seepage wetlands are characterized by subsurface diffuse flow through the B-horizon of the soil profile, and thus are recorded to contribute, to some degree, to surface flow attenuation as a result of the accumulation of organic matter and fine-sediment within the soil allowing the system to slow the movement of subsurface flow. The seepage of surface flow into the wetland and the gradual subsurface flow through it reduces flood and erosion potential of downstream systems.

Additionally, due to the aforementioned seepage wetland being situated within minor catchment area, which are dominated by industry and anthropogenic changes; sediment and inorganic pollutants present within the surface runoff that will flow into and through the system before entering downstream watercourses. Thus, this presents an opportunity for this wetland to supply valuable water quality enhancement benefits. One such process acting within the seepage wetlands, which removes nitrates and nitrites from the soils is denitrification, which is fed by both the groundwater that emerges through low redox potential soils within the wetland and the wetland plants, which supply the organic carbon necessary for the process. Socio-cultural ecosystem services for the wetland was low.

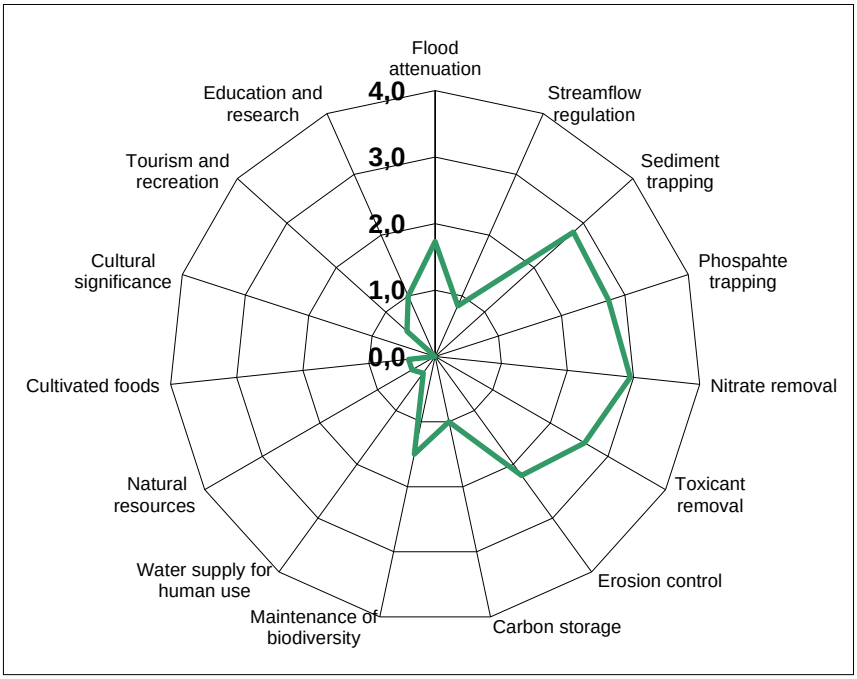


Figure 22: Diagram illustrating the direct and indirect benefits supplied by Seep06

9.8. Ecological Importance and Sensitivity of Seep06

Seep06 calculated a low EIS due to the size of the wetland, which will hinder its ability to provide ecosystem services at a moderate to high level. Furthermore, in terms of Ecological Importance, this wetland did not offer a habitat or currently contain any unique species. This wetland had no benefit to society and did not provide any natural resources to the surrounding community. The proposed development will occur a fair distance away from Seep06 and all development that is proposed to be constructed near this wetland should adhere to the NEM:BA (Act no 107 of 2004) principles, one of which states that all development should occur sustainably with an end-goal of no net-loss of biodiversity.

Table 42: Summary of the Ecological Importance and Sensitivity scores for Seep06

SUMMARY	SEEP01	
	SCORE	RATING
Ecological Importance	1.00	Moderate
Functional/Hydrological Importance	0.94	Low
Direct Benefits to Society	0.04	Low
Overall Importance	**0.66**	**Low**

10. BUFFER ZONE DETERMINATION

It is recommended that the buffer zone, which was calculated for the at-risk wetlands which may potentially be impacted on by the proposed development utilising the best practice buffer zone tool (Macfarlane *&* Bredin, 2016) be applied. Due to most portions of the proposed development (Transmission Line Preferred Route and especially activities such as stringing yard, site office and transmission line monopoles) occurring within or adjacent to the wetland, the buffers provided in Table 43 are not entirely practical. However, the buffers were calculated for the activities that should not be conducted which is mentioned later in this paragraph. Thus, it is of the wetland specialist opinion that the proposed development can occur within the wetland if the mitigation measures in this report are followed, along with implementation of the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022). The following activities should not be conducted within the calculated buffer zones (with exclusion to the proposed temporary construction facilities) - washing of vehicles, waste dumping (organic or artificial), haulage roads, and any other activities which may be detrimental to the health and functionality of the watercourse. Additionally, any unauthorised, or potentially detrimental activities, which occur in the direct vicinity, or upstream, of the watercourse should be rehabilitated according to the site EMPr, and preventative or mitigation strategies. Table 43 and Figure 23 below provide the recommended buffer zone relative to the study area.

Table 43: Recommended buffer zones for the wetlands that will be potentially impacted on by the proposed development (Macfarlane & Bredin, 2016).

WATERCOURSE	CONSTRUCTION PHASE (M)	OPERATIONAL PHASE (M)
CVB01, FP01, FP02, FP03, UVB01, UVB04	29	22
Seep06	16	10

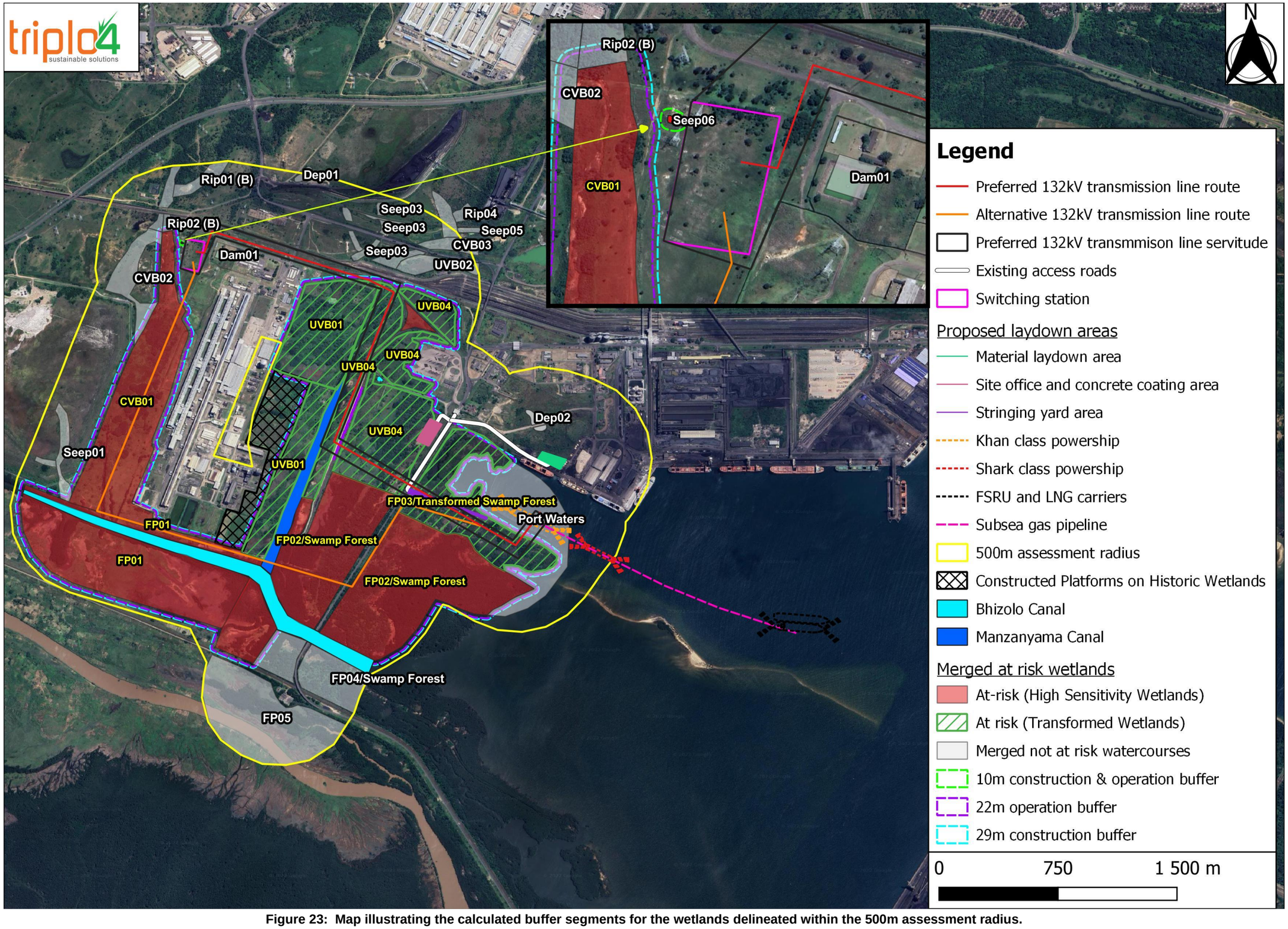


Figure 23: Map illustrating the calculated buffer segments for the wetlands delineated within the 500m assessment radius.

11. IMPACT AND RISK ASSESSMENT

11.1. Impact Assessment

An understanding of the relationship between the landscape and the dynamic characteristics of watercourses is vital for the accurate assessment of watercourse functions and values. Watercourses are adjusting to disturbance occurring within them and within the greater landscape, on a continuous basis. The recognition to what extent these various disturbances have on watercourses and their associated PES and EIS is vital when assessing disturbance and impact and when considering mitigative measures.

The types of impacts on watercourses can be categorised into three (3) broad categories, namely; direct, indirect and cumulative impacts. Direct impacts are associated with disturbances occurring within the system such as canalisation, infilling, removal of vegetation and infrastructure development. Indirect impacts include disturbances outside the system, such as increased surface water and sediment, loss of recharge area, changes in local drainage patterns. Cumulative impacts include disturbances resulting from combined direct and/or indirect impacts to the system over time. However, as this study was conducted over two days in the field the cumulative impacts on the assessed resources cannot be documented with confidence within this report. A more in-depth study over several seasons will need to be conducted to accurately determine the relevant cumulative, and/or downstream impacts. Thus, the cumulative impacts provided in this report are based on existing impacts on and assumptions of proposed projects that might have an impact on the surrounding environment.

The direct and indirect impacts associated with the proposed development and the relevant alternatives are grouped into three (3) encapsulating impact categories where associated or interlinked impacts are grouped. Impacts have been separated into construction and operational phases of the development within these categories (Table 44).

Table 44: Impact categories and associated impacts (without mitigation) relating to the proposed development.

BROAD IMPACT CATEGORY			PROJECT-SPECIFIC IMPACTS	
			CONSTRUCTION PHASE	OPERATIONAL PHASE
1	Direct habitat modification	**Potential cause of impact** - *Vegetation removal* - *Direct infilling and/or excavation* - *Establishment of AIPs* - *Modification of profile (e.g. beds and banks)* - *Alteration in habitat types* - *New structure being introduced* **Potential Consequence** - *Partial loss of wetland systems and/or habitat* - *Partial loss to the flow regime of the wetland systems and/or habitat* - *Partial loss of wetland systems and/or habitat (i.e. NFEPA system)* - *Partial loss of ecosystem goods and services*	- Direct removal of wetland vegetation may occur as a result of the construction of overhead powerlines within wetland environment. This is a consequence of the excavation, trenching and infilling activities associated with the proposed development construction activities. Specific reference must be made to the following systems where the proposed development will extend into the delineated boundary: CVB01, FP01, FP02, FP03 and UVB04 - The direct impact on the abovementioned systems will be the alteration of the hydrological flow regime, alteration to the geomorphological extent in certain areas, alteration of stream banks and beds, removal of wetland vegetation and alteration of the vegetation type in each system. - Furthermore, the excavation, trenching and infilling within these wetland systems will result in the slight reduction in hydric soils as well as hydrophytes, which were calculated to supplying ecosystem services to a moderately high degree. - AIPs are already present in a large portion of the catchments associated with the proposed development. However, further encroachment by AIPs,	- Possibility of continued proliferation of AIPs, opportunist weeds and pioneer species due to ineffective rehabilitation. - The continued encroachment by the marginal vegetation at several of the impacted wetland systems, due to excess nutrient input, will continue to alter the physcio-chemical properties of the at risk wetlands, as well as further change the water balance within the catchment area. - Ineffective rehabilitation of the wetland systems disturbed area by overhead powerline base resulting in the continued erosion and sedimentation of the downstream freshwater systems. - Obstruction of flow due to base of overhead powerlines, might result in the accumulation of sediment or other blockages will result in upstream ponding and will reduce flows to downstream areas thereby impacting

