Wetland Rehabilitation Plan

Wetland Rehabilitation Plan for the proposed Transmission Lines from the Port of Richards Bay to the proposed Switching Station and temporary laydown areas, uMhlathuze Local and King Cetshwayo District Municipalities, KwaZulu-Natal

A Project for Karpowership South Africa

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triplo4 sustainable solutions

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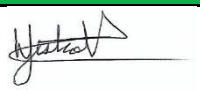
Compiled and Authorised by:

Compiled By:	**Date**	**Signature**
Suheil Malek Hoosen Wetland Specialist *Pr.Sci.Nat*	26/09/2022	
Reviewed By:	**Date**	**Signature**
Wayne Westcott Wetland Ecologist *Pr.Sci.Nat*	30/09/2022	
Chen Read Senior Sustainability Consultant *EAPASA*	03/10/2022	

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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, DFFE and DMR 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.

AIP (Alien Invasive Plant)
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).

Landowner
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 BAR / EIARs

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

DFFE:	Department of Forestry, Fisheries and Environment
(D)EDTEA:	(Department of) Economic Development, Tourism and Environmental Affairs
DWS:	Department of Water and Sanitation
ECA:	Environment Conservation Act
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EIS:	Ecological Importance and Sensitivity
EMPr:	Environmental Management Programme
HGM(U):	HydroGeoMorphic (Unit)
AIP(s)	Alien Invasive Plant (Species)
NEMA:	National Environmental Management Act
NEM:BA:	National Environmental Management: Biodiversity Act
NFEPA:	National Freshwater Ecosystem Priority Area
NWA:	National Water Act
PES:	Present Ecological State
RAM:	Risk Assessment Matrix (in referral to the DWS RAM)
SEMA:	Specific Environmental Management Acts
WUL(A):	Water Use License (Application)

1. INTRODUCTION

1.1. 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, KwaZulu-Natal (KZN) province.

The proposed development includes Two routes herein referred to as the Transmission Line Preferred Route and Transmission Line Alternative Route, as well as a proposed Switching Station were assessed under the proposed development. The length of the Preferred Alternative Route is approximately 3.6 Kilometres (km), whereas the length of the Alternative Route is approximately 4.5km and the proposed switching station area is approximately 1.75 hectares (ha) in extent. 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 Transnet Port Authorities (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 on which these routes and associated infrastructure is proposed is considered gentle in topography, located approximately 450 Metres (m) west of the Richards Bay Port sandbar. The Preferred Alternative Route begins on a Freshwater Ecosystem Priority Area (FEPA) Estuary (SANB, 2018) and traverses 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 traverses in a southerly direction, which quickly turns west and finally towards the north 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 via one of two options as per Figure 1 below.

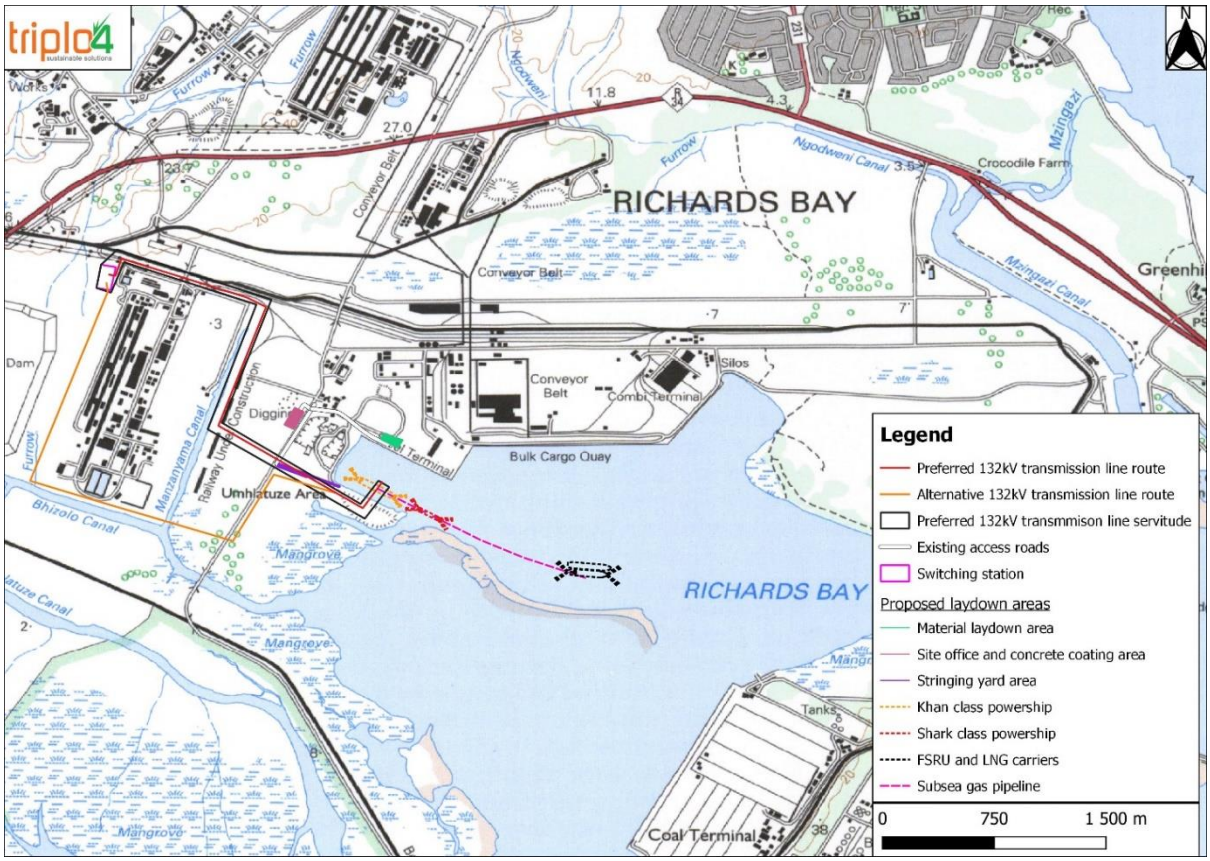

Figure 1: Locality and topographical map of the Alternative 1 & 2, proposed switching station and temporary laydown areas.

1.2. OBJECTIVES OF THE WRP

The aim of the WRP is to determine the following:

- Impact caused to the onsite wetlands by current land use practices and by the proposed development;
- Compile rehabilitation measures to improve the wetlands health, and calculate the equivalent of the wetlands at risk; and
- Develop monitoring plan to ensure that the measures are adhered to and successfully implemented.

1.3. AUTHORS OF THE WRP

This document was compiled by:

Mr Suheil Malek Hoosen - Masters in Environmental Science

Suheil Malek Hoosen is a Wetland Specialist, who holds a Master's Degree in Environmental Science with over 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 over 75 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.

2. WETLAND DELINEATION OF THE PROJECT

2.1. WETLAND DELINEATION

The wetland delineation conducted by Triplo4 Wetland Ecologist (Mr. Suheil Malek Hoosen) in September 2020 and updated in October 2022, was aimed at identifying all wetland areas on site and within the regulated 500m zone of the proposed development that were at risk or not at risk. Figure 2 below depicts the delineated wetlands that were verified during the site investigations.

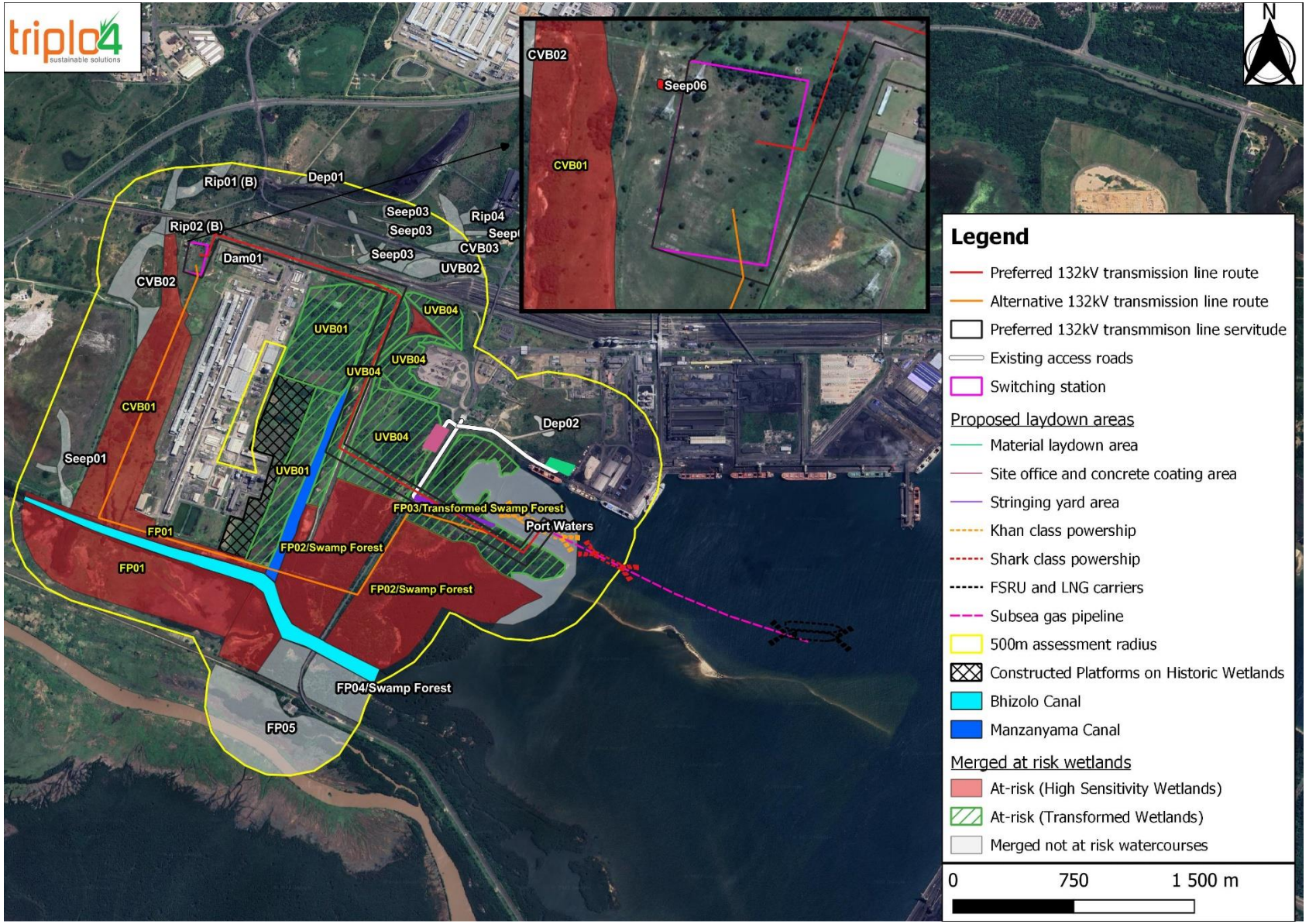

Figure 2: Map of the in-field delineations of the watercourses identified at the proposed development and 500m assessment radius

3. METHODOLOGY

The methods utilised within this assessment follow the phased approach as indicated in objectives of the Wetland Rehabilitation Plan works under Section 1.2 above. The phased approach is as follows:

- Identification of potential rehabilitation targets for delineated watercourses that were determined to be at risk, within the surrounding 500m assessment radius wetlands, and potential rehabilitation to the catchment areas;
- Evaluate the condition of the identified watercourses before and after development has occurred, with and without rehabilitation measures applied;
- Prioritise watercourses to be impacted and rehabilitated within the relevant quaternary catchment area; and
- Develop a comprehensive watercourse rehabilitation and management plan including:
  - Calculate the hectare equivalents of the at risk watercourses;
  - Rehabilitation objectives to quantify the improvement in the prioritised systems;
  - Identify rehabilitation problems;
  - Develop a rehabilitation strategy including the final rehabilitation plans;
  - Determine and describe the rehabilitation interventions required; and
  - Develop a monitoring and evaluation plan.