		- *Partial or total loss of rare/unique/endangered species* - *Introduction or increased infestation of alien invasive plant species* - *Partial or total alteration of the physiochemical properties of freshwater micro-habitats.* - *Loss of invertebrate species composition and diversity* - *Loss of migratory route for semi-aquatic and/or aquatic species*	pioneer species and opportunist weeds may occur if the appropriate mitigation, and rehabilitation strategies are not implemented. - Extensive modification of the soil profile will take place in certain areas along the footprint of the proposed development, specifically during the construction phase. This will result in the destruction of seed banks, the decrease in the fertility of the soil and consequent sedimentation of downstream freshwater systems. - Terrestrial and wetland environments may be transformed as a result of indiscriminate movement of construction vehicles and personnel. - Possible illegal harvesting of indigenous vegetation by construction personnel. - Obstruction of flows during the construction of the overhead powerlines may result in impoundment of water and sediment load upstream of the wetland environments during periods of heavy rainfall. - Burying of aquatic habitat as a result of deposition and unauthorised dumping by contracted personnel.	on upstream and downstream wetland systems. - Reduction in the species composition and diversity of aquatic invertebrates as a result of certain species being sensitive to the proposed anthropogenic changes such as traversing through wetlands and potential foreign material entering wetlands. - Hectare equivalent loss of wetlands which will in turn reduce the potential of wetlands to provide ecosystem services to the surrounding environment, such as migratory route for semi-aquatic and/or aquatic organisms, lack of water supply to humans due to an increase proliferation of AIPs and deposition of high levels of nutrients to important wetlands, which can cause eutrophic conditions in these systems due to a lack of nutrient assimilation by wetland systems upstream.
2	Catchment modifications (land cover	**Potential cause of impact** - *Vegetation removal* - *Erosion*	- Vegetation removal may potentially result in an increase in exposed surfaces and subsequent potential for decreased soil particle cohesion and soil binding	- Potentially increased levels of stormwater flow as a result of the

	and surface runoff)	- *Sedimentation* - *Increased surface runoff volume and velocity* - *Reduced infiltration* - *Alteration in habitat types* - *Reduction in soil permeability*	capacity, increasing the potential for erosion and sedimentation. - Formation of rills and gullies from increased concentrated runoff which has the potential to occur. This increase in volume and velocity of runoff increases the particle carrying capacity of the water flowing over the surface and into the at risk wetlands, resulting in increased rates of erosion and sedimentation within the wetland systems. - Soil compaction resulting in reduced infiltration and increased surface runoff together with the artificial creation of preferential flow paths due to construction activities, will result in increased quantities of flow and sediments entering the wetland systems. - Erosion of certain land cover classes (e.g. bare-ground, shallow-rooted grass species and degraded veld) as a result of increased surface runoff created by the hardened concreted surfaces. - There is the potential for the creation of low light conditions reducing photosynthetic activity and the visual abilities of foraging aquatic biota due to increased sediment deposition.	increase in the surface-area of concrete within the catchment areas. - Potential decrease in soil permeability and infiltration due to the increased hardening of surfaces. - Continued, or increased, soil compaction on the footpath/tracks which have been created by the construction personnel. - The transportation of excessive catchment sediment can result in a change in topsoil thus, a change in substrate in turn cause a proliferation of AIPs. - If the laydown areas are not properly rehabilitated it could lead to further loss of habitat and topsoil from wetland systems, as a result of the increased velocity of surface water runoff from the bare surface associated with the camp and the erosion of wetland systems in close proximity to the camp.
		Potential Consequence - *Partial loss of wetland systems and/or habitat* - *Partial loss of the flow regime of wetland systems and/or habitat* - *Incision and sedimentation of wetlands* - *Decrease in PES of wetlands* - *Introduction or increased infestation of AIPs* - *Partial loss of ecosystem goods and services*		
3	Water Quality (Pollution)	**Potential cause of impact** - *Hydrocarbon input from construction vehicles*	- During construction, there are several potential pollution inputs into the wetland systems. These pollutants alter the water quality parameters such as	- The current dirt roads and railway lines are an existing structure and the public are currently utilizing these linear

	(During rainfall events)	- *The incorrect positioning and maintenance of the portable chemical toilets and use of the surround environment as ablution facilities may result in sewage and chemicals entering the wetlands* - *General waste being deposited into the wetlands by construction personnel* - *Excess sediment input as a result of the construction activities and associated soil displacement* - *Raw cement entering the wetlands through incorrect batching procedure and/or direct disposal.* **Potential Consequence** - *Decrease in PES of wetlands* - *Water quality impairment in the wetlands*	turbidity (increased suspended solids), nutrient levels, chemical oxygen demand and ph. Consequently, these impact the species composition of the system, especially species sensitive to minor changes in these parameters. - Sedimentation of the downstream wetland systems, resulting in altered sediment balances, destruction of habitats and the change in water quality (i.e. potential influx of nutrients and inorganic pollutants). - Hydrocarbons including petrol/diesel and oils/grease/lubricants associated with construction activities (machinery, maintenance, storage, handling) may potentially enter the wetland systems by means of surface runoff or through dumping by construction workers. - A negative effect on the aquatic habitat within the construction footprint and downslope of footprint, particularly aquatic flora and fauna sensitive to changes in turbidity levels, nutrient levels, chemical oxygen demand and toxicants.	structures. Thus, the impacts associated with vehicle and human movement already exist. - Continued sedimentation of wetland systems as a result of sediment laden runoff entering the features from areas disturbed during construction and ineffectively rehabilitated. - With ineffective rehabilitation, sedimentation will continue and will result in an impact on water quality. - Continued sedimentation of the wetland systems as a result of continued erosion of areas disturbed during construction activities. - If rehabilitation is ineffective, aeolian processes may cause the erosion and transport of loose, exposed material to downstream systems.

		- *Increased turbidity of water as a result of excess sediment.* - *Partial loss of rare/unique/endangered species* - *Introduction or increased infestation of AIPs* - *Partial loss of ecosystem goods and services (i.e. increased pollutants within a wetland reduces its effectiveness in assimilating any new pollutants entering the feature).* - *Increase in nutrients in the wetlands can ultimately cause eutrophic conditions.*		

The following is a representation of the quantitative impact assessment for the proposed development, as well as the mitigation measures that must be implemented to realise the post-mitigation significance scores. This quantitative impact assessment was conducted in line with the methodology requested from the minister of Environmental Affairs.

It must be noted that it is the opinion of the author of this report that the scoring methodology provided is not a true reflection of the project situation and the findings of this assessment (e.g. impact duration). The preferred impact assessment scoring has thus been added to provide the best assessment possible as indicated in the table below.

Table 45: Impact categories and significance rating relating to the proposed development.

Aspect:	Risk/ Aspect Description	Overall Significance - Pre as per DFFE	Overall Significance-Pre as per Specialist Recommendation	Mitigation Of Impacts	Overall Significance - Post as per DFFE	Overall Significance-Post as per Specialist Recommendation	Reversibility	Irreplaceable Loss of Resources	Fatal Flaw
DIRECT IMPACTS									
Direct habitat modification	- *Vegetation removal* - *Direct infilling and/or excavation* - *Establishment of AIPs* - *Modification of profile (e.g. beds and banks)* - *Alteration in habitat types* - *New structure being introduced*	Medium (Negative)	Medium Low (Negative)	• Existing access roads and areas where existing overhead powerlines have been built must be utilised, only those areas that do not have existing linear infrastructure can be disturbed for the newly introduced overhead powerlines. • The use of heavy construction vehicles within a wetland must not occur where possible. If usage of heavy construction vehicles is required in wetlands wooden planks must be placed in wetland area first and heavy construction vehicles to only drive on these planks. • All excavated topsoil and subsoil from the wetland must be stockpiled separately and reinstated in the order of subsoil and topsoil once construction activities are completed. • Stockpiled wetland subsoil and topsoil must not contain any AIPs when being reinstated. • All areas in which erosional and depositional features have formed must be reinstated to its natural condition. • Temporary access roads must be reinstated to the natural environmental condition. • AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils must be re-vegetated with indigenous vegetation native to that area. • The drafted Wetland Rehabilitation and Monitoring Plan (T4-WRP-RB, Oct 2022) must be implemented and followed in order to reinstate the areas that will be disturbed.	Medium Low (Negative)	Low (Negative)	Reversible	No	No
Water Quality (Pollution)	- *Hydrocarbon input from construction vehicles* - *The incorrect positioning and maintenance of the portable chemical toilets and use of the surround environment as ablution facilities may result in sewage and chemicals entering the wetlands* - *General waste being deposited into the*	Medium (Negative)	Medium Low (Negative)	• Inspect all storage facilities and vehicles daily for the early detection of mechanical deterioration or leaks. • The placement of drip trays must be conducted under vehicles that are stationary on site. • Mixing and transferring of chemicals or hazardous substances must take place on drip trays, shutter boards or other impermeable surfaces within bunded areas and should only be mixed or transferred by suitably trained personnel. • Drip trays must be utilised at all fuel dispensing areas.	Medium Low (Negative)	Low (Negative)	Reversible	No	No

	wetlands by construction personnel - *Excess sediment input as a result of the construction activities and associated soil displacement* - *Raw cement entering the wetlands through incorrect batching procedure and/or direct disposal.*			• Vehicles and machinery should preferably be cleaned off site. Should cleaning be required on site it must only take place within designated areas away from the prescribed buffer zone and watercourses, and should only occur in areas that have been previously disturbed and bunded areas. • Dispose of used oils, wash water from cement and other pollutants at an appropriate licensed waste facility. • All construction material brought onto site must be non-reactive to prevent contamination. • Clean up any spillages immediately with the use of a chemical spill kit and dispose of contaminated material at an appropriately registered facility. • The digging of pit latrines is not allowed under any circumstances. • None of the open areas or the surrounding environment may be used as ablution facilities.					
INDIRECT IMPACTS									
Catchment modifications (land cover and surface runoff)	- *Vegetation removal* - *Erosion* - *Sedimentation* - *Increased surface runoff volume and velocity* - *Reduced infiltration* - *Alteration in habitat types* - *Reduction in soil permeability*	Medium Low (Negative)	Low	• Existing access roads and areas where existing overhead powerlines have been built must be utilised, only those areas that do not have existing linear infrastructure can be disturbed for the newly introduced overhead powerlines. • All excavated topsoil and subsoil from the terrestrial areas must be stockpiled separately and reinstated in the order of subsoil and topsoil once construction activities are completed. • Stockpiled terrestrial subsoil and topsoil must not contain any AIPs when being reinstated. • All areas in which erosional and depositional features have formed must be reinstated to its natural condition. • Temporary access roads must be reinstated to the natural environmental condition. • AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils must be re-vegetated with indigenous vegetation native to that area.	Low	Very Low	Reversible	No	No
Water Quality (Pollution)	- *Hydrocarbon input from construction vehicles* - *The incorrect positioning and maintenance of the portable chemical toilets and use of the surround environment as ablution facilities may result in sewage and chemicals entering the wetlands*	Medium Low (Negative)	Low	• Inspect all storage facilities and vehicles daily for the early detection of mechanical deterioration or leaks. • The placement of drip trays must be conducted under vehicles that are stationary on site. • Mixing and transferring of chemicals or hazardous substances must take place on drip trays, shutter boards or other impermeable surfaces within bunded areas and should only	Low	Very Low	Reversible	No	No

	- *General waste being deposited into the wetlands by construction personnel* - *Excess sediment input as a result of the construction activities and associated soil displacement* - *Raw cement entering the wetlands through incorrect batching procedure and/or direct disposal.*			be mixed or transferred by suitably trained personnel. • Drip trays must be utilised at all fuel dispensing areas. • Vehicles and machinery should preferably be cleaned off site. Should cleaning be required on site it must only take place within designated areas away from the prescribed buffer zone and watercourses, and should only occur in areas that have been previously disturbed and bunded areas. • Dispose of used oils, wash water from cement and other pollutants at an appropriate licensed waste facility. • Clean up any spillages immediately with the use of a chemical spill kit and dispose of contaminated material at an appropriately registered facility. • The digging of pit latrines is not allowed under any circumstances. • None of the open areas or the surrounding environment may be used as ablution facilities.					

From the quantitative impact assessment conducted and presented in Table 46, it is evident that the overall impact significance scores can be mitigated to a medium to low and low impact rating as per DFFE preferred scoring method. However, utilising the specialist's preferred methodology the overall impact significant scores are noted to be low to very low, post-mitigation. All impacts are regarded as reversible, with no loss to irreplaceable features. However, it must be noted that in order to achieve reversibility of impacts and no loss of irreplaceable features, the mitigation measures outlined in this report coupled with the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) must be implemented. It was concluded that no fatal flaws exist for the preferred alternative of the proposed development from a wetland perspective.

The following represents the assumed cumulative impacts which takes into consideration proposed similar projects within the Port of Richards Bay.

Table 46: Impact categories and associated impacts (without mitigation) relating to the proposed development.