3.1. METHODOLOGY TO CALCULATE HECTARE EQUIVALENT

In order to truly determine the health, impact and rehabilitation success, a common unit of measure was needed to allow for accurate comparisons. Hectare equivalents (ha equiv.) is the best-practise representation of the health/integrity of a wetland system expressed as an area (Cowden and Kotze, 2009). The WET-Health assessment of a wetland is based on a comparison of the current, or simulated state of the system to a reference/natural state (Macfarlane *et al*., 2009). In this reference/natural state the wetland's health is unmodified (health= 100 % (Ecological Category= A)) and the functional area of wetland habitat is equivalent to the total area of the system (e.g. 50 ha). Therefore, if the ha equiv. equation were to be applied to this example the health of the wetland would equate to 50 ha equiv. of intact wetland habitat that is capable of supplying ecosystem services to the surrounding environment.

Table 1: Table presenting the hectare equivalents equation relevant to a hypothetical 50 ha wetland system in its natural state.

Hectare equivalents equation: Reference/Natural State $= \frac{Health\ Score}{10}\ x\ area\ of\ wetland$ $= \frac{10}{10}\ x\ 50$ = 50 ha equiv. of intact wetland habitat	Where the: Area = 50 ha Health score = 10 – impact score = 10 – 0 = 10

However, at present the wetland systems within the current environment have been degraded due to various impacts (e.g. anthropogenic pressures), and this has resulted in the health and functionality of the wetlands being altered in comparison to their reference/natural state. For example, if a wetland in a reference/natural state were to be impacted on by several infill and contamination events the health could be reduced from 100 % to 30 % (reflecting a health score of 3.0). The following ha equiv. equation would apply to this scenario.

Table 2: Table presenting the hectare equivalents equation relevant to a hypothetical 50 ha wetland system in its natural state.

Hectare equivalents equation: Current State $= \frac{Health\ Score}{10}\ x\ area\ of\ wetland$ $= \frac{3}{10}\ x\ 50$ = 15 ha equiv. of intact wetland habitat Therefore, a reduction in 35 ha equiv. (70 %) of intact wetland has occurred as a result of various impacts.	Where the: Area= 50 ha Health score = 10 – impact score = 10 – 7 = 3

In addition to being able to represent the functionality of a wetland in its current state, ha equiv. can be utilised to simulate the gain in functional area of wetland habitat in a post-rehabilitation state. Therefore, providing a means of quantifying the potential benefit of rehabilitation activities within degraded wetland habitats.

4. ASSUMPTIONS AND LIMITATIONS

ASSUMPTION/LIMITATION	DESCRIPTION
Only the watercourses that will be directly impacted on by the proposed development were priorities for rehabilitation and/or mitigation measures.	Upon conducting the hectare equivalent calculation, it was determined that onsite rehabilitation of the at-risk watercourses would be sufficient to remediate the residual impacts. Furthermore, this is supported by the best practice Wetland Offset guideline calculation in the Wetland Delineation and Functional Assessment for the proposed transmission lines from the Port of Richards Bay to proposed switching station report (T4-WDFA-RB, Oct 2022).
The data and information provided by the client was the most recent and relevant and covers every aspect of the proposed development that was required to be considered under this study.	All the latest aspects were considered when drafting this report.
Two (2) site visits were conducted on the 18/09/2020 and 04/10/2020; and an additional site visit on the 23/09/2022 for the locations of the material laydown area, which covers seasonal variation to a certain extent. It must be noted that watercourses vary both temporally and spatially. Assessments such as this may potentially miss certain ecological information, thus potentially limiting accuracy, detail and confidence.	Two (2) initial site visits were conducted within sixteen (16) days of each other and an additional site visit in September 2022. The first was conducted within the prescribed SANBI dry season, however it must be noted that KZN was experiencing rainfall at the time, whereas the second site visit was conducted within the prescribed SANBI wet season. The last site visit was only conducted for the material laydown areas. Thus, seasonal variation was covered.
Ecology is both dynamic and complex, resulting in the potential of some aspects to be overlooked.	The watercourses on site were assessed thoroughly by the Wetland Specialist to ensure all sensitivities were identified.
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 will, if additional information or counter arguments are provided and verified, hold the right to amend the report if need be.	The specialist is professionally confident in his findings presented in this report, which were collected over multiple site visits.
It should be recognised that the study area and the surrounding micro/macro catchment areas have primarily undergone disturbance from predominantly industry, sugarcane plantation, linear infrastructure (e.g: dirt and tar roads, transmission lines and railway lines) and Port Activities. Therefore, this adds several confounding effects to the interpretation of the natural reference conditions of the wetland systems and the historic and current functioning of these systems.	The presumed natural state of the at-risk watercourses is explicitly explained in the Wetland Delineation and Functional Assessment for the proposed transmission lines from the Port of Richards Bay to proposed switching station report (T4-WDFA-RB, Oct 2022). These explanations of the at-risk watercourses take into consideration the presumed natural state, historical and current impacts; and the current integrity and services that these watercourses are providing.

5. REHABILITATION PROCESS AND TASK

5.1. SUMMARY OF THE DELINEATED WATERCOURSES WITHIN THE 500M ASSESSMENT RADIUS

It was determined during the site investigation conducted in September and October 2020; and an additional site visit in September 2022 for only the material laydown area that a total of twenty-six (26) watercourses were delineated within the 500m assessment radius. These included; 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. The riverine systems were classified as B channel streams. Further to this, it was determined during the site investigation that CVB01, FP01, FP02, FP03, UVB01, UVB04 and Seep06 will be impacted upon by the proposed development.

Table 3 below is a summary of the watercourses at risk in terms of their hydrogeomorphic unit type or stream type, central co-ordinate points, area and potential impact from the proposed development.

Table 3: Representing the hydro-geomorphic type of wetlands systems and potential impact from the proposed development

WETLAND	POTENTIAL IMPACT
CVB01	- Removal of indigenous wetland vegetation in order to access site for construction of Alternative 2 overhead powerline in wetland. - Potential temporary drainage of wetland for the construction of concrete foundation for Alternative 2 overhead powerline. - Construction of concrete foundation with wetland soil. - Impact on the water quality via runoff of foreign material into wetland. - Altered hydrological wetness zones. - Potential development of erosional and depositional features. - Reduction in biodiversity. - Replacement of indigenous terrestrial vegetation by anthropogenic changes in the catchment, thus increasing surface runoff. - Potential proliferation of alien invasive plants (AIP) during the constructional and operational phases within the wetland.
FP01 **FP02**	- Removal of indigenous wetland vegetation in order to access site for construction of Alternative 2 overhead powerline in wetland. - Potential temporary drainage of wetland for the construction of concrete foundation for Alternative 2 overhead powerline. - Construction of concrete foundation with wetland soil. - Impact on the water quality via runoff of foreign material into wetland. - Altered hydrological wetness zones. - Potential development of erosional and depositional features. - Reduction in biodiversity. - Replacement of indigenous terrestrial vegetation by anthropogenic changes in the catchment, thus increasing surface runoff. - Potential proliferation of alien invasive plants (AIP) during the constructional and operational phases within the wetland.

FP03	- Removal of indigenous wetland vegetation in order to access site for construction of the Preferred and Alternative overhead powerlines in wetland habitat. - Removal of indigenous wetland vegetation for establishment of temporary access roads and temporary laydown areas for installation of gas pipeline. - Potential temporary drainage of wetland habitat for the construction of concrete foundations for the Preferred and Alternative overhead powerlines. - Construction of concrete foundation with wetland soil. - Impact on the water quality via runoff of foreign material into wetland. - Altered hydrological wetness zones. - Potential development of erosional and depositional features. - Reduction in biodiversity. - Replacement of indigenous terrestrial vegetation by anthropogenic changes in the catchment, thus increasing surface runoff. - Potential proliferation of alien invasive plants (AIP) during the constructional and operational phases within the wetland.
UVB04	- Removal of indigenous wetland vegetation in order to access site for construction of Alternative 1 overhead powerline in wetland. - Potential temporary drainage of wetland for the construction of concrete foundation for Alternative 1 overhead powerline. - Construction of concrete foundation with wetland soil. - Construction of temporary site office and concrete coating area. - Impact on the water quality via runoff of foreign material into wetland. - Altered hydrological wetness zones. - Potential development of erosional and depositional features. - Reduction in biodiversity. - Replacement of indigenous terrestrial vegetation by anthropogenic changes in the catchment, thus increasing surface runoff. - Potential proliferation of alien invasive plants (AIP) during the constructional and operational phases within the wetland.
UVB01	- Removal of indigenous wetland vegetation in order to access the site for construction of the Preferred Alternative and Alternative overhead powerlines in wetland habitat. - Potential temporary drainage of wetland habitat for the construction of concrete foundations for the Preferred Alternative and Alternative overhead powerlines. - Construction of concrete foundation with wetland soil. - Impact on the water quality via runoff of foreign material into wetland. - Altered hydrological wetness zones. - Potential development of erosional and depositional features. - Potential sedimentation from upslope catchment due to construction activities occurring in close proximity to wetland. - Reduction in biodiversity. - Replacement of indigenous terrestrial vegetation by anthropogenic changes in the catchment, thus increasing surface runoff. - Potential proliferation of alien invasive plants (AIP) during the constructional and operational phases within the wetland.

5.2. THE CURRENT STATE OF THE AT RISK WATERCOURSES, POST DEVELOPMENT AND WITHOUT REHABILITATION, POST DEVELOPMENT AND WITH REHABILITATION AND HECTARE EQUIVALENT CALCULATION

As per Section 5.1 above, it was determined that six (6) wetlands are at risk as a result of the proposed development. All of the wetlands identified to be at risk (CVB01, FP01, FP02, FP03, UVB01 and UVB04) were identified to be at a High Risk and fall within Quaternary Catchment W12F. The main

anthropogenic pressures that have impacted upon the current Present Ecological State (PES) of these watercourses are catchment and in-situ related namely: creation of hardened surfaces such as linear activities (dirt & tar roads, overhead powerlines, and railway lines), mines and industry within the catchment; whereas in-situ impacts ranged from construction of admin offices, canals, industry buildings & platforms, railway lines, tar roads and infilling with dredged material with wetland wetness zones.

It must be noted that in line with the National Environmental Management: Biodiversity Act (NEM: BA) (Act no. 10 of 2004), any proposed development must occur in a sustainable manner to ensure that no-net-loss of biodiversity and/or ecosystem processes occurs. Thus, this must be taken into consideration when the proposed development occurs.

Rehabilitation is employed to counter the effects of impacts and, if possible, improve on the health of an impacted watercourse beyond its current state. However, in order to quantify rehabilitation in wetland systems within the study area associated with the proposed development, it was essentially to evaluate the current health. The following below will discuss the post-development/rehabilitation PES score results that were calculated for the at-risk watercourses delineated within quaternary catchments W12F. It will also present the current state hectare equivalent (ha equiv.), calculated for the assessed at-risk wetland systems, as well as the estimated ha equiv. post-development with and without the implementation of rehabilitation measures.

Summary of the proposed Transmission Lines from the Port of Richards Bay to the proposed Switching Station:

The proposed development will encompass the following:

- A FSRU and LNG Carrier (approximately 29 300m^2).
- 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.