Broad Impact Category		Assumed Impacts	
		Construction Phase	Operational Phase
1	RBGP2 400MW Gas to Power Project at the RBIDZ 1F	- Potential increase of hardened surfaces in the catchment, thus reducing area for infiltration of water which will flow either at the subsurface or surface to wetlands. - Potential decrease in opportunity of groundwater recharge during rainfall events due to increased hardened surfaces. - Potential increase in dust pollution. - Potential increase in sedimentation of downstream watercourses.	- Potential increase of hardened surfaces in the catchment, thus reducing area for infiltration of water which will flow either at the subsurface or surface to wetlands. - Potential decrease in opportunity of groundwater recharge during rainfall events due to increased hardened surfaces. - Potential toxic spills into terrestrial environments which can be transported into watercourses if no effective clean-up is conducted. - Possibility of continued proliferation of AIPs, opportunist weeds and pioneer species due to ineffective rehabilitation which can be transported to watercourses by faunal species that go in and out of watercourses.
2	Nseleni Independent Floating Power Plant - Port/ old Bayside complex.	- Potential increase of hardened surfaces in the catchment, thus reducing area for infiltration of water which will flow either at the subsurface or surface to wetlands. - Potential decrease in the opportunity for groundwater recharge during rainfall events due to increased hardened surfaces. - Potential increase in dust pollution. - Potential increase in sedimentation of downstream watercourses. - Potential overall loss of sensitive biodiversity in Port of Richards Bay and Industrial District Zone (IDZ).	- Potential increase of hardened surfaces in the catchment, thus reducing area for infiltration of water which will flow either at the subsurface or surface to wetlands. - Potential decrease in the opportunity for groundwater recharge during rainfall events due to increased hardened surfaces. - Potential toxic spills into terrestrial environments which can be transported into watercourses if no effective clean-up is conducted. - Potential overall loss of sensitive biodiversity in Port of Richards Bay and IDZ. - Possibility of continued proliferation of AIPs, opportunist weeds and pioneer species due to ineffective rehabilitation which can be transported to

			watercourses by faunal species that frequent the watercourses.
3	Eskom 3000 MV CCPP and associated infrastructure on Portion 2 of Erf 11376 and Portion 4 of Erf 11376 within the RBIDZ Zone 1D	- Potential increase of hardened surfaces in the catchment, thus reducing area for infiltration of water which will flow either at the subsurface or surface to wetlands. - Potential decrease in opportunity of groundwater recharge during rainfall events due to increased hardened surfaces. - Potential increase in dust pollution. - Potential increase in sedimentation of downstream watercourses. - Potential overall loss of sensitive biodiversity in Port of Richards Bay and Industrial District Zone (IDZ).	- Potential increase of hardened surfaces in the catchment, thus reducing area for infiltration of water which will flow either at the subsurface or surface to wetlands. - Potential decrease in opportunity of groundwater recharge during rainfall events due to increased hardened surfaces. - Potential toxic spills into terrestrial environments which can be transported into watercourses if no effective clean-up is conducted. - Potential overall loss of sensitive biodiversity in Port of Richards Bay and Industrial District Zone (IDZ). - Possibility of continued proliferation of AIPs, opportunist weeds and pioneer species due to ineffective rehabilitation which can be transported to watercourses by faunal species that go in and out of watercourses.
4	320MW Emergency Risk Mitigation Power Plant (RMPP) and associated infrastructure near Richards Bay.	- Potential increase of hardened surfaces in the catchment, thus reducing area for infiltration of water which will flow either at the subsurface or surface to wetlands. - Potential decrease in the opportunity for groundwater recharge during rainfall events due to increased hardened surfaces. - Potential increase in dust pollution. - Potential increase in sedimentation of downstream watercourses.	- Potential increase of hardened surfaces in the catchment, thus reducing area for infiltration of water which will flow either at the subsurface or surface to wetlands. - Potential decrease in the opportunity for groundwater recharge during rainfall events due to increased hardened surfaces. - Potential toxic spills into terrestrial environments which can be transported into watercourses if no effective clean-up is conducted. - Possibility of continued proliferation of AIPs, opportunist weeds and pioneer species due to ineffective rehabilitation which can be transported to watercourses by faunal species that go in and out of watercourses.

11.1.1. Cumulative Impact Statement

In taking into consideration the four (4) projects in Table 46 and the potential cumulative loss of wetlands could be considered. Overall, wetlands within the Port of Richards Bay and the IDZ have been extensively disturbed due to current and past land use practices such as industrial and port activities.

The RBGP2 400MW Gas to Power Project at the RBIDZ 1F consisted of no wetlands on site and no wetlands that will be impacted upon by the proposed project. Impacts can be indirect in nature and very unlikely (Low Negative).

The study area of the Nseleni Independent Floating Power Plant – Port/ Old Bayside Complex consisted of several wetlands that may be impacted by the proposed project. Wetlands will be most likely directly and indirectly impact on by the project. In terms of cumulative impacts, the greater catchment of the Port of Richards Bay and IDZ will experience a (Moderate Negative) loss of wetlands if the Nseleni Independent Floating Power Plant and Karpowership project commences. However, if the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) outlined for the Karpowership project is implemented in conjunction with the mitigation and rehabilitation measures formulated for the Nseleni Independent Floating Power Plant project, the functional area of wetlands in the Port of Richards Bay and IDZ area can be improved to mitigate the (Moderate Negative) loss to (Low Negative) loss.

The Eskom 3000 MV CCPP and associated infrastructure Project consisted of several wetlands on the site that will be impacted by the proposed project. Wetlands will be most likely directly and indirectly impacted by the project. In terms of cumulative impacts, the greater catchment of the Port of Richards Bay and IDZ will experience a (Moderate Negative) loss of wetlands if the Eskom 3000 MV CCPP project and Karpowership project commence. However, if the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) outlined for the Karpowership project is implemented in conjunction with a mitigation and rehabilitation measures for the Eskom 3000 MV CCPP project, the functional area of wetlands in the Port of Richards Bay and IDZ area can be improved to mitigate the (Moderate Negative) loss to (Low Negative) loss.

The study area of the 320MW Emergency Risk Mitigation Power Plant (RMPP) and associated infrastructure near Richards Bay consisted of wetlands on site, however no wetlands were determined to be at direct risk of being impact on by the project. Indirect impacts may be evident, however this was determined to be very unlikely, and thus the overall impact significance of the development was determined to be (Low Negative).

The overall cumulative impacts can be measured as a (Moderate Low Negative) loss of wetlands, which includes the KSA Gas to Power Project, and thus it is the specialist's opinion that the proposed development in terms of the preferred alternative and associated infrastructure being assessed in this report can proceed.

11.1.2. Residual Impact Statement

The potential residual impact assessment with the proposed development were considered to be Low, should the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) be strictly implemented and subsequently monitored onsite. However, in implementing the precautionary approach, it is recommended that potential residual impacts, especially with regard to FP03/Transformed Swamp Forest, be monitored biannually by an appointed environmental consultant and reported to KSA and competent authority (Department of Forestry, Fisheries and Environment; and Department of Water and Sanitation) on any negative impacts been identified.

11.1.3. Need and Desirability

In South Africa's current and past climate, the ongoing need for electrified energy has become a very significant and increasing challenge over the years. Due to lack of maintenance and upgrading of existing electrical infrastructure (e.g. generation facilities, transmission lines and substations) coupled with the demand for more electricity due to ongoing development in the country and population growth, South Africa's electricity supply has been under constant strain and has led to loadshedding. Loadshedding has crippled

the South African economy and has led to the loss of income and jobs for large portions of the South African population. Furthermore, due to the desire of businesses to continue operating during loadshedding schedules, alternative energy measures such as diesel operated generators have been purchased and utilised, which result in increased expenses for businesses, reduced profit margins and greater individual environmental impacts. Thus, the 'need' for electrified energy in South Africa has risen and thus alternative energy creating mechanisms such as Karpowership are required to eliminate loadshedding in the near future. The ability of Karpowership to bring in electrified energy is immediate if the required infrastructure (e.g. substation and transmission lines) and regulatory permissions are in place, unlike alternative energy sources such as wind farms and solar photovoltaic farms, which require lengthy construction of energy infrastructure (i.e. battery housings, wind turbines and solar fields) before the transmission of electrified energy can occur, which also brings with it completion risks. In comparison to the proposed development, the footprint of the aforementioned energy infrastructure (i.e. wind farms and solar photovoltaic farms) would have a much larger footprint (typically land use of at least a multiple of x100 or greater) to produce the same amount, or less, energy. This huge increase in land use required can in turn negatively impact on the receiving environment and organisms.

From a freshwater perspective associated with the proposed development in Port of Richards Bay, Karpowership will have a minimal impact on freshwater resources, seeing that it will occur in an operational port and will only require monopole transmission lines on land, some of which will be placed in an already existing transmission line servitude and degraded areas. Therefore, the need from an energy, social and economic perspective will be positive for South Africa, whilst environmental impacts will need to be mitigated and monitored as outlined in this report.

NB: With regards to the terminology irreplaceability, other terminology is utilised in the impact assessment such as: partial loss of wetland habitat, partial loss of ecosystem services and partial loss of migratory routes for semi-aquatic species. Furthermore, it must be noted that mitigation measures outlined in this report and the conducted Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) would render the aforementioned irreplaceable terms (e.g: partial loss of wetland habitat) to be reversible as the mitigation and rehabilitation measures being proposed will improve the functionality of the wetlands if properly implemented. Additionally, the rationale for these wetlands to be improved in terms of functionality can be better understood reading the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022). A brief explanation of this is that certain area of these wetlands were noted to not be functional anymore due to historic and current land use practices. The rehabilitation plan, if followed step by step will ultimately create more functional area in the wetlands.

11.1.4. Polycentric integrative approach to assessment

11.1.4.1. Introduction

A polycentric approach to the proposed project requires for the holistic consideration of all relevant factors, inclusive of potential impacts that the proposed project could have on the local as well as the broader community. Section 2(4)(b) of NEMA states that *Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in* the *environment by pursuing the selection of the best practicable environmental option.* Sustainable development as per NEMA requires the integration of social, economic, and environmental factors in the planning, implementation, and evaluation of proposed projects, to ensure that development serves the needs of present and future generations.

This specialist assessment considered both the positive and negative impact significance of actual and potential impacts on the geographical, physical, biological, social, economic, and cultural aspects of the environment in a polycentric and holistic approach to:

- Ensure that all aspects are weighed up against each other,

- Identify the risks and consequences of alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management as set out in section 2 of NEMA.

A specialist integrative workshop and weekly meetings were held during the EIA process where specialists raised concerns to be considered by the specialist team and also verified technical information to prevent any discrepancies and where relevant, to co-ordinate approaches.

This approach ensured that there are no gaps were evident between the various specialist reports and provides a holistic picture of the project and allows for a polycentric assessment of environmental and socio-economic impacts and the identification of appropriate mitigations and recommendations for potential negative impacts and the maximisation of positive impacts and the value of the project to society.

11.1.4.2. Polycentric integrated specialist reports considered in the assessment

The specialist reports considered in the polycentric integrated approach in this report were the Hydrological Assessment, Aquatic Assessment, Hydropedological Assessment, Geohydrological Assessment and Terrestrial Biodiversity Assessment (GCS Ref - 22-0886, 2022, GCS Ref - 22-0886_PED1, 2022; GCS Ref – 22-0886_GW1, 2022; GCS, 2022-22-0885; de Wet, 2022). The Hydrological Assessment provided insight into the flood lines around the proposed project and an overview of the baseline water quality. The Aquatic Assessment provided insight into the *in situ* water quality of the rivers around the proposed project. The Hydropedological Assessment provided valuable information on the hillslopes and hillslope hydrology surrounding the proposed project and associated wetlands. The Geohydrological Assessment provided valuable insight into the prevailing groundwater conditions. Lastly, the Terrestrial Biodiversity Assessment provided valuable input in terms of existing vegetation disturbances and potential red data species present in the area.

It was found that the sources and receivers as identified in this investigation, align with those of the reports reviewed and information brought forward in the weekly meetings held during the EIA process. The aforementioned reports provided input in terms of verified *in situ* quality of water within the watercourses, informed on the hydrological drivers in the catchment in which the wetlands respond to and identification of species of conservation concern (SCC) which were incorporated into the wetland report.

11.1.4.3. Polycentric approach to the recommendations and conclusions

The following specialist considered the Wetland Delineation and Functional Assessment findings and recommendations; and internalised these within their reports to ensure a polycentric integrative approach to evaluations, assessments and recommendations:

- Hydrological Assessment (GCS Ref - 22-0886),
- Aquatic Assessment (GCS, 2022-22-0885),
- Hydropedological Assessment (GCS Ref - 22-0886_PED1),
- Geohydrological Assessment (GCS Ref – 22-0886_GW1, 2022), and
- Terrestrial Biodiversity Assessment (de Wet, 2022).

11.2. DWS Risk Assessment Matrix (RAM)

The DWS has published an amendment of the GN 509 Section 21 (c) and (i) activities in terms of the NWA (No. 36 of 1998). The purpose of the authorisation is as follows:

> *"This General Authorisation replaces the need for a water user to apply for a license in terms of the National Water Act (No.36 of 1998) ("the Act") provided that the water use is within the limits and conditions of this General Authorisation."*

The reason for this amendment is to streamline the WULA process by allowing projects that are calculated to pose a low risk of impacting on the surrounding aquatic environment to be granted under a GA instead of having to undergo a full WULA process. The risk rating of each aspect pertaining to all the construction activities associated with the proposed development is calculated using the DWS RAM (DWS, 2016). Any aspect that is assessed to pose a moderate or high risk of impacting on the surrounding watercourses will trigger the need for the proposed development to undergo a full WULA process. However, if all the aspects are calculated to be of negligible-to-low risk the proposed development may be authorised under a GA, as per GN509 (26 August 2016), which was drafted under the NWA (No. 36 of 1998).

The strength of the revised DWS RAM is that the critical components of each impact, namely duration, extent, magnitude, probability and significance, are carefully considered, allowing a balanced perspective of each impact to be gained. It was concluded that there are several aspects associate with the proposed development that are unable to be mitigated from a moderate to low risk rating of impacting on the surrounding watercourses. Thus, in terms of Section 21 (c) and (i) of the NWA (Act no. 36 of 1998), the proposed development has already be authorised a WUL via a full WULL process Table 47 below is a summarized version of the DWS RAM (DWS, 2016) for the proposed development.