The proposed development will potentially have an adverse effect on the surrounding at-risk wetland systems health, and thus their ability to supply ecosystem goods and services. While the impacts of the proposed development will potentially reduce the overall health status of the at-risk watercourses, by implementing rehabilitation measures in the prioritised at-risk watercourses, this will increase the opportunity for the overall health of these watercourses to improve, thus improving biodiversity and ecosystem services of the surrounding wetland environments.

5.2.1. At risk channelled valley bottom wetland in quaternary catchment W12F

Table 4: Overall PES of the at risk CVB wetland in its current state, post-development without rehabilitation and post-development with rehabilitation

HGM UNIT	DEVELOPMENT STAGES	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	OVERALL PES SCORE	PES CATEGORY
CVB01	Current State	4.0 (D)	1.1 (B)	5.5 (D)	3.6 (C)	Moderately Modified
	Post-Development	**5.2 (D)**	**2.3 (C)**	**6.7 (E)**	**4.8 (D)**	**Largely Modified**

	– No Rehabilitation					
	Post-Development – Rehabilitation	**3.2 (C)**	**1.8 (B)**	**3.8 (C)**	**2.9 (C)**	**Moderately Modified**

5.2.2.Hectare equivalents of CVB wetland in quaternary catchment W12F

CVB01 calculated hectare equivalent (ha equiv.) of 30.0 in its current states in comparison to its natural state. The loss of functionality of CVB01 in its current state with no construction occurring is 16.9 ha equiv.

If the proposed development (Alternative 2) occurs within CVB01, due to the proposed construction of the concrete foundation in which the lattice towers will be placed for stability, 0.8 ha of wetland will be lost completely. Furthermore, If the proposed development occurs without any rehabilitation a loss of 22.2 ha equiv. will occur within CVB01, which is a difference in loss of 5.3 ha equiv. from its current state without any construction occurring. This will in turn result in a reduction in these systems overall functionality to provide the essential ecosystem services within CVB01 and the surrounding environment. It is estimated that with the relevant rehabilitation measures, the ha equiv. of CVB01 will improve (difference from current state) by 3.5 ha equiv. directly due to rehabilitation measures that will be implemented within and around the wetland.

Table 5: Calculation of the current state, post-development with no rehabilitation and post development with rehabilitation of the hectare equivalent, wetland loss and difference of state of CVB wetland

HGM UNIT	STATE	AREA (HA)	OVERALL IMPACT SCORE	HEALTH SCORE	HA EQUIV.	HA EQUIV. LOSS	DIFFERENCE FROM CURRENT STATE
CVB01	Current State	46.9	3.6	6.4	30.0	16.9	-
	Post-Development – No Rehabilitation	46.1	4.8	5.2	23.9	22.2	-5.3
	Post-Development – Rehabilitation	**46.1**	**2.9**	**7.1**	**32.7**	**13.4**	**+3.5**

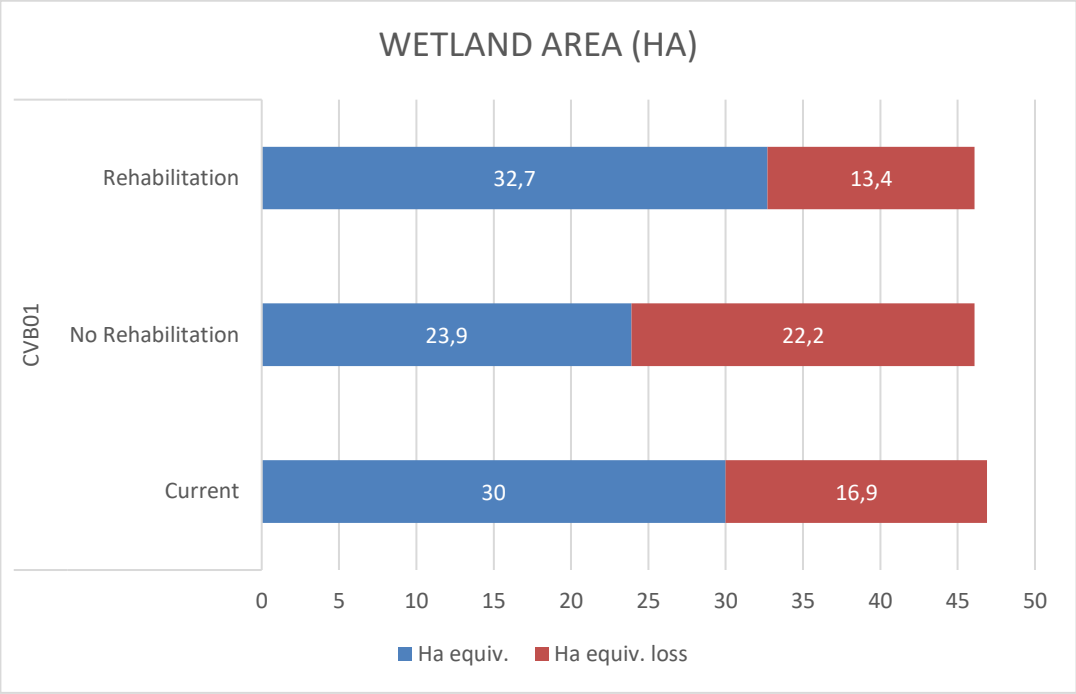

Figure 3: Representation of the hectare equivalent gain and loss of CVB01 in its currents state, state without rehabilitation and state with rehabilitation.

5.2.3. At risk floodplain wetlands in quaternary catchment W12F

The at risk FP01, FP02 and FP03 will experience similar impacts as a result of the proposed development due to their location in the landscape in relation to the proposed development. Table 6 below provides the PES of all the WET-Health assessment modules (hydrology, geomorphology and vegetation) and the overall PES of the current state, estimated state with no rehabilitation and estimated state with rehabilitation of the at risk floodplain wetlands in quaternary catchment W12F.

Table 6: Overall PES of the at risk floodplain wetlands in its current state, post-development without rehabilitation and post-development with rehabilitation

HGM UNIT	DEVELOPMENT STAGES	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	OVERALL PES SCORE	PES CATEGORY
FP01	Current State	6.0 (E)	1.3 (B)	3.1 (C)	3.8 (C)	Moderately modified
	Post-Development – No Rehabilitation	**7.2 (E)**	**2.8 (C)**	**4.8 (D)**	**5.2 (D)**	**Largely modified**
	Post-Development – Rehabilitation	**5.5 (D)**	**2.0 (C)**	**2.1 (C)**	**3.5 (C)**	**Moderately modified**
FP02	Current State	4.0 (D)	1.6 (B)	5.6 (D)	3.7 (C)	Moderately Modified
	Post-Development – No Rehabilitation	**5.2 (D)**	**3.1 (C)**	**6.8 (E)**	**5.0 (D)**	**Largely modified**
	Post-Development – Rehabilitation	**3.4 (D)**	**2.0 (C)**	**3.4(C)**	**3.0 (C)**	**Moderately modified**
FP03	Current State	7.5 (E)	2.5 (C)	6.6 (E)	5.8 (D)	Largely modified

	Post-Development – No Rehabilitation	**8.6 (F)**	**4.2 (D)**	**8.1 (F)**	**7.2 (E)**	**Seriously modified**
	Post-Development – Rehabilitation	**5.6 (D)**	**3.1 (C)**	**3.8 (C)**	**4.3 (D)**	**Largely modified**

5.2.4.Hectare equivalent of at risk floodplain wetlands in quaternary catchment W12F

The floodplain wetlands, namely: FP01, FP02 and FP03 calculated hectare equivalents of 42.4 ha equiv., 57.6 ha equiv. and 12.2 ha equiv., respectively in their current state in comparison to its natural condition.

The estimated overall ha equiv. loss of floodplain wetlands if the proposed development occurs within and around the wetlands and if no rehabilitation is conducted is 101.1 ha equiv. This will in turn result in a reduction in these systems ability to provide valuable ecosystem services namely; attenuation of floods, sink for toxicants and nitrate from a catchment which exhibit poor veld conditions and inability to trap phosphate and sediment. The difference in in ha equiv. from the current to if no rehabilitation occurs after development is 24.5 ha equiv.

It must be noted that if rehabilitation occurs within these wetlands and surrounding terrestrial environment, an overall improvement of 123.8 ha equiv, can be achieved, as compared to its current state. Thus, this will improve the ha equiv. to a difference of 1.4 ha equiv. as compared to its current state, which promotes sustainable development in line with NEM:BA.

Table 7: Calculation of the current state, post-development with no rehabilitation and post development with rehabilitation of the hectare equivalent, wetland loss and difference of state of floodplain wetlands

HGM UNIT	STATE	AREA (HA)	OVERALL IMPACT SCORE	HEALTH SCORE	HA EQUIV.	HA EQUIV. LOSS	DIFFERENCE FROM CURRENT STATE
FP01	Current State	68.4	3.8 (C)	6.2	42.4	26.0	-
	Post-Development – No Rehabilitation	67.8	5.2 (D)	4.8	32.5	35.3	-9.3
	Post-Development – Rehabilitation	67.8	**3.5 (C)**	**6.5**	**44.1**	**23.7**	**+2.3**
FP02	Current State	91.4	3.7 (C)	6.3	57.6	33.8	-
	Post-Development – No Rehabilitation	90.8	5.0 (D)	5.0	45.4	45.4	-11.6
	Post-Development – Rehabilitation	90.8	3.0 (C)	**7.0**	**63.5**	**27.3**	**+6.5**
FP03	Current State	29.0	5.8 (D)	4.2	12.2	16.8	-
	Post-Development – No Rehabilitation	28.4	7.2 (E)	2.8	8.0	20.4	-3.6
	Post-Development – Rehabilitation	28.4	4.3 (D)	**5.7**	**16.2**	**12.2**	**+4.6**

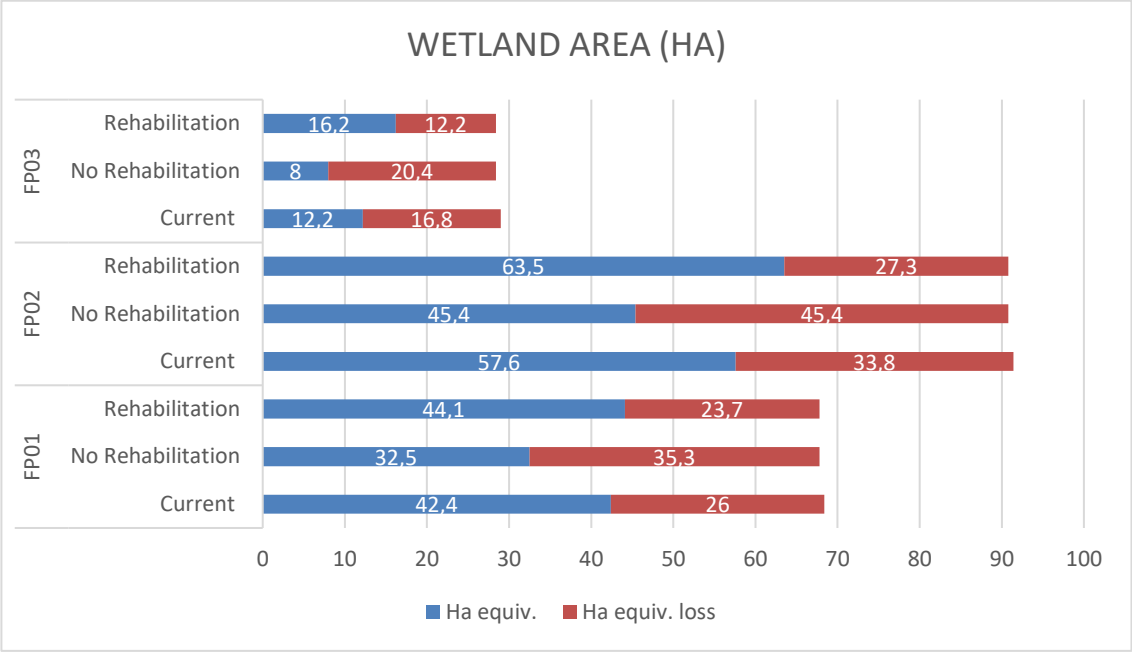

Figure 4: Representations of the hectare equivalent gain and loss of floodplain wetlands in its currents state, state without rehabilitation and state with rehabilitation.

5.2.5.At risk unchannelled valley bottom wetlands in quaternary catchment W12F

The at risk UVB01 and UVB04, will be impact differently by the proposed development as explained in Table 3. UVB01 will be predominantly indirectly impacted, whereas UVB04 will be directly impacted by the proposed development. Table 8 below provides the PES of all the WET-Health assessment modules (hydrology, geomorphology and vegetation) and the overall PES of the current state, estimated state with no rehabilitation and estimated state with rehabilitation of the at risk unchannelled valley bottom wetlands in quaternary catchment W12F.

Table 8: Overall PES of the at risk unchannelled valley bottom wetlands in its current state, post-development without rehabilitation and post-development with rehabilitation

HGM UNIT	DEVELOPMENT STAGES	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	OVERALL PES SCORE	PES CATEGORY
UVB01	Current State	6.5 (E)	2.1 (C)	6.5 (E)	5.2 (D)	Largely modified
	Post-Development – No Rehabilitation	**7.1 (E)**	**3.2 (C)**	**7.2 (E)**	**6.0 (E)**	**Seriously modified**
	Post-Development – Rehabilitation	**5.2 (D)**	**1.9 (B)**	**4.8 (D)**	**4.1 (D)**	**Largely modified**
UVB04	Current State	7.0 (E)	2.2 (C)	6.3 (E)	5.5 (D)	Largely Modified
	Post-Development – No Rehabilitation	**8.2 (F)**	**3.4 (C)**	**7.8 (E)**	**6.7 (E)**	**Seriously modified**
	Post-Development – Rehabilitation	**5.8 (D)**	**2.6 (C)**	**4.8 (D)**	**4.6 (D)**	**Largely modified**

5.2.6. Hectare equivalent of at risk unchannelled valley bottom wetlands in quaternary catchment W12F

The unchannelled valley bottom wetlands, namely: UVB01 and UVB04 calculated hectare equivalents of 42.4 ha equiv., 57.6 ha equiv. and 12.2 ha equiv., respectively in their current state in comparison to its natural condition.

The estimated overall ha equiv. loss of unchannelled valley bottom wetlands if the proposed development occurs within and around the wetlands and if no rehabilitation is conducted is 101.1 ha equiv. This will in turn result in a reduction in these systems ability to provide valuable ecosystem services namely; attenuation of floods, sink for toxicants and nitrate from a catchment which exhibit poor veld conditions and inability to trap phosphate and sediment. The difference in in ha equiv. from the current to if no rehabilitation occurs after development is 24.5 ha equiv.

It must be noted that if rehabilitation occurs within these wetlands and surrounding terrestrial environment, an overall improvement of 123.8 ha equiv, can be achieved, as compared to its current state. Thus, this will improve the ha equiv. to a difference of 1.4 ha equiv. as compared to its current state, which promotes sustainable development in line with NEM:BA.

Table 9: Calculation of the current state, post-development with no rehabilitation and post development with rehabilitation of the hectare equivalent, wetland loss and difference of state of unchannelled valley bottom wetlands

HGM UNIT	STATE	AREA (HA)	OVERALL IMPACT SCORE	HEALTH SCORE	HA EQUIV.	HA EQUIV. LOSS	DIFFERENCE FROM CURRENT STATE
UVB01	Current State	41.5	5.2 (D)	4.8	19.9	21.6	-
	Post-Development – No Rehabilitation	41.5	6.0 (E)	4.0	16.6	24.9	-3.3
	Post-Development – Rehabilitation	41.5	**4.1 (D)**	**4.9**	**20.3**	**21.2**	**+0.4**
UVB04	Current State	57.0	5.5 (D)	4.5	25.6	31.4	-
	Post-Development – No Rehabilitation	55.2	6.7 (E)	3.3	18.2	37.0	-5.6
	Post-Development – Rehabilitation	55.2	4.6 (D)	**5.4**	**29.8**	**25.4**	**+6.0**

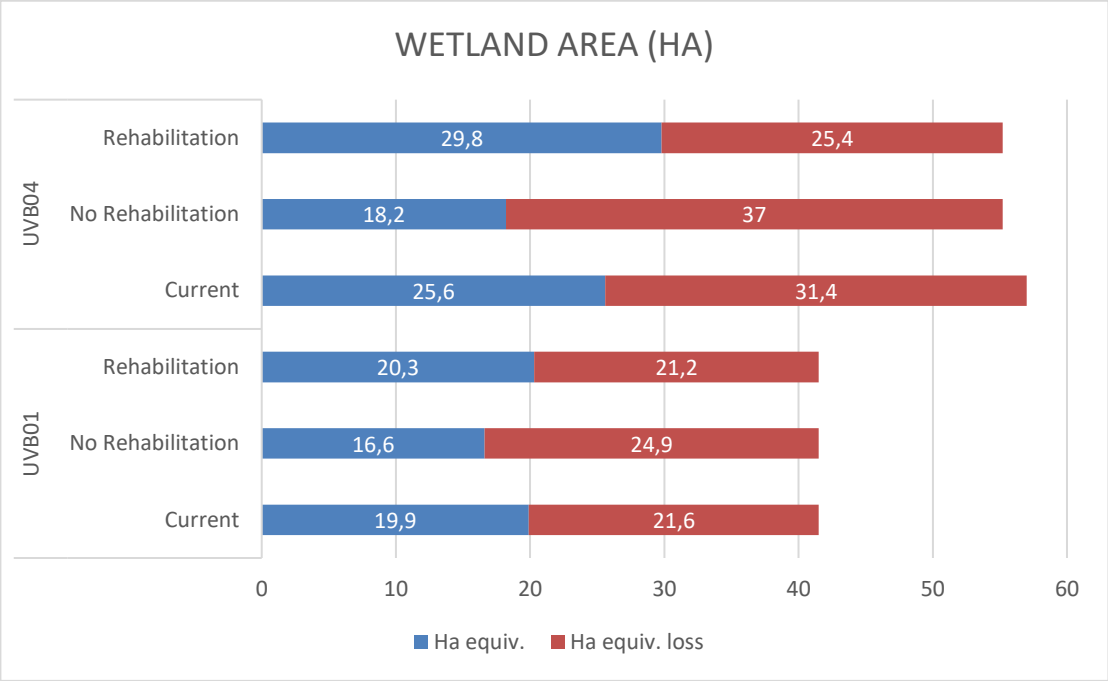

Figure 5: Representations of the hectare equivalent gain and loss of unchannelled valley bottom wetlands in its currents state, state without rehabilitation and state with rehabilitation.

5.2.7. Overall hectare equivalent for at risk wetlands within the study in quaternary catchment W12F

When all impacts are considered, the post-development hectare equivalents for the wetland systems potentially impacted upon by the proposed development will be lower than the current state if no rehabilitation is implemented. This is predominantly due to the location of the proposed development in relation to the wetlands that are considered to be at risk after the risk screening was conducted.

Due to certain activities of the proposed development occurring within the wetland footprint and being potentially permanent structures within the wetland, approximately 4.4 ha of wetland area will be lost.

If no rehabilitation will be conducted, ha equiv. of the at risk wetland systems will be an overall of 144.6 ha equiv. and a loss of 185.2 ha equiv. as compared to its current state. Furthermore, the difference of hectare equivalent loss for the at-risk wetlands systems will be an overall loss of 38.7 ha equiv. as compared to the current state.

If the relevant rehabilitation outlined in this report are conducted, the overall ha equiv. for the at risk wetland systems will be 206.6 ha equiv. and a reduced loss of 123.2 ha equiv. as compared to its current state. The difference of ha equiv. from the current state will be an improvement of 23.3 ha equiv. if the rehabilitation is successful and conducted in accordance to this rehabilitation plan.

Table 10: *The overall hectare equivalents of the at-risk wetland systems in their current, post-development without rehabilitation, and post-development with rehabilitation states*

States	Wetlands	Area (ha)	Ha Equiv.	Ha Equiv. Loss	Difference from Current State (ha)
Current State	CVB01	46.9	30.0	16.9	-
	FP01 FP02 FP03	188.8	112.2	76.6	-
	UVB01 UVB04	98.5	45.5	53.0	-
	Total		**187.7**	**146.5**	**-**

		334.2			
Post-Development – No Rehabilitation	CVB01	46.1	23.9	22.2	-5.3
	FP01 FP02 FP03	187.0	85.9	101.1	-24.5
	UVB01 UVB04	96.7	34.8	61.9	-8.9
	Total	**329.8**	**144.6**	**185.2**	**-38.7**
Post-Development – Rehabilitation	CVB01	46.1	32.7	13.4	+3.5
	FP01 FP02 FP03	187.0	123.8	63.2	+13.4
	UVB01 UVB04	96.7	50.1	46.6	+6.4
	Total	**329.8**	**206.6**	**123.2**	**+23.3**

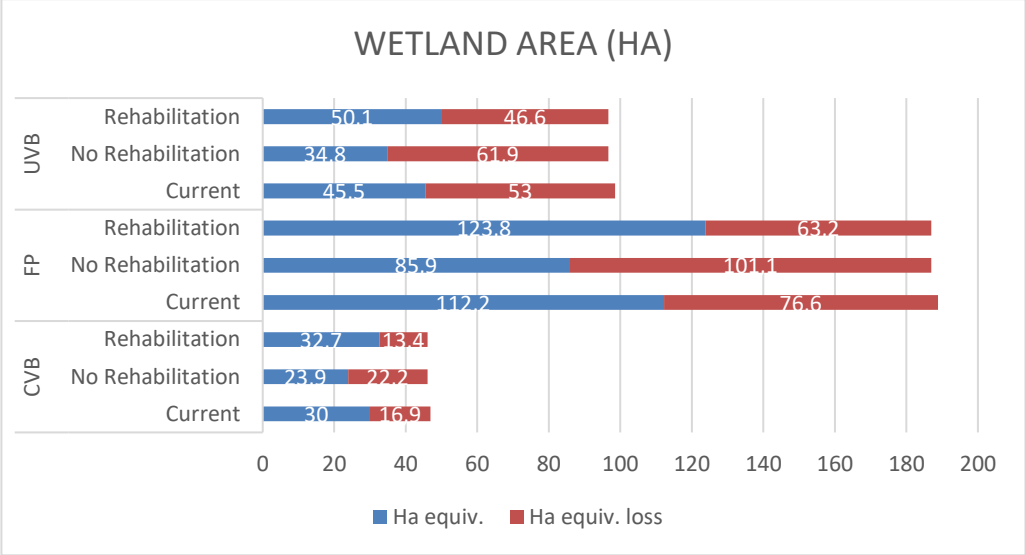

Figure 6: Representations of the hectare equivalent gain and loss of overall at risk wetland systems in its currents state, state without rehabilitation and state with rehabilitation.

5.3. REHABILITATION STRATEGY

5.3.1. Anticipated Wetland System Impacts

In order to rehabilitate any damage to the wetland systems on site, it is important to note the current and potential future impacts. The following are the current and future impacts to the at-risk wetlands on site that will require the relevant rehabilitation:

- Increase of hardened surfaces within the catchment and wetlands, thus increasing surface runoff of water and increase the potential for erosion to occur.
- Creation of unauthorised tracks or footpaths within the catchment and wetlands, which in turn will create preferential drainage erosional features in the catchment and wetlands.
- The establishment of minor and major depositional and erosional features due to poor construction ethics and lack of proper rehabilitation.
- Direct loss of wetland area for the construction of concrete foundation and temporary laydown areas within wetland.
- Potential input of foreign materials and excess sediment into at risk wetland systems during the constructional phase.