Table 47: Evaluation of potential impacts of the proposed development on the surrounding watercourses (Presented in a summarised DWS RAM)

Nr.	Phases	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Control Measures	Risk Rating Post Mitigation	Type Watercourse
1	Pre-C	Establishment of a construction site camps and erection of ablution facilities within a previously disturbed area.	Increase in surface-area of hardened surfaces	Potential encroachment by AIPs; Potential destruction of native and/or indigenous plant species in the catchment; Disruption to soil profile and consequent creation of excess sediment in the catchment; Compaction of the soil profile in the catchment; Potential alteration to the physcio-chemical properties of the downstream watercourses due to input of foreign material and excess sediment from catchment; Potential pollution of groundwater and surrounding watercourses if erected ablution facilities are poorly maintained.	1,375	3,375	**9**	**30,375**	Low		Negligible	**FP03 UVB04**
	Pre-C		Clearing and grubbing		1,375	4,375	**9**	**39,375**	Low		Negligible	
	Pre-C & C		Potential application of herbicide to clear land		1,4375	4,4375	**9**	**39,9375**	Low		Negligible	
2	Pre-C	Establishment of temporary site camps for the material laydown area, site office and concrete coating area and stringing yard.	Increase in surface-area of hardened surfaces	Potential encroachment by AIPs; Potential destruction of native and/or indigenous plant species within FP03; Disruption to soil profile and consequent creation of excess sediment; Compaction of the soil profile within FP03; Potential alteration to the physcio-chemical properties of FP03 due to input of foreign material and excess sediment; Potential creation and exacerbation of erosional and depositional features.	3	7	**11**	**77**	Moderate	All areas in which erosional and depositional features have formed must be reinstated to its natural condition. Temporary access roads must be reinstated to the natural environmental condition. AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils exist must be re-vegetated with indigenous vegetation native to that area. The drafted Wetland Rehabilitation and Monitoring Plan (T4-WRP-RB, Oct 2022) must be implemented and followed in order to reinstate the areas that will be disturbed.	Low	**FP03 UVB04**
	Pre-C		Clearing and grubbing		3	7	**11**	**77**	Moderate		Low	
	Pre-C		Access roads and stringing yards		3,125	7,125	**11**	**78,375**	Moderate		Low	
3	Pre-C & C	Demarcation of buffer zones and no-go areas and the allocation/preparation of spoil sites (topsoil separate from subsoil), waste dump sites and construction vehicle routes	Erection of silt fencing around all waste dumps and downslope of watercourses (including coverage sails).	Disruption of the soil profile and thus creation of excess sediment in the catchment; The potential increase of preferential drainage parts as a result of construction vehicles creating unauthorised	1	3	**8**	**24**	Low		Negligible	**All at risk watercourses**

	Pre-C & C		The dumping of waste and spoil at the designated sites using haulage routes	pathways; Compaction of topsoil as a result of construction vehicles baring excess weight on soil; Removed topsoil and subsoil which will be utilised for rehabilitation purposes contaminated by AIPs and loss due to natural wind mechanism.	1,75	5,25	**8**	**42**	Low		Negligible	
	Pre-C & C		Input of dropper, or wooden poles to extend danger tape on, or paint poles		1	3	**8**	**24**	Low		Negligible	
4	Pre-C & C	Construction vehicle movement throughout the lifespan of the proposed development.	Movement of construction vehicles over loose soil particles.	Increased surface runoff and reduction in soil infiltration/permeability; Potential increase in risk of contamination of watercourses due to oil leakages from construction vehicles; Compaction of topsoil by construction vehicles within watercourses; Potential creation of preferential drainage paths by construction vehicles coupled with heavy rainfall events; Potential increase in opportunity for erosional and depositional features to form; Potential for AIP to encroach if not maintained.	1,625	4,625	**9**	**41,625**	Low		Negligible	**All at risk watercourses**
	Pre-C & C		Different soil structures baring excess weight of the large construction vehicles.		2,75	5,75	**9**	**51,75**	Low		Negligible	
	Pre-C & C		Accidental spills (e.g. hydrocarbons, chemicals, oil).		2,75	5,75	**9**	**51,75**	Low		Negligible	
	Pre-C & C		Movement of vehicles and large construction vehicles on watercourses		3	6	**10**	**60**	Moderate	Limit the movement of heavy construction vehicles on access roads created in wetland environments. All temporary access roads created for vehicular movement must be reinstated to natural environmental condition. Any erosional and depositional features must be reinstated and removed, respectively, especially from wetland environments. AIP must be removed during the constructional and operational phases of project. Areas where bare ground exist, must be re-vegetated with indigenous vegetation native to the area.	Low	
5	Pre-C & C	Direct destruction of vegetation and topsoil layer within the footprint of the Overhead Powerlines and temporary material laydown area, site office and concrete coating area and stringing yard.	Loss of biodiversity within the site and disruption and/or destruction of faunal habitats.	Disruption of the soil profile and thus potential sedimentation of watercourse; Increased risk of erosion due to exposure of bare-ground and reduced soil cohesion; Reduction in infiltration and increased risk of gully and rill erosion within watercourse; Fatality of in-situ sedentary organism unable to relocate; Potential relocation of	3	7	**10**	**70**	Moderate	All areas in which erosional and depositional features have formed must be reinstated to its natural condition. Temporary access roads must be reinstated to the natural environmental condition. AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils exist must be re-vegetated with indigenous vegetation native to that area. The drafted Wetland Rehabilitation and Monitoring Plan (T4-WRP-RB, Oct 2022) must be implemented and followed in order to reinstate the areas that will be disturbed.	Low	**All at risk watercourses**
	Pre-C & C		Reduction of groundcover and increased surface-area of exposed bare-ground and impermeable-surfaces.		3	7	**9**	**63**	Moderate		Low	

	Pre-C & C		Reducing the soil cohesion created by the plant roots.	faunal species unable to stand disturbances of the area; Potential increase in proliferation of AIPs	2,75	6,75	**9,5**	**64,125**	Moderate		Low	
6	Pre C & C	Construction of the 132kV Overhead Monopole and Switching Station	Setup a concrete batch plant onsite (if contractor does not utilise a commercial ready mix concrete supplier)	Potential contamination of the surrounding terrestrial by concrete mix or hydrocarbons; Potential sedimentation of down slope watercourses; Increased hardened surfaces and thus higher energy surface and stormwater runoff into the down slope watercourses; Loss of habitat for species within watercourses and surrounding catchment; Potential contamination of sediment and groundwater due to continuous cement spills and poor construction ethics. Potential diversion of the natural flow of water during rainfall events. Potential loss of water being transported to downstream watercourses.	1,75	3,75	**9**	**33,75**	Low		Negligible	
	C		Piling and creation of footings (depending on soil baring capacity) (Preferred Route)		2,5	7,5	**10**	**75**	Moderate	Existing access roads and areas where existing overhead powerlines have been built must be utilised, only those areas that do not have existing linear infrastructure can be disturbed for the newly introduced overhead powerlines. The use of heavy construction vehicles within a wetland must not occur where possible. If usage of heavy construction vehicles is required in wetlands wooden planks must be placed in wetland area first and heavy construction vehicles to only drive on these planks. All excavated topsoil and subsoil from the wetland must be stockpiled separately and reinstated in the order of subsoil and topsoil once construction activities are completed. Stockpiled wetland subsoil and topsoil must not contain any AIPs when being reinstated. All areas in which erosional and depositional features have formed must be reinstated to its natural condition. Temporary access roads must be reinstated to the natural environmental condition. AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils exist must be re-vegetated with indigenous vegetation native to that area. The drafted Wetland Rehabilitation and Monitoring Plan (T4-WRP-RB, Oct 2022) must be implemented and followed in order to reinstate the areas that will be disturbed.	Low	**All at risk watercourses**
	C		Piling and creation of footings (depending on soil baring capacity) (Alternative Route)		5	12	**12**	**144**	Moderate	The Wetland Ecologist does not support this route.	Moderate	

	C		Excavation and trenching for concrete bases (Preferred Alternative)			2,75		7,75		**10**	**77,5**	Moderate	The use of heavy construction vehicles within a wetland must not occur where possible. If usage of heavy construction vehicles is required in wetlands wooden planks must be placed in wetland area first and heavy construction vehicles to only drive on these planks All excavated topsoil and subsoil from the wetland must be stockpiled separately and reinstated in the order of subsoil and topsoil once construction activities are completed. Stockpiled wetland subsoil and topsoil must not contain any AIPs when being reinstated. All areas in which erosional and depositional features have formed must be reinstated to its natural condition. Temporary access roads must be reinstated to the natural environmental condition. AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils exist must be re-vegetated with indigenous vegetation native to that area. The drafted Wetland Rehabilitation and Monitoring Plan (T4-WRP-RB, Oct 2022) must be implemented and followed in order to reinstate the areas that will be disturbed.	Low	
	C		Excavation and trenching for concrete bases (Alterative Route)			5		12		**12**	**144**	Moderate	The Wetland Ecologist does not support this route.	Moderate	
	C		Construction of steel sections and plates (Preferred Route)			2,5		7,5		**10**	**75**	Moderate	Existing access roads and areas where existing overhead powerlines have been built must be utilised, only those areas that do not have existing linear infrastructure can be disturbed for the newly introduced overhead powerlines. The welding of the steel sections must be conducted of site and brought just to assemble on site. The use of heavy construction vehicles within a wetland must not occur where possible. If usage of heavy construction vehicles is required in wetlands wooden planks must be placed in wetland area first and heavy construction vehicles to only drive on these planks AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils exist must be re-vegetated with indigenous vegetation native to that area. The drafted Wetland Rehabilitation and Monitoring Plan (T4-WRP-RB, Oct 2022) must be implemented and followed in order to reinstate the areas that will be disturbed.	Low	

	C		Construction of steel sections and plates (Alternative Route)		3,875	9,875	**11**	**108,625**	Moderate	The Wetland Ecologist does not support this route.	Moderate	
	C		Construction of circuits required for overhead powerlines (Preferred Route)		2,25	7,25	**10**	**72,5**	Moderate	Existing access roads and areas where existing overhead powerlines have been built must be utilised, only those areas that do not have existing linear infrastructure can be disturbed for the newly introduced overhead powerlines. The use of heavy construction vehicles within a wetland must not occur where possible. AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils exist must be re-vegetated with indigenous vegetation native to that area. The drafted Wetland Rehabilitation and Monitoring Plan (T4-WRP-RB, Oct 2022) must be implemented and followed in order to reinstate the areas that will be disturbed.A Wetland Rehabilitation and Monitoring Plan must be drafted and followed in order to reinstate the area to be disturbed.	Low	
	C		Construction of circuits required for overhead powerlines (Alternative Route)		2,75	7,75	**11**	**85,25**	Moderate	The Wetland Ecologist does not support this route.	Moderate	
	C		Hardened surfaces in the catchment for switching station and associated infrastructure		2	7	**10**	**70**	Moderate	Existing access roads and areas that have been previously disturbed must be utilised for access to the site where the switching station will exist. AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils exist must be re-vegetated with indigenous vegetation native to that area.	Low	
												,
7	C	Construction and installation of the gas pipeline	Pipeline assembly and welding in stringing yard	Potential sedimentation of down slope watercourses; Increased hardened surfaces and thus	2,5	6,5	**10**	**65**	Moderate	The use of heavy construction vehicles within a wetland must not occur where possible. All excavated topsoil and subsoil from the wetland must be stockpiled separately and	Low	**FP03**

	C		Pipeline installation	higher energy surface and stormwater runoff into the down slope watercourses; Loss of habitat for species within watercourses and surrounding catchment; Potential contamination of sediment and groundwater due to continuous cement spills and poor construction ethics. Potential diversion of the natural flow of water during rainfall events. Potential loss of water being transported to downstream watercourses.	2,75	6,75	**11**	**74,25**	Moderate	reinstated in the order of subsoil and topsoil once construction activities are completed. Stockpiled wetland subsoil and topsoil must not contain any AIPs when being reinstated. All areas in which erosional and depositional features have formed must be reinstated to its natural condition. Temporary access roads must be reinstated to the natural environmental condition. AIP encroachment must be controlled as per the Wetland Rehabilitation and Monitoring Plan. Areas where bare soils exist must be re-vegetated with indigenous vegetation native to that area. The drafted Wetland Rehabilitation and Monitoring Plan (T4-WRP-RB, Oct 2022) must be implemented and followed in order to reinstate the areas that will be disturbed.	Low	
8	R	De-establishment of the site camp, spoil sites, waste dumps and the rehabilitation of the temporary access/haulage roads.	Tillage of areas of bare-soil and revegetation using a mixture of indigenous species typical of the area	**Positive impacts**: Increase surface roughness and reduce the velocity of the surface runoff; Decrease erosion potential; Increase biodiversity; Remove all potential contaminants; Reinstate natural topography.	1	3	**4**	**12**	Low		Negligible	**All at risk watercourses**
	R		Reshape local topography to natural slope if necessary.		1	3	**4**	**12**	Low		Negligible	
9	O	Utilisation of the Overhead Powerlines and Switching Station	Increased risk of pollution and change in watercourse characteristics (Preferred Route)	Removal of vegetation cover and loss of biodiversity; Partial destruction of aquatic and terrestrial habitats and potential loss of faunal species; Soil compaction and thus increased surface runoff and decreased infiltration/permeability; Increased friction against rainfall and surface runoff with the addition of vegetation; Increased opportunity for groundwater and watercourse contamination as a result of leaks from construction vehicles; Increased potential of erosional features if temporally cleared areas are not rehabilitated.	2,25	7,25	**11**	**79,75**	Moderate	Ensure that all areas that have been disturbed in the catchment are adequately rehabilitated. No bare-ground areas should exist after construction. Areas where erosional features have formed (gully or rill erosion) should be reinstated with relevant topsoil immediate and re-vegetated initially with a fast-growing indigenous grass native to the area and thereafter replaced with a similar vegetation type of the area. Areas where sedimentation has occurred must be immediately removed to ensure no drowning of indigenous vegetation and opportunity for AIPs to proliferate. AIPs within the area must be removed and replaced with indigenous vegetation native to the area. The potential residual impact assessment with the proposed development were considered to be Low, should the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) be strictly implemented and subsequently monitored onsite. However, in implementing the precautionary approach, it is	Low	**All at risk watercourses**

											recommended that potential residual impacts, especially with regard to FP03/Transformed Swamp Forest, be monitored biannually by an environmental consultant and reported to competent authority and KSA.	
	O		Increased risk of pollution and change in watercourse characteristics (Alternative Route)		4	11	**13**	**143**	Moderate	The Wetland Ecologist does not support this route.	Moderate	
			Increased risk of vehicles creating unauthorised tracks during repairs (Preferred Route)		2	7	**10**	**70**	Moderate	Ensure that all areas that have been disturbed in the catchment are adequately rehabilitated. No bare-ground areas should exist after construction. Areas where erosional features have formed (gully or rill erosion) should be reinstated with relevant topsoil immediate and re-vegetated initially with a fast-growing indigenous grass native to the area and thereafter replaced with a similar vegetation type of the area. Areas where sedimentation has occurred must be immediately removed to ensure no drowning of indigenous vegetation and opportunity for AIPs to proliferate. AIPs within the area must be removed and replaced with indigenous vegetation native to the area.	Low	
	O		Increased risk of vehicles creating unauthorised tracks during repairs (Alternative Route)		3,5	10,5	**12**	**126**	Moderate	The Wetland Ecologist does not support this route.	Moderate	

12. MITIGATION MEASURES

The mitigation of negative impacts on biodiversity and ecosystem goods and services is a legal requirement for authorisation purposes and must take on different forms depending on the significance of the impact and the specific area being affected. Mitigation requires proactive planning that is enabled through a mitigation hierarchy (Figure 24). Its application is intended to strive to first avoid disturbance of ecosystems and loss of biodiversity, and where this cannot be avoided altogether, to minimise, rehabilitate, and then finally offset any remaining significant residual negative impacts on biodiversity (DEA, 2013).