- Potential loss of biodiversity within the wetland systems.
- Potential loss of integrity and functionality of wetland systems.
- Potential proliferation AIP's within all of the wetland systems.

5.3.2.Aims and Objectives

In order for a rehabilitation project to succeed, it is important to set achievable aims and objectives with which the rehabilitation can be compared. These are to be set in accordance with WET-RehabPlan (Kotze *et al*.2008).

5.3.2.1. Aim

The aim of the wetland rehabilitation plan is to mitigate and restore the wetland systems which are current being impacted by the existing land and future land uses by the proposed Transmission Lines from the Port of Richards Bay to proposed Switching Station, as well as the associated temporary laydown areas.

5.3.2.2. Objectives

In order to achieve the aim of the project, the following objectives have been set up to ensure the success of the rehabilitation:

- Reinstate the natural geomorphology, topography and vegetation of temporary access roads; and temporary laydown areas for construction of overhead powerlines and installation of gas pipeline.
- Reinstate minor and major erosional and depositional features within at risk wetlands which were created due to anthropogenic changes within catchment and wetlands; and ensure the exposed soils are re-vegetated with the relevant indigenous vegetation.
- Removal of AIPs and re-vegetate the calculated buffer zones of the at risk wetlands with the appropriate indigenous vegetation to improve surface roughness and linkage to the landscape.
- Strategic installation of sand trap downslope of the construction of the overhead powerlines to ensure no sedimentation occurs and foreign materials enter wetland environments during any constructional activity.
- Removal of AIPs within wetland zones and adjacent buffer zones; and re-vegetate disturbed area with appropriate indigenous species.

It must be noted, as per the Wetland Delineation and Functional Assessment (Karpowership – Transmission Line from the Port of Richards Bay to proposed Switching Station, 2022), the Alternative Route was deemed unacceptable by the Wetland Ecologist as it would be too detrimental to the integrity and functionality of the wetland environment (CVB01). However, due to other wetlands being screening to be at risk by the Alternative Route 1 (FP01, FP02, FP03, UVB01, UVB04), the wetland that would have been impacted by Alternative Route 2 (CVB01) will still need to be rehabilitated in order to be in line with NEM:BA. Due to the potential direct impact of the Preferred Alternative Transmission Line Route, wetlands screened to be at risk as a result of the Alternative Transmission Line Route will also need to be rehabilitated in order to compensate for the loss of functional wetland habitat caused by the Preferred Alternative Transmission Line Route. The rehabilitation of the wetlands determined to have the potential to be indirectly impacted on by the Preferred Alternative Transmission Line route will be essential to compensate for the loss of intact wetland habitat caused by the direct impact aspect. REHABILITATION STRATEGY & INTERVENTIONS

5.3.2.3. Rehabilitation Strategy

In this section the wetland-specific rehabilitation strategies will be outlined and discussed, along with maps presenting the proposed locations of the areas in which the recommended rehabilitation measures are to be implemented. The wetland rehabilitation strategy **did not identify** the need for **hard intervention** to be conducted within wetlands or surrounding environment. Further to this, soft

interventions will be implemented for the wetland systems at risk to improve the overall functionality and integrity of these wetlands.

As noted in the previous section, several impacts have been identified which need to be addressed in order to increase the existing wetland systems health. One being the AIP removal must begin across certain portions of the site with subsequent re-vegetation with indigenous species to restore the systems to a more natural state. This will need to be conducted under the supervision of a registered botanist or horticulturist to ensure the correct species are selected and the project will be a success.

The following rehabilitation strategy will be divided into the different hydrogeomorphic units that were identified to be at risk from the proposed development, starting with channelled valley bottom wetland.

Channelled Valley Bottom Wetland

The following table are the rehabilitation strategies to be conducted for CVB01 and also a recipe to achieve the rehabilitation aim.

Table 11: Representing the rehabilitation strategy for CVB01

Wetland System	Rehabilitation Strategy
CVB01	- Removal of existing unauthorised dirt road and reinstate the natural topography of the wetland. - Removal of any ad hoc material (e.g: dumping of pipes and general waste) within the wetland. - Exposed bare soil areas within the wetland that will not be utilised during the operational phase must be immediately re-vegetated with hydric type vegetation common within the area (See Appendix 9, Table 16). - Removal of AIPs must be conducted within the wetland. This must be conducted predominantly manually by hand, if too difficult to remove by hand, approved watercourse herbicides can be used as prescribed. - Removal of AIPs within the 29m constructional buffer and re-vegetate these areas with indigenous vegetation local to the area (Appendix 9, Table 16).

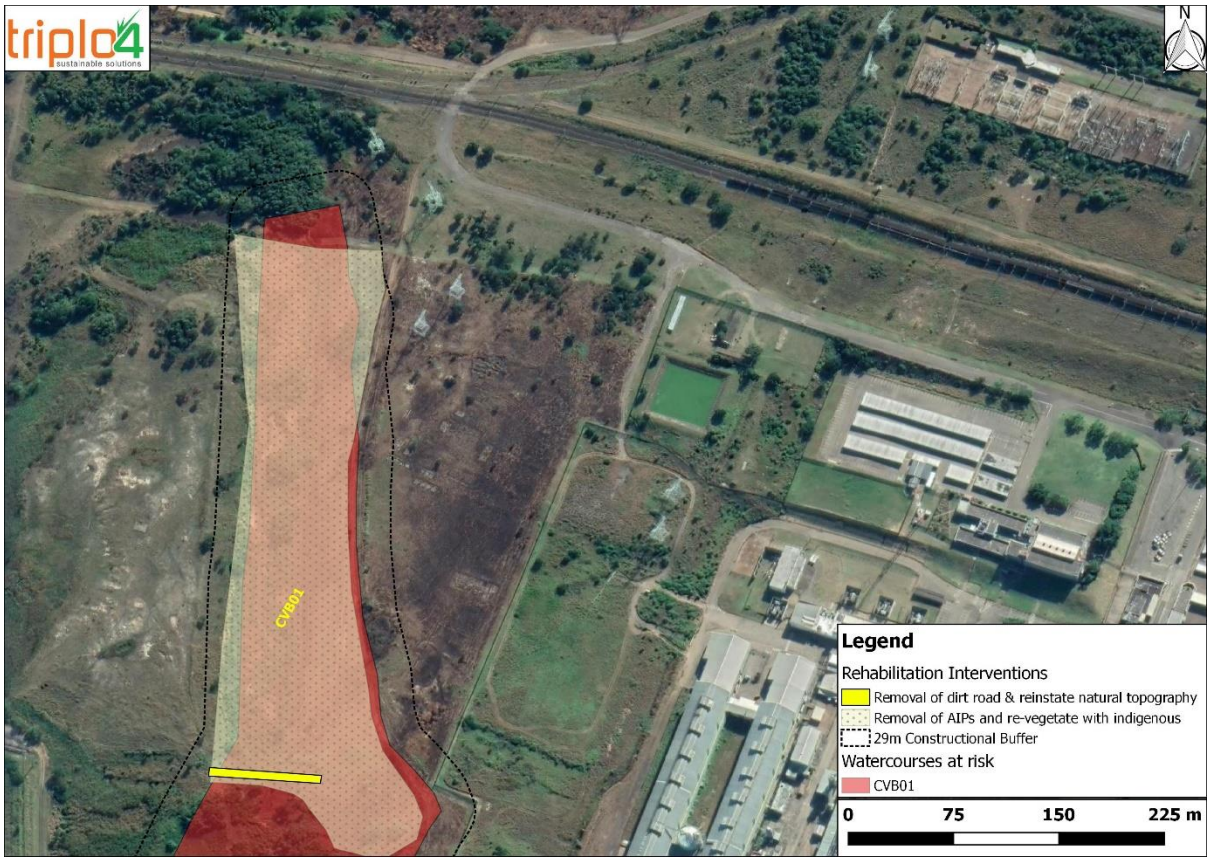

Figure 7: Map of the rehabilitation strategy for CVB01

Floodplain Wetlands (FP01, FP02, FP03)

The following table are the rehabilitation strategies to be conducted for FP01, FP02 and FP03, and also a recipe to achieve the rehabilitation aim.

Table 12: Representing the rehabilitation strategy for FP01, FP02 and FP03

Wetland System	Rehabilitation Strategy
FP01 FP02 FP03	- Erection of temporary sediment traps (silt fences) approximately 20m downslope of the proposed overhead powerline route, in order to capture sediment during the constructional phase. - Sediment traps must be cleaned out on a weekly basis during the constructional phase. - Sediment traps must be removed once the constructional phase comes to an end. - Areas to be utilised for temporary access roads and temporary laydown areas for the installation of the gas pipeline must be immediately reinstated to the natural wetland topography and geomorphology once installation is completed. - Temporary access roads and temporary laydown areas must thereafter be re-vegetated with hydric indigenous vegetation local to the area that can survive in the elevated saline conditions (See Appendix 9, Table 16). - The depositional feature within FP02 and FP03 must be removed and reinstated to a more natural topographical level as per the surrounding wetland landscape. The removed excess sand must be disposed of at a certified dump site. The area must be re-vegetated with hydric indigenous vegetation that can survive elevated saline conditions (See Appendix 9, Table 16). - Any further exposed bare soil areas as a result of construction activities that will not fall part of the operational phase area within the wetland must be immediately re-vegetated with hydric type vegetation common within the area (See Appendix 9 Table 16).

	- The landscaper/botanist must take into consideration of the tides that could potentially flood certain portions of the plains of the wetland from time to time. - Removal of AIPs must be conducted within the wetland. This must be conducted predominantly manually by hand, if too difficult to remove by hand, approved watercourse herbicides can be used as prescribed. - Removal of AIPs within the 29m buffer and re-vegetate these areas with indigenous vegetation local to the area (Appendix 9 Table 16). - Remove any ad hoc rubbish found in the wetland and ensure it is maintained free of rubbish.