The proposed development takes into consideration the principle of 'avoidance or prevent' by not supporting the transmission line alternative route by avoiding impacts to sensitive FP01, FP02 and CVB01 through the selection of the preferred route.

The proposed development also takes into consideration the 'minimise' principle by utilising preferred technology such as monopole infrastructure for the evacuation of power. This reduces the individual footprints within the wetland. Various mitigations are provided for inclusion into the EMPr to minimise potential impacts to the wetlands

The tier chosen for the proposed development is 'rehabilitate'. This is due to the proposed development traversing certain portions of wetland environments and temporary disturbing certain portions of the wetland systems (e.g. temporary laydown areas). In order to mitigate these impacts, the mitigation measures provided in this report, along with the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) must be implemented. However, it must be noted that although the preferred route is indicated as a continued red polygon, there are various areas within these that have been heavily impacted, degraded and infilled from dredging and other existing levelling activities. The preferred route is maximising the use of these areas to avoid impacts to the undisturbed portions of the wetland

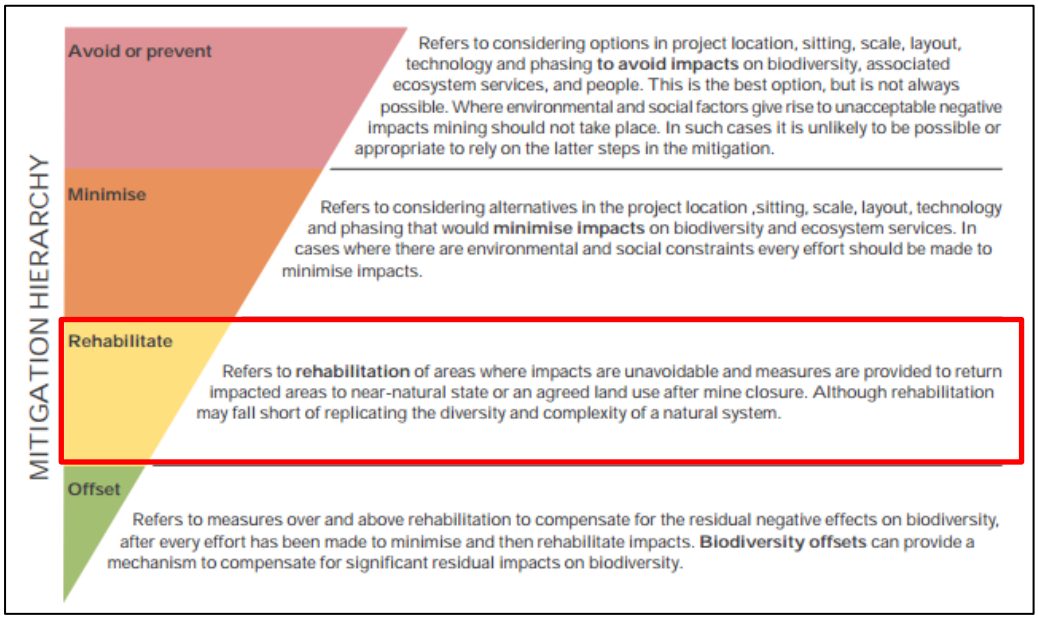


Figure 24: The mitigation hierarchy for dealing with negative impacts on biodiversity. Its application is intended to require companies to first strive to avoid disturbance of ecosystems and loss of biodiversity, and where they cannot be avoided altogether, to minimise, rehabilitate or offset any residual negative impacts on biodiversity (DEA, 2013).

12.1. Pre-construction Mitigation Measures

Table 48: Pre-Construction phase mitigation measures.

MITIGATIVE MEASURES	PHASE OF PROPOSED DEVELOPMENT - PRE-CONSTRUCTION
Generic/Broad	- The footprint of the all laydown areas and the construction footprint must be kept to a minimum, to ensure there is no unnecessary intrusion into any watercourses. - All access points, roads and turning areas as per authorised footprint must be agreed by the engineer and Environmental Control Officer (ECO) prior to commencement of construction. No ad hoc haulage roads or turning areas may be created. - Stockpile areas of raw materials and other construction material must be clearly identified and demarcated prior to materials being brought onto site. None of these areas must be on or near slopes. All stockpiling areas must be approved by the ECO before stockpiling occurs. - Detailed planning, positioning and demarcation of onsite waste dump sites must be completed prior to any waste handling occurring (this includes rubbish). All onsite personal must also be trained in proper waste management techniques and shown the appropriate waste dumps for specific materials prior to any construction activities occurring (including site establishment). - The contractor must utilize a Stormwater Management Plan (which may form part of the construction method statement) to ensure that all construction activities do not cause, or precipitate, soil erosion which may result in sediment input into the surrounding environment. The designated responsible person on site, as indicated in the stormwater control plan (Site Manager) must ensure that no construction work takes place before the stormwater control measures are in place and must include post-construction/operational phase stormwater requirements. - Soft engineering (grassed swales (Teff Grass or Red Grass ideal for this climate)) instead of hard gutters should be used where possible. - All staff are to be trained on their environmental responsibilities before commencing work. All new staff are to be trained before they start work on site. This should be adequately covered within the site-specific EMPr and should not require input from a wetland assessment (above what is detailed within this report). - No-go areas must be determined and demarcated and agreed upon by contractors, engineers and ECO before any construction activities occur onsite. Special attention must be given to the identified wetland systems (and their associated buffers) in the vicinity of the development activities. Unnecessary intrusion into these systems is prohibited and only those that are authorized should be conducted. These areas must be clearly demarcated onsite and indicated to all construction workers onsite before any construction activities (including site establishment) takes place. Where intrusion is required, the working corridor must be kept to a minimum and identified and demarcated clearly before any construction commences to minimize the impact. Wetland areas that should not be accessed are FP01, FP02 and CVB01.
Site/Project Specific	- Existing access/haulage routes must be utilised during construction as far as possible. - Crossing structures utilised be wide enough to allow diffuse, unhindered through-flow of the wetland systems and avoid impoundment upslope.

12.2. Construction Mitigation Measures

Table 49: Construction Phase Mitigation Measures

MITIGATIVE MEASURES	PHASE OF PROPOSED DEVELOPMENT - CONSTRUCTION
Generic/Broad	- A construction method statement is required to be compiled by the applicant/contractor for all activities associated with the proposed development. This method statement must include the phases of the project, activities associated with the construction and all mitigation measures stipulated within this report and the site-specific EMPr. The applicant, engineer, contractor and ECO must agree and approve the statement as this will become a binding document which must be implemented onsite. The independent ECO must monitor that this document is continuously implemented onsite to ensure no unnecessary disturbance. - A serial plan of construction must be developed: • Construction must be immediately followed by rehabilitation; • Excavation of any soils in the wetland system must be done to allow the storage of soil in sequence; • Soil replacement must be conducted in same sequence as excavated; • Soil surfaces must not be left open for lengthy periods to prevent erosion. • Affected surface vegetation must be removed, appropriately stored then reinstated, immediately post-construction, as close to their original position as possible, to reduce the possibility of longer-term change to the vegetation community. The vegetation must be removed keeping the root systems intact as far as possible. • If required vegetation plugs can be sorted from areas adjacent to the construction site, under the supervision of the Environmental Control Officer or appointed landscaper. - Environmental inductions and training must include the contents of the above method statement. - During the necessary removal of the natural vegetation for the development of the associated infrastructure (e.g. site camp, access roads) any protected species which are recorded must be safely relocated to an adequate habitat within the same catchment area. An independent botanist must be consulted during this process. - Excess dust observed in the vicinity of the proposed development must be noted and the appropriate dust suppression techniques implemented to ensure no excess sediment input into the surrounding wetlands. - Cut and fill must be avoided where possible during the set-up of the construction camp. The utilization of the already heavily disturbed areas should be encouraged. - Removal of vegetation must only be done when essential for the proposed development. Do not allow any disturbance to the adjoining natural vegetation cover or soils. All disturbed areas must be prepared and then re-vegetated to the satisfaction of the ECO. - Where feasible, construction activities should be conducted during the drier months of the year (April – August) to minimize the possibility of erosion, sedimentation and transport of suspended solids associated with disturbed areas and rainfall events. No construction activities must be conducted during storm events. - All potential stormwater contaminants must be bunded in the site camp to prevent run-off into the surrounding environment. A drainage system must be established for the construction camp. The drainage system must be regularly checked to ensure an unobstructed water flow.

	- Establish cut off drains and berms to reduce stormwater flow through the construction site. - The contractor must prepare a Stormwater Control Plan (which may form part of the construction method statement) to ensure that all construction activities do not cause, or precipitate, soil erosion sediment which may result in sediment input into the surrounding environment. - The designated responsible person on site, as indicated in the stormwater control plan (Site Manager) must ensure that no construction work takes place before the stormwater control measures are in place and must include post-construction/operational phase stormwater requirements. - No contaminated runoff or grey water is allowed to be discharged from the construction camp. - The demarcated wetlands systems must be protected from erosion and direct or indirect spills of pollutants, e.g. sediment, refuse, sewage, cement, oils, fuels, chemicals and wastewater. - All exposed surfaces within the construction site must be checked for AIPs monthly and any identified alien species must be removed by hand pulling/uprooting and appropriately disposed of. Herbicides should **only** be utilised where manually removing is not possible. Herbicides utilised are restricted to products which have been certified safe for use in wetland areas by an independent testing authority. The ECO must be consulted before the purchase of any herbicide. - Stockpiles and topsoil storage areas must not be located within the wetlands and/or riverine channels or within the 1:100-year flood lines. The furthest threshold must be adhered to. Stockpiles should not be placed in vegetated areas that will not be cleared. Stockpile areas can be placed in the proposed material laydown area. - Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles. - Water used on site must be from an approved source. - The digging of pit latrines is not allowed under any circumstances. - None of the open areas or the surrounding environment may be used as ablution facilities. - Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes. - Hazardous material must be stored in designated areas with adequate pollution prevention. Hazardous material should be stored at the material laydown area which does not fall within a delineated wetland. Should any spills of hazardous materials occur on the site or in the storage area, the relevant clean-up specialists must be contacted immediately. Materials that absorb fuel & oil, such as spill kits or earth should be placed over the spill. This contaminated material must be uplifted, placed within impermeable container and disposed of at a recognized disposal site. - In the event of a spillage that cannot be contained and which poses a serious threat to the local environment, the following Departments must be informed of the incident in accordance with Section 30 of the National Environmental Management Act, Act 107 of 1998, within forty-eight (48) hours: • The Local Authority; • DWS; • The Department of Economic Development, Tourism and Environmental Affairs • The Local Fire Department when relevant; and • Any other affected departments.

	- An incident record must be completed for all spills that do occur onsite. Minor incidents will include small spills of less than 5 litres (L) that do not enter a watercourse, stormwater drains, housekeeping issues and general small non-compliances with the requirements of this report, method statements, EA and/or EMPr. The record of incidents is to be included in the reporting to the authorities. Major incidents must be reported to the authorities, which include spills larger than 5L and all incidents involving contamination of water resources, stormwater or other reportable incidents. **Minor incidents**: small spills less than 5L that do not enter stormwater, minor non-compliance with EMPr that does not cause major environmental impact i.e. Housekeeping issues. **Action**: Supervisor and staff on site to record and address and notify ECO. ECO to advise on remediation measures and to follow up on actions taken to address incident. **Records**: On site incident register. **Major incidents**: Large spills or any spills that enter watercourses, stormwater, contamination of soil, fires, explosions. **Action**: Report immediately to ECO, action to be taken to prevent further damage and incident to be reported to authorities. ECO to advise on remediation measures and to follow up on actions taken to address incident. **Records**: On site incident register and report to authorities as listed above. - The harvesting of firewood, medicinal plants, tree bark, flowers or other natural materials is forbidden on the site and surrounding environment. - The Contractor must, as an initial and on-going exercise, implement erosion and sedimentation control measures (e.g. sediment capture/silt fences) to the satisfaction of the ECO. Stabilisation of cleared areas to prevent and control erosion and/or sedimentation must be actively managed. - Sediment control: construct silt fences/traps in areas prone to erosion, to retain sediment-laden runoff. (i.e. place silt traps strategically on the periphery of freshwater resources, remove sediment on a regular basis (weekly) and transport to designated dumping site, ensure silt fences/traps are adequately maintained). - A designated waste area, which must be located outside of the wetland constructional buffer and the 1:100 year floodline, must be utilised at all times. Bins must be provided and emptied at no less than monthly intervals. The material laydown and site office can be utilised for this activity. - All solid waste generated during the construction process (including packets, plastic, rubble, cut plant material, waste metals) must be placed in the waste collection area in the construction camp and must not be allowed to blow around the site, be accessible by animals, or be placed in piles adjacent the skips / bins. - Burying of waste, rubble on site, or dumping in drainage lines/rivers is strictly prohibited.
Site/Project Specific	- The impoundment of water upslope due to the proposed development must be avoided. This is specifically relevant at the points where the proposed development will cross wetlands as per the current design (preferred alternative) and following wetlands: FP03 and UVB04. - Silt traps must be erected around all excavation, dumping and/or infill activity which may take place at the proposed development which are given authorization to be utilised to reduce the siltation to the downstream wetlands. Furthermore, dust suppression techniques must be applied on all access/haulage roads to reduce dust contamination of the wetlands. - Silt traps must be erected at the base of the slopes leading into the downstream wetlands and around all site camps, spill sites, access roads and temporary structures. Removal of sediment from the erected silt traps must take place on a weekly basis. - Erosion and sedimentation must be monitored closely. After every heavy rainfall event, the contractor and ECO must check the site for erosional damage and rehabilitation must occur immediately if damage is found. - During the period when heavy machinery (e.g. Tractor Loaded Backhoe (TLB), truck, that will need to traverse the wetlands must do so cautiously to avoid any unnecessary damage to the vegetation. This will minimize the disturbance of the soil profile and the land cover. However, this should be avoided if possible to ensure the functionality and integrity of the wetlands are kept intact.

	- Topsoil and subsoil which is excavated from the terrestrial and wetland areas must be stockpiled with the topsoil separate from the subsoil and preserved for future rehabilitation. Cleared vegetation and soils which will not be utilised for rehabilitation purposes must be disposed of at a registered waste disposal facility. Stockpiles must be seeded with indigenous grasses or stabilised with geotextiles to reduce erosion potential. - All areas of loose sand, which are prone to wind erosion must be sprayed with water or other dust suppression techniques.

12.3. Post Construction/Rehabilitation Phase

Table 50: Post-construction/rehabilitation phase measures

MITIGATIVE MEASURES	PHASE OF PROPOSED DEVELOPMENT - POST-CONSTRUCTION/REHABILITATION
Generic/Broad	- Rehabilitation is not the static endpoint of a recipe-like process (Kusler & Kentula, 1990). Rather, it is a process in its own right, whereby the wetland/riverine system is given an opportunity for a new beginning (Grenfell, *et. al*., 2007). - Rehabilitation requires that there is an attempt to imitate natural processes and reinstate natural ecological driving forces in such a way that it aids the recovery (or maintenance) of dynamic systems so that, although they are unlikely to be identical to their natural counterparts, they will be comparable in critical ways so as to function similarly (Jordan, et. al., 1987). - It must be recognised that rehabilitation interventions may have different ecological starting points (ranging from totally degraded to slightly degraded) and different goal endpoints (ranging from a state that is close to the pristine to one which is still far from pristine, but nonetheless an improvement on the state of the system without any rehabilitation intervention). The chosen goal endpoint depends on what is achievable, given the site conditions, and those ecosystem attributes and services that are considered most important. Any rehabilitation project should therefore be based on an understanding of both the ecological starting point and on a defined goal endpoint, and should accept that it is not possible to predict exactly how the wetland/riparian system is likely to respond to the rehabilitation interventions. - The most typical rehabilitation interventions designed to assist in the recovery of degraded wetland ecosystems are 'plugs'. The 'plugs' are placed with the intention of reinstating a more natural hydrology. Typical interventions for maintaining the health wetland ecosystems that are in the process of degrading are the placement of erosion control structures which assist in halting the advance through a wetland of an erosion headcut. However, rehabilitation is not confined to physical structures, and rehabilitation may include interventions such as reducing livestock grazing-pressure or reducing the frequency of burning. - All post-construction building material and waste must be cleared in accordance with the EMPr, before any re-vegetation may take place. - Erosion features that have developed as a result of construction related disturbance are required to be stabilised. This may also include the need to deactivate any erosion head cuts/rills/gullies that may have developed by either compacted soil infill, rock plugs, gabions or any other suitable measures. - If the gradient of the banks is greater than 1:1.75, the banks must be stabilised with a biodegradable cover such as Geojute which must be secured to the steep slope with wooden (biodegradable) pegs. This will reduce soil erosion potential.

	- Any areas, which fall outside the direct construction footprint, that have been compacted are required to be ripped to allow for the establishment of vegetation. This ripping must not result in the mixing of sub - and topsoil. - No imported soil material may be utilised for rehabilitation, unless it can be ensured that it is free of any AIPs seeds. - Before adding the topsoil weeds and AIPs must be removed. - Additional stabilisation of cleared areas to prevent and control erosion must be actively managed. The method of stabilisation should be determined in consultation with the ECO and engineer. The following methods (or a combination) may be considered, depending on the specific conditions of the site: • Brush packing • Mulch or chip cover • Terracing • Straw stabilising (at the rate of one bale/m² and rotated into the top 100mm of the completed earthworks) • Watering • Planting / sodding • Hand-seeding / Hydro-seeding • Mechanical cover or packing structures (Geofabric, Hessian cover, Armourflex, Log / pole fencing) - The landscape architect/horticulturist must supervise the handling, maintenance and planting of the plant/trees. No trees must be planted within the authorised/agreed transmission servitudes. - No AIPs may be utilised during the rehabilitation process. - Rapidly germinating indigenous species (e.g. fast growing, deep rooting, rhizomatous, stoloniferous) known to bind soils in terrestrial, riparian and/or wetland areas must be utilised where there is a strong motivation for stabilisation over reinstating similar plant communities to that being disturbed. This should be informed by a qualified specialist. - Exposure of plant root systems to drying winds, high temperatures or water logging must be avoided. - Where possible, revegetation must take place at the start of the spring rains to maximise water availability and minimise the need for irrigation. This will ensure optimal conditions for germination and rapid vegetation establishment. If not possible during the correct season, revegetation can start immediately with regular irrigation to assist with revegetation growth, under the guidance of a qualified horticulturist. - If this is not possible, irrigation of planted areas may be necessary during dry periods (external sources of water must be utilised e.g. Joe-Joe tanks). - Water utilised for irrigation must be free of any chlorine or contaminants that may negatively affect the plant species. - The use of irrigation may be halted where hydro-seeding shall be utilised, until seeds have germinated and growth has commenced. - It is the contractor's responsibility to continuously monitor the area for AIPs during the contract and establishment period, and any AIPs encountered must be removed. - Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas. - AIPs shall not be stockpiled, they should be removed from site and dumped at an approved site. - Any use of herbicides in removing alien plant species is required to be investigated by the ECO before use, for the necessity, type proposed to be used, effectiveness and impacts of the product on aquatic biota.

Site/Project Specific	- Rehabilitation must commence immediately or within 30 days from the period when the construction phase has ended. - All alternative tracks and footpaths created during the construction phase should be appropriately rehabilitated (e.g. tillage and re-vegetation of the affected areas). This rehabilitation should result in improved surface roughness and increased infiltration along with reduced stormwater flow and consequently reduced rill erosion. - Any unauthorised haulage or access roads which were created must be decommissioned and rehabilitation to reinstate the natural vegetation, increase the surface roughness and resultantly increase infiltration (e.g. tillage and revegetation). - All construction waste materials must be removed, and temporary structures (e.g. offices, workshops, storage containers, ablution facilities) dismantled, from site and the surrounding environment, this will need to be checked by the ECO and the various contractors. - The reinstatement of the longitudinal bank profiles, which have been altered, must be rehabilitated if possible. The soil horizons must be reinstated on the correct structural order and the vegetation groundcover over the disturbed area re-vegetated according to the native indigenous species within the area. - AIPs must be removed manually without further disturbance to the surrounding ecosystems. If manual removal is not possible, seek guidance from a local cooperative extension service or Working for Water. - Rehabilitation of the sections where AIPs are removed must take place. The appropriate indigenous grass and woody vegetation species seeds must be attained from a registered nursery with the guidance of a botanist (Plant species lists can be sourced from the Ecological Impact Assessment and Estuarine Impact Assessment).

12.4. Operation Phase

Table 51: Operational phase mitigation measures

MITIGATIVE MEASURES	PHASE OF PROPOSED DEVELOPMENT - OPERATIONAL
Generic (Broad)	- The establishment and infestation of AIPs must be prevented, managed and eradicated in the areas impacted upon by the proposed construction activities by a horticulturist for the period stipulated in the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022). The type of species and location of that species will determine the type of methodology required for its management and eradication. This methodology should target all lifecycle phases and propagules of the specific species, e.g. seedlings/saplings, seeds, roots. - Indigenous vegetation within the site must not be removed or damaged, where possible, during the alien plant control, increasing the probability of indigenous species propagating and preventing the re-establishment of alien species. - As stated above, any use of herbicides in removing alien plant species is required to be investigated by the ECO before use, for the necessity, type proposed to be used, effectiveness and impacts of the product on aquatic biota.
Site/Project Specific	- The monitoring of the overhead powerlines and associated infrastructure (e.g: foundation) must be conducted on a bi-annual basis to ensure that structural faults do not result in the unnecessary contamination of the wetlands and downstream wetlands. - Additional monitoring is required as per the monitoring requirements (Section 12) below.

13. MONITORING REQUIREMENTS

The monitoring of the proposed development is essential to maintain and/or improve the PES of the surrounding wetland/riverine systems. The mitigative recommendations stated above must be incorporated into the project-specific EMPr and compliance with the requirements/recommendations must be audited by a suitability qualified independent ECO. The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. Monitoring for non-compliance must be undertaken on a daily basis during the construction phase by the contractors under the guidance of the Project Manager / ECO / Engineer. An appropriately timed audit report should be compiled by the independent ECO. Paramount to the reporting of non-conformance and incidents is that appropriate corrective and preventative action plans are developed and adhered to. Photographic records of all incidents and non-conformances must be retained. This is to ensure that the key impacts on the watercourses are adequately managed and mitigated against and that the rehabilitation of any disturbed areas within any system is successful.

- A monitoring programme must be in place not only to ensure compliance with the EMPr throughout the construction phase, but also to monitor any post-construction environmental issues and impacts during the vegetation establishment phase. Compliance against the EMPr must be monitored during the construction phase monthly by an independent ECO. The period and frequency of monitoring required post-construction must be determined by the competent authorities or from ESKOM generic documentation and implemented by the ECO. Once the initial transplants / plugs are planted, the landscaper must conduct weekly site visits to remove AIPs (in accordance with the latest revised NEM:BA requirements) and address any re-vegetation concerns until re-vegetation is considered successful (i.e. >80% indigenous cover). An accepted monitoring period of re-vegetated areas after this initial period is monitoring every 3 months for the first 12 months and every 6 months thereafter until the vegetation has successfully been established. If the re-vegetated areas have inadequate surface coverage (less than 30% within 9 months after re-vegetation) the area should be prepared and re-vegetated again.
- The cost-effective qualitative monitoring of the rehabilitation area may be time based through the use of periodic photographs taken from permanent photo points. These points are required to be established during site inception. The timeline created between the pre- and post-rehabilitation photos will provide an invaluable visual representation of the progress that is conveyed in a straightforward manner. The photographer should be an environmental scientist therefore allowing an expert assessment of the site adding to the qualitative information gathered from the photographs.
- The below mentioned criteria must be adhered to, ensuring the quality of the information collected:
    - Establishment of the photo points must be completed during site inception/establishment. This will allow for pre-rehabilitation imagery spanning more than a once off photograph.
    - These points should be permanently marked and assigned a unique identify number to ensure continual relocation and accuracy of the photographs. GPS co-ordinates should be recorded of each site. This is to ensure if any markers are removed or vandalised then they can be replaced.
    - Photo point locations should be easily relocated and accessible and must not be obscured by future vegetation growth.
    - The level of detail captured must be appropriate to the area that has undergone rehabilitation.
    - Photo record forms must be developed and utilised for every photo taken. The information required will be project name, location, unique identity number, directional point (e.g. North, South), date, time, photographers name and additional comments.
    - Qualitative ecological information that must be visually interpreted and recorded at the same time as taking the photograph include:
        - Evidence of any channelling.
        - Extent of the site vegetation ground cover.
        - General level of plant growth, substrate levels, and water levels.
        - General observations of water quality such as clarity and presence of litter.
        - Evidence of anthropogenic presence
        - Vegetation condition, extent of AIPs; and

- Evidence of erosion and close monitoring of the post-construction erosion-control measures which must be implemented.

This is to ensure that the key impacts on the watercourses are adequately managed and mitigated against and that rehabilitation of any disturbed areas within the system is successful.

14. POTENTIAL LICENSING REQUIREMENTS

Water uses are defined within Section 21 of NWA (Act no. 36 of 1998). These generally relate to the utilisation/removal of water (surface and ground), alterations and/or diversions of watercourses and, discharging/disposing of waste into a watercourse. The water uses under Section 21 that are associated with the proposed development are section 21 (c) and (i) as per Table 52 below.

Table 52: Section 21 Water Uses applicable to the proposed development.

SECTION 21 OF NWA	DEFINITION (DWAF 2007)	APPLICABILITY
21 (c): Impeding or diverting the flow of water in a watercourse	Causing an obstruction to the flow of water in a watercourse or diverting some or all of the flow in or from a watercourse. Impeding or diverting flow does not normally cause any loss of water, however influences the flow regime in a watercourse. Impeding or diverting structures can fully or partially extend into a river, forcing the natural flow direction to be re-directed by the structure.	The proposed development and its associated constructional activities will occur within FP03 and UVB04. Thus, this will impact directly on the natural flow regime of the wetlands.
21 (i): Altering the bed, banks, course or characteristics of a watercourse	Alteration of the course (including the beds, banks or characteristics) of a watercourse. Alteration of the course refers to any changes affecting: the energy of the watercourse; the morphology of the watercourse; the physical characteristics; the chemical characteristics; flood dynamics; and biotic components of a watercourse.	The proposed Transmission Line Preferred Route will occur within FP03 and UVB04, and occur in close proximity to UVB01. Proposed Transmission Line Alternative Route will occur within FP01, FP02 and CVB01. The proposed switching station will occur in close proximity to Seep06. Thus, due to certain wetlands being directly and indirectly impacted, this will change the morphology and other components of the wetlands.