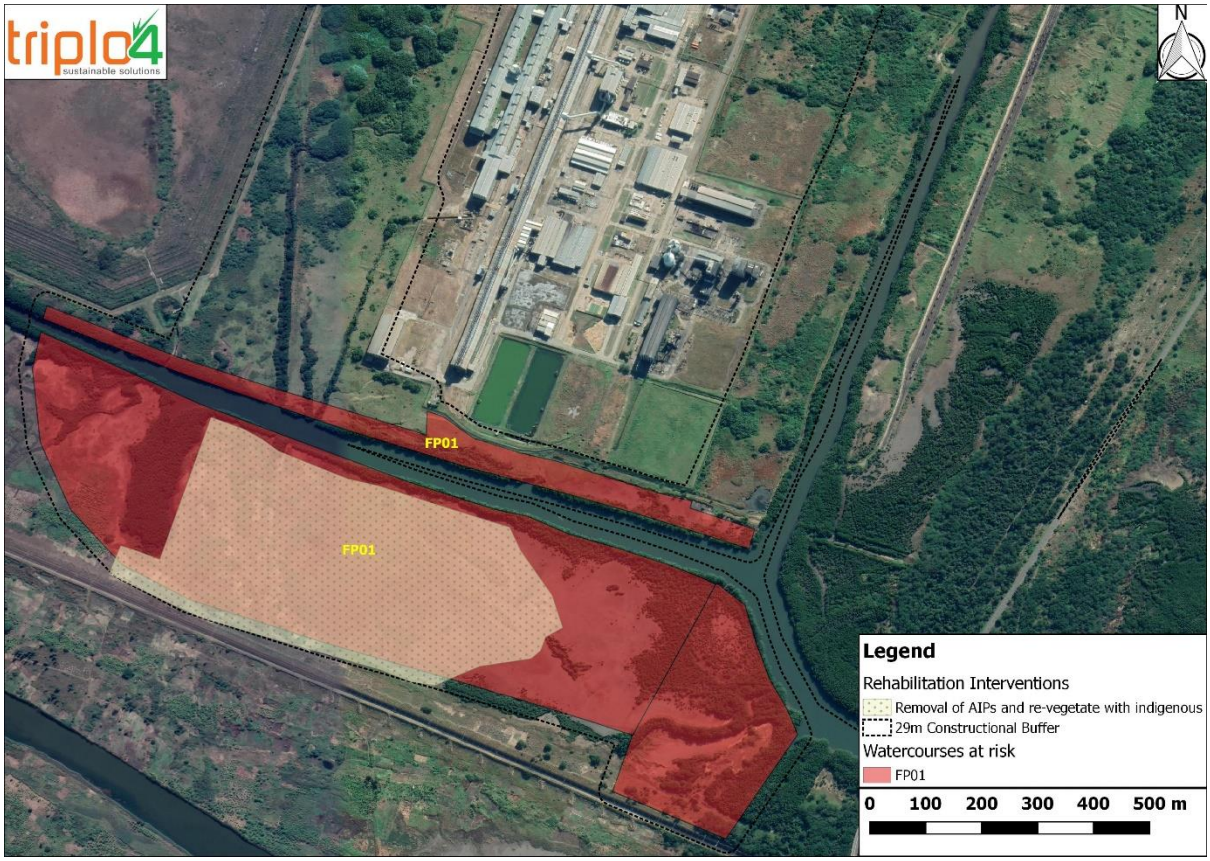

Figure 8: Map of the rehabilitation strategy for FP01

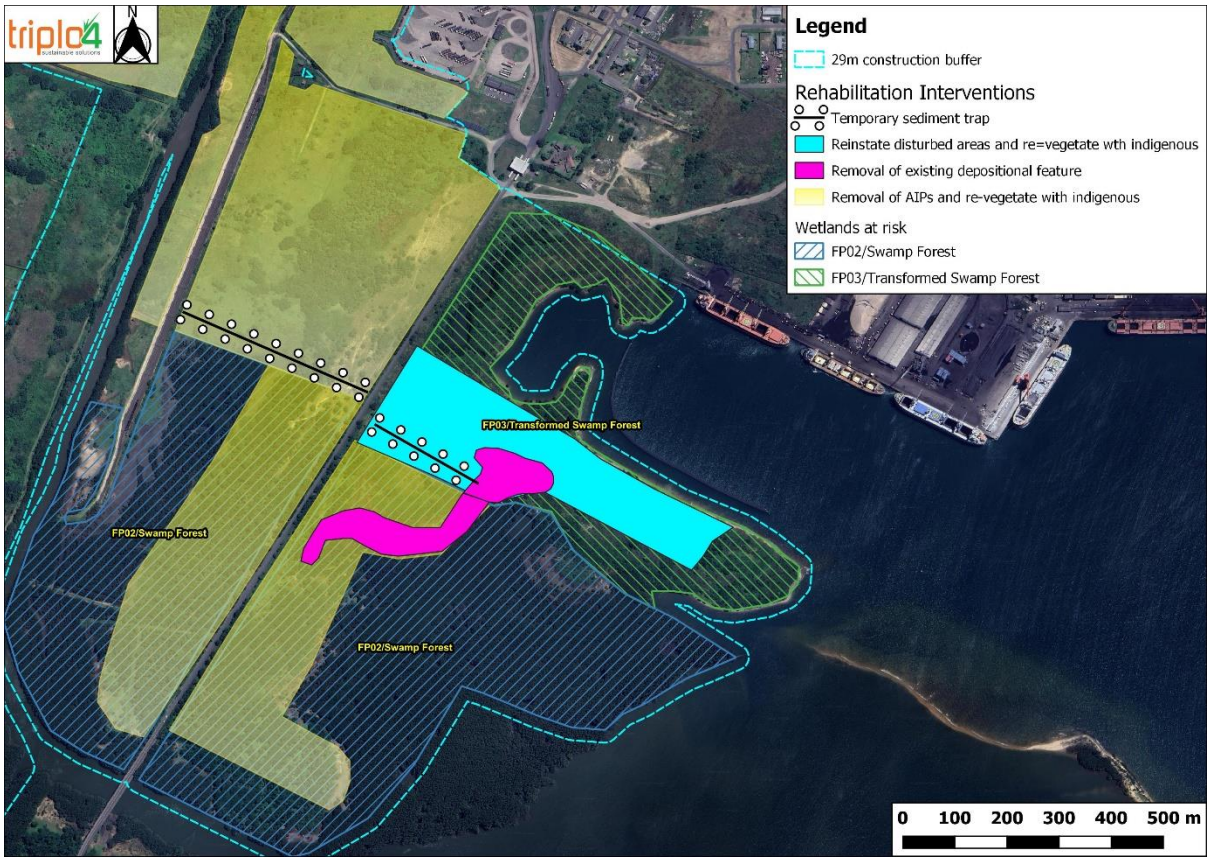

Figure 9: Map of Rehabilitation Strategy for FP02 and FP03

Unchannelled Valley Bottom Wetlands (UVB01 and UVB04)

The following table are the rehabilitation strategies to be conducted for UVB01 and UVB04, which is also a recipe to achieve the rehabilitation aim.

Table 13: Representing the rehabilitation strategy for UVB01 and UVB04

Wetland System	Rehabilitation Strategy
UVB01 UVB04	- Erection of temporary sediment traps (silt fences) approximately 20m downslope of the proposed overhead powerline route, in order to capture sediment during the constructional phase. - Sediment traps must be cleaned out on a weekly basis during the constructional phase. - Sediment traps must be removed once the constructional phase comes to an end. - Exposed bare soil areas within the wetland that will not be utilised during the operational phase must be immediately re-vegetated with hydric type vegetation common within the area (See Appendix 9, Table 16). - Removal of AIPs must be conducted within the wetland. This must be conducted predominantly manually by hand, if too difficult to remove by hand, approved watercourse herbicides can be used as prescribed. - Removal of AIPs within the 29m buffer and re-vegetate these areas with indigenous vegetation local to the area (Appendix 9 Table 16). - Remove any ad hoc rubbish found in the wetland and ensure it is maintained free of rubbish.

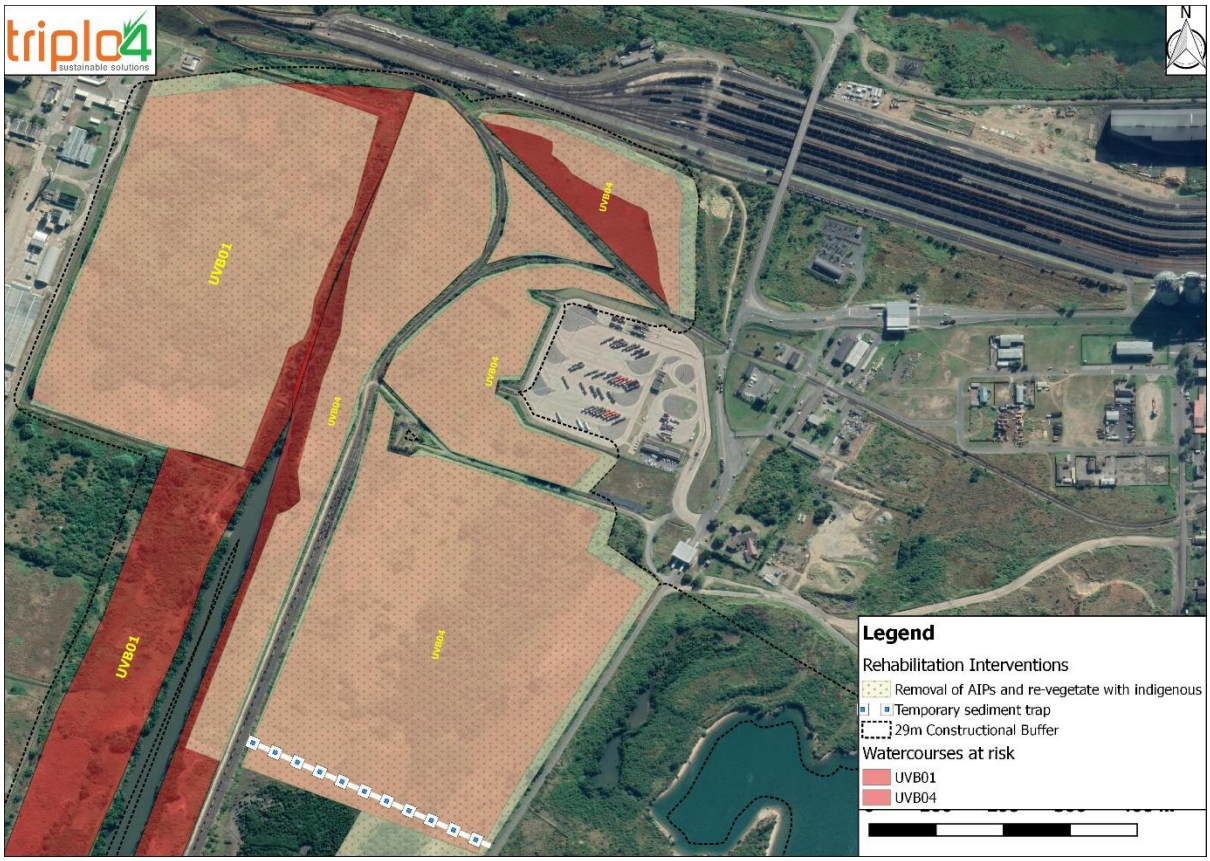

Figure 10: Map of the rehabilitation strategy for UVB01 and UVB04

5.3.2.4. Implementation Order

The below implementation order is an estimated timeframe for the rehabilitation work to be completed. Notably, removal and management of alien invasive should commence in areas where construction will not occur first and thereafter in areas where construction has been completed to prevent continuous impacts on the surrounding wetland systems within the proposed development boundary.

Table 14: Estimated Implementation Order for Rehabilitation Interventions

Phase	Rehabilitation Activities	Estimated Time Frames
1	Removal of existing dirt road in CVB01	0 – 3 months
2	Alien invasive management	Approximately 5 years
3	Sediment traps (silt fences)	Lifespan of the constructional phase
4	Reinstatement of temporary disturbed area at FP03 for installation of gas pipeline	0 – 5 months
5	Removal of existing depositional feature within FP02 and FP03	0 – 1 month
6	Re-vegetation of wetland and 29m Buffer	Approximately 5 years

5.3.2.5. Interventions

- *Removal of existing dirt road in CVB01:*

The removal of the existing dirt road within CVB01 must be conducted as a first item for the rehabilitation process of this wetland. This will be required to be conducted at first as the removal process of the dirt road might cause minor disturbances to other immediate adjacent portions of the wetland. Once the dirt road has been removed, other rehabilitation process such as removal of AIPs and re-vegetation with hydric indigenous vegetation can occur.