**Any activity which triggers a water use requiring a water use licence in terms of the NWA implies that all other water uses, even those within the ambit of a General Authorisation, will need to be authorised in a single water use licence.*

According to the DWS, any structures (e.g. pipelines, roads, overhead powerlines) within a 500m radius from the boundary of a watercourse constitute a Section 21 (c) and (i) water use and as such require a WULA if the associated risks are categorised as “medium to high.” However, according to General Notice 509 (GN509, 2016) of the NWA, a GA may be acquired for the use of water in terms of Section 21 (c) and (i) within the extent of a watercourse where the Risk Class as determined by the new Risk Assessment Matrix (RAM) is “low.” The associated risk category of the proposed development was determined utilising the DWS RAM (Section 10.2) (DWS, 2016).

The proposed development was granted a WUL through a full WULA process due to certain aspects being unable to be mitigated from a moderate to low risk rating, which relates to Sections 21 (c) and (i) of the NWA (Act no. 36 of 1998). Commencing with a water use in terms of Section 21 of the NWA without prior authorisation from DWS is unlawful in terms of Section 151 of the NWA.

15. POTENTIAL WETLAND OFFSET REQUIREMENTS

In order to understand the wetland offset requirements, management objectives should be set for each of the watercourses that will be directly impacted by the proposed development in terms of their hectare equivalents. It is of the opinion of the specialist that the proposed Transmission Line Alternative Route is not supported. Thus, the proposed Transmission Line Preferred Route is supported and traversing two (2) wetlands namely; FP03 and UVB04. Thus, the management objectives of these wetlands will be determined (EKZNW comment, March 2021).

15.1. Management of Watercourses

The DWAF (2007) recommended management objectives for watercourses is generally based on PES and EIS when there is a lack of classification of a watercourses and should form an integral part of the future management of freshwater ecosystems. Utilising the PES and EIS scores, the management objectives can be determined.

Subsequent to analysis of the current state/condition (PES score) and importance (EIS score) of each system, the specific management objective for each wetland was determined. The management objectives, PES and EIS scores of wetlands (FP03 and UVB04) are presented in Table 54 and the management objectives. The objective is either to **maintain** or **improve** the current status quo of freshwater ecosystem without any further loss of integrity or functioning. The management objective of maintaining the current state of the ecosystem is further supported by the NEM:BA (Act no.10 of 2004), where the biodiversity conservation and sustainable development principle is that of no net loss of biodiversity and ecosystem processes.

15.1.1. Recommended Management Objectives

Utilising Table 53 below, and the PES and EIS scores of each wetland, the management objectives of the wetland systems which were assessed can be determined.

Table 53: Recommended management objectives for watercourses based on PES & EIS scores (DWAF 2007).

			Ecological Importance and Sensitivity (EIS)			
			Very High	High	Moderate	Low
PES	A	Pristine	A Maintain	A Maintain	A Maintain	A Maintain
	B	Natural	A Improve	A/B Improve	B Maintain	B Maintain
	C	Good	B Improve	B/C Improve	C Maintain	C Maintain
	D	Fair	C Improve	C/D Improve	D Maintain	D Maintain
	E/F	Poor	D Improve	E/F Improve	E/F Maintain	E/F Maintain

Table 54: Recommended management objectives associated with each wetland resource which will be impacted on by the proposed development.

Water Resource	Risk Category	PES Score	EIS Score	Management Objective
FP03	High	D	Moderate	D Maintain
UVB01	High	D	High	C/D Improve

15.2. Hectare Equivalents Calculation for FP03 and UVB04

In order to determine the Hectare Equivalents of FP03 and UVB04 in their current state and potential state after the proposed development, the best practice Wetland Offset guideline for South Africa was utilised (Macfarlane *et a*l., 2014). The Wetland Offset tool determined the following for FP03 and UVB04:

15.2.1. Hectare Equivalent for FP03

The Hectare Equivalent for FP03 was calculated at a site level for two of three components of the Wetland Offset Tool (Macfarlane *et al*., 2014). The components that were calculated for were "Wetland Functionality Targets and Ecosystem Conservation Targets." The Wetland Functionality Targets scored a Functional Offset Target of – 1.7. The rationale for scoring a Functional Offset Target that is negative is due to the post-development functional value (%) being higher than the prior development functional value (%). The post-development functional value (%) was assumed to be higher than the prior due to the necessity of a Wetland Rehabilitation Plan which will improve certain modules within the wetland, thus improving the overall functionality of the wetland.

Table 55: Representing the Wetland Functionality Targets for FP03

Wetland Functionality Targets			
Impact Assessment	Prior to development	Wetland size (ha)	29
		Functional v alue (%)	42
	Post development	Functional v alue (%)	46
		Change in functional v alue (%)	-4
	Key Regulating and Supporting Services Identified		flood attenuation
	Development Impact (Functional hectare equivalents)		-1,2
Offset calculation	Offset Ratios	Triggers for potential adjustment in exceptional circumstances	Wetlands providing critical flood attenuation, water quality enhancement or carbon sequestration functions
		Functional Importance Ratio	1,5
	Functional Offset Target (Functional hectare equivalents)		-1,7
Further considerations	Have other key Provisioning or Cultural Services Identified that require compensation?		No
	Additional compensatory mechanisms proposed	Rehabilitation of entire delineated HGM unit within the 500m regulated area.	

In terms of the Ecosystem Conservation Targets, the habitat intactness improves from 9.86% to 13.05%, in which the vegetation module was suggested to improve after rehabilitation. The Wetland Vegetation Group in which this wetland falls under is the Indian Ocean Coastal Belt 1 which is least threatened in terms of its ecosystem threat status and well protected in terms of its level of protection. Due to the site being historically transformed and poorly rehabilitated the Regional and National Conservation Context was of moderate importance although this wetland falls under the FEPA Wetland (Nel *et al*., 2011) and CBA irreplaceable (EKZNW, 2016) datasets, respectively. Thus, the Ecosystem Conservation Target for FP03 was calculated to be 0.0 and required no further offsetting.

Table 56: Representing the Ecosystem Conservation Targets for FP03

Ecosystem Conservation Targets				
Impact Assessment	Prior to development	Wetland size (ha)		
		Habitat intactness (%)		9,86
	Post development	Habitat intactness (%)		13,05
		Change in habitat intactness (%)		-3,19
	Development Impact (Habitat hectare equivalents)			0
Determining offset ratios	Ecosystem Status	Wetland Vegetation Group (or type based on local clasification)		Indian Ocean Coastal Belt 1
		Threat status of wetland	Threat status	LT
			Threat status Score	1
		Protection level of wetland	Protection level	Well Protected
			Protection level Score	0,25
			Ecosystem Status Muliplier	0,25
	Regional and National Conservation context	Priority of wetland as defined in Regional and National Conservation Plans	Moderate Importance	0,75
			Regional & National Context Multiplier	0,8
	Local site attributes	Uniqueness and importance of biota present in the wetland	Moderate biodiversity value	0,75
		Buffer zone integrity (within 500m of wetland)	Buffer compatability score	0,25
		Local connectivity	Moderate connectivity	0,75
			Local Context Multiplier	0,7
			Ecosystem Conservation Ratio	0,12
Offset Calculation	Development Impact (Habitat hectare equivalents)			0,0
	Ecosystem Conservation Ratio			0,1
	Ecosystem Conservation Target (Habitat hectare equivalents)			0,0

15.2.2. Hectare Equivalent for UVB04

The Hectare Equivalent for UVB04 was calculated at a site level for two of three components of the Wetland Offset Tool (Macfarlane *et al*., 2014). The components that were calculated for were "Wetland Functionality Targets and Ecosystem Conservation Targets." The Wetland Functionality Targets scored a Functional Offset Target of – 3.4. The rationale for scoring a Functional Offset Target that is negative is due to the post-development functional value (%) being higher than the prior development functional value (%). The post-development functional value (%) was assumed to be higher than the prior due to the necessity of a Wetland Rehabilitation Plan which will improve certain modules within the wetland, thus improving the overall functionality of the wetland.

Table 57: Representing the Wetland Functional Targets for UVB04

Wetland Functionality Targets			
Impact Assessment	Prior to development	Wetland size (ha)	57
		Functional value (%)	45
	Post development	Functional value (%)	49
		Change in functional value (%)	-4
	Key Regulating and Supporting Services Identified		flood attenuation
	Development Impact (Functional hectare equivalents)		-2,3
Offset calculation	Offset Ratios	Triggers for potential adjustment in exceptional circumstances	Wetlands providing critical flood attenuation, water quality enhancement or carbon sequestration functions
		Functional Importance Ratio	1,5
	Functional Offset Target (Functional hectare equivalents)		-3,4
Further considerations	Have other key Provisioning or Cultural Services identified that require compensation?		No
	Additional compensatory mechanisms proposed	Rehabilitation of entire delineated HGM unit within the 500m regulated area.	

In terms of the Ecosystem Conservation Targets, the habitat intactness improves from 37% to 46%, in which the vegetation module was suggested to improve after rehabilitation. The Wetland Vegetation Group in which this wetland falls under is the Indian Ocean Coastal Belt 1 which is least threatened in terms of its threat status and well protected it terms of its level of protection. Although the site has been historically transformed and poorly rehabilitated the Regional and National Conservation Context was was of high importance due to this wetland falling under a FEPA Wetland (Nel *et al*., 2011) and CBA irreplaceable (EKZNW, 2016) datasets, respectively. Thus, the Ecosystem Conservation Target for FP03 was calculated to be 0.0 and required no further offsetting.

Table 58: Representing the Ecosystem Conservation Targets for UVB04

Ecosystem Conservation Targets				
Impact Assessment	Prior to development	Wetland size (ha)		
		Habitat intactness (%)	37	
	Post development	Habitat intactness (%)	46	
		Change in habitat intactness (%)	-9	
	Development Impact (Habitat hectare equivalents)		0	
Determining offset ratios	Ecosystem Status	Wetland Vegetation Group (or type based on local clasification)	Indian Ocean Coastal Belt 1	
		Threat status of wetland	Threat status	LT
			Threat status Score	1
		Protection level of wetland	Protection level	Well Protected
			Protection level Score	0,25
			Ecosystem Status Muliplier	0,25
	Regional and National Conservation context	Priority of wetland as defined in Regional and National Conservation Plans	High Importance	1
			Regional & National Context Multiplier	1,0
	Local site attributes	Uniqueness and importance of biota present in the wetland	Moderate biodiversity value	0,75
		Buffer zone integrity (within 500m of wetland)	Buffer compatability score	0,5
		Local connectivity	Moderate connectivity	0,75
			Local Context Multiplier	0,7
			Ecosystem Conservation Ratio	0,18
Offset Calculation	Development Impact (Habitat hectare equivalents)		0,0	
	Ecosystem Conservation Ratio		0,2	
	Ecosystem Conservation Target (Habitat hectare equivalents)		0,0	

In terms of wetland offsetting for FP03 and UVB04, after utilizing the best practice Wetland Offset tool (Macfarlane *et al*., 2014) coupled with the (DWAF, 2007) Recommended Management Objectives findings, no wetland offsetting will be required in terms of Wetland Functionality Targets and Ecosystem Conservation Targets. Furthermore, the specialist recommends that a Wetland Rehabilitation Plan be implemented to be in line with NEMBA (Act no 107 of 2004), to ensure no net loss of biodiversity occurs to the surrounding environment.

The potential residual impact of the proposed development was considered to be Low, should the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) be strictly implemented and subsequently monitored onsite. However, in implementing the precautionary approach, it is recommended that potential residual impacts, especially with regard to disturbance of FP03/Transformed Swamp Forest, be monitored biannually by an appointed environmental consultant and reported to KSA and the competent authority (DFFE; and DWS) when any negative impacts are identified. As part of the monitoring, a Wetland Specialist must conduct an annual audit of the wetlands that will be directly impacted upon by the preferred alternative route (i.e. wetlands FP03 and UVB04).

16. CONCLUSION

After the application of the initial risk screening assessment, it was determined that the proposed development consist of a total of twenty six (26) watercourses, in which the classification of these watercourses are one (1) artificial dam, one (1) estuary/port waters, three (3) channelled valley bottom wetlands, two (2) depression wetland, five (5) floodplain wetlands, four (4) unchannelled valley bottom wetlands, six (6) hillslope seepage wetlands and four (4) river riparian systems. The riverine systems were classified as B channel streams. It was determined that CVB01, FP01, FP02 and Seep06 will be impacted upon by the transmission line alternative route and switching station, whereas CVB01, FP03, UVB01, UVB04 and Seep06 will be impacted upon by the transmission line preferred alternative, temporary laydown areas and switching station.. These wetlands that will be impacted upon by the proposed development were determined to be **of a high risk (as per the risk screening)** as a result of their position in the landscape in relation to the proposed development. It must be noted that the risk rating was provided on the basis that the proposed development will occur within the wetland extent.

The overall PES scores for CVB01, FP01, and Seep06 were calculated to be C (moderately modified), whereas FP03, UVB01 and UVB04 all calculated to be a D (largely modified) PES. The aforementioned scores for the at risk watercourses were primarily as a result of anthropogenic pressures in the catchment and wetland extent namely; construction of linear infrastructure (dirt and tar roads, overhead powerlines) within the catchment, increase in hardened surfaces in the catchment predominantly by industry development, construction of industry and industry platforms within the wetland, creation of dirt roads within the wetland, infilling within wetland, historic construction activities coupled with poor rehabilitation and proliferation of AIPs due to the aforementioned changes. This indicated that modifications have moderately and largely impacted the wetlands within the study area which has subsequently impacted on the habitat quality, diversity, and size.

Although, the at risk wetlands within the study area have undergone anthropogenic alterations as a result of the broader catchment activities, the at risk wetlands within the study were recorded to have maintained an ecosystem structure and function to have the ability to supply valuable ESS to the surrounding environment. The at risk wetland systems calculated to have the potential to supply the following ESS at a moderate to moderately high level; nitrate and toxicant removal, sediment and phosphate trapping; and flood attenuation, streamflow regulation, erosion control and carbon storage at a moderate level. Furthermore, socio-cultural ESS were calculated to be supplied at a moderately low to low level as these wetlands were predominantly not utilised by the surrounding community, besides UVB01 in which the natural resource (reed type *Cyperus papyrus*) vegetation was being harvested. Furthermore, due to all the at risk wetlands besides Seep06 being identified at a desktop level to be NFEPA (Nel *et al*., 2011) and Critical Biodiversity Areas (EKZNW, 2016), conservation and maintenance of these wetlands are imperative to achieve biodiversity goals for conservation and protection of these unique environments.

It was identified utilising the RAM (DWS, 2016) in Section 10.2 of this report that several aspects of the construction activities associated with the proposed development scored a moderate risk rating, however these aspects did not have the potential to be mitigated from a moderate to low risk rating. Thus, in line with GN509 of 26 August 2016, which was drafted in accordance with the NWA (No. 36 of 1998), as well as the specialist's opinion, the proposed development has undergone a full WULA process and received the relevant Water Use License (WUL) for the project.

From the quantitative impact assessment conducted and presented in Table 46, it is evident that the overall impact significance scores can be mitigated to a medium to low and low impact rating as per DFFE preferred scoring method. However, utilising the specialist's preferred methodology the overall impact significant scores are noted to be low to very low, post-mitigation. All impacts are regarded as reversible, with no loss to irreplaceable features. However, it must be noted that in order to achieve reversibility of impacts and no loss of irreplaceable features, the mitigation measures outlined in this report coupled with the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) must be implemented. It was concluded that no fatal flaws exist for the preferred alternative of the proposed development from a wetland perspective.

The assessment of cumulative impacts took into consideration four (4) projects that might occur within the Port of Richards Bay and IDZ area namely: the RBGP2 400MW Gas to Power project, the Nseleni Independent Floating Power Plant – Port/old Bayside complex project, 320MW Emergency Risk Mitigation Power Plant (RMPP) and the Eskom 3000MV CCPP and associated infrastructure project. It was determined that the overall cumulative impacts will be (Moderate Low Negative), including the KSA Gas to Power Project, if the Wetland Rehabilitation Plan for Karpowership project in conjunction with the mitigation measures outlined in this report and other four (4) environmental assessment projects are followed.

The potential residual impacts associated with the proposed development were considered to be Low, should the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) be strictly implemented and subsequently monitored onsite. However, in implementing the precautionary approach, it is recommended that potential residual impacts, especially with regard to disturbance of FP03/Transformed Swamp Forest, be monitored biannually by an appointed environmental consultant and reported to KSA and the competent authority (DFFE; and DWS) when any negative impacts are identified. As part of the monitoring, a Wetland Specialist must conduct an annual audit of the wetlands that will be directly impacted upon by the preferred alternative route (i.e. wetlands FP03 and UVB04).

NB: With regards to the terminology irreplaceability, other terminology is utilised in the impact assessment such as: partial loss of wetland habitat, partial loss of ecosystem services and partial loss of migratory routes for semi-aquatic species. Furthermore, it must be noted that mitigation measures outlined in this report and the conducted Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022) would render the aforementioned irreplaceable terms (e.g: partial loss of wetland habitat) to be reversible as the mitigation and rehabilitation measures being proposed will improve the functionality of the wetlands if properly implemented. Additionally, the rationale for these wetlands to be improved in terms of functionality can be better understood reading the Wetland Rehabilitation Plan (T4-WRP-RB, Oct 2022). A brief explanation of this is that certain area of these wetlands were noted to not be functional anymore due to historic and current land use practices. The rehabilitation plan, when followed step by step will ultimately create more functional area in the wetlands.

Upon conducting the Wetland Offset utilizing the best practice guideline (Macfarlane *et al*., 2014), FP03 and UVB04 did not require any offsetting due the potential improvement of the Wetland Functionality Targets and no change value for the Ecosystem Conservation Target.

In South Africa's current and past climate, the ongoing need for electrified energy has become a very significant and increasing challenge over the years. Due to lack of maintenance and upgrading of existing electrical infrastructure (e.g. generation facilities, transmission lines and substations) coupled with the demand for more electricity due to ongoing development in the country and population growth, South Africa's electricity supply has been under constant strain and has led to loadshedding. Loadshedding has crippled the South African economy and has led to the loss of income and jobs for large portions of the South African population. Furthermore, due to the desire of businesses to continue operating during loadshedding schedules, alternative energy measures such as diesel operated generators have been purchased and utilised, which result in increased expenses for businesses, reduced profit margins and greater individual environmental impacts. Thus, the 'need' for electrified energy in South Africa has risen and thus alternative energy creating mechanisms such as Karpowership could are required to eliminate loadshedding in the near future. The ability of Karpowership to bring in electrified energy is immediate if the required infrastructure (e.g. substation and transmission lines) and regulatory permissions are in place, unlike alternative energy sources such as wind farms and solar photovoltaic farms, which require lengthy construction of energy infrastructure (i.e. battery housings, wind turbines and solar fields) before the transmission of electrified energy can occur, which also brings with it completion risks. In comparison to the proposed development, the footprint of the aforementioned energy infrastructure (i.e. wind farms and solar photovoltaic farms) would have a much larger footprint (typically land use of at least a multiple of x100 or greater) to produce the same amount, or less, energy. This huge increase in land use required can in turn negatively impact on the receiving environment and organisms.

From a freshwater perspective associated with the proposed development in Port of Richards Bay, Karpowership will have a minimal impact on freshwater resources, seeing that it will occur in an operational port and will only require monopole transmission lines on land, some of which will be placed in an already existing transmission line servitude. Therefore, the need from an energy, social and economic perspective will be positive for South Africa, whilst environmental impacts will need to be mitigated and monitored as outlined in this report.

Upon the site visit and conducting the assessments, the specialist is **not in support** of the proposed Transmission Line Alternative Route as this route was deemed to impact on a major portion of wetlands within the study. The specialist does support the proposed Transmission Line Preferred Route and all of the associated construction activities and temporary laydown areas. Furthermore, the mitigation measures outlined in this report are to be included in the EMPr, and must be followed. Lastly, due to certain portions of the proposed development occurring within the at risk wetlands, in order to be in line with NEM:BA, the conducted **Wetland Rehabilitation Plan** (T4-WRP-RB, Oct 2022) must be implemented to ensure no net loss of biodiversity occurs.

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18. CURRICULUM VITAE AND SACNASP

CURRICULUM VITAE

Name of Firm:	**Triplo4 Sustainable Solutions (Pty) Ltd**		
Name of Staff:	Suheil Malek Hoosen		
Position in Firm:	Wetland Ecologist		
Profession:	Environmental Science		
Date of Birth:	10/12/1991		
Years of Professional Experience:	7	**Nationality:**	South African

Education:

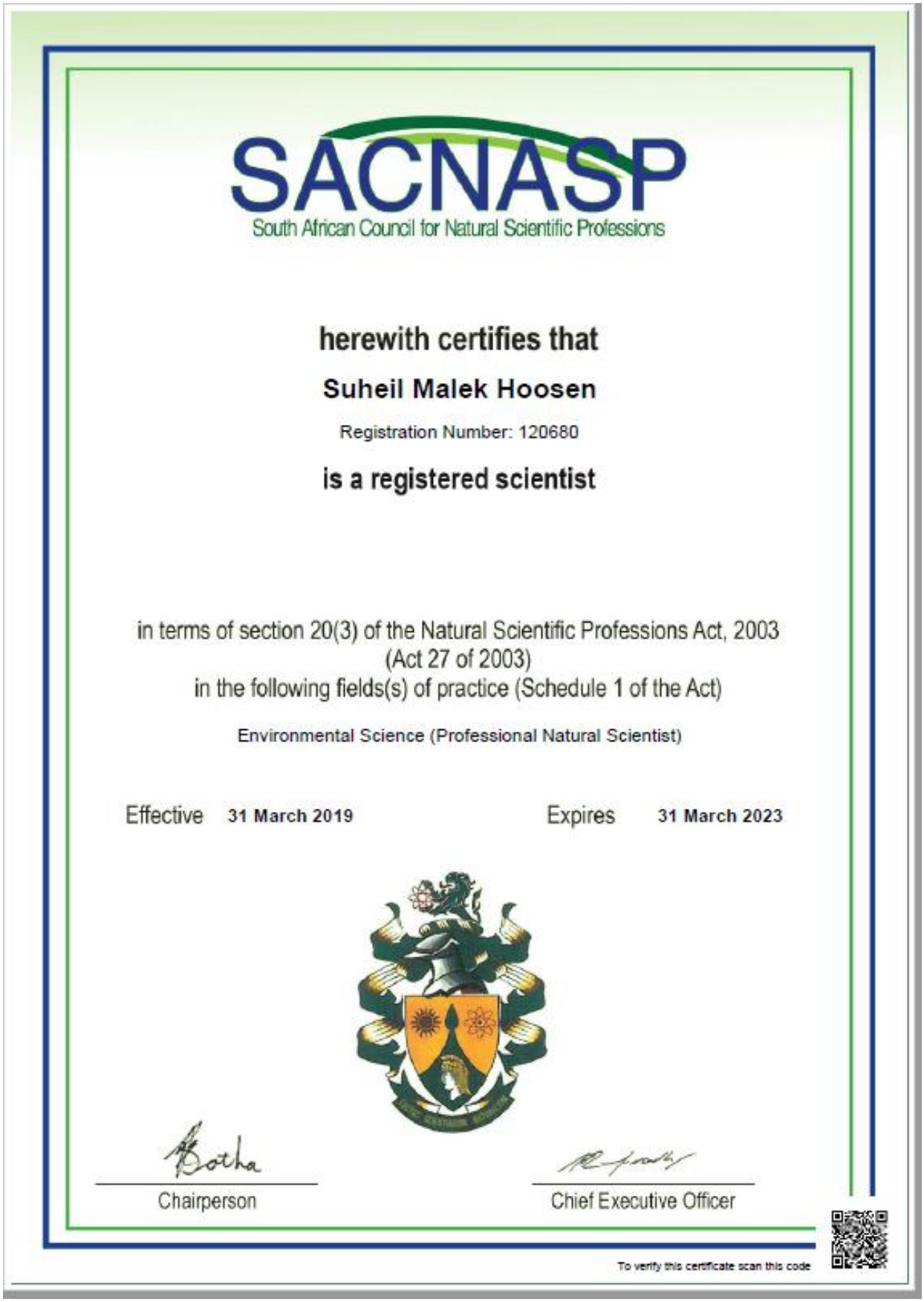
2018	MSc Environmental Science, University of KwaZulu-Natal, South Africa
2014	BSc (Honours), Environmental Science, University of KwaZulu-Natal, South Africa
2013	BSc, Environmental and Earth Science, University of KwaZulu-Natal, South Africa

Employment History:

2019 to date	**Triplo4 Sustainable Solutions (Pty) Ltd, South Africa** Wetland Ecologist
2018 to 2019	**KSEMS Environmental Consulting, South Africa** Wetland Ecologist
2016 to 2018	**Aeon Nexus** Junior Wetland Ecologist
2015 to 2016	**Council of Scientific and Industrial Research (CSIR)** Intern

Courses

2021	**Hydropedology and Wetlands** By: WETREST and DSAfrica
2019	**SASS5 Aquatic Biomonitoring Course** By: Dr Graham (GroundTruth)
2018	**Tools for Wetland Assessment** By: Proff. Ellery (Rhodes University)



SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Suheil Malek Hoosen

Registration Number: 120680

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Environmental Science (Professional Natural Scientist)

Effective **31 March 2019** Expires **31 March 2023**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

19. SPECIALIST DECLARATION

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/14/12/16/3/3/2/2007
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

Wetland Delineation and Functional Assessment for the Proposed Gas to Power via Powership Project at Port of Richards Bay, uMhlathuze Local Municipality, 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

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

SPECIALIST INFORMATION

Specialist Company Name:	Triplo4 Sustainable Solutions (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition	
Specialist name:	Mr. Suheil Malek Hoosen			
Specialist Qualifications:	MSc Environmental Science			
Professional affiliation/registration:	SACNASP (*Pr. Sci. Nat.*)			
Physical address:	Suite 5 The Circle, Douglas Crowe Avenue, Ballito Business Pk, Dolphin Coast, 4420			
Postal address:	N/A			
Postal code:	N/A	Cell:	083 580 2540	
Telephone:	032 946 3213	Fax:	032 946 0826	
E-mail:	suheil@triplo4.com			

DECLARATION BY THE SPECIALIST

I, ___Suheil Malek Hoosen___, 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

Triplo4 Sustainable Solutions (Pty) Ltd

Name of Company:

20/10/2022

Date

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

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

1. SPECIALIST INFORMATION

Specialist Company Name:	Triplo4 Sustainable Solutions (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition	51
Specialist name:	Suheil Malek Hoosen			
Specialist Qualifications:	MSc Environmental Science			
Professional affiliation/registration:	SACNASP			
Physical address:	Suite5 The Circle, Douglas Crowe Ave, Ballito Business Pk, Dolphin Coast			
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Postal code:	4420	Cell:	0835802540	
Telephone:	032 946 3213	Fax:	N/A	
E-mail:	suheil@triplo4.com			

2. DECLARATION BY THE SPECIALIST

I, _Suheil Malek Hoosen_, 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

Triplo4 Sustainable Solutions (Pty) Ltd

Name of Company:

31/10/2022

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, _Suheil Malek Hoosen__, 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

Triplo4 Sustainable Solutions (Pty) Ltd

Name of Company

31/10/2022

Date

Signature of the Commissioner of Oaths

Date: 31/10/2022

Commisioner of Oaths
Mandy Lynn Meiring
Manager Postnet Brooklyn
256 Dey Street

Ref No: 9/1/8/2 Pretoria
11 November 2009

Date