- *Alien invasive management:*

All AIPs located within the at-risk wetland systems consisted of shrub and woody type AIPs. The AIP shrub and tree species much be cut and removed. If possible, a controlled burning schedule must be developed for the grassland area surrounding the wetland to control the AIPs. If hardier AIPs species such as *Lantana camara* and *Solamum mauritianum* begin spreading, approved herbicides may be used via foliar spraying. The herbicide used, time of spraying and control of collateral spraying is the responsibility of an approved Pest Control Operator (PCO). Dye must be added to all herbicides in order to easily identify treated and non-treated plants in order to reduce excess being used. Herbicides such as Roundup, Mamba, Chopper and Garlon must not be utilised due to the potential for collateral damage in the sensitive wetland environment and downstream systems. It must be noted that AIP removal cannot be a once off activity and must be an on-going activity for a minimum of 5 years. Within the 5 years, removal must be monitored and occur on a monthly basis for the first year, thereafter it can be conducted every 3 months for the remaining 4 years.

- *Sediment traps (silt fences):*

The other rehabilitation measures that need to be conducted on site during the constructional phase are namely; the strategic placement of sediment traps (silt fences) approximately 20m downslope of the proposed overhead transmission lines constructional area to ensure that the integrity of the wetlands are intact. Once the aforementioned phases come to a conclusion, the measures will be removed during the operational phase unless stated to be left in place by the ECO as to ensure integrity of wetlands are maintained.

- *Reinstatement of temporary disturbed area at FP03 for installation of gas pipeline:*

This area of FP03 has been historically disturbed by Port activities and will be further disturbed by the installation of the gas pipeline by creating temporary dirt roads and a temporary laydown area. Upon the conclusion of the gas pipeline installation, sediment in this area will most likely be compacted due to the heavy vehicles moving in this area. Movement of soil to match the natural topography of the surrounding floodplain wetlands coupled with the re-establishment of topsoil for the growth of hydric indigenous vegetation. Due to the wetland being in close proximity to the Port waters which have an elevated saline condition, the choice of hydric indigenous vegetation will need to be one that can withstand the saline conditions and local of the area.

- *Removal of existing depositional feature within FP02 and FP03:*

As stated in the above point, FP03 and portions of FP02 have been utilised historically for Port activities. This has caused an extensive depositional feature to form within FP02 and FP03 (indicated in Figure 9 as removal of existing depositional feature). This is an impact to the wetlands geomorphological module and should be removed and reinstated to the surrounding topographical wetland. Thereafter, this area should be re-vegetated with hydric indigenous vegetation that will be able to withstand elevated saline conditions.

- *Re-vegetation of wetland and 29m Buffer:*

The re-vegetation process of wetland and the 29m Buffer, similar to the alien invasive management plan must be conducted for a minimum of 5 years. The appointed landscaper/horticulturist and ECO must work closely together to ensure that bare soil areas are re-vegetated with the appropriate vegetation type and reducing the opportunity for erosional features to form. The re-vegetation process will typically occur when a certain area requires rehabilitation immediately but predominantly after the constructional phase, within the rehabilitation and operational phases.

6. MONITORING PLAN

Monitoring is described as the systematic collection of data that is essential for the evaluation of the means and extent of the ecological response and can be used for the implementation of management requirements (Finlayson, 2003). Evaluation is the comparison of actual project outcomes against the agreed strategic plans, comparing what was set out to be achieved against what was actually achieved. The process of monitoring and evaluation is useful to:

- Help one identify problems and the causes;
- Suggest possible solutions to identified problems;
- Raise questions about original assumptions and strategy;
- Support learning as it forces one to reflect on where one is going and how one is getting there;
- Provide one with information and insights;
- Encourage one to act on the information and insight; and
- Increase the likelihood that one will make a positive difference.

The evaluation of a project is reliant on an adaptive management approach being adopted. The inclusion of an adaptive management approach in the monitoring and auditing plan is important to safeguard the success of a project since adaptive management aims to achieve a “learning by doing” approach in which it is important to:

1) Determine what may have caused a mitigation or rehabilitation measure to underperform; and
2) To re-address suggested measures in order to avoid further underperformance.

The details of the parameters that require measurement in order to inform onsite monitoring are described by Cowden and Kotze (2009). These parameters are divided into three different levels with increasing intensity in assessments with each level. These levels are:

- **Level 1** – the outputs and basic outcomes of the wetland rehabilitation in terms of physical interventions;
- **Level 2** – the rapid assessments of the rehabilitation outcomes using appropriate assessment tools; and
- **Level 3** – the comprehensive assessment of the wetland rehabilitation outcomes determined by the rehabilitation objectives.

Level 3 monitoring is deemed surplus to requirement for the rehabilitation type and measures recommended within this report. Levels 1 and 2 will suffice to determine if the wetland impacted during construction is recovering post-rehabilitation.

6.1.1. TIMEFRAMES

According to WET-Rehab Evaluate (Cowden and Kotze 2009), the monitoring of the structural survival and integrity of the habitats should be undertaken at a 1 month, 2 month, 3 month, 6 month, 1 year, 2 year, 3 year, 4 year and 5 year intervals following the completion of the construction activities. The frequency with which the monitoring activities are undertaken may vary depending on the indicators being measured, e.g. the monitoring of vegetation should be undertaken during the growing season of the vegetation and therefore, will not necessarily coincide with the aforementioned frequency.

6.1.2. BASELINE DATA AND MONITORING REGIME

According to best-practice, outlined in WET-Rehab Evaluate (Cowden and Kotze 2009), baseline monitoring and the identification of reference sites should be undertaken as a means to provide comparative data for monitoring, indicating the changes occurring within the system attributed to the implementation of the rehabilitation. However, due to the altered nature of the systems within the site and predominantly within the broader landscape, reference sites are unlikely to be obtained, however baseline data can still be collected. Baseline data should be collected prior to the implementation of the rehabilitation plan.

6.1. LEVEL 1 MONITORING

Level 1 monitoring generally focuses on the outputs and basic outcomes of wetland rehabilitation, which are generally limited to the implementation phase. The long-term monitoring of the wetland rehabilitation outputs is therefore focused on the assessment of the structural integrity of the interventions, with emphasis on identifying structural vulnerability. The monitoring of the interventions integrity and/or vulnerability needs to be undertaken by a SACNASP registered wetland specialist with experience in wetland rehabilitation interventions. Additional requirements of the Level 1 monitoring process include monitoring visual changes of the rehabilitated wetlands.

6.1.1.STRUCTURAL INTERVENTIONS

The assessment of the structural integrity would be undertaken based on the specific criteria outlined and focus on the long-term stability of the interventions and the likelihood of achieving the stated objectives. This assessment would serve to identify weaknesses or strengths of the selected interventions within the wetland habitat. The monitoring intervals for the interventions should coincide with the above-mentioned intervals, and furthermore include event-based monitoring. Event-based monitoring is determined by the design level of the structures and the flood return periods. The monitoring of the structures following specific flood events ensures that any required maintenance activities can quickly be implemented. The maintenance of the structures is essential in ensuring the benefits supplied by the wetland are not compromised. As described in the rehabilitation plan, the proposed interventions consist of:

- Removal of existing dirt road in CVB01;
- Alien invasive management;
- Sediment traps (silt fences);
- Reinstate of temporary disturbed area at FP03 for installation of gas pipeline;
- Removal of existing depositional feature within FP02 and FP03; and
- Re-vegetation of wetland and 29m Buffer.

6.1.2.VISUAL ASSESSMENT

Changes in the visual appearance of the ecosystems can be used to show changes in the systems' characteristics. A photographic record, utilising a series of photographs, would enable interested parties to track broad-scale vegetation changes (Cowden and Kotze, 2009). In this instance, with the clearing AIPs and the promotion of wetland habitat, the use of a photographic record is considered to be a useful monitoring tool. It is recommended that the photographic record be derived from both:

- Aerial photographs; and
- Panoramic and/or site photographs (fixed point photography).

6.1.2.1. Aerial Photographs

Google Earth regularly update their imagery, and this imagery should be used to illustrate the large-scale changes in the watercourses following the implementation of the rehabilitation and on-going management. In this instance, aerial imagery is likely to illustrate the changes linked to the rehabilitation, for example: plugging of artificial drains, clearing of AIPs and the promotion of wetland habitat.

6.1.2.2. Fixed Point Photography/Site Photographs

Panoramic photographs from an overview point in combination with Fixed Point Photography (FPP) would provide useful indications of the changes at both a landscape and within-system level. These photographs would be taken pre- and post-implementation and should be collected in accordance with the guidelines outlined in WET-Rehab Evaluate (Cowden and Kotze, 2009). Photographs should be taken up and downstream of each proposed intervention, both pre- and post-implementation.

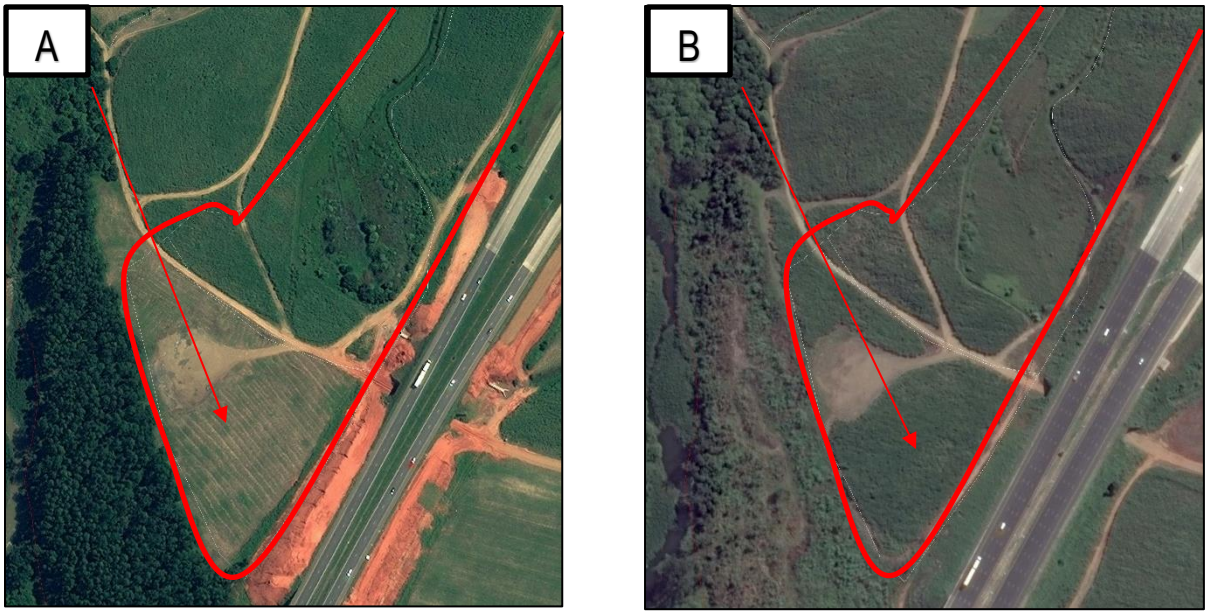

Figure 11: An example of the use of aerial photography to monitor the condition of the rehabilitated wetland habitats subsequent to the implementation of the proposed rehabilitation activities. A- Lack of wetland vegetation and surface roughness (indicated by red arrow) and B- Revegetation with hydric indigenous vegetation in the same area (indicated by red arrow).

6.2. LEVEL 2 MONITORING

The rapid assessment of the wetlands functionality and integrity would assist in illustrating any benefits/deficits associated with the rehabilitation activities. This would be undertaken for the current and post-rehabilitation scenarios, utilising the WET-EcoServices (Kotze *et al*. 2007) and WET-Health (Macfarlane *et al*. 2007) assessments techniques. A Wetland Delineation and Functional Assessment (WDFA) Report (in this case the report by Triplo4: WDFA Karpowership – Transmission Lines from the Port of Richards Bay to proposed Switching Station) must be compiled in order to determine the current conditions which would serve as the baseline data to which post-rehabilitation assessments will be compared. To ensure accuracy of the assessments undertaken, the practitioner should have an understanding of general wetland functioning and the conditions specific to the site itself, such as the origin of the wetland, how it would function in its natural state, and what factors are affecting its functioning and integrity.

The Level 2 functioning and integrity assessments should be undertaken for each of the rehabilitated wetlands every year or in response to observed changes to the wetlands or subsequent to a major event that could have damaged the wetlands.

6.2.1. ASSESSMENT OF ECOSYSTEM SERVICES

WET-EcoServices is used to assess the goods and services that individual wetlands provide, thereby aiding informed planning and decision-making (Kotze, *et. al*., 2007). The tool provides guidelines for scoring the importance of a wetland in delivering each of 15 different ecosystem services (including flood attenuation, sediment trapping and provision of cultural services). Ecosystem service delivery must be assessed at Level 2, based on a field assessment of key descriptors (e.g. flow pattern through the wetland). The ecosystem services, which include the direct and indirect benefits supplied by the wetland to the surrounding environment and communities, are assessed by scoring various characteristics of the wetland and the surrounding catchment according to the following scale:

- Low (0);
- Moderately low (1);
- Intermediate (2);
- Moderately high (3); and
- High (4).

The overall goal of assessing the post-rehabilitation state of the wetlands with the use of WET-EcoServices is to reveal the improvement or deterioration of the wetland at supplying ecosystem services. This will be determined by comparing the post-rehabilitation scores to the baseline assessment scores. This allows for more informed planning and decision making.

6.2.2. ASSESSMENT OF ECOSYSTEM INTEGRITY

The assessment of ecosystem integrity must be undertaken using the WET-Health assessment technique, which was developed for southern African wetlands (Kotze, 2011; Kotze*, et. al*., 2012). WET-Health is a tool designed to assess the health or integrity of a wetland. Wetland health is defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition. In the case of the proposed rehabilitation plan, it will be used to compare the integrity of the wetland systems before and after rehabilitation (post-construction). This technique attempts to assess hydrological, geomorphological and vegetation health in three separate modules.

- **Hydrology** is defined in this context as the distribution and movement of water through a wetland and its soils. This module focuses on changes in water inputs as a result of changes in catchment activities and characteristics that affect water supply and its timing, as well as on modifications within the wetland that alter the water distribution and retention patterns within the wetland.
- **Geomorphology** is defined in this context as the distribution and retention patterns of sediment within the wetland. This module focuses on evaluating current geomorphic health through the presence of indicators of excessive sediment inputs and/or losses for clastic (minerogenic) and organic sediment (peat).
- **Vegetation** is defined in this context as the vegetation structural and compositional state. This module evaluates changes in vegetation composition and structure as a consequence of current and historic on-site transformation and/or disturbance.

The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, within each module, and then derive the Present Ecological State (PES) category for each module. The tool attempts to standardise the way that impacts are calculated and presented across each of the modules. This takes the form of assessing the spatial extent of impacts of individual activities and then separately assessing the intensity of the impact of each activity in the affected area by allocating it a weighted score from 0 - 10 (Macfarlane, *et. al*., 2009). Once the PES for hydrology, geomorphology and vegetation are determined, the scores are integrated into a composite impact score, using the predetermined ratio of 3:2:2, respectively (Macfarlane, *et. al*., 2009) for the three modules. This composite impact score is used to derive overall health score for the wetland.

6.3. LEVEL 3 MONITORING

Level 3 monitoring involves an in-depth, comprehensive assessment of the wetland rehabilitation outcomes by measuring certain indicators at a finer resolution, greater frequency and over a longer period of time. Since this level of monitoring is more intense and specific to various aspects of a system, such as vegetation identification, it would typically require specialist input. According to WET-Rehab Evaluate, this level of monitoring may be required where:

- The wetland rehabilitation objectives require a finer level of monitoring;
- The wetland has been prioritised to be of importance;
- The potential benefits of a finer scale investigation are great; and
- The wetland is of high importance.

Level 3 monitoring assesses, at a finer and more intensive level, the project's attainment of the outcomes of the wetland rehabilitation activities. This level of monitoring may be selected for projects where:

- The wetland rehabilitation objectives for the project call for a fine level of monitoring (e.g. increased population of a certain fish species);

- Uncertainty exists in terms of achieving the objectives, and opportunities for gaining new insights are potentially great;
- The project has relevance to key research questions, as well as being accessible to research bodies and personnel;
- The prioritisation outlined in the rehabilitation process; and
- The wetland to be particularly important, or the wetland is found to be functionally important.

The wetlands associated with the proposed Transmission Line Preferred Alterative from the Port of Richards Bay to proposed Switching Station and associated temporary laydown areas, are regarded as moderate important systems which do not meet these requirements for Level 3 monitoring. Therefore, it is recommended that the monitoring plan for the rehabilitation measures and interventions be assessed at a **Level 2 once a year** for the lifespan of the project (20 years) to ensure the integrity and functionality of the wetlands are intact.

7. CONCLUSION

Triplo4 was appointed by KSA to conduct a 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.

Due to the potential direct impact of the Preferred Alternative Transmission Line Route, wetlands screened to be at risk as a result of the Alternative Transmission Line Route will also need to be rehabilitated in order to compensate for the loss of functional wetland habitat caused by the Preferred Alternative Transmission Line Route. The rehabilitation of the wetlands determined to have the potential to be indirectly impacted on by the Preferred Alternative Transmission Line route will be essential to compensate for the loss of intact wetland habitat caused by the direct impact aspect.

The most urgent matters currently to be addressed is to ensure the rehabilitation strategy is followed in terms of:

- Removal of existing dirt road in CVB01;
- Alien invasive management;
- Sediment traps (silt fences);
- Reinstate of temporary disturbed area at FP03 for installation of gas pipeline;
- Removal of existing depositional feature within FP02 and FP03; and
- Re-vegetation of wetland and 29m Buffer.

As per the recommendation outlined in the WDFA (T4-WDFA-RB, Oct 2022), the Wetland Specialist is not in support of the Alternative Transmission Line Route as the route was regarded as being too detrimental to the functionality and integrity of the at risk wetlands It must be noted that the Wetland Specialist does support the Preferred Alternative Transmission Line Route and associated infrastructure (switching station and temporary laydown areas).

Furthermore, it is of the Wetland Specialist's opinion that the rehabilitation strategies and interventions outlined in this report be followed to ensure the integrity and functionality of the identified at-risk wetlands systems improve, thus improving the biodiversity in an area that has been transformed historically and will further be transformed by the proposed development activities. Furthermore, **an annual (once a year) Functionality Assessment (WET-Health and WET-EcoServices)** for the lifespan of the project must be conducted to ensure that the development is occurring in line with NEM:BA and that the functionality of the at risk and rehabilitated wetlands are not deteriorating.

8. REFERENCES

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9. APPENDIX

9.1. VEGETATION TYPES THAT CAN BE UTILISED IN THE RE-VEGETATION REHABILITATION PROCESS

The following is a list of indigenous trees and shrubs that can utilised in any re-vegetation process in the catchment of the project area.

Table 15: Indigenous tree and shrub species that can be utilized in the re-vegetation process in the terrestrial areas if required

Tree species	
Scientific name	**Common name**
Acacia natalitia	
Acacia nilotica	Scented thorn
Acacia sieberiana var. *woodii*	Paper bark
Albizia adianthifolia	Flatcrown
Apodytes dimidiates	White Pear
Bridelia micrantha	Mitzeeri
Caldendron capenses	Cape Chestnut
Celtis Africana	White Stinkwood
Combretum erythrophylum	River Bushwillow
Cussonia spicata	Common Cabbage
Diospyros lycoides	Blue Bush
Dombeya rotundifolia	Wild Pear
Ekenbergia capensis	Cape Ash
Erythrina lysistemon	Corral Tree
Ficus natalensis	Natal Fig
Ficus sur	Cluster Fig
Ficus burkei	Common Wild Fig
Grewia occidentalis	Cross berry
Gymnosporia buxifolia	Common Spike-Thorn
Halleria lucida	Tree Fuschia
Harpephyllum caffrum	Wild Plum
Leucosidea serricea	Ouhout
Pittosporum viridiflorum	Cheesewood
Searsia/Rhus chiridensis	Red Currant
Searsia/Rhus leptodictya	Mountain Karee
Searsia/Rhus lancea	Karee
Searsia/Rhus pyroides	Common Wild Currant
Schotia brachypetala	Weeping Boer-Bean
Syzigium cordata	Water Berry
Trichilia emetic	Natal Mahogany
Vepris lanceolata	White Ironwood
Ziziphus mucronata	Buffalo Thorn

Shrub Species	
Scientific Name	**Common Name**
Aloe arborescens	
Aloe marlothii	
Buddleja salvifolia	Sagewood
Carissa macrocarpa	Bird Num-Num
Dietes species	Wild Iris
Dovyalis caffra	Kei Apple
Ehretia rigida	Puzzle Bush
Grewia flava	Wild Currant
Helichrysum kraussii	Everlastings
Leonotis leonorus	Wild Dagga
Mackaya bella	Forest Bell Bush
Pavetta lanceolata	Forest's Pride Bush
Plectranthus species	Spur Flowers
Plumbago auriculata	Cape Leadwort
Rhamnus prinoides	Dogwood
Strelitzia nicolai	Natal Wild Banana
Tecoma capensis	Cape Honeysuckle
Thunbergia natalensis	Natal Bluebell

The vegetation types in Table 16 in red and bold were identified on site and should be utilized in the re-vegetation process as they are representative of the site. Only if these vegetation types are difficult to acquire should other species in Table 16 be utilized.

Table 16: ***List of grasses, sedges, rush, and woody plants which can be utilized in the re-vegetation process in the channelled valley bottom, floodplain and unchannelled valley bottom wetllands***

Channelled valley bottom wetland re-vegetation species	
Scientific name	**Type**
Cynodon dactylon	Grass
Cyperus fastigiatus	Sedge
Cyperus marginatus	Sedge
Cyperus papyrus	**Grass**
Cyperus prolifer	Sedge
Eragrotis plana	Grass
Paspalum dilatatum	Grass
Pycreus nitidus	Sedge
Schoenoplectus brachyceras	Sedge
Typha capensis	**Grass**
Floodplain wetlands re-vegetation species	

Scientific name	Type
Cyperus fastigiatus	Sedge
Cyperus fastigiatus	Sedge
Cyperus papyrus	**Grass**
Cyperus prolifer	Sedge
Eragrotis plana	**Grass**
Ficus lutea	**Tree**
Ficus trichopoda	**Tree**
Panicum maximum	**Grass**
Phoenix reclinata	**Tree**
Phragmites australis	**Grass**
Phragmitis australis	**Grass**
Pycreus nitidus	Sedge
Schoenoplectus brachyceras	Sedge
Strelizia nicolai	Tree
Syzigium cordatum	Tree
Typha capensis	**Grass**
Typha capensis	**Rush**
Zostera capensis	**Grass (Saline tolerant Grass)**
Unchannelled valley bottom wetland re-vegetation species	
Scientific name	**Type**
Cyperus fastigiatus	Sedge
Cyperus papyrus	**Grass**
Cyperus prolifer	Sedge
Phoenix reclinata	Tree
Phragmites australis	**Grass**
Pycreus nitidus	Sedge
Schoenoplectus brachyceras	Sedge
Strelizia nicolai	Tree
Syzigium cordatum	Tree
Typha capensis	**Rush**

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

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

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

PROJECT TITLE

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

Kindly note the following:

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

Departmental Details

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

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

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

1. SPECIALIST INFORMATION

Specialist Company Name:	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			
Postal address:	Suite5 The Circle, Douglas Crowe Ave, Ballito Business Pk, Dolphin Coast			
